VOLUME III
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COMMENTS METHODS AND SUMMARY

1. Summary and Methods

NMFS reviewed and considered all written and oral public submissions received during the DEIS public review and comment periods. NMFS’ goal was to identify substantive comments to be addressed in this FEIS, and to categorize those comments based on topics and issues. This categorization scheme allowed subject matter experts to review comments directly related to their areas of expertise, and allowed NMFS to generate summary statistics based on the topics and issues addressed in each of the comments.

All unique public comment submissions received on the Proposed Rule and DEIS can be viewed online at http://www.regulations.gov by typing “NOAA-NMFS-2020-0031” in the search field. Due to the vast number of form letters and form letter variants, at least one of each variant was posted but many near duplicate comments were received but not posted.

2. Methodology

A. Terminology

The following terminology is used throughout this appendix:

- Submission: The entire content submitted by a single person or group at a single time. For example, a 10-page letter from a citizen, an email with a portable document format (PDF) attachment, and a transcript of an oral comment given at a public hearing meeting were each considered a submission.

- Form letter submission: Pre-written text provided by an interest group for submission by individuals. Due to the large number of submissions, any text with at least a 70 percent match was considered a form letter.

- Variant form letter submission: A submission that is based on, but does not match the pre-written form letter template or text prepared by the interest group (less than 70 percent match), but the substantive comments are either the same or a subset of a form letter.

- Unique submission: A submission that is not based on any identified form letter text.

- Comment: A specific statement within a submission that expresses a sender’s specific point of view, concern, question, or suggestion. A comment can consist of more than once sentence, as long as those grouped sentences express a single idea. One submission may contain many comments.

- Substantive Comment: DEIS submissions were reviewed to identify and categorize “substantive” comments. To be substantive, a comment must meet both of the following criteria:
  - Related to the Proposed Rule and DEIS: To be substantive, a comment must relate to Atlantic Large Whale Take Reduction Plan. Comments outside the scope of the plan, such as those addressing vessel strikes or climate change, were not considered substantive.
Consisting of more than simple opinion: This criterion requires that substantive comments provide information to help NMFS prepare the FEIS by providing some level of support or basis for the commenter’s position, a specific suggestion, or some indication of issues the commenter believes are significant. As an example, “NMFS should do everything it can to protect whales” was not considered substantive, but “NMFS should create immediate fishing closures in areas where right whales are most prevalent” was considered substantive.

Substantive comments include those that suggest the DEIS analysis is flawed in a specific way, or suggest alternate information than what is presented in the DEIS. These comments challenge or question the accuracy of information presented, the adequacy, methodology or assumptions of the analysis presented in the DEIS (with supporting rationale), present new information relevant to the analysis, present reasonable alternatives (including mitigation) other than those analyzed in the document, or corrects factual errors in the content of the DEIS. Substantive comments could also provide information in support of the analysis presented in the DEIS.

B. Comment Submittal

Federal agencies, state/local/tribal governments, fishermen, and the general public had the opportunity to provide comments on the DEIS and SEIS via the following mechanisms:

- Electronic submissions via www.Regulations.gov on docket number NOAA-NMFS-2020-0031
- Electronic submissions via email to a NMFS representative
- Comments submitted verbally at each of the public information sessions and hearings (See Chapter 1 of the FEIS for a description of the sessions and Appendix 1.2 for transcripts)

All submissions initially provided at public information sessions and public hearings were assigned a unique identification number. That unique ID was retained throughout the comment management process.

C. Comment Processing

NMFS reviewed all of the comments submitted through public information sessions and hearings, via email, and submitted through Regulations.gov. The Regulations.gov submissions were provided in text format and as attachments in PDF, Microsoft Word, or jpg formats. Text from these comments were copied from the original format into a single Google Sheets spreadsheet that served as the primary submission database. Where the submission included multiple comments, the submissions were broken up into several entries. The submission database also included information about each submission, including the submitter’s name, affiliation, and overall disposition of the sender toward the Proposed Rule.
3. Substantive Comments Review and Analysis

Each submission was reviewed to identify substantive comments (as defined in above). Each substantive comment was entered into another Google Sheets spreadsheet that served as the master substantive comment database with its comment number identifier. Substantive comments were extracted from the submission text and assigned to a topic and subtopic. Each substantive comment was assigned to one or more subject matter experts for review and response, and responses were reviewed by multiple subject matter experts to facilitate FEIS updates.

NMFS identified a total of 187 distinct substantive comments that were within the scope of the current rulemaking. The majority of these comments were submitted by multiple people, some of them by thousands of people. See Chapter 1, Table 1.7 for a list of the unique topics and subtopics submitted. Comment Submission Summary

NMFS received 171,213 submissions on the Proposed Rule and the Draft Environmental Impact Statement (DEIS) through the comment portal.

Of these, six submissions from Non-Governmental Organizations were entered as counting for more than one comment: Pew Charitable Trusts: 47,699; Conservation Law Foundation: 1,192; Humane Society of the U.S: 15,922; Oceana: 18,440; Natural Resources Defense Council: 33,045; Riverkeepers: 4.

Five additional submissions from Non-Governmental Organizations (NGO) were entered as one comment, but had thousands of signatures attached: International Fund for Animal Welfare: 31,912; Whale and Dolphin Conservation: 3,629; Environment America: 11,727; Center for Biological Diversity: 26,594; Environmental Action: 11,135. All of the above-referenced submissions, which represent up to 201,269 people, were in favor of stronger regulations to protect North Atlantic right whales.

We also received comments through public information sessions and hearings. See Chapter 1 of the FEIS for a breakdown of webinar attendees by date. A total of 211 individuals provided comments through these informational sessions and public hearings, some of them on multiple days. Of these, at least 58 identified themselves as fishermen on the webinars.

NMFS received 53,585 individual submissions uploaded through the Regulations.gov portal, as well as 9 comments emailed directly to our office, of which 3 were also posted on Regulations.gov. After running a deduplication analysis, 1,360 submissions were posted on Regulations.gov. From this group, NMFS identified additional form letter submissions not detected by the deduplication analysis, and, after reviewing the entries for double submissions or submissions of supporting documentation separate from the original submission, we received approximately 1,076 unique written submissions that were not clearly part of a coordinated campaign. While repeated language was identified in a small number of these submissions, evidence generally did not suggest that these submissions were form letters, or pre-written text provided by an interest group for submission by individuals. A summary table of unique submissions by stakeholder groups is below.
Table 7-1: Written DEIS Submissions by Stakeholder Group

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<th>Stakeholder Group</th>
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<td><strong>Total</strong></td>
<td><strong>1076</strong></td>
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4. Comments Submitted Through Regulations.Gov and Email

Submissions were reviewed to determine the overall disposition of the provider toward the proposed Project. Based on this review, dispositions of the 1,076 unique submissions is as follows:

- Supports some or all of Proposed Rule: 647 (60.13 percent)
- Opposes some or all of Proposed Rule: 352 (32.71 percent)
- Supports regulation to protect whales, but would like to see this one withdrawn, and for NMFS to start over: 45 (4.18 percent)
- Neutral (no distinct disposition/provided suggestions): 34 (3.16 percent)

Table 7-2 lists the name and agency or organization affiliation (if any) for each person or group that provided a unique substantive comment during the DEIS comment period submitted through Regulations.gov. These comments are all available in full on Regulations.gov under the docket number NOAA-NMFS-2020-0031.

Some individuals submitted more than one unique comment, and some submitted duplicate comments, which are noted in column 3. In the cases in which more than one person or entity was represented by the comment, that is noted in the table below. Please note, this list does not include bulk submissions or form letters and variants on form letters, some of which were posted, so numbering below is not consecutive. For those, see Table 7-3 below.
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NMFS identified 54 form letters that contained repeated language or pre-written text provided by an interest group for submission by individuals. Table 7-3 identifies the form letters submitted and the numbers of duplicate submissions.

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5. Comments Submitted Orally at Public Information Sessions and Public Hearings

A total of 122 speakers submitted comments orally at public information sessions or public hearings. Many of the speakers submitted more than one comment, and several submitted comments at more than one session. If an individual commented at more than one session, the individual was counted as a unique speaker on each day. A summary table of commenters by stakeholder group is below.

<table>
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<th>Stakeholder Group</th>
<th>Number of Commenters</th>
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<td>Fishing Industry Group</td>
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<td><strong>Total</strong></td>
<td><strong>122</strong></td>
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We tallied a total of 236 unique comments submitted by these speakers. Of the submitted comments, 44 expressed support for the Proposed Rule, 77 expressed opposition to the Proposed Rule, and the remaining comments were either specific questions or suggestions that do not indicate support or opposition. The full transcripts from the public hearings are available in Appendix 7.3. The comments contained in these submissions are all addressed in Appendix 1.1 Response to Comments.

- Supports some or all of Proposed Rule: 44 (18.64 percent)
- Opposes some or all of Proposed Rule: 77 (32.63 percent)
- Neutral (questions/suggestions/did not indicate): 115 (48.73 percent)

Table 7-5: Oral Comment Submissions

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<th>Areas</th>
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<td>Southern Maine</td>
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<td>Areas</td>
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<td>Max Strahan</td>
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<td>Areas</td>
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<td>Northeast ME focus</td>
<td>Virginia Olsen</td>
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<tr>
<td>Public Hearing</td>
<td>2/24/2021</td>
<td>Northeast ME focus</td>
<td>Zack Klyver</td>
</tr>
</tbody>
</table>
6. Unique Comments Summary

When removing duplicate written and oral submissions, we received a total of 1,129 unique written and oral submissions. The general disposition of these submissions was more positive than negative.

- Supports some or all of Proposed Rule: 657 (58.19 percent)
- Opposes some or all of Proposed Rule: 386 (34.19 percent)
- Supports regulation to protect whales, but would like to see this one withdrawn, and for NMFS to start over: 46 (4.07 percent)
- Neutral (questions/suggestions/did not indicate): 42 (3.72 percent)
7. Form Letter Comments

As noted above, 54 form letters were identified using the Regulations.gov deduplication analysis, as in Table 7-3 above. These form letters contained 28 separate comments, identified in Table 7-6 below. The primary form letters, which chosen by the deduplication analysis, are available in Appendix 7.4

Of the form 54 form submissions, 50 supported stronger regulations to protect right whales, one supported limiting the number of buoys (ZZ), one supported tracking whales (ZU), one opposed ropeless fishing (ZZA), and one was an empty test message (ZJ).

Table 7-6 Form Letter Comments

<table>
<thead>
<tr>
<th>Topic</th>
<th>Comment</th>
<th>Form Letter ID</th>
<th>Number of Submissions Containing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistance for Commercial Fisheries</td>
<td>NMFS should assist commercial trap fisheries in a transition to whale-safe gear</td>
<td>F, U, ZP</td>
<td>75</td>
</tr>
<tr>
<td>Ban Fishing Gear</td>
<td>The use of any ropes, nets, or any other type of fishing gear that may entangle any species should be completely banned.</td>
<td>D</td>
<td>7,858</td>
</tr>
<tr>
<td>Closures - Emergency</td>
<td>NMFS should immediately implement closures to lobster and crab fishing with vertical buoy lines in the areas where right whales concentrate</td>
<td>A, E, Q, W, ZB, ZI, ZS, ZV, ZW</td>
<td>23,653</td>
</tr>
<tr>
<td>Closures - Emergency - MV/N/GOM</td>
<td>Closures must immediately implement emergency action designating a year-round closure south of Martha's Vineyard and Nantucket and in three areas in the Gulf of Maine</td>
<td>A, J, P, W, ZB, ZV</td>
<td>23,127</td>
</tr>
<tr>
<td>Closures - Insufficient</td>
<td>Closures outlined in the proposed rule are too small and too short/should be expanded/more, and longer, habitat closures</td>
<td>A, ZV, J, P, ZX, B, G, K, M, S, T, Y, ZC, ZK, ZL, ZY, E, V, N, R, ZH</td>
<td>36,524</td>
</tr>
<tr>
<td>Closures - Offshore</td>
<td>Closures in offshore areas would also minimize the impact on fishermen, because the majority of lobster fishing occurs closer to shore</td>
<td>A, J, W, ZB, ZA</td>
<td>23,103</td>
</tr>
<tr>
<td>Closures - Best Available Data</td>
<td>Closures should be based on the best available science which includes recent and historical sightings, acoustic data, and prey data.</td>
<td>P, V</td>
<td>22</td>
</tr>
<tr>
<td>Closures - Martha's Vineyard/Nantucket and Gulf of Maine</td>
<td>The closure south of Nantucket and Martha’s Vineyard, in the most conservative alternative (3a) may be an appropriate size but is far too short in time at February through April. This should be a year-round closure as right whales have been seen almost every month of the year here for the last several years</td>
<td>P, V, ZV</td>
<td>25</td>
</tr>
<tr>
<td>Disentanglement</td>
<td>Please re-direct all effort to increased research and whale disentanglement efforts</td>
<td>ZU</td>
<td>3</td>
</tr>
<tr>
<td>Topic</td>
<td>Comment</td>
<td>Form Letter ID</td>
<td>Number of Submissions Containing</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>----------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Economics</td>
<td>If you do not make serious and timely changes to your plans, I will go out of business in 10 years or less</td>
<td>ZU</td>
<td>3</td>
</tr>
<tr>
<td>Emergency Action</td>
<td>NOAA Fisheries officials must take emergency action and create immediate fishing closures in areas where right whales are most prevalent</td>
<td>I, O, ZT, F, ZF, C, U, ZG, V, ZN, E, ZO</td>
<td>10,147</td>
</tr>
<tr>
<td>Emergency Action</td>
<td>NMFS has statutory authority to enact emergency regulations to close important right whale habitat to fishing with static vertical buoy lines</td>
<td>B, Y, G, K, M, T, ZC, ZK, ZL, ZX, ZY</td>
<td>12,774</td>
</tr>
<tr>
<td>Gear Marking</td>
<td>support increased gear marking with state and area specific colors and that all gear buoys everywhere have at least the same marking requirements as Maine (license number unique to that fisherman/gear owner)</td>
<td>ZU</td>
<td>3</td>
</tr>
<tr>
<td>General Support</td>
<td>Please protect the whales!</td>
<td>Z, ZQ</td>
<td>14</td>
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<tr>
<td>Harm Lobster Industry</td>
<td>Fishing restrictions will end up seriously harming the lobster industry</td>
<td>X</td>
<td>6</td>
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<tr>
<td>Monitoring</td>
<td>Expanded and improved fishery monitoring to account for interactions between fishing gear and right whales</td>
<td>ZG</td>
<td>5</td>
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<tr>
<td>Test Message</td>
<td>Test message</td>
<td>ZJ</td>
<td>4</td>
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<tr>
<td>Population Data</td>
<td>New rules should reflect the most recent population estimate produced by the Agency’s own scientist, not data consider obsolete by NOAA itself</td>
<td>A, C, D, H, J, L, U, P, ZA, ZD, ZE, ZF, ZI, ZN, ZO, ZP, ZT, ZV</td>
<td>40,529</td>
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<tr>
<td>Research</td>
<td>We should be conducting a world-class study on what specific gear configurations and locations are causing entanglements, and during what times of the year</td>
<td>ZU</td>
<td>3</td>
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<tr>
<td>Risk Reduction</td>
<td>NOAA should reduce risk to right whales by at least 80 percent</td>
<td>A, C, E, F, I, J, O, P, Q, U, V, W, ZA, ZB, ZF, ZI, ZT, ZV, ZW</td>
<td>33,287</td>
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<tr>
<td>Ropeless - Accelerate Permitting</td>
<td>NOAA Fisheries should fast-track the transition to requiring &quot;ropeless&quot; fishing gear</td>
<td>B, D, G, H, K, L, M, S, T, Y, ZC, ZD, ZE, ZK, ZL, ZM, ZP, ZR, ZY, ZZB</td>
<td>20,727</td>
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<tr>
<td>Ropeless - Investment</td>
<td>NOAA Fisheries should invest in developing ropeless technology as quickly and responsibly as possible, while establishing a plan to assist</td>
<td>C, F, P, R, U, ZE, ZF, ZG</td>
<td>9,558</td>
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<tr>
<td>Topic</td>
<td>Comment</td>
<td>Form Letter ID</td>
<td>Number of Submissions Containing</td>
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<td>---------------------------------</td>
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<tr>
<td>commercial trap fisheries in a transition to whale-safe gear</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ropeless - Incentives</td>
<td>NOAA Fisheries must continue efforts to test and foster a market for rope-free technologies, including the creation of incentives for fishermen to try them</td>
<td>N, V, ZH, ZO</td>
<td>61</td>
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<tr>
<td>Ropeless - General Support</td>
<td>Ropeless (or buoyless) fishing adaptations carry the promise to improve fishing and protect whales</td>
<td>E, H, ZG, ZX</td>
<td>609</td>
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<tr>
<td>Ropeless - General Opposition</td>
<td>One thing that CAN NOT happen is ROPELESS fishing! Ropeless needs to be forgotten, it’s not needed with the precautions we have now taken and is a impractical fantasy that would miserably fail and ruin the lobstering industry.</td>
<td>ZZA</td>
<td>3</td>
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<tr>
<td>Tracking</td>
<td>We need to do much better with tracking right whales</td>
<td>ZU</td>
<td>3</td>
</tr>
<tr>
<td>Trawls</td>
<td>I support limiting the number of buoys</td>
<td>ZZ</td>
<td>3</td>
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<td>Weak Rope</td>
<td>This rule relies too heavily on a costly and inadequate transition to weaker rope, which has not been proven to protect younger whales and does not reduce the long-term health effects of chronic entanglements on whales</td>
<td>A, C, D, E, F, H, J, L, N, P, R, U, V, W, ZD, ZE, ZF, ZH, ZM, ZP, ZV</td>
<td>41,205</td>
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</table>
8. Bulk Submission Comments

As noted above, 11 submissions from Non-Governmental Organizations were either entered as counting for more than one comment, included multiple signatures, or both. These are listed below, and are all available on Regulations.gov. All of the these submissions, which represent up to 201,269 people, were in favor of stronger regulations to protect North Atlantic right whales. Comments that were submitted on Regulations.gov as one comment but included fewer than 50 signatures are not included in Table 7-7 below, but are included in Table 7-2.

The comments contained in these submissions are all addressed in the Appendix 1.1 Response to Comments.

Table 7-7: Bulk Submissions

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<td>Center for Biological Diversity</td>
<td>26,594</td>
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<tr>
<td>668</td>
<td>Oceana</td>
<td>18,440</td>
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<td>705</td>
<td>International Fund for Animal Welfare</td>
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<td>728</td>
<td>Riverkeepers</td>
<td>4</td>
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<td>752</td>
<td>Conservation Law Foundation</td>
<td>1,192</td>
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<tr>
<td>784</td>
<td>Whale and Dolphin Conservation</td>
<td>3,629</td>
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<tr>
<td>818</td>
<td>Environment America</td>
<td>11,727</td>
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<td>1058</td>
<td>Humane Society of the U.S</td>
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<td>1333</td>
<td>Natural Resources Defense Council</td>
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<td>1340</td>
<td>Pew Charitable Trusts</td>
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<td>1351</td>
<td>Environmental Action</td>
<td>11,135</td>
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Appendix 7.2
Comments from TRT Members

Trap/Pot Fishery
1. Atlantic Offshore Lobstermen's Association
2. Rhode Island Lobstermen's Association
3. Massachusetts Lobstermen's Association
4. Maine Lobstermen's Association

Conservation/Environmental Groups
5. Whale and Dolphin Conservation
7. International Fund for Animal Welfare
8. The Humane Society of the U.S.

State Fishery Resource Managers
9. Georgia Department of Natural Resources
10. Joint letter from Connecticut Department of Environmental Protection and New York Department of Environmental Conservation
11. Massachusetts Department of Marine Fisheries
12. Rhode Island Division of Fish and Wildlife
13. New Hampshire Fish and Game Department
14. Maine Department of Marine Resources

Federal Resource Managers
15. Marine Mammal Commission

Fishery Management Organizations
17. Atlantic States Marine Fisheries Commission

Academic/Scientific Groups
18. Richard Merrick, Falmouth, MA
19. Alex Costidis, Virginia Aquarium and Marine Science Center
20. Amy Knowlton, New England Aquarium
21. Bill McLellan, University of North Carolina-Wilmington
22. Letter from Scientists: Amy Knowlton, Moira Brown, Ph.D., Peter Corkeron, Ph.D., Philip Hamilton, Scott Kraus, Heather Pettis, Rosalind Rolland (Cabot Center, New England Aquarium), Mark Baumgartner, Ph.D., Michael Moore (Woods Hole Oceanographic Institution), Chris Clark, Ph.D. (Cornell University), Alexander M. Costidis, Ph.D. (Virginia Aquarium Marine Science Center), Steve Katona, Sean Todd (College of the Atlantic), Bill McLellan (UNC-Wilmington) Doug Nowacek, Andy Read, Rob Schick (Duke University), Nick Record (Bigelow Laboratory for Ocean Sciences), Scott Landry, Stormy Mayo, Jooke Robbins (Center for Coastal Studies), Brian Sharp, Sarah Sharp (International Fund for Animal Welfare), Tim Werner, UMASS-Boston
Mr. Michael Pentony  
Regional Administrator, NMFS GARFO  
55 Great Republic Drive  
Gloucester MA, 01930

Dear Mike,

The Atlantic Offshore Lobstermen’s Association submits the following comments toward the Atlantic Large Whale Take Reduction Plan (TRP) proposed rule and draft environmental impact statement (DEIS). The Association supports NMFS’s efforts to protect endangered North Atlantic right whales (NARWs) throughout their range, but we have serious concerns about the risk reduction burden being placed on the northeast lobster and Jonah crab fishery. We cannot stress strongly enough that NARWs will not be saved from extinction without a comprehensive, concerted, and holistic approach to reduce serious injury and mortality risk across the species range from all sources, as demonstrated in the draft Biological Opinion (BiOp)\(^1\) model outcomes. This includes fisheries and ship strikes in Canadian waters, as well as the U.S. Mid-Atlantic and South Atlantic, and emerging sources of potential anthropogenic harm, including offshore wind industrialization.

As noted in our scoping comments, recent trends in Canadian waters interactions with NARWs must be a top consideration when setting US conservation targets, because deaths and serious injuries attributable to the domestic lobster fleet have been steadily trending downward. US lobstermen have been marking gear and modifying practices to avoid interactions for over 20 years, during which time the right whale population more than doubled in size. As the BiOp demonstrates, a total closure of US fixed gear fisheries will not rebuild the population if mortalities and serious injuries (M/SIs) continue in Canada. Actions taken outside of US waters will greatly impact the future of fixed gear fisheries in the US; if M/SIs in Canada continue, potential biological removal (PBR) levels will further decline, and the actions needed for US fisheries to maintain incidental take permits will become ever more draconian and untenable. The Association requests that NMFS use every tool at its disposal to ensure protections for right whales in Canada.

Reducing human caused injury to the species must be a shared endeavor, both as a matter of equity and as the only effective way to conserve NARWs. While we recognize that NMFS has limited resources available to pursue rulemaking, we note that the Agency has made NARW conservation a priority (i.e. species in the spotlight). It is unfathomable that NMFS is not currently pursuing more concerted efforts to reduce injury and mortality risk from recreational boating, shipping, and offshore wind industries in US waters.

---

\(^1\) Draft Endangered Species Act Section 7 Consultation Biological Opinion for 10 Greater Atlantic Regional Fisheries Office FMPs. Published online January 2021.
While the lobster fishery faces a real risk of being completely shut down, the Agency has done little more than outreach to address the failings of the existing Vessel Strike Rule, as outlined in a recent NMFS report. This despite recent deaths of young whales caused by ship strikes in the Mid and South Atlantic. We therefore ask that NMFS immediately increase enforcement of the existing vessel strike regulations, consider amending speeding fines to be commiserate with violations, and initiate rulemaking to better prevent ship strikes.

Further, the government continues to approve incidental harassment permits (IHP) for offshore wind in the MA/RI lease area without consideration of the cumulative impacts of construction and operations activities on NARWs and their prey (Figure 1). As noted in the South Fork DEIS:

“The likelihood of injury depends on proximity to the noise source, the intensity of the source, the effectiveness of noise attenuation measures, and the duration of noise exposure. For example, a low-frequency cetacean remaining within 5.4 miles (28,517 feet) of impact hammer operation over the 4 hours required for a difficult monopile installation could experience permanent hearing injury, referred to as a permanent threshold shift (PTS).”

Current monitoring plans which rely on vessel based observers are insufficient given the potential for harming whales miles away. NMFS should consider operating daily aerial surveys and requiring wind developers to fund and deploy acoustic sensing technologies to monitor NARWs during marginal weather conditions. Vineyard Wind’s IHP should be re-evaluated considering recent modifications to construction plans that involve larger turbines.

Focusing specifically on the proposed rule, we disagree with the method used to calculate the proposed rule’s risk reduction targets for the US lobster fishery. Particularly concerning is the Agency’s approach of dividing unassigned M/SI entanglements evenly between the US and Canada, rather than using a proportional division based on known cases (0.18 US/0.82 CN⁴). While the Agency provided a limited rational for the 50/50 country split, both the Atlantic Large Whale Take Reduction Team and CIE Peer Review Panel expressed concern with this method. Also, puzzlingly, the Agency saw fit to use the data record of known cases to proportionally assign US cases with undetermined cause (strike vs. entanglement) in the draft BiOp. For the final rule, the Association strongly recommends that NMFS employ a consistent proportional method that reflects known data trends to apportion the risk reduction needed by each country.

Entanglement risk reduction needed by US fisheries to account for non-cryptic M/SIs are shown in the table below. Importantly, the entanglement risk reductions below and calculated in the DEIS are for all US fisheries. Yet, the fisheries included in the proposed rule comprise 93.7% of the end lines estimated to be fished in TRP managed waters, not 100% (DEIS, Table 2.3). The Association requests that the final rule’s risk reduction target be 93.7% of the total US entanglement reduction need. We encourage NMFS to use 2010-2019 data to calculate the risk reduction needed as this

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² North Atlantic Right Whale Vessel Speed Rule Assessment, June 2020. Published online January 2021.
³ South Fork Wind Farm and South Fork Export Cable Project, Draft Environmental Impact Statement. January 2021
period coincides with a regime change in zooplankton prey, includes the latest available data, and is consistent with data used in the Draft BiOp to estimate risk to NARW.

Table 1: Average annual M/SI by country of origin for the date ranges and values in the DEIS (Table 2.4) and Draft BiOp (Table 56) using unknown cases assigned proportionally rather than 50:50. Total US are assigned cases plus unassigned cases attributed to the US using the same proportion as known cases. Reduction needed was calculated by applying the DEIS equation of 1-(0.9/total US) to the Total US values.

<table>
<thead>
<tr>
<th>Date Range</th>
<th>Avg Yrly M/SI</th>
<th>US</th>
<th>CN</th>
<th>Unk.</th>
<th>US Unk. proportion</th>
<th>CN Unk. proportion</th>
<th>Total US</th>
<th>Reduction Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-2016</td>
<td>5.15</td>
<td>0.40</td>
<td>0.60</td>
<td>4.15</td>
<td>1.66</td>
<td>2.49</td>
<td>2.06</td>
<td>0.63 (63%)</td>
</tr>
<tr>
<td>2013-2017</td>
<td>5.55</td>
<td>0.20</td>
<td>1.20</td>
<td>4.15</td>
<td>0.58</td>
<td>3.57</td>
<td>0.78</td>
<td>None, under PBR</td>
</tr>
<tr>
<td>2014-2018</td>
<td>6.54</td>
<td>0.20</td>
<td>1.40</td>
<td>4.94</td>
<td>0.62</td>
<td>4.32</td>
<td>0.82</td>
<td>None, under PBR</td>
</tr>
<tr>
<td>2010-2018</td>
<td>5.23</td>
<td>0.22</td>
<td>0.78</td>
<td>4.23</td>
<td>0.93</td>
<td>3.30</td>
<td>1.15</td>
<td>0.34 (34%)</td>
</tr>
<tr>
<td>2010-2019</td>
<td>4.90</td>
<td>0.20</td>
<td>0.90</td>
<td>3.80</td>
<td>0.69</td>
<td>3.11</td>
<td>0.89</td>
<td>None, under PBR</td>
</tr>
</tbody>
</table>

NMFS staff highlighted the importance of equity when they assembled the Take Reduction Team (TRT) in 2019 to develop risk reduction proposals that asked each component of the lobster/jonah crab fishery to assume an equal share of the conservation task. AOLA’s TRT representative supported this approach at the TRT forums and in previous letters submitted to the Agency, even though the Area 3 fleet represents <3% of vertical lines fished in all ALWTRP managed water (<1% when exempted waters gear is included)\(^5\). This laudable goal is, unfortunately, not reflected in the proposed regulations.

Of particular concern is the inconsistent starting point on which risk reduction percentages are calculated for each lobster management area (LMA) and/or state. The overarching reference year in the DEIS is calendar year 2017, yet the MA LMA 1 fishery is given credit for extending the seasonal closure of Cape Cod Bay from 2015 forward, while LMA 2 (RI) and LMA 3 fisheries are not provided credit for trap cuts that permanently removed gear from the water during the same years. We support the Agency’s decision to give MA 2015/2016 credit, but the same standard should apply to all LMAs. Further, the conservation benefit for 2017-2020 trap cuts are credited differently for LMA 2 and 3. We therefore ask that NMFS consistently apply a reference year across all regulated jurisdictions; preference being for 2015 forward which would encompass all fisheries actions since the last amendment to the ALWTRP. If NMFS disregards this request, the final rule must provide a legal justification explaining how this inconsistent treatment of federal permit holders does not violate National Standard’s guidelines.

Before providing the Association’s alternative management recommendations for LMA 3, we have overarching comments regarding the use of 1700lb breaking strength line and closed areas as risk reduction provisions in the proposed rule.

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\(^5\) Industrial Economics (IEc) 2017 vertical line model 2017 baseline data. Provided to TRT November 2019.
As to weak end lines and equivalent weak line contrivances, we want to emphasis two points. Firstly, we appreciate the Agency’s inclusion of weaker line as means to minimize the risk of serious entanglements, given that fishing without end lines is not a practical near term solution. However, we do worry about the limited scientific justification for 1700 lbs. as the target strength, and the seemingly arbitrary decision that weak contrivances placed 40 feet apart are equivalent to 1700 lb. rope. Secondly, AOLA members have been testing modified gear since 2019 and to date the only rope or contrivance that appears viable is the Time Tension Line Cutter. We understand that NMFS intends to develop a list of acceptable weak gears ahead of rule implementation, however time is running short. We cannot stress enough the importance of this work. NMFS needs to dedicate staff and funding to manufacturing, systematically testing, and approving weak end line options as a top priority in 2021.

Given that 1700 lb. breaking strength is a rather arbitrary target, we encourage NMFS to be flexible when approving alternative gears including available gears that may be slightly above the 1700 lb. target, especially in the short term when options are limited. As documented by Maine DMR, initial line strength decreases with every pass through the hauler plates, quickly eroding to the point of needing to be replaced so as not to pose a safety risk. That said, lobstermen should not be asked to take on the financial and safety burdens of re-rigging gear once again only to be told in a few years later that the changes didn’t work. All gear changes should be thoroughly tested for safety, durability, and efficacy before changes are made on the water.

As to closed areas, after much discussion and risk reduction analysis, the TRT opted against including closed areas in their near unanimous recommendations on which the proposed rule is founded, yet options for three seasonal closures are included in the DEIS analysis. Closed areas were generally rejected by the TRT because of concerns that poor spatial and temporal fishing gear information, and the lack of uniform and consistent NARW surveying methods, would make it impossible to objectively evaluate seasonal restricted gear areas. The TRT felt that a closure would have the best chance of reducing entanglement risk when the area was small and well defined, and fishing gear was removed from the water, rather than moved elsewhere.

Despite the known data weaknesses and lack of uniform data sources, NMFS staff undertook a commendable and innovative analysis to generate estimated risk reductions for the proposed seasonal closure areas, primarily using the recently developed Decision Support Tool (DST). As noted in the DEIS, the CIE Peer Review Panel concluded that the DST provides a useful way for industry and managers to compare relative changes in entanglement risk for right whales under various risk management scenarios. However, the proposed rule generally treats the results of closed area analyses as absolute values without presenting confidence intervals. The DEIS frequently frames the management options without explaining the underlying data uncertainty and does not consistently consider the possibility of redirection of fishing effort, both of which interject uncertainty into the closed area risk reduction evaluation. We agree with the CIE Review Panel in cautioning the Agency when applying DST results to inform management. We understand that rulemaking needs to proceed concurrently with improvement of the tool, however this ongoing development has made it exceedingly difficult to provide comments, on closed areas in particular, since the data sets (i.e. Duke Model) and risk reduction credits have changed since the DEIS was originally drafted.
We feel strongly that closure areas should not be the way forward to protect whales. As noted in the DEIS, fixed closures are likely to provided only limited and short term benefit because of the increasing unpredictability of oceanographic patterns, and subsequent NARW habitat use. Dynamic closures are in principal a better approach, but in practice they have been proven not to work because of limits on federal rulemaking and the weeks/months needed for the lobster fleet to move gear. Both fixed and dynamic closures have unpredictable, unintended, and indirect consequences that cannot be accurately analyzed in an EIS. For example, any or all these scenarios could occur; “fencing” when moved gear surrounds a closed area, redirection of entanglement risk when gear is moved to distant areas, gear conflict within and between fixed and mobile fleets, additional habitat impacts, economic impacts, and inequitable treatment of fishing operations. For these reasons and those discussed by the TRT we strongly oppose closures, however we encourage NMFS to reinitiate funding for annual copepod surveys and predictive zooplankton modeling as they relate to future whale habitat use. We also strongly encourage the Agency to implement the monitoring and surveillance recommendations made by NMFS’s expert working group.6

If NMFS does pursue closed areas in the final rule, the FEIS must include an improved analysis of the impacts of displaced fishing on the surrounding habitat and co-occurrence of whales and endlines. This analysis should rely on information provided by fishermen during the public hearing process. In contrast to the existing seasonal Massachusetts Restricted Area where the coastal lobster fleet removes gear from the water and doesn’t fish for three months, the vessels operating in the proposed closures are generally larger and typically year-round operations that will move gear to the nearest economical fishing ground. This appears to be particularly true for the non-preferred LMA 3 George’s Basin closure given fleet dynamics in that area. We agree with NMFS assessment that closing this area could increase risk to right whales while economically disadvantaging the fishery. As noted in the DEIS (5-154):

“The trap/pot buoy line closures could also have negative indirect effects if fishing effort is relocated just outside of the restricted areas adjacent to valuable whale habitats. This relocated effort may result in a wall of fishing gear, which would increase risk of entanglement risk as whales move in and out of these management areas.”

We contacted the small fleet that operates in Georges Basin and they report that in response to a closure, they would move gear, likely in close proximity to the closure and/or further west into offshore Gulf of Maine. Therefore, we oppose the George’s Basin closed area, but encourage the Agency to pursue measures to improve spatial and temporal fisheries data, such as 100% catch and effort reporting for all federally permitted lobster vessels and independent validation of effort, such as through the use of electronic vessel and trap tracking technologies.

We are opposed to NMFS’s preferred and non-preferred South of the Islands closure alternatives, because we believe a closure in this area will result in redirection of effort and concentrate lobster gear into other areas inhabited by whales. We offer the below information in response to NMFS request for “information indicating that we can achieve the 60% risk reduction without the restricted area, we would consider eliminating the restricted area from rulemaking.” The following focuses on LMA 3 and the 2/3 overlap, given that we do not represent LMA 2 fishermen we defer Area 3 recommendations to state agencies and inshore lobstersmen’s associations. That

said, after discussions with MA Lobstermen’s Association leadership we believe they also support the following recommendations that apply to the Area 2/3 overlap.

Analysis of this closure area is complicated by the cross jurisdictional nature of the location, which encompasses state and federal waters, and portions of two management areas (LMA 2 & LMA 3) plus a management overlap area that is shared by federally permitted vessels. The closure area would be bordered to the north by land masses, to the south by a heavily trafficked shipping lane, and, depending on the alternative selected, either border on the west or fully encompass, the 1,600 square mile MA/RI offshore wind lease area. Once wind construction and operations begin, the opportunity to move gear to fishable, open bottom, in LMA 2 will be severely limited (Figure 1).

Figure 1. DEIS’s South of the Islands seasonal fisheries closure proposals in relation to BOEM’s MA/RI offshore wind area and 1998-2018 whale sightings provided by the NARW Consortium.

We do not dispute that right whales use the proposed seasonal gear risked area, but given the opportunistic nature of surveying, lack of a mechanism to standard days of effort and transect patterns, and the possibility of counting the same individual on multiple sequential surveys, the data should not be used to quantify changes in abundance over time (see quotes below). These data are valuable as a snapshot of the survey area on a given day, but they have major deficiencies which need to be corrected, as noted in NMFS’s Expert Working Group report.6

“...opportunistic sightings data can present challenges (no area is systematically surveyed, effort is not corrected for, and there is potential to count an individual whale more than once)...” – Dr. Michael Moore, 2020 declaration to US District Court for the D.C. Case 1:18-cv-00112-JEB

“Acoustic detection data, opportunistic sightings and right whale satellite-tag tracking data have not been incorporated into the model of right whale habitat use. Although it is not clear
how these sources of information can be used in the surface density model, as they differ fundamentally from the systemic surveys used to estimate that model...” - CIE Peer Review of DST Report 2019

Lobster and Jonah crab effort in LMA 3 and the 2/3 overlap portions of the proposed closure is primarily seasonal, starting in the fall and continuing until the early spring. Most of the fishery centers around the southern portion of the 2/3 overlap and the northern portion of LMA 3, with the effort moving south tracking the winter migration of the crab and lobster populations. The LMA 3 portion of the proposed closure encompasses highly productive Jonah crab fishing bottom, which has generated approximately $14-18 million dollars annually in recent years.7

LMA 3 vessels specialize in moving gear so a closure of this area will result in 100% of that gear moving to another area, likely south and east, based on our conversations with fishermen, but given that LMA 3 is a geographically large area that supports a relatively small number of vessels, gear could be moved considerable distances with unintended risk consequences. The same is true for the 45-60 ft LMA 2 vessels that work in the 2/3 overlap, with their gear likely to move west and north. Given the unpredictable and changing NARW habitat use, noted increases in abundance of whales in Southern New England and Mid-Atlantic waters, and assurance that fishing gear will be displaced not removed from the water, it is not an acceptable strategy to assume that a South of Islands closure area will reduce risk of a critically endangered species. If NMFS does establish a closed area south of the Islands, we recommend it encompass the smallest possible area spatially and temporally and include a two year sunset provision. A sunset is advisable given the yet to be determined consequences of wind industrialization on whale and zooplankton behavior.8

Our final point on closures relates to shipping and offshore wind. If NMFS is going to implement closures, it is incumbent on the Agency to also implement speed restrictions for all vessels transiting or operating in other industries in those areas. As the 2019 season in Canada demonstrated, with nearly half of the mortalities attributable to ship strikes, area closures do not protect right whales when there is heavy vessel activity. We strongly encourage better monitoring of whale activity in US shipping lanes (particularly south of Nantucket), penalties for vessels exceeding speed limits sufficient to correct transgressions, and consideration of redirecting shipping around whale aggregations.

Alternative Proposal for LMA 3:

After careful consideration of the LMA 3 provisions proposed and consultation with Area 3 participants, we offer the following alternative measures to reduce co-occurrence of NARWs and vertical lines and reduce entanglement severity using methods that are viable for the offshore fleet. Thanks to the efforts of Dr. Trego and Dr. Shank to analyze alternative measures, we feel the alternatives proposed below exceed the proposed rule’s minimum risk reduction target. That said, we note that some of the subarea options may not be fully additive to the LMA wide options, so specific credits in the list below may need be adjusted in the final rule.

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7 Atlantic States Marine Fisheries Commission, Review of the Interstate FMP for Jonah Crab, 2019 Fishing Year.
LMA 3 Wide Provisions:

- Forthcoming LMA 3 permit trap cap reduction – **12% LMA 3 credit**

- Year round trawling up requirement of 45 traps per trawl with 2 endlines, with area specific exceptions described below. To accomplish this, the maximum allowed trawl length will need to be extended to 1.75 nautical miles. – **13.7% LMA 3 credit**

- One end line of each trawl will use 1700 lb. breaking strength rope in the top 75% of the line depth. Weak links (breakaways) remain unchanged at 1500 lbs. The second end line on each trawl remains full strength. – **29% LMA 3 credit**

Sub-Area Provisions:

- GEORGES BASIN – 50 trap trawls year round in the area shown below (DEIS non-preferred closures area) with one weak end line in the top 75%. – **12.1% LMA 3 credit**

- SOUTH OF THE ISLANDS - Instead of a seasonal closure in one of the boxes in Figure 1, all vessels fishing in Area 3, or the 2/3 overlap would fish 45 trap trawls, both end lines using 1700 lb. rope in top 75%, and 600 lb weak links year round. These provisions will apply only in closed area boundaries in NMFS final rule, and only to the portion of the closed area encompassing LMA 3 and the 2/3 overlap. – **3.7% LMA 3 credit**

- SHELF EDGE - In waters deeper than 50-75 fathoms, 35 trap trawls year round with one weak end line to 75%. The final boundary for this area will be determined in the final rule, but we ask that the Agency select a straight line boundary similar to the chart below, with 35 trap trawls allowed seaward of the line. – **minus 0.3% LMA 3 credit**
Individual Vessel Provisions:

- Permit exemption option for smaller Area 3 vessels to allow 40 trap trawls in all areas year round to address vessel safety and capacity concerns.

The LMA 3 Wide provisions are the same as presented in the proposed rule, so we will not offer further justification, but do direct you to the discussion of end line reductions below. We also note that LMA 3 fishermen are interested in considering the use of Time Tension Line Cutters either as equivalents to 75% weak lines or as an additional provision on the remaining full strength end lines in the future. We ask that that Agency work expeditiously to test those devices and attribute risk reduction credit.

As to the sub area options, we propose further trawling up in Georges Basin in recognition of the potential co-occurrence of NARWs and gear in this area. We feel year round trawling up is a more protective and preferable option compared to a closed area given the DEIS finding that a seasonal closed area could increase risk. For Southern New England, we propose an option that will lower the likelihood of entanglement, without forcing gear to move into areas with unpredictable risk potential. Given that the LMA 3 and overlap portions of the preferred closures scored only a 3.7% risk reduction in the DEIS, we believe that the proposed gear modifications, which would apply to both LMA 2 and 3 vessels fishing in the overlap, will better reduce risk. Finally, for the shelf edge, we request allowance to fish 35 trap trawls in consideration of operational and safety constrains that come with fishing on the continental slope. NMFS initial analysis of this provision found that it limited LMA 3 wide risk reduction by only 0.3% when these operations fished 35 trap trawls, rather than 45 trap trawls, given limited co-occurrence of whales and gear in these waters.

The individual vessel provision is also unchanged from the proposed rule. A handful of smaller LMA 3 vessels have expressed interest in this option for their operations to enhance safety at sea for crew members.

Related to gear marking, we support the Agency’s proposal to continue with black area marks for LMA 3, however, given that LMA 3 is prosecuted solely in federal waters, we are uncertain of the need for the additional federal waters green mark.

Finally, the best way to reduce entanglement risk is to remove vertical lines from the water. NMFS has recognized this in the proposed rule by crediting LMA 3 for forthcoming changes to the area trap cap. Given that this credit (12%) is a key component of Area 3’s efforts to conserve NARWs, we implore GARFO staff to prioritize this long awaited rulemaking. In addition to credit for the forthcoming trap cap reduction, we ask that NMFS reconsider the entanglement risk reduction provided by LMA 3’s 2016-2020 trap cuts and transferability conservation tax. We understand the concern that trap reductions do not necessarily equate to end line reductions, but surely some credit is due for permanently removing fishing gear.

In fact, 2000-2018 VTR records\(^9\) indicate that the average number of traps per trawl increased after that first round of trap reduction (prior to 2010) and held steady during the first few years of recent

\(^9\) A3 2000-2018 VTR data analysis provided to AOLA by GARFO staff.
trap cuts (latest data available). In other words, as the number of traps reduced in LMA 3 so too did the number of end lines. Increasing the minimum traps per trawl from 20 to 35-45 as proposed above will ensure that the end lines already removed from the fishery cannot return to the water. Therefore, we ask that NMFS provide LMA 3 with credit for trap cuts since the reference year using a metric that is equitable to the proposed LMA 2 credit for similar FMP modifications.

AOLA staff submitted a detailed memo about data sources available for a LMA 3 endline reduction analysis to NMFS on 2/26/20. To briefly reiterate, there are three data sets that could be used to broadly assess and characterize fishing effort. 1) VTR records – Self reported fishing effort and catch data submitted by active LMA3 vessels. These data estimate active traps, average trawl lengths, and provide spatial and temporal information for a subset of LMA 3 permit holders. These data are the primary source used in the DEIS analysis. 2) Permit allocation records – Ownership and traps allocation records for 100% of LMA 3 permit holders. These data provide the maximum number of traps permitted in the area annually. 3) Permit designation records – Permit renewal records for 100% of LMA3 permit holders. These data provide the maximum number of active traps that could be deployed annually.

We ask that NMFS consider permit records the best available data to assess end line reductions, since they cover 100% of the fishery, are 100% accurate, and are the data source to be used in the forthcoming trap cap reduction rule. Permitted traps represent the total universe of gear that could be fished each year, not necessarily active effort, however they also reflect gear that has been permanently removed from the fishery. Removing traps from existing permits permanently reduces the risk of entanglement because of limited access provisions the prevent the issuance of new permits and minimum trawl lengths prevent fishing less traps with more lines.

Table 3: Annual LMA 3 permit records. Trap allocations sourced from GARFO permit records provided to AOLA staff. End lines calculated using 36 traps per trawl (VTR estimate). Reductions are shown in comparison to fishing year 2010, but effort was stable until allocation reductions and transferability conservation tax began in fishing year 2016.

<table>
<thead>
<tr>
<th>Fishing Year</th>
<th>Traps</th>
<th>End Lines</th>
<th>Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>148,108</td>
<td>8,288</td>
<td>0%</td>
</tr>
<tr>
<td>2011</td>
<td>148,108</td>
<td>8,288</td>
<td>0%</td>
</tr>
<tr>
<td>2012</td>
<td>148,108</td>
<td>8,288</td>
<td>0%</td>
</tr>
<tr>
<td>2013</td>
<td>148,108</td>
<td>8,288</td>
<td>0%</td>
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<tr>
<td>2014</td>
<td>148,108</td>
<td>8,288</td>
<td>0%</td>
</tr>
<tr>
<td>2015</td>
<td>148,108</td>
<td>8,288</td>
<td>0%</td>
</tr>
<tr>
<td>2016</td>
<td>136,868</td>
<td>7,604</td>
<td>8%</td>
</tr>
<tr>
<td>2017</td>
<td>128,901</td>
<td>7,161</td>
<td>13%</td>
</tr>
<tr>
<td>2018</td>
<td>121,797</td>
<td>6,767</td>
<td>18%</td>
</tr>
<tr>
<td>2019</td>
<td>115,479</td>
<td>6,416</td>
<td>22%</td>
</tr>
<tr>
<td>2020</td>
<td>109,378</td>
<td>6,077</td>
<td>26%</td>
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</tbody>
</table>

Given the uncertain surrounding entanglement risk reduction and the needs for greater enforcement and better data collection, we have aimed to be risk adverse in our proposed measures to ensure that the LMA 3 fleet goes above the minimum mandate during this phase of rulemaking.
It is our expectation that this approach, as well as our continued participation in gear research and data improvement efforts, will be considered when future rule making is considered for LMA 3.

In conclusion, the Atlantic Offshore Lobstermen’s Association will continue to work with NMFS on risk reductions solutions that are feasible for Area 3 fishermen and protective of right whale. However, we urge NMFS to move quickly to broaden the scope of whale conservation, to not only hold Canada accountable, but to also make sure other US fisheries, shipping, tourism, commerce and emerging industries – the nearly 2 million acres of the Atlantic wind energy leases, and aquaculture – are not putting NARWs at further jeopardy. We further worry that the Agency is not acting expeditiously to address underlying uncertainty in critical data sets and models, and that the conservation framework outlined in the Draft Biological Opinion could fail to meet its goals, resulting in a jeopardy finding and closure of the lobster fishery. As such, we have enclosed our recommendations for a broader NARW conservation framework as Appendix A.

Thank you for the opportunity to comment,

Sincerely,

[Signature]

David Borden,
Executive Director
Appendix A –NARW Conservation Framework Recommendations

From AOLA’s Bi-Op Letter

We acknowledge that NMFS staff and leadership have worked diligently on the issue of NARW conservation, but the urgency of this situation requires a more detailed action plan than outlined in the BiOp framework. With that in mind, we make the following recommendations regarding the framework process. This list includes many items already in development by the Agency or recommended by NMFS staff.

Short term priorities (less than one year)

- Given the well documented environmental regime shift in 2010, it is critical that NARWs and their prey species be effectively monitored. NMFS should fully reinitiate funding for annual copepod surveys and predictive zooplankton modeling as they relate to NARWs future use of US habitats. NMFS should implement a plan for systematic broad-scale coastwide aerial, vessel, and acoustic surveying of the NARW population to standardize US data sources. Details about how to improve monitoring have been outlined in an outstanding 2020 NMFS Monitoring and Surveillance Technical Memo.

- Given the shifts of Calanus sp. biomass and NARWs into Canadian waters, NMFS should immediately re-engage Canadian counterparts in a dialog aimed at standardizing copepod and NARW sampling and surveying methods. There needs to be transboundary compatible surveys and data streams to properly monitor the stock.

- There should also be immediate standardization of NARW conservation programs in each country. The recently announced implementation delay of Import Provisions, which were already 5 years in the making, needs to be reversed. Given that the Import Rule\textsuperscript{10} is one of the few tools the US has to increase marine mammal protections and ensure comparable protections and fair competition, NMFS should seek expedited discussions with Canadian counterparts and conduct quarterly bilateral meetings.

- We suggest bilateral meetings include the leadership of NOAA/NMFS, one New England Fishery Management Council representative, one Atlantic States Marine Fisheries Commission representative, one environmental/conservation organization representative, and one inshore and one offshore commercial lobsterman. This would add a needed layer of transparency to the discussions, strengthen the US delegation, and allow the two fishery management organization that manage most fixed fishing gear in NARW habitat direct access and input to the discussions. There are many examples of Council and Commission participation in international discussions, therefore this request is not without precedent.

- NMFS should expedite rulemaking on long overdue tasks including 100% reporting in the federal lobster/Jonah crab fishery and implementation of a trap cap reduction in LMA 3. The latter was recommended by Atlantic States Marine Fisheries Commission in 2012.

\textsuperscript{10} Marine Mammal Protection Act’s Fish and Fish Product Import Provisions
• NMFS should immediately start rulemaking to address the increase in ship strikes in US waters described in the recently published vessel speed rule assessment and further documented in recent weeks in the South Atlantic. In the interim, there should be increased enforcement of existing ship speed regulations and consideration of amending fee structures to be commiserate with violations.

Longer term priorities

• US and Canadian scientists should collaborate on an annual report (similar to the NARW Consortium’s annual “report card”) that summarizes changes in stock status, provides the latest entanglement and ship strike data, and provides links to, or appendices of, other relevant reports and documents. Currently there is a tremendous amount of work being done by both countries’ governments and private organizations that should be made available in a timely and transparent way to advance our collective understand of the species and human interactions.

• US and Canadian scientists should collaborate on a transboundary benchmark NARW stock assessment to be completed in 2022/2023. This assessment should be externally peer reviewed and made publicly available well in advance of the 2024 evaluation period. Phase 3 rulemaking should not begin until the results of the peer reviewed stock assessment are available to assess progress toward conservation goals.

• We strongly encourage the Agency to improve the NARW population model used to assess jeopardy. This will require both better data and re-evaluation of the model’s assumptions.

Summary of AOLA’s Request’s in the above DEIS/Proposed Rule Comment Letter

• The Association requests that NMFS use every tool at its disposal to ensure protections for right whales in Canada.

• We ask that NMFS immediately increase enforcement of the existing vessel strike regulations, consider amending speeding fines to be commiserate with violations, and initiate rulemaking to better prevent ship strikes.

• NMFS should consider operating daily aerial surveys and requiring wind developers to fund and deploy acoustic sensing technologies to monitor NARWs during marginal weather conditions. Vineyard Wind’s IHP should be re-evaluated considering recent modifications to construction plans that involve larger turbines.

• For the final rule, the Association strongly recommends that NMFS employ a consistent proportional method that reflects known data trends to apportion the risk reduction needed by each country.

• The Association requests that the final rule’s risk reduction target be 93.7% of the total US entanglement reduction need. We encourage NMFS to use 2010-2019 data to calculate the
risk reduction needed as this period coincides with a regime change in zooplankton prey, includes the latest available data, and is consistent with data used in the Draft BiOp to estimate risk to NARW.

- We ask that NMFS consistently apply a reference year across all regulated jurisdictions; preference being for 2015 forward which would encompass all fisheries actions since the last amendment to the ALWTRP. If NMFS disregards this request, the final rule must provide a legal justification explaining how this inconsistent treatment of federal permit holders does not violate National Standard’s guidelines.

- NMFS needs to dedicate staff and funding to manufacturing, systematically testing, and approving weak end line options as a top priority in 2021.

- We encourage NMFS to reinitiate funding for annual copepod surveys and predictive zooplankton modeling as they relate to future whale habitat use. We also strongly encourage the Agency to address the monitoring and surveillance recommendations made by NMFS’s expert working group.

- If NMFS does establish a closed area south of the Islands, we recommend it encompass the smallest possible area spatially and temporally and include a two year sunset provision. A sunset is advisable given the yet to be determined consequences of wind industrialization on whale and zooplankton behavior. Further, we encourage the Agency to better justify their use of alternative whale sightings data as the best available.

- We request that NMFS consider AOLA’s risk reduction provisions as an alternative preferred suite of measures for LMA 3 in the final rule and FEIS.
Please accept these comments towards the Atlantic Large Whale Risk Reduction Plan.

I agree with the strategy of having gear marking requirements differ according to region. The entanglement risk problem requires more accurate data to determine areas of particular concern and having unique gear identifiers based on location is a strong start. The broad brushed approach is one that is very detrimental to the commercial fishing industry and may cause undue harm to fishermen by burdening them with regulations that will achieve no entanglement risk reduction. Area specific gear markings endeavor to gather better data about where entanglements may be occurring and therefore not only reduce broad brush regulations but also target areas that will achieve the highest risk reduction. While I agree with having different gear marking requirements for different areas there also needs to be a balance on the workload for fishermen and having overly complicated regulations that are hard to enforce. Specifically, requiring a 6” green mark in federal waters in addition to the gear marking requirements for a particular state may be overly burdensome and create enforcement issues. Gear marking will need to be done before a season starts and many fishermen start fishing in state waters and move gear into federal waters as the season progresses. This will mean that fishermen will need to add a 6” mark to wet, seaweeded rope while dealing with moving gear which always results in space, time, and weather being at premiums. Also, it is something that may wear off and therefore be attributed incorrectly to state waters. Finally, this may cause enforcement confusion as environmental police are tasked with enforcing thousands of laws and rules that differ based on permits/licenses, area fished, time of year fished, and other ever-changing parameters.

I would like to suggest that NMFS consider and test what is known as Neo-Corp #10 braided rope for acceptable use in achieving 1700lb breaking strength endlines. It has been tested and found to break at less than 1700lbs and also has shown to be operationally feasible in many areas. Also, with consideration to operational feasibility and safety, having the top 50% of each endline be required to be 1700lb weak rope or have weak insertions would be best. This will reduce rope loss and potentially reduce the amount of line entangled around a whale since the line will break at the 50% point, leaving behind most of the endline.

Gear marking and preparing endlines with 1700lb breaking strength top portions of weak-insertions is going to be very time-consuming and add to an already arduous process of preparing traps to be fished when the season arrives. Over the years fishermen have been asked to do more and more in terms of regulations. There will come a point when these additional preparations supersede the amount of time it actually takes to prepare the rest of the gear. It takes a lot of time to be ready for the seasons and is one of the factors that makes this type of commercial fishing only suitable for dedicated and driven individuals. This additional time, money, and stress needs to be considered in this rule making and especially in future rule making.

Having a conservation equivalency in the “trawling up” task is a must. For example if an area is required to have a 10 trap trawl with endlines, then a 5 trap trawl with a single endline should be
conservationally equivalent. Trawling up poses a MAJOR safety risk for many lobster vessels. Some vessels are too small for these larger required trawls and/or were not built to handle trawls. Some fishermen operate their vessels alone. Requiring trawls that are too long greatly reduces their safety. If possible, an exemption such as vessels 29ft and shorter could be allowed to use shorter trawls or singles as the state of Massachusetts just enacted in their recent Large Whale Risk Reduction regulations.

Other measures and endeavors that should be undertaken include increasing aerial survey coverage and occurrences, continuing to monitor large ship traffic and seasonal speed restrictions, pushing Canada to do their part, and examining the effects of large-scale wind farms on NARWS and their food source. The wind energy area (WEA) off RI and southern Mass completely covers and engulfs the migration and foraging areas of Right whales. There have been virtually no studies on the effects of wind farm geotechnical and geophysical surveys, construction, or operation on copepods or marine mammals. Wind farms in Europe have been shown to completely alter localized ecosystems based on the creation of turbidity and sedimentation via modifying currents through physical structures. Wind farm geotechnical and geophysical surveys employ many of the same survey approaches as oil and gas exploration, yet they are ongoing with less than minimal oversight or regulatory requirements. Once construction starts, near continuous around the clock pile driving will result in major effects on marine organisms on a massive scale. The intense sound and pressure that results is likely to kill most small zooplankton in a localized area. This would significantly alter the presence of copepods, therefore reducing a food source for Right whales. The areas south of Martha’s Vineyard and Nantucket (encompassed by WEA) serve as a temporary foraging spot for Right whales along their migratory route. The overall condition of individual Right whales is already shown to be declining. If this “rest stop food source” is reduced or eliminated, RWs will have to endure their long and ever-changing journey with less food resulting in further declination of their physical aptitude. Agreements by wind farm developers to halt construction and pile driving during RW presence will only help so much. RWs can be difficult to spot visually from boats or planes depending on distance from vessel or sea state. Also, sound and pressure from construction is likely to cover much farther distances than a RW can be visually or otherwise detected. This will result in further disturbance to RWs and may even result in harassment or “takes” as defined legally. My concerns here only scratch the surface of issues that need to be considered and studied with regards to wind farms and endangered species. I realize that the breadth of this current action does not encompass wind farms, however, I strongly feel that it is important that NOAA NMFS and BOEM work together on this issue and therefore I am stating it and raising it in a forum that I believe can at least suggest to the appropriate departments the importance of this issue. Wind farms proceeding in their current form will undoubtedly have a far greater impact on NARWs than commercial fishing ever has or ever will. Altering the physical and biological state of an ecosystem will have an indelible deleterious effect to this species...and many others.

Thank you for your time and consideration of my comments.

Sincerely,

Gregory J. Mataronas
February 25, 2021

Michael Pentony, Regional Administrator
National Marine Fisheries Service,
Greater Atlantic Regional Fisheries Office
55 Great Republic Dr.
Gloucester, MA 01933

RE: NOAA-NMFS-2020-0031-0006

Dear Mr. Pentony,

On behalf of its 1800 members, the Massachusetts Lobstermen’s Association (MLA) respectfully submits this letter of comment with great concern and reservation to National Marine Fisheries Service (NMFS) regarding the proposed amendments to the regulations implementing the Atlantic Large Whale Take Reduction Team Plan (TEAM/PLAN), NOAA-NMFS-2020-0031, to reduce the incidental mortality and serious injury to North Atlantic Right whales and other protected species in the northeast commercial lobster and crab trap/pot fisheries to meet the goals of the Marine Mammal Protection Act (MMPA) and the Endanger Species Act (ESA).

Established in 1963, the MLA is a member-driven organization that accepts and supports the interdependence of species conservation and the members’ collective economic interests. The MLA continues to work conscientiously through the management process with the MA Division of Marine Fisheries (MADMF), Atlantic States Marine Fisheries, National Marine Fisheries Service (NMFS), and Atlantic Large Whale Take Reduction Team (ALWTRT) to ensure the continued sustainability and profitability of all the resources in which our members are engaged in.

The cooperation put forth by the Massachusetts commercial lobster industry is a true testament that we can collectively work together with managers to reduce the potential risk for right whales all the while preserving the viable and historic commercial lobster fishery here in the Commonwealth.
Massachusetts Right Whale Conservation Timeline

1935- International ban on hunting whales goes into effect
1970- North Atlantic Right Whales listed as endangered
1996- NOAA implements the Large Whale Take Reduction Plan
1997-MA requirement for “breakaway” features in gillnets and trap/pot buoy lines
Seasonal ban in Cape Cod Bay for gillnets and on use of floating rope between pots
1997-Dedicated aerial surveys begin in Cape Cod Bay
2000- Year-round gear marking is implemented
2004 – Year-round ban on floating rope between traps in Cape Cod Bay
2007 - Year-round ban on use of floating rope between traps statewide
2014- MA Restricted Area is created – A three-month closure Feb-April to 3,071 sq. miles
2015 - 3 month (Feb/Apr) closure to all pots/traps in the MA Restricted Area
2016 – 3 month (Feb/Apr) closure to all pots/traps in the MA Restricted Area
2017 – 3 month (Feb/Apr) closure to all pots/traps in the MA Restricted Area PLUS 4-day extension of the gear closure in Cape Cod Bay
2018 - 3 month (Feb/Apr) closure to all pots/traps in the MA Restricted Area PLUS a 15-day extension of the gear closure and speed restriction (10 mph) for small vessels in Cape Cod Bay
2019- 3 month (Feb/Apr) closure to all pots/traps in the MA Restricted Area
2020 - 3 month (Feb/Apr) closure to all pots/traps in the MA Restricted Area, MLA members deploy 700 coils of whale safe 1700lb weak red rope.
2021 – MFAC implements 73.6% risk reduction conservation measures

Proposed Rule Changes

Modify gear marking to introduce state-specific marking colors

The MLA SUPPORTS increasing the number of the area color for vertical lines markings. By using a state by state color scheme it will help to identify the origin of an interaction should there be one. Currently, the limited markings on the vertical lines drastically hinders NMFS’s ability to truly identify the origin of the interaction to sanction the appropriate risk reductions.

However, the MLA is greatly concerned about the dual permit holders who will have markings indicative of state waters fishermen should the top 2 fathoms of vertical line be missing upon retrieval which is where the one federal green mark is located. NMFS needs to seriously reevaluate how these dual permit holders will mark their endlines in federal waters.
Modified Gear Configurations (Trawls and Weak Contrivances)

Trawls
Currently, there are less than 80,000 vertical lines deployed by the commercial lobster fleet in Massachusetts and a significant number of commercial lobstermen continue to convert their businesses to fish trawls. Their collective effort to further reduce vertical lines will be beneficial and the **MLA DOES NOT SUPPORT** the 50% increase in pots in the trawls for LMA 1, LMA2 and OC between 3-12nm. The fleet that fishes in these areas is limited by vessel size and available deck space, creating a significant safety concern.

The proposed gear configurations to reduce the number of vertical buoy lines by requiring more traps between buoy lines between LMAs is unfair as the LMAs beyond 12nm is only a 25% increase. The MLA requests the same 25% trawl length increase be applied to all the LMAs under consideration.

<table>
<thead>
<tr>
<th>LMA</th>
<th>Current</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMA1, 6-12 nm</td>
<td>10 traps/trawl</td>
<td>15 traps/trawl</td>
</tr>
<tr>
<td>LMA 2, OC 3-12 nm</td>
<td>10 traps/trawl</td>
<td>15 traps/trawl</td>
</tr>
<tr>
<td>LMA1, 2 beyond 12 nm</td>
<td>15-20 traps/trawl</td>
<td>25 traps/trawl</td>
</tr>
</tbody>
</table>

Massachusetts Vertical Line Reductions Underway
The MADMF has decades of data to back up the ongoing reduction of the lobster fishery here in Massachusetts with a 100% MANDATORY reporting. The MADMF can show the downward trend for the MA lobster fleet. Currently, in Massachusetts there are less than 747 active lobstermen fishing an average of 490 pots and most of them are fishing 5-30 pot trawls with an estimated 20-25 permits retiring every year.

The Massachusetts commercial lobster fishery in 2007 had 1,361 permits and as of 2019 there was only 1,066 permits issued of which 747 were fished. During this timeframe there has been a reduction of 295 commercial lobster permits with **NO NEW PERMITS** being issued. The commercial lobster industry in the Commonwealth deploys approximately 80,000 vertical lines and the numbers are going down as the new conservation management comes online in early 2021.
Table 1: MA Lobster-pot Fishery, Total maximum buoy lines by LMA and Year, 2011-2018

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LMA1</td>
<td>71,811</td>
<td>67,801</td>
<td>65,220</td>
<td>66,050</td>
<td>61,014</td>
<td>67,846</td>
<td>60,821</td>
<td></td>
</tr>
<tr>
<td>LMA2</td>
<td>10,952</td>
<td>10,828</td>
<td>8,560</td>
<td>7,803</td>
<td>7,333</td>
<td>7,167</td>
<td>7,002</td>
<td></td>
</tr>
<tr>
<td>LMA3</td>
<td>1,299</td>
<td>1,256</td>
<td>1,335</td>
<td>1,549</td>
<td>1,040</td>
<td>1,126</td>
<td>1,228</td>
<td></td>
</tr>
<tr>
<td>OCLMA</td>
<td>18,430</td>
<td>15,027</td>
<td>16,773</td>
<td>15,009</td>
<td>15,037</td>
<td>13,669</td>
<td>13,518</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>102,492</td>
<td>94,912</td>
<td>91,888</td>
<td>90,411</td>
<td>84,424</td>
<td>86,153</td>
<td>89,594</td>
<td></td>
</tr>
</tbody>
</table>

Data Source: MA Supplemental Reports and LMA permit declarations

Massachusetts Ongoing Trap Reductions

Currently, Massachusetts commercial lobstermen are still reducing effort through the ongoing trap reductions in Lobster Management Area (LMA) 2 and LMA 3 and these real numbers in reduction that need to be quantified and given a conservation credit. Today, there are approximately 70 active lobstermen in MA LMA 2 and approximately 58 active lobstermen in Outer Cape Cod (OCC), how much further can they be reduced in effort to remain whole when they are continually paying a conservation tax every time a tag is transferred. It should also be noted that; every transfer in LMA 2, LMA 3 and OCC there is also a 10% conservation trap tax which also equates to even a further reduction in effort.

Weak Contrivances

On January 28th, the MFAC implemented a more restrictive rule for state waters weak insertions at every 60’, the MLA is concerned that the frequency of weak insertions or weak rope into buoy lines will not be fair and equitable among states.

The MLA SUPPORTS that EVERY state MUST HAVE THE SAME NUMBER of weak contrivances in federal waters without any exceptions. The commercial lobstermen here in the Commonwealth will yet again be doing more than the rest of the lobster fishery and the weak contrivances for the vertical buoy lines need to be in line with the federal plan. Many MLA members fish both state and federal waters and these requirements need to lineup so they can move in and out of state waters into federal waters without changing out their entire endline.

<table>
<thead>
<tr>
<th>State</th>
<th>Current</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMA 1, 2, OCC beyond 12 nm</td>
<td>None</td>
<td>1 weak insertion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>35% down the line</td>
</tr>
<tr>
<td>NH/MA/RI Coast–3 nm</td>
<td>None</td>
<td>1 weak insertion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50% down the line</td>
</tr>
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</table>
1700lb Weak Red and Candy Cane Rope as a “Weak Contrivance”

In 2019, the Lobster Foundation of Massachusetts was granted a Massachusetts Environmental Trust grant to develop a 1700lb weaker whale safer red rope that was deployed during the 2020 fishing season for field testing. The ropes 1700lb breaking strength basis came from the New England Aquariums study *Effects of fishing rope strength on the severity of large whale entanglements* by Amy Knowlton et. al. where they “found entangled in tested rope strengths below 7.56 kN or 1700 lbsf, implementation of RBS ropes would likely reduce the probability of mortality and suffering” Kowlton et.al.

We are happy to report that over 700 coils of the first version were successfully distributed and deployed by several hundred commercial lobstermen in Massachusetts. MADMF also purchased 400 plus coils of the weak red rope that will be distributed to the commercial lobster industry in early March.

The LFoM was also awarded a small grant to purchase the 1700lb breaking strength red and white (Candy Cane) rope to be field tested this spring (2021). We are looking forward to securing additional funding to purchase a large quantity of the weak ropes to be deployed during the 2021 fishing season.

These two weak ropes breaking at 1700lbs have been tested by Kevin Staples at the Maine Department of Resources and we are happy to report that they are breaking well within the acceptable tolerance ranges to significantly reduce the Serious Injury and Mortality to right whales:

<table>
<thead>
<tr>
<th>New -Weak Red Rope (Small 3/8”)</th>
<th>New - Weak rope 3/8” Red and White (Candy Cane)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1700 lbs</td>
<td>1492 lbs</td>
</tr>
<tr>
<td>1736 lbs</td>
<td>1462 lbs</td>
</tr>
<tr>
<td>1747 lbs</td>
<td>1501 lbs</td>
</tr>
<tr>
<td>1740 lbs</td>
<td>1471 lbs</td>
</tr>
<tr>
<td>1675 lbs</td>
<td>1522 lbs</td>
</tr>
</tbody>
</table>
Ketcham Supply in New Bedford has been instrumental in getting these two 1700lb. weak ropes developed and manufactured. We are pleased to report that these weak ropes can be made in state specific colors and are hopeful that NMFS will utilize these weak ropes and various colorations for implementation as a default gear marking.

Furthermore, the MLA and LFoM is working tirelessly with the MADMF to develop and test a suite of acceptable weak contrivances that will be acceptable. We are hopeful that NMFS will adopt these and release a menu as soon as possible as the commercial lobstermen are looking for options to configure the endlines to be ready for the 2021 fishing season.

The LFoM is processing all the data that was collected from the first year of the weak red rope project. The consensus is that the weak red rope is a viable option for a weak contrivance and the MLA respectfully asks NMFS to accept the 1700lb. weak red rope as a weak contrivance.

The 1700lb. candy cane rope will be field tested this year and should also be accepted as a weak contrivance based on the manufacturers specifications and testing that has been done by the MEDMR all of which proves it to be well within the 1700lb., with acceptable tolerances, for a “weak contrivance” as the industry needs as many options as possible.

*(See rope manufacturers specifications below)*
# Product Specifications

## Low Tensile Marine Rope

*Ketcham Supply is the exclusive distributor of this product*

<table>
<thead>
<tr>
<th>Part No.</th>
<th>R38SR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description:</td>
<td>Low Tensile Marine Rope. Hard lay, sinking line. 100% Polyester, dyed red.</td>
</tr>
<tr>
<td>Uses:</td>
<td>This rope is used to attach and retrieve deep water fishing traps. The low tensile strength promotes quick release of whales or large sea mammals in the event of entanglement with the rope or fishing gear.</td>
</tr>
<tr>
<td>Tensile strength:</td>
<td>1700 lbs +/- 3%</td>
</tr>
<tr>
<td>Yield:</td>
<td>36 ft/lb</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>3/8” dia. X 600 ft.</td>
</tr>
</tbody>
</table>
| Manufacturer:       | Rocky Mount Cord Company  
                      | 381 N. Grace Street  
                      | Rocky Mount, NC 27803  
                      | www.rmcord.com |

### Product Image:

![Product Image](image-url)

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*Ketcham Supply Co*

111 Myrtle Street, New Bedford, MA 02740  
www.ketchamsupply.com  
info@ketchamsupply.com  
508.997.4787
Low Tensile Marine Rope

Ketcham Supply is the exclusive distributor of this product

<table>
<thead>
<tr>
<th>Part Number</th>
<th>R38SCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
<td>3/8 Inch</td>
</tr>
<tr>
<td>Length</td>
<td>600 Foot Coils</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>1,700 Pounds, +/- 3%</td>
</tr>
<tr>
<td>Characteristics</td>
<td>Hard Lay, Sink Rope</td>
</tr>
<tr>
<td>Color</td>
<td>White with Dyed Red Strands</td>
</tr>
<tr>
<td>Yield</td>
<td>36 Feet per Pound</td>
</tr>
<tr>
<td>Material</td>
<td>100% Polyester</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Rocky Mount Cord Company</td>
</tr>
<tr>
<td></td>
<td>381 N. Grace Street</td>
</tr>
<tr>
<td></td>
<td>Rocky Mount, NC 27803</td>
</tr>
</tbody>
</table>

Product Image
Modify existing seasonal restricted areas to restrict buoy lines
(but allow ropeless (acoustic) fishing)

The Massachusetts Lobstermen’s Association DOES NOT SUPPORT ropeless (acoustic) technology and the MLA DOES NOT support the ten-year timeline set forth in the BiOp which clearly indicates that ropeless (acoustic) fishing year round is the ultimate goal of NMFS.

<table>
<thead>
<tr>
<th>LMA</th>
<th>Current</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Restricted Areas</td>
<td>Closed to Fishing</td>
<td>Allow trap/pot fishing without buoy lines in existing and proposed restricted areas with an exempted fishing permit (EFP). EFP authorizations would likely include conditions to protect right whales (e.g. area restrictions, low vessel speed, observer monitoring, and reporting requirements.)</td>
</tr>
</tbody>
</table>

Ropeless (Acoustic) Fishing is NOT REAL

Today, there is a lot of misperception on what can and cannot be done in the commercial lobster fishery when it comes to the use of ropeless (acoustic) fishing. Over the last 5 years or so, there has been a major effort to make it mandatory for the commercial lobstermen and fixed gear fishermen to transition over to ropeless (acoustic) gear to further save the right whales.

Furthermore, this gear transition to ropeless (acoustic) is being pushed for year round implementation when it is not needed as the 3-month closure is in effect when the right whales are present. The MA Restricted Area has a 0% chance of an entanglement happening and to think there will be zero failures of this technology is knowingly putting the right whales at risk.

The sheer magnitude of the economic undertaking would be well over 150 million dollars to outfit the commercial lobster industry here in the Commonwealth the first year. The individual cost would be an estimated $190,000 per fishermen to outfit their gear to go fishing. Not to mention there is an average of 10% gear loss each year and this would have to be replaced year in and year out and the gear loss would likely increase dramatically as the technology has yet to be tested on large scale multi-disciplined fisheries. This transition would take hundreds of millions of dollars and decades to implement and outfit every commercial fishing vessel that is on the water.

The unintended consequences of gear conflicts between traditional and ropeless (acoustic) gear in the fisheries would be grave if not thought through to the end. Fixed gear commercial fishing and the
mobile gear industry do not fish in one hypothetical box for a species and this is where the gear conflicts would be catastrophic given that the technology is not readily available nor do individual brands talk to each other.

Here is a scenario for comparison when technologies do not communicate with each other; What would happen if AT & T, Verizon, Singular, Sprint, and Metro PCS cellphones did not communicate with each other? The consumers would have to carry several cell phones to stay connected and this would be the same for the ropeless (acoustic) technology. As of today, February 23, 2021, these technologies do not communicate with each other; Desert Star, Edge Tech, Lobster Lift, Smelts and more, do not interact with each other so each commercial fisherman would have to have multiple boxes, screens, and transducers on their vessel to see where all the gear is on the bottom.

As stated by MLA, Secretary Treasurer, Dave Casoni during the North Atlantic Right Whale Consortium meeting in 2019; “We’re at the Model T today and they expect us to be at the Tesla tomorrow.” Remember it took 100 plus years to get there with tens of thousands of people working on the technology.

**New seasonal buoy line closures**

The MLA **DOES NOT** support ANY new closures as a conservation risk reduction measure. The proposed closure in LMA 2/3 and overlap is almost the size of Connecticut and unjustly too large and must be reduced dramatically. The opportunistic sightings data that was used needs to be excluded as it was not collected in a systematic or timely manner.

The month of April should also be removed from the proposed SNE closure timeframe for the same reasons as noted above, the low number of historic opportunistic right whale sightings data does not warrant this month being closed. There just aren’t the high aggregations and this month would be economically devastating to the commercial trap/pot fleet (lobster, crab & gillnet).
To evade a closure, even with the low number of fishermen fishing and the low number of right whale sightings, the LMA 2/3 overlap commercial lobstermen would be willing to fish 45 pot trawls with both endlines weakened to further reduce risk.

The LMA2 commercial lobstermen have been eviscerated through years of trap reductions and there is so few fishermen fishing in this area and for them to lose yet even more profitable fishing would be economically devastating to these fishermen.

The MLA further requests that a 5-year review and sunset provision be added to ANY closure as the ecosystem is rapidly changing and the right whales are moving.

**Additional Comments and Concerns**

Massachusetts commercial lobstermen have remained at the forefront of conservation measures for the right whales for over two decades. Unfortunately, the Biological Opinion (BiOp) clearly indicates an aggressive timeline for the implementation of more conservation measures implemented above and beyond ALL the conservation measures that are in place today. While NMFS's BiOp found "no jeopardy", they are basing everything on their contingency plan to implement a Conservation Framework over the next 10 years leaving the federally permitted commercial lobstermen in Massachusetts in limbo yet again.

**Phase 1**: Implementation of the Proposed Rule to reduce risk to right whales from the northeast lobster and Jonah crab fisheries by at least 60% in 2021.

**Phase 2**: Implementation of rules (to be determined) to reduce mortality and serious injury (M/SI) in federal gillnet and other Atlantic coast trap/pot fisheries by 60% in 2023.

**Phase 3**: Implementation of rules (to be determined) for an additional 60% risk reduction in all federal fixed gear fisheries in 2025

**Phase 4**: Implementation of rules (to be determined) for additional 87% risk reduction in all federal fixed gear fisheries in 2030. This could be reduced to 28% if M/SI from Canada or vessel strikes are reduced.

The BiOp is setting an unrealistic and unattainable timeline for upwards of a 98% risk reduction conservation, what does that really mean to the commercial lobstermen in Massachusetts when we are at 73.6% today, this would be upwards of a 100% risk reduction by 2030. How is this even remotely
feasible when Massachusetts commercial lobstermen have ZERO mortalities and or serious injuries attributed to their fishery!

The unrealistic, idealistic and aggressive “phased” in approach on the Massachusetts commercial lobster fleet will cause even more economic hardship regardless of them being at the forefront on ALL the right whale conservation measures to date.

**Massachusetts Marine Fisheries Advisory Commission (MFAC)**

The MFAC at their January 28, 2021 voted on and passed an aggressive suite of additional conservation measures for a 73/6% risk reduction for right whale protection will be implemented in Massachusetts by March 5, 2021. These conservation measures are as follows;

**Commercial Fixed Gear Closures**

The MFAC voted to:

- Expand the existing seasonal state waters commercial trap gear closure in both space and time. The existing closure occurs from February 1 – April 30 within Cape Cod Bay, Stellwagen Bank, and the Outer Cape Cod Lobster Management Area. The closure area will extend north in state waters from Scituate Harbor to the New Hampshire maritime border and the closure duration will extend through May 15. However, during the May 1 – May 15 period, the closure will occur on a dynamic basis allowing DMF to lift the closure (or parts thereof) if whales no longer remain in state waters. The closure will not extend into those southern state waters in Lobster Conservation Management Area 2.

- Geographically expand the existing January 1 – May 15 gillnet closure in Cape Cod Bay to include a discrete area along the South Shore between Plymouth and Scituate.

**Commercial Trap Gear Modifications.** The MFAC voted to:

- Require commercial trap fishermen to fish buoy lines that break when exposed to 1,700 pounds of tension beginning on May 1, 2021. This may be achieved by fishing specially manufactured buoy lines with a custom 1,700 pound breaking strength or by inserting NOAA Fisheries approved...
contrivances into the top 75% of the buoy line every 60’. At this time, the only approved contrivance is the so-called “South Shore Sleeve.”

- Require commercial trap fishermen fish buoy lines with a maximum diameter of 3/8”.

**Recreational Lobster and Crab Trap Measures.** The MFAC voted to:

- Establish a recreational lobster and crab trap haul-out period of November 1 – May 15 (beginning on November 1, 2021) throughout all of state waters. This haul-out period will not apply to unbuoyed recreational lobster trap gear fished in the Cape Cod Canal.

- Require recreational trap fishermen fish buoy lines with a maximum diameter of 5/16”.


Massachusetts commercial lobstermen are repeatedly burdened with economic hardships and the MOST restrictive conservation regulations in the United States commercial lobster industry, it is NO LONGER the sole responsibility of the Massachusetts commercial lobstermen to do ANY more “risk reduction or conservation” until other regions step up to the SAME draconian risk reduction and conservation effort levels that are in place right here in the Commonwealth.

**Unknown Takes**

NMFS has determined that under these baseline conditions (baseline 2000-2019) predict that the “right whale population will continue to decline over the next 50 years, even if all U.S. federal fixed gear fisheries are shut down.”  https://www.greateratlantic.fisheries.noaa.gov/public/nema/PRD/DraftFisheriesBiOp011421.pdf

Right whales continue to change their movement patterns, resulting in their emergence in areas at times of year where they haven’t been traditionally observed. In 2017, right whales appeared in the Gulf of St. Lawrence, around busy shipping lanes and areas of a high abundance of unregulated Canadian snow crab gear.

In 2017-2018 in Canada alone there were 12 right whales killed in the Gulf of St Lawrence; 5 to ship strikes, 2 to entanglements and 5 unknown causes. There were 5 additional live entanglements in this area. In 2018, a dead right whale was found off the Southeast U.S. in gear consistent with the Canadian snow crab fishery.
Per the ALWTRT proposal, there have been, with certainty, 0.2 takes per year attributed to the U.S. fisheries and 0.7 to Canadian fisheries. The 0.5 difference is significant between the countries and seeing Canada is only limited to spatial and temporal protections for right whales ONLY for the snow crab fishery leaving thousands of unregulated endlines being deployed in Canada.

When a word like “IF” is used to describe how much time right whales spend in the waters of the U.S. vs. Canada, one would think tagging these animals would be critical in saving them?! While survey flights religiously track right whales in Massachusetts, there seems to be less of an interest in tracking them throughout the region. Right whales need to be tagged today!

The staggering amount of deaths endured by the right whales in Canadian waters is unfathomable. The Canadians have killed on average 8 right whales per year over the last three years. NOAA could take ALL of the vertical lines out of the water along the East Coast and the Potential Biological Removal (PBR) would still be exceeded and the U.S commercial lobstermen would still be found 50% at fault! How is the U.S. commercial lobster fishery ever supposed to achieve the PBR goal when it is truly unattainable?

Currently, there are no regulations on the Canadian lobster fishery prohibiting the use of floating line at the surface which is deadly to right whales. Whereas, ALL U.S. commercial lobstermen are prohibited from using floating line at the surface, this conservation measures can make a difference and it should be implemented in Canada without further delay.

For decades now the commercial lobster industry has asked to tag these animals with great push back. Now more than ever we need real-time data on where these animals are so to reduce further harm as these animal’s swim into unprotected water. The days of assuming where they swim need to stop and tagging them for real-time data needs to be realized without further delay.

We cannot save the species without significant Canadian action TODAY! We need to demand more action from Canada as right whales are more frequently traveling from Florida to the Gulf of St. Lawrence into unregulated Canadian gear and vessel activity. When the right whales leave the safest waters of Cape Cod Bay in the spring they are very well fed and very much alive until they arrive in the unprotected water in the Gulf of St. Lawrence where they continue to die.
Habitat Degradation

As the ecosystem in the Northeast continues to deteriorate, right whales continue to case the copepods into the unprotected waters in Canada leaving the U.S commercial lobstermen continue to pay the price for the right whales’ failure to thrive. The right whales are using more energy searching for food leaving them thinner than their relatives in the Southern Hemisphere.

“The heatwave of 2018 fits with a much longer trend in the region, which is among the fastest-warming parts of the global ocean. In the past three decades, the Gulf of Maine has warmed by 0.06°C (0.11°F) per year, three times faster than the global average. Over the past 15 years, the basin has warmed at seven times the global average. The Gulf has warmed faster than 99 percent of the global ocean.”

There is no denying that the ongoing, Watery heatwave cooks the Gulf of Maine, and is driving the right whales and their food of choice, copepods, northward where they continue encounter large diameter endlines and heavy fishing gear. “The populations of copepods, a key food source for endangered Northern Right Whales, also seem to be moving with the changing conditions.”

Moreover, the negative implications of Projecting the effects of climate change on Calanus finmarchicus distribution within the U.S. Northeast Continental Shelf, Brian D. Grieve1,2, Jon A. Hare3 & Vincent S. Saba4, (Grievel et. al.), do not look good for the recovery efforts set forth in the BiOp or the proposed ALWTRT rule for the right whale.

“Calanus finmarchicus is vital to pelagic ecosystems in the North Atlantic Ocean. Previous studies suggest the species is vulnerable to the effects of global warming, particularly on the Northeast U.S. Shelf, which is in the southern portion of its range. In this study, we evaluate an ensemble of six different downscaled climate models and a high-resolution global climate model, and create a generalized additive model (GAM) to examine how future changes in temperature and salinity could affect the distribution and density of C. finmarchicus. By 2081–2100, we project average C.
finmarchicus density will decrease by as much as 50% under a high greenhouse gas emissions scenario. These decreases are particularly pronounced in the spring and summer in the Gulf of Maine and Georges Bank.

Furthermore, the “trained GAM was used to project C. finmarchicus densities into the future under different climate scenarios. By the 2041–2060 period, there is expected to be similar decreases in C. finmarchicus density under the RCP 4.5 and RCP 8.5 scenarios, down 22% and 25% of present day density over all regions and seasons, respectively.” https://www.nature.com/articles/s41598-017-06524-1.pdf This timeline clearly indicates that ALL the right whale conservation efforts by the lobster fishery will not help these animals to thrive as they are starving and unable to thrive in an ecosystem that is failing them.

With all the modeling, speculations, and conservation efforts being expended on “saving” the right whales, maybe we should all be looking at saving the Calanus. Without enough food, calanus, to feed on, by 2100 will there be any right whales left? Based on the BiOp 50 year predictions and the projected calanus density model, most likely there will not be any right whales left.
Additionally, the BiOp clearly stated; the ecosystem is changing and the species is shifting northward into unprotected waters. Per the United States Census Bureau’s, Coastline Population Trends in the United States: 1960 to 2008 the growth along the eastern seaboard of the United States “Between 1960 and 2008, the percentage increase in population along the coastline (84 percent) was greater than that of the United States (70 percent).” Unfortunately, the majority of that growth on the eastern coastline was based on “new coastline residents in the 1990s and post 2000 periods.”


With upwards of a 500% increase in coastal populations along the eastern seaboard, has a real detrimental impact on the marine ecosystem. Without ecosystem safeguards in place, there seems to be an equally disproportionate amount of conservation mandates put on the commercial lobster industry without any conservation repercussions being put on the population along the eastern seaboard. Are we all doing our part to save a species that may not be able to be saved or are we killing the most historic and iconic fishing industries in the United States, the American lobster fishery?

In closing, the Massachusetts Lobstermen’s Association thanks you for the opportunity to comment and your thoughtful deliberation on our points of concern. Also we respectfully ask you to please remember, that OUR commercial fishermen are stewards of the sea and without a healthy marine ecosystem, collectively, they will not be able to continue earning a living in the historic and iconic commercial lobster fishery.

Sincerely,

Beth Casoni
MLA, Executive Director

cc.
Sen. E. Warren
Sen. E. Markey
Cong. W. Keating
Cong. S. Moulton
Gov. C. Baker
Lt. Gov. K. Polito
EEA, Sec. K. Theoharides
FWE, Com. R. Amidon
DMF, Dir., D. McKiernan
MAFAC
March 1, 2021

Via Federal eRulemaking Portal

Michael Pentony, Regional Administrator
NMFS, Greater Atlantic Regional Fisheries Office
55 Great Republic Drive
Gloucester, MA 01930

RE: Proposed Amendments to Regulations Implementing the Atlantic Large Whale Take Reduction Plan, NOAA-NMFS-2020-0031

Dear Mr. Pentony:

The Maine Lobstermen’s Association (“MLA”) provides these written comments in response to the National Marine Fisheries Service’s (“NMFS”) proposed rule to amend the regulations implementing the Atlantic Large Whale Take Reduction Plan (“TRP”) and NMFS’s associated draft environmental impact statement (“DEIS”). See 85 Fed. Reg. 86,878 (Dec. 31, 2020) (“Proposed Rule”). MLA appreciates NMFS’s consideration of these comments.¹

The MLA was founded in 1954 and is the oldest and largest fishing industry association on the east coast. The MLA advocates for a sustainable lobster resource and the fishermen and communities that depend on it. The MLA engages in advocacy, education, stewardship and sustainable resource management, collaborative research, and cultural exchange. For more than 65 years, the MLA has ably represented the interests of the Maine lobster industry and educated the public, regulators, and elected officials about the importance of this industry.

The MLA is committed to supporting both the continued viability of the Maine lobster fishery and the improvement of the health of the western North Atlantic stock of the North Atlantic right whale (“NARW”) through management measures that accurately address documented risks to the NARW based on the best available science. Maine lobstermen are world leaders in conservation and stewardship. We take pride in our longstanding sustainable fishing practices, which include the implementation of successful measures for over two decades to protect the NARW. Since NMFS formed the Atlantic Large Whale Take Reduction Team (“TRT”) in 1997, the MLA has been fully engaged in working to reduce the potential risks to the NARW from entanglement in U.S. fishing gear.

We provide the comments below to inform and improve NMFS’s development of a final rule and preparation of a final EIS. As an important initial matter, we wish to emphasize that MLA opposes the proposed LMA1 restricted area, which is the product of a legally, scientifically, and factually deficient process. The TRT did not recommend (or even discuss) the LMA1 restricted area. No LMA1 closure of any kind was presented for public review and input in the scoping process for the DEIS. Consequently, the proposed LMA1 restricted area has not been sufficiently vetted and, indeed, NMFS has substantially underestimated the economic impact of this proposal. A mere 60 days for public input is not adequate to assess and inform a proposal that (1) will have adverse economic, operational, safety, and social impacts on the fishery and (2) in the normal course, would have been comprehensively investigated and informed through the statutorily mandated Marine Mammal Protection Act (“MMPA”) take reduction planning and National Environmental Policy Act (“NEPA”) scoping processes.

In the short period of time that has been given, MLA has worked diligently to assess the proposed LMA1 restricted area as best as possible under the circumstances. Notwithstanding MLA’s opposition, if NMFS decides to implement the LMA1 restricted area, then MLA strongly recommends that NMFS: (1) shift the closure period to September through December; (2) reconfigure the restricted area as specifically described in the comments below; and (3) select Alternative 1-B (the “trigger” option). These recommendations would significantly reduce the economic, operational, safety, and social impacts of the closure without compromising conservation benefits to NARW. Additionally, the “trigger” implementation option would also allow NMFS to both implement the restricted area if and when it becomes necessary, and properly investigate temporal and geographic options for the restricted area based on full input from the fishery and other stakeholders. Our detailed comments and recommendations regarding the LMA1 restricted area are set forth in Section II.D below.

The other key points and recommendations addressed in Section II below are summarized briefly as follows:

- The Proposed Rule unjustifiably targets the Northeast lobster fishery. There have been no observed serious injury or mortality entanglements associated with the fishery since a comprehensive suite of protective measures was implemented in 2009. See Section II.A.

- The 60% risk reduction target is flawed because it arbitrarily assigns only 50% of unknown entanglements to Canadian fisheries when the best available data show that a much higher percentage of entanglements occur within Canadian fisheries. Within U.S.
fisheries, NMFS arbitrarily assigns all risk for unknown entanglements to trap/pot gear when the best available science suggests that NARWs are twice as likely to be entangled in other types of gear. Accordingly, we recommend that NMFS take a consistent probabilistic approach for all apportionments that are made for purposes of determining risk reduction, specifically to base apportionment on observed data. See Section II.B.

- The Proposed Rule fails to account for the full benefits of weakening vertical lines to reduce mortality and serious injury from entanglements. The full benefits should be taken into account in the development of a final rule. See Section II.C.

- The MLA strongly recommends that NMFS include conservation equivalencies in its final rule to allow lobstermen as much flexibility as possible in implementing risk reduction measures, particularly when some of those measure will not be practicable for many lobstermen. See Section II.E.

- The MLA supports the Proposed Rule’s gear-marking provisions. See Section II.F.

- The Proposed Rule underestimates economic impacts. When actual impacts are considered, the Proposed Rule is economically significant under E.O. 12866 and must be evaluated as such. See Section II.G.

- The MLA recommends that NMFS adopt a phased-in implementation schedule for a final rule because lobstermen cannot reconfigure and mark gear in the middle of the fishing season. See Section II.H.

- The final EIS must present a full analysis of all of the technological, operational, economic, safety, and enforcement concerns that must be resolved for a ropeless gear fishery to be viable. See Section II.I.

- Alternative 3 exceeds legal requirements, is impracticable, and fails to maximize net benefits. NMFS should therefore not adopt Alternative 3 or any portions of Alternative 3. See Section II.J.

- The TRT process leading up to the TRP recommendations that form, in part, a basis for the Proposed Rule was rushed and flawed. This undermines both the TRP recommendations and the Proposed Rule. See Section II.K.

1. BACKGROUND

A. The Maine Lobster Fishery.

The Maine Lobster Fishery has long been an integral part of the state’s—and the New England region’s—culture, heritage, and economy. Lobstering income serves as the foundation of Maine’s coastal economy and is the economic engine that keeps many small rural towns alive.
Maine’s lobster fleet directly supports more than 10,000 jobs: 3,670 captains, up to 5,750 crew, and 1,095 students.²

The Maine Lobster Fishery generates more than $1.5 billion annually in sales and distribution supply chain revenue to the region’s economy,³ and is made up of a diverse collection of small businesses that are located in small, rural communities. Maine lobstermen live along more than 3,500 miles of coastline in 120 rural communities, including 15 year-round islands.⁴ These coastal communities lack traditional economic opportunity and instead are highly dependent on self-employment: 23% overall, with a 38% level in year-round island localities (compared to 13% nationwide).⁵ The median household income for Maine lobstermen is $39,395, compared to the national median of $44,389.⁶

By law, every Maine lobsterman is a self-employed business owner. Each runs his or her own boat and lives, works, and spends his or her earnings locally. Maine’s Department of Marine Resources (“DMR”) assigns a commercial lobster license and a maximum 800-trap tag allocation to a vessel. The vessel is owned and operated by the captain.⁷ There is no corporate ownership in the Maine lobster fleet. Licenses and trap tags can be sold only by the state of Maine; no sale or transfer by private parties is permitted.⁸ In 2018, Maine DMR issued 4,830 commercial lobster licenses and 1,095 student licenses.⁹

The Maine Lobster Fishery has been hit hard by the economic fallout of the COVID-19 pandemic. Illness and lockdowns resulted in substantial constriction of the food service and entertainment sectors, where approximately 70% of American lobster has traditionally been sold.¹⁰ Lobster is particularly vulnerable to price deflation due to the tremendous risk in holding

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² This is based on a calculation of potential crew and categories of lobster licenses sold. In 2018, there were 1,390 Class I licenses (29% no crew allowed), 1,891 Class II licenses (39% one crew member allowed), and 1,549 Class III licenses (32% up to four crew members allowed). See ME. REV. STAT. tit. 12, § 6421.


⁵ Id.


⁷ ME. REV. STAT. tit. 12, § § 6431-G.

⁸ Id. § 6421.


¹⁰ Letter from Marianne Lacroix, Exec. Director, Maine Lobster Marketing Collaborative, to Patrice McCarron, Exec. Director, Me. Lobstermen’s Ass’n, Inc. (Apr. 22, 2020) (on file with recipient).
and moving live product. For example, the price paid to lobstermen for their catch dropped from $6.00 to $3.50 per pound between Memorial Day and early June 2020 as demand fell, putting lobster businesses at risk of failing.

For more than a century, the Maine Lobster Fishery has been a stable presence along New England’s waterfronts. It is an icon of the region, and a vital part of the region’s culture, traditions, and economy. The future of many of Maine’s coastal communities, and economic opportunity for children growing up in these communities, depends on the continued success of the Maine Lobster Fishery.

B. Successful Regulation of the U.S. Northeast Lobster Fishery Under the TRP.

Sections 117 and 118 of the MMPA establish the mechanisms by which NMFS regulates the interactions of commercial fisheries with marine mammals. Section 117 requires NMFS to, \textit{inter alia}, estimate annual levels of “human-caused mortality and serious injury” (“M/SI”) of marine mammal stocks and to report those estimates in annual stock assessment reports (“SAR”).\footnote{11 U.S.C. § 1386.} Under Section 118, those M/SI estimates are used as the basis for various regulatory mechanisms. As relevant here, NMFS’s implementation of the MMPA’s take reduction planning provisions is based upon the level of M/SI by commercial fisheries compared to a marine mammal stock’s “potential biological removal” level (“PBR”).\footnote{See id. § 1387(f).}

Commercial fisheries interactions with marine mammals that do not result in M/SI do not “count against” PBR.\footnote{See id. § 1387(f)(2) (both take reduction planning goals refer only to reducing M/SI).} Accordingly, take reduction plans can include measures intended to reduce the severity of marine mammal interactions such that they do not result in M/SI.\footnote{See, e.g., 50 C.F.R. § 229.37(c) (2012) (Hawaii false killer whale take reduction regulations requiring weak hooks, strong branch lines, and training to remove hooks and trailing gear from hooked whales, resulting in non-serious interactions).} The MMPA’s take reduction planning short-term and long-term goals can therefore be achieved by both minimizing marine mammal interactions and ensuring that any interactions that do occur result in non-serious injuries.

Under the guidance of the TRT and implementation of the TRP, the NARW population growth trajectory was favorable for many years. Collaborative work by lobster harvesters, researchers, fishery managers, and other stakeholders contributed to scientific knowledge of NARW behavior and interaction with fishing gear and other human activities across its migratory range.\footnote{The MLA and its members have collaborated with scientists in developing and testing fishing gear to reduce the risk of entanglement. The MLA partnered with the NMFS gear team in the 1990s to measure gear profiles, test weak links, and explore gear modifications; worked with researchers in the 2000s to establish methods and standards to deploy weak links, develop buoy line marking methods, and deploy remotely operated vehicles and sensors to measure groundline rope profiles; and tested a variety of vertical line modifications, such as weak rope, stiff rope, glow rope, and time tension line cutters. Since}
scientists, and the private sector to develop innovative fishing practices and gear deployment strategies intended to reduce the frequency and severity of interactions between whales and fishing gear. This work led to a series of enhanced measures to mitigate risk to the species from the U.S. Northeast Lobster Fishery (the “Lobster Fishery”).

Specifically, regulations developed and imposed at the state and federal level, including those implemented under the TRP, have significantly reduced both (1) the amount of lobster-related rope in the water, and (2) the risk of a severe outcome (i.e., a M/SI determination) if a NARW encounters such gear (see Table 1 below). The principal elements of these protective measures are summarized below.

- **Sinking groundline requirement.** The 2009 TRP regulations preclude the use of “floating groundlines” connecting lobster traps and, instead, require the use of “sinking groundlines.” This eliminates the potential for whale entanglement in floating lines near the ocean bottom. This regulation removed over 27,000 miles of floating groundlines from New England waters.\(^{16}\)

- **Vertical line reduction.** The 2014 TRP regulations established minimum traps per trawl based on geographic area and distance from shore, resulting in the removal of approximately 2,740 miles of rope from the water.

- **Massachusetts Restricted Area.** In 2015, TRP regulations established a 3,000 square mile area spanning Cape Cod Bay, Massachusetts Bay, and outer Cape Cod, which has been closed to lobster gear from February 1 to April 30 annually, eliminating entanglement risk for up to three-quarters of the NARW during these months. The state waters portion of this closure is managed by the Massachusetts Division of Fisheries (“DMF”), which has extended applicability to recreational fishermen and moved the closure date beyond April 30 as appropriate.

- **Gear Marking.** Federal fixed gear fishermen regulated under the TRP are required to mark vertical lines to aid in identifying the source of gear involved in an entanglement. In 2020, Maine implemented new regulations to require unique and expanded gear markings.

2010, MLA and its members have worked with scientists to publish a resource describing lobster gear and configurations deployed in the Lobster Fishery, map lobster fishing effort, develop a fishing gear/right whale risk model, document wear issues associated with sinking groundlines and recommendations to improve wear of that line, describe options for best fishing practices, test colored vertical lines, measure the breaking strength of existing vertical lines, test new versions of weak rope, and update time tension line cutters. In addition, individual MLA members have collaborated with researchers and developers seeking to design a viable system for ropeless fishing.

\(^{16}\) See Brief for Me. Lobstermen’s Association as Intervenor-Defendants’, Decl. of Glenn Salvador at 5, Ctr. for Biological Diversity v. Ross, 2020 U.S. Dist. LEXIS 149837, Civil Action No. 18-112 (JEB)(Aug. 19, 2020) (Attached to Draft BiOp Comment Letter as Addendum C) [hereinafter Salvador Decl.].
• **Weak Links.** The TRP requires the incorporation of 600-lb. weak links (1,100 lbs in LMA3) in the top of a buoy line and to any attachments along the buoy line.

• **Universal Gear Requirements.** The TRP regulations establish a suite of gear modifications to reduce entanglement risk to NARW, prohibiting the use of floating line at the surface and wet storage of gear for more than 30 days.

• **Protections in Maine’s Exempt Waters.** In addition to the Universal Gear Requirements, the state of Maine requires lobster gear fished in Maine’s exempt waters where NMFS has determined there is minimal risk to NARW to implement whale protective measures. Exempt gear must have at least one of the following modifications: (1) sinking or neutrally buoyant rope for all buoy lines, (2) sinking or neutrally buoyant rope for all groundlines, or (3) a 600-lb. weak link attached to the top of the buoy line. As of September 2020, this gear must be marked with three purple marks (36” at the top and 12” at the middle and bottom on of the line).

• **Gear Marking.** Federally regulated fixed gear fishermen are required to mark vertical lines to aid in identifying the source of gear involved in an entanglement. In 2020, Maine implemented new regulations to require unique and expanded gear markings.

• **Effort Reduction.** The Lobster Fishery has reduced effort across all jurisdictions since the inception of the TRP. Area 3 has implemented mandatory annual trap allocation limits of 5% per year, Massachusetts has a long-standing moratorium on lobster licenses, and Maine has established a limited-entry and apprentice Program, all of which have resulted in a significant reduction in the risk of entanglement to NARWs.

In sum, implementation of additional protective measures by lobstermen under the TRP has removed nearly 30,000 miles of rope and significantly lowered the risk profile of lobster gear and fishing practices. MLA has been a key participant in the TRT process, helping to develop and successfully implement these enhanced protections for NARW with demonstrated success (Table 1). Since 2009, there has been a sustained downward trend in observed entanglement and M/SI of NARW in American lobster gear, attributable to the comprehensive actions taken under the TRP. This must be (but is not) fully accounted for in the DEIS and Proposed Rule.

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17 188-75-02 ME. CODE R. § A(2) (2021).

18 TRT members include MLA’s Executive Director, Patrice McCarron (more than 15 years); MLA President and commercial fisherman, Kristan Porter; MLA Vice-President and lobsterman John Williams; MLA Director and lobsterman Michael Sargent; and former MLA Board member and lobsterman, Dwight Carver.

19 NOAA law enforcement has reported excellent compliance rates with fishery regulations, including measures required by TRP. See, e.g., NAT’L OCEANIC & ATMOSPHERIC ADMIN., ENFORCEMENT REPORT (Oct. 2018), https://archive.fisheries.noaa.gov/garfo/protected/whaletrp/trt/meetings/October%202018/noaa_fisheries_enforcement_presentation.pdf (compliance rates for all fisheries was 92% in 2017).
II. COMMENTS ON PROPOSED RULE

A. The Proposed Rule Unjustifiably Targets the Lobster Fishery.

The MLA supports risk reduction measures that are based on the best available science, appropriately designed to achieve applicable legal standards, and accurately reflect the risk posed by each commercial fishery’s co-occurrence with NARW. The MLA is disappointed that NMFS’s management recommendations in the Proposed Rule have prioritized additional mitigation measures in the Lobster Fishery even though the most significant documented threats to NARW originate elsewhere. As described in the comments below, NMFS is not sufficiently addressing other, more substantial sources of NARW M/SI. NMFS must address the entanglement risk posed by all commercial fisheries in order to fulfill its legal obligations.

Additionally, NMFS has not sufficiently presented and analyzed available data showing that the Lobster Fishery has substantially reduced the risk it presents to NARW over the past decade through implementation of risk reduction measures that have proven to be effective. Instead, as explained in the comments below, NMFS has artificially inflated the risk of the Lobster Fishery based solely on the number of lines fished, and has not appropriately taken into account indisputably relevant factors such as location-specific whale density, whale behavior, and the threat levels associated with different types of fishing gear.

As illustrated in Table 1, continuous enhancements of whale protective measures have been followed by significant declines in NARW entanglements attributed to the Lobster Fishery. From 2000 to 2010, American lobster gear comprised 45% of known cases of such entanglements (6 cases out of 13). However, since 2010, lobster gear comprises only 0.04% of known cases (1 case out of 25). Since 2014, there has been only one entanglement (a non-serious injury) in New England lobster gear. During this same time period, no NARW is known to have died or suffered serious injury arising from entanglement in gear attributed to lobster fishing. This is significant since efforts to monitor and study NARW, including expanded survey effort, have substantially improved since the beginning of the TRT process and increased the likelihood to detect and identify sources of harm.

| Table 1. Confirmed American Lobster Entanglement 1997-2019 |
|---------------------------------|-----------------|-----------------|
| 4 Non-serious injuries           | 1 Mortality; 4 Non-serious injuries | 1 Non-serious injury |

The MLA therefore continues to object to NMFS’s prioritization of the Lobster Fishery for immediate management action. The level of risk reduction sought by NMFS is not consistent with the fishery’s demonstrated lack of confirmed entanglements and M/SI with NARW since 2010.

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21 *Id.*
B. The Risk Reduction Target of 60% Is Flawed and Inconsistent with the Best Available Science.

The MLA continues to object to the 60% risk reduction goal upon which the Proposed Rule is premised because it is not consistent with the best available science. The MLA instead urges NMFS to adopt a uniform probabilistic approach, giving full weight to observed data, to appropriately apportion unknown human causes of NARW M/SI. When available, additional data, information, and expert judgment should be used to refine those proportions. This methodology should apply to apportionment of (1) entanglements of unknown origin between U.S. and Canada, and (2) entanglements occurring within the U.S. of unknown fishing gear type.

1. NMFS ignores trends in observed data in assigning unknown-origin entanglements to U.S. fisheries.

A core premise of the 60% risk reduction target is NMFS’s assignment of half of all entanglements of unknown origin to U.S. fisheries. NMFS makes this assumption “[f]or the purposes of developing a conservative target” despite observational data showing a significantly higher proportion of entanglements with Canadian fisheries. This 50-50 assumption is very significant because 96% of all mortality attributed to the Lobster Fishery results from entanglements of unknown origin. As detailed below, the 50-50 assumption is flawed and inconsistent with the best available science.

First, NMFS’s 50-50 allocation is not consistent with recent observational data showing the disproportionate lethality of Canadian snow crab gear. As illustrated by Table 2 below, from 2016 to 2019, the data show a disturbing trend in which Canadian gear accounts for 31% of known entanglements and 36% of M/SI. However, NMFS improperly discounts the value of this observed data in the DEIS, stating that entanglements “can rarely be identified to a specific fishery” and “[i]t is impossible to confirm the country of origin for every incident.” NMFS’s own data show that identifying causation is not uncommon, with 37% of entanglement cases confirmed to a country from 2016 to 2019. Moreover, no confirmed M/SI from entanglements with U.S. fisheries have been observed over the last five years through 2019. Indeed, on February 23, 2021, the Atlantic Scientific Review Group (“ASRG”) prepared a consensus statement recommending that NMFS “reassess the 1:1 apportionment of mortality between the US and Canada based on recent observed M/SI.” (Emphasis added.)

23 Id.
24 NAT’L MARINE FISHERIES SERV., DRAFT ENV’T IMPACT STATEMENT, at 2-30 (Dec. 30, 2020) [hereinafter “DEIS”].
Summary of Entanglement Incidents – US-Canada Comparison

<table>
<thead>
<tr>
<th></th>
<th>2000-2019</th>
<th>2016-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entanglement</td>
<td>MSI</td>
<td>Entanglement</td>
</tr>
<tr>
<td>All events</td>
<td>114</td>
<td>52</td>
</tr>
<tr>
<td>CN</td>
<td>18 (16%)</td>
<td>9 (17%)</td>
</tr>
<tr>
<td>US</td>
<td>8 (7%)</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>88 (77%)</td>
<td>41 (79%)</td>
</tr>
</tbody>
</table>

Source: Adapted from Draft BiOp, Table 56

Second, although the data presented above may not be statistically significant,\(^{25}\) it is arbitrary to ignore the stark differences in confirmed U.S. and Canadian entanglements. There are underlying factors that strongly suggest a divergence with respect to both entanglement risk associated with the trap/pot gear profiles used in each country and the risk of encounter based on the recent shift in whale migratory behavior to the Gulf of St. Lawrence during the snow crab fishing season. The combination of foraging behavior, which exposes whales to greater risk, and proximity to heavy snow crab fishing gear has proved deadly in recent years. Indeed, Canada had few, if any, risk reduction measures in place prior to 2017.\(^{26}\)

Meanwhile, beginning in 2009, both U.S. fisheries and maritime transportation sectors implemented a series of regulatory enhancements to reduce NARW M/SI U.S. waters.\(^{27}\) U.S. fisheries implemented additional measures in 2014 to reduce the number of vertical lines. This set of regulatory improvements, coupled with the shift of NARW migratory habits that exposes the animals to Canada’s more lethal snow crab gear, explain the differences in the most recent data.

Glenn Salvador, who spent more than two decades as a gear specialist at NMFS, examined NMFS’s entanglement data over the 2000-2018 period to assess the effects of the protective measures implemented in the U.S. (but not in Canada) starting in 2009.\(^{28}\) Specifically, Mr. Salvador reviewed data available for 138 documented entanglement cases in U.S. and Canadian fisheries of all types, and concluded that there has been a significant decline in NARW entanglements in U.S. lobster gear since 2010. Moreover, he noted that, since 2014, there has

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\(^{25}\) Based on a Student’s T-Test (2-tailed), the difference is not significant at p < 0.05. RONALD E. WAPOLE & RAYMOND H. MYERS, PROBABILITY & STATISTICS FOR ENGINEERS & SCIENTISTS (7th Ed. 2006).


\(^{27}\) See supra Section I.A. Although increased NARW migration into the Gulf of St. Lawrence was observed as early as 2015, Canadian regulators did not implement enhanced protective measures for vessels until 2017 and fisheries until 2018. See NARW sightings data at [https://apps-nefsc.fisheries.noaa.gov/psb/surveys/MapperiframeWithText.html](https://apps-nefsc.fisheries.noaa.gov/psb/surveys/MapperiframeWithText.html).

\(^{28}\) Salvador Decl., supra note 16, at 5.
been only a single, non-serious entanglement attributed to the Lobster Fishery for which Maine was ruled out as the origin of the gear involved. Mr. Salvador also observed that rope removed from entangled whales since 2014 is not characteristic of ropes used in the Lobster Fishery. Based on these findings, he concluded that “the decline in lobster gear entanglement is due to the success of whale protection measures implemented by lobstermen and a significant distributional shift of NARW into Canadian waters where they encounter Canadian fishing gear.” Mr. Salvador further concluded that “[t]he largest entanglement threat is now posed by Canadian snow crab gear trap/pot gear.” The data supporting his conclusion are illustrated in Figure 1 below.

MLA has identified a pronounced trend in NMFS’s data on gear of unknown origin, with the proportion of cases with no gear present increasing significantly beginning in 2015 coincident with the increase in confirmed entanglement in Canadian snow crab gear. This raises significant unanswered questions about the responsibility of Canadian fisheries for these entanglements.

Figure 1.

Third, to determine what percentage of the unknown sources are U.S. versus Canadian fisheries, NMFS also considered “assigning those seen first in U.S. waters to U.S. gear” and determined this approach “would suggest that a two- or threefold reduction is necessary to achieve PBR.” However, as noted in the NARW stock assessment, “[t]he date sighted and

29 Email from Patrice McCarron, Exec. Director, Me. Lobstermen’s Ass’n, Inc., to Dave Morin, NOAA Greater Atl. Reg’l Fisheries Office (“GARFO”) Large Whale Disentanglement Coordinator (Aug. 15, 2019). (attached as Addendum 2).

30 Id.

31 Id.

32 Id.

33 The MLA first raised this issue with NMFS in an August 30, 2019 letter to Chris Oliver. Letter from Me. Lobstermen’s Ass’n, Inc. to Chris Oliver, Assistant Administrator NOAA Fisheries (Aug. 30, 2019) (attached as Addendum 3).

34 DEIS, supra note 24, 2-38.
location provided...are not necessarily when or where the serious injury or mortality occurred; rather, this information indicates when and where the whale was first reported beached, entangled, or injured.”  

According to NMFS’s entanglement data, at least four entanglements confirmed in Canada gear were first sighted in U.S. waters. Yet NMFS continues to erroneously cite data on entangled whales first sighted in U.S. waters as a justification for the need for management action in the U.S.  

*Fourth*, the DEIS states “that much of the North Atlantic right whale population is believed to spend more time exposed to fisheries in U.S. waters than in Canadian waters,” yet there are *no* data available to support this assumption. Moreover, residency time in U.S. waters is generally irrelevant for the purpose of ascertaining the entanglement risk of commercial fisheries. NMFS should instead compare the time spent by NARW in the portion of U.S. waters where the lobster fishery operates to inform its assumptions to apportion unknown whales among fisheries. Residency time in more southern locations, for example, is not indicative of the entanglement risk of the Lobster Fishery. This same concern was expressed in the Center for Independent Experts’ (“CIE”) review of the Decision Support Tool (“DST”).  

*Fifth*, neither the Proposed Rule nor the DEIS addresses the difference in observation effort between Canadian and U.S. waters. Survey effort has historically been significantly greater in U.S. waters, as NMFS has conducted aerial surveillance operations on nearly a year-round basis for many years. As a result, entanglement events in Canadian waters were likely under-sampled prior to 2017, the year when survey effort in Canada was increased with the assistance of NMFS. Greater survey effort in the U.S. relative to Canada increases the likelihood that an entanglement event identified in the U.S. was also observed in Canadian waters. As a result, the DEIS’s assertion that U.S. waters have “less entanglement risk” is not supported by the data.  

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36 The fact that NARW carcasses entangled in Canadian snow crab gear started to show up in U.S. waters since 2015 indicates that entanglements first sighted in the U.S. without the entangling gear present must be assigned some probability that the entanglement originated in Canada.


38 Email from NOAA Greater Atl. Reg’l Fisheries Office to Nat’l Marine Fisheries Serv. Atlantic Large Whale Take Reduction Team (Apr. 18, 2019) (Introducing the 50:50 US/CN apportionment, GARFO states: “Because our Stock Assessment Reports have not included a determination on the fraction of time North Atlantic right whales spend in U.S. and Canadian waters, we do not have a data-based residency estimate to apply at this time.”); see also Draft BiOp Comment Letter, Addendum D.


40 NMFS data presented at the October 2018 TRT meeting shows that while surveillance in Canada increased significantly in 2017 and was greater than U.S. efforts (95 hours in Northeastern US, 152 hours in CN), surveillance efforts were similar in 2018 (150 hours Northeastern U.S. vs. 152 hours in Canada). NAT’L MARINE FISHERIES SERV. ATL. LARGE WHALE TAKE REDUCTION TEAM Meeting, Providence, RI, Oct. 9-12, 2018.
entanglement event would be observed. A small number of additional observed entanglements in Canadian waters would be sufficient to make the difference between the U.S. and Canada statistically significant. This factor also undermines NMFS’s 50-50 allocation.41

Sixth, similar to the concerns recently expressed by the ASRG, NMFS’s earlier peer review of the DST called into question the 50-50 allocation. Specifically, the peer review report states:

The current approach for apportioning human-caused mortality by country may not be the most appropriate approach. There has been a clear recent shift in the spatial distribution of NARW which has been coupled with a shift in the source of known serious injuries or mortalities to more Canadian records. Therefore, a different method from the 50:50 split of unknowns to US and Canadian fisheries should be examined.[42]

Reviewer Jason How acknowledged the lack of a scientific basis for the 50-50 split and offered a different approach to address the uncertainty:

The current 50% apportionment of unknowns to U.S. fisheries does not reflect the current shift in NARW distribution and the recent increase in Canadian fisheries involvement in SI-M. Discussions between industry and government should therefore be entered into to find a compromise solution, whereby the recent shift in NARW abundance is accounted for, but fishers are still required to address the SI-M issues which likely arise from their fisheries noting the large number of unknown SI-M which can’t be attributed to a particular country.[43]

In sum, NMFS arbitrarily assigns a 50-50 allocation between U.S. and Canadian fisheries rather than using a probabilistic approach informed by observed entanglements from 2010-2019. This is not consistent with the best available science, and artificially inflates the presumed impacts of U.S. fisheries, and the Lobster Fishery specifically, which, in turn, calls into question NMFS’s 60% risk reduction target. NMFS must revise the risk reduction target to correctly reflect an allocation of risk between Canada and the U.S. that is supported by the best available science.

41 MARTIN CRYER, CTR. FOR INDEP. EXPERTS, INDEPENDENT PEER REVIEW NORTH ATLANTIC RIGHT WHALE MODEL POPULATIONS, at 5 (May 2020) (stating the 50:50 allocation “does not seem to have much supporting evidence in the documentation provided.”).

42 BOWEN ET AL., supra note 39, at 13.

43 Id. at 18.
2. The best available science does not support an assumption that all unknown gear entanglements involve U.S. commercial trap/pot fisheries.

NMFS’s assumption that the U.S. commercial trap/pot fisheries must reduce risk by 60% is further compromised by NMFS’s mistaken premise that it must focus on the fisheries “representing the highest number of endlines in the U.S. Atlantic.”\textsuperscript{44} The Draft BiOp shows that this premise stems from NMFS’s assumption that “all of the presumed U.S. entanglements in unknown gear were from trap/pot gear (2016 IEC, unpublished data).”\textsuperscript{45} This misallocation of all M/SI entanglements of unknown gear type to U.S. trap/pot fisheries has the effect of making these fisheries responsible for an additional 38%\textsuperscript{46} of entanglements with no evidence of the fisheries’ involvement in those entanglements. This is arbitrary for a number of reasons.

First, the best available data suggest that NARWs are more often entangled in gear types other than lobster gear. Where the type of gear involved in an entanglement event is known, and Canadian trap/pot incidents are excluded, the ratio between non-trap/pot gear and trap/pot gear is 1.75:1. \textit{See Table 3 below.}\textsuperscript{47} In other words, observations involving confirmed gear type suggest that NARW are nearly twice as likely to be entangled in gear other than commercial trap/pot fisheries. We understand that gear is recovered in a relatively small proportion of entanglement incidents, and that the gear type is identified in even fewer incidents. However, to completely discount the distinction in observed data and assign all entanglements of unknown gear type to trap/pot fisheries for the purpose of assigning responsibility for an allegedly needed risk reduction is without scientific support and is arbitrary.

\textsuperscript{44} DEIS, \textit{supra} note 24, at 2-34.


\textsuperscript{46} 76% of M/SI are unknown; NMFS allocates half of this to the U.S. \textit{See DEIS, supra} note 24, at 2-34.

\textsuperscript{47} Email attachment from Colleen Coogan, NOAA Greater Atl. Reg’l Fisheries Office Marine Mammal & Sea Turtle Branch Chief, to Patrice McCarron, Exec. Director, Me. Lobstermen’s Ass’n, Inc. (Dec. 24, 2020); \textit{see} Draft BiOp Comment Letter, Addendum E.
Table 3.
Summary of Entanglement Incidents – By Gear Type – 2000-2019

<table>
<thead>
<tr>
<th></th>
<th>Entanglement</th>
<th>MSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>All events</td>
<td>114</td>
<td>52</td>
</tr>
<tr>
<td>Gear known</td>
<td>25</td>
<td>12</td>
</tr>
<tr>
<td>Trap/pot</td>
<td>18</td>
<td>10</td>
</tr>
<tr>
<td>trap/pot – CN crab</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>trap/pot – US</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>trap/pot – US lobster</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>trap/pot – Unknown</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Non-trap</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Non-trap – US</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Non-trap – country unknown</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Gear unknown</td>
<td>89</td>
<td>40</td>
</tr>
<tr>
<td>No gear present</td>
<td>52</td>
<td>18</td>
</tr>
<tr>
<td>Gear not recovered</td>
<td>33</td>
<td>19</td>
</tr>
<tr>
<td>Gear undetermined</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: NMFS NARW Entanglement Data 2000-2019

Second, although most of the lines in U.S. waters are from trap/pot fisheries, NMFS recognizes that not all lines pose the same risk to NARW. NMFS developed the DST to assess the variable threat from different gear types and configurations in its risk assessment. A methodology is under development to assess risk of lobster lines based on the type of rope fished (i.e., strength based on diameter) and the configuration of the gear (i.e., length of line, length of trawl).48 Even with an incomplete understanding of the threat of various gear types, early results of the DST show that line density alone is not a reliable indicator of risk to whales. For example, the state of Maine, using the DST, determined that 70% of the risk to NARW from Maine lobster gear occurs in an area where only 10% of lines are fished.49

Third, the best available data show that both the entanglement risk and potential of a severe entanglement differ between trap/pot and non-trap gear. Just as encounters with strong, large diameter line fished in Canadian trap/pot fisheries have been responsible for the majority of NARW M/SI in recent years, it is likely that a NARW encountering non-trap gear fished in wide strings would have a higher likelihood of entanglement than a vertical line occupying less than


49 Letter from Erin Summers, Director of Biomonitoring & Assessment Division of Me. Dep’t Marine Resources, to Patrice McCarron, Exec. Director, Me. Lobstermen’s Ass’n, Inc. (Feb. 12, 2021) (on file with recipient); see also DEIS, supra note 24, at 3-105 (with preliminary risk analysis: “Maine federal waters from the 3- mile line out to 12 miles constitutes 11% of Maine’s annual NARW occurrence and 88% of Maine’s NARW presence is contained beyond 12 miles.”).
an inch across the water column.\textsuperscript{50} The Woods Hole Oceanographic Institute has developed a methodology in collaboration with the fishing industry to attribute risk to gear based on proportion of water column occupied.\textsuperscript{51} This information must be considered in this rulemaking.

\textit{Fourth,} neither the Proposed Rule nor the DEIS addresses the potential for a whale to shed trap versus non-trap gear, which is highly relevant considering that fishing gear is shed in the majority of incidents. Two-thirds of all entanglement events are minor,\textsuperscript{52} meaning that whales frequently shed fishing gear, avoiding serious injury. It is reasonable to assume that the entanglement profile of fishing gear influences the likelihood of its being shed, and ultimately, the probability of a resulting serious or non-serious entanglement. The DEIS does not analyze differences between trap and non-trap fisheries with respect to the potential to cause M/SI. Instead, NMFS simply assigns all M/SI resulting from unknown gear type to trap/pot fisheries rather than using a probabilistic approach informed by observed entanglements. In so doing, NMFS fails to accurately address the highly important legal distinction between entanglements that result in M/SI (which count toward PBR) and entanglements that result in non-serious injuries (which do not count toward PBR).

\textit{Fifth,} NMFS has not taken account of significant variances in NARW behavior. The scientific literature demonstrates that NARW diving depth depends on the distribution of prey (especially \textit{C. finmarchicus}) (Baumgarten \textit{et al.} 2017). Floating groundlines, which have been prohibited in federal waters since 2009, pose a particular threat in areas where NARW are known to dive to the seafloor (Hamilton and Krause 2019\textsuperscript{53}). Foraging behavior exposes baleen to entanglements, which subsequently interfere with successful feeding (Cassoff \textit{et al.} 2011\textsuperscript{54} and Johnson \textit{et al.} 2005\textsuperscript{55}). There is ample scientific documentation of feeding grounds within U.S. waters,\textsuperscript{56} and fishing gear deployed in those areas must be considered to pose higher risk of M/SI than elsewhere. Specifically, NARW are known to forage in areas off the coast of Massachusetts


\textsuperscript{51} See HAUKE L. KITE-POWELL \textit{ET AL.}, THE SPATIAL AND TEMPORAL DISTRIBUTION OF RISK TO RIGHT WHALES FROM LOBSTER FISHING GEAR OFF THE COAST OF MAINE (forthcoming).

\textsuperscript{52} PHILLIP K. HAMILTON \textit{ET AL.}, MAINTENANCE OF THE NORTH ATLANTIC RIGHT WHALE CATALOG, WHALE SCARRING AND VISUAL HEALTH DATABASES, ANTHROPOGENIC INJURY CASE STUDIES, AND NEAR REAL-TIME MATCHING FOR BIOPSY EFFORTS, ENTANGLED, INJURED, SICK, OR DEAD RIGHT WHALES, at 50 (Oct. 2020).


\textsuperscript{56} 2019 Stock Assessments, \textit{supra} note 35; NAT’L OCEANIC & ATMOSPHERIC ADMIN. Technical Memo. NMFS-NE-264.
and the Gulf of St. Lawrence where large aggregations congregate for significant periods of time. By contrast, NARW in Maine waters are generally transiting from south of Maine to Canadian waters where their prey is found.\(^{57}\) Thus, the risk of M/SI to NARW from Maine fishing gear is lower than the risk posed by fishing gear in waters where NARW foraging occurs based on both density of whales present and whale behavior.

The Proposed Rule is arbitrarily premised upon a scenario that inflates the assumed frequency and severity of NARW entanglements with trap/pot fisheries based solely on presence of rope. If this mistake is not corrected, the Proposed Rule and NMFS’s subsequent regulatory efforts with respect to non-trap/pot fisheries could fail to benefit NARW because they will not adequately address entanglement with gear that is most likely to result in M/SI.

We therefore strongly recommend that NMFS take a consistent probabilistic approach for all apportionments that are made for purposes of determining risk reduction, specifically to base apportionment on observed data. This approach should also consider additional data, information, and expert judgment, as appropriate, and apply them in a manner that refines the allocations based on observed data.

C. The Proposed Rule Underestimates the Risk Reduction Benefits from Non-Closure Measures.

1. The DST is fundamentally flawed and must be updated.

The DST’s calculations of entanglement risk equally weight whale abundance, gear density, and gear type. Independent reviewers expressed concerns with this approach and made numerous suggestions to refine it.\(^{58}\) Based on the reviewers’ comments and input MLA has received from its members, NMFS cannot support the assumption that the likelihood of entanglement of NARWs is based equally on these factors.\(^{59}\) Instead, the DST must consider whale behavior in addition to whale density and develop a gear threat tool that more accurately reflects the risk of different gear types including size and strength of gear, and gear configurations and rigging techniques that inform relative threat of gear to NARW.

\(^{57}\) Note that the study of NARW foraging tagged a small number of whales around Jeffrey’s Ledge and no individuals elsewhere within waters offshore of Maine. Most of the foraging whales were located offshore Massachusetts and in the Bay of Fundy. MARK F. BAUMGARTNER ET AL., NORTH ATLANTIC RIGHT WHALE FORAGING ECOLOGY AND ITS ROLE IN HUMAN-CAUSED MORTALITY, Fig 1. (OCT. 2017), https://doi.org/10.3354/meps12315 [hereinafter Baumgartner, et al.].

\(^{58}\) See BOWEN ET AL., supra note 38.

\(^{59}\) JULIE VAN DER HOOP, CTR. FOR INDEP. EXPERTS, REVIEW OF THE NORTH ATLANTIC RIGHT WHALE DECISION SUPPORT TOOL, at 13 (Dec. 2019) (“The challenge is that we know little about how a co-occurrence becomes an entanglement.”); BOWEN ET AL., supra note 38, at 9 (“Little is known about the circumstances that lead right whales to become entangled or those that result in the whale becoming disentangled.”); JASON HOW, CTR. FOR INDEP. EXPERTS, CENTER FOR INDEPENDENT EXPERTS INDEPENDENT REVIEW OF THE NORTH ATLANTIC RIGHT WHALE DECISION SUPPORT TOOL, at 2 (Dec. 2019) (“Currently there is too much uncertainty regarding the mechanisms surrounding an entanglement and how these are likely to be impacted by changes to gear configuration and whale size etc.”).
Improved information on whale behavior and the threat of various gear types and configurations is especially important to designing mitigation measures that achieve risk reduction targets. Making these improvements will ensure that economic impacts are optimized with respect to reducing entanglement risk, and that the Lobster Fishery receives full credit for its actions. As presently designed, the DST imposes tremendous cost on the Lobster Fishery without commensurate risk reduction or properly calculating risk reduction.

There is a significant range in DST estimates of risk reduction from measures in the Proposed Rule. Specifically, the DEIS estimates the effectiveness of the Proposed Rule to range from 47.1 to 79.4 percent (DEIS Table 3.4). Excluding the LMA1 restricted area, the estimated effectiveness varies between 36.1 and 67.7 percent, with a central estimate of 57.3 percent. The effects of some of the risk reduction measures may exceed the upper bound of effectiveness, let alone the central estimate, as discussed below for the weak line requirements.

Were the measures in the Preferred Alternative to achieve their maximum estimated effectiveness, the proposed LMA1 restricted area would not be necessary to meet the Lobster Fishery’s risk reduction target. NMFS may account for this uncertainty in effectiveness when structuring its regulations to implement conservation measures in phases. In light of the recommendations made by independent experts to further refine the DST, which we fully support, we believe NMFS should use a phased approach to risk reduction rather than immediately implementing a closure (the LMA1 restricted area) that may not be necessary.60

2. The Proposed Rule does not account for the full benefits of weakening vertical lines.

The proposed mitigation measures that eliminate line in the water (e.g., trawling up or a closure) would reduce the risk of entanglements of all degrees. Although weak points inserted in rope do not reduce the risk of a NARW *encounter*, there is a rational basis to assume that weak-point insertions effectively reduce the likelihood of a severe (i.e., M/SI) entanglement. NARW are likely to break free of gear rigged with weak point insertions by applying enough force to break the line and swim free. However, the DEIS does not sufficiently consider the benefit that weak point insertions are more likely to result in minor, rather than severe entanglement, and therefore inaccurately estimates the total benefit of weakening lines to be only 14 percent.

NMFS’s 14% estimate is contrary to the best available science, which suggests that NARW are capable of applying enough force to break ropes weakened with insertions of 1700-pounds or less,61 and that those encounters rarely result in a severe entanglement. Indeed, actions that reduce severe entanglements may be sufficient to reduce the M/SI rate to below PBR.

60 MLA is aware that NMFS has recently re-run the DST model. MLA’s comments are provided based upon the information presented in the Proposed Rule and the associated record presented for public review. Any new DST model runs are not part of the administrative record and cannot form the basis for a final rule under the Administrative Procedure Act (“APA”).

Knowlton et al. (2015)\textsuperscript{62} found that, “broad adoption of ropes with breaking strengths of \(\leq 7.56\) kN (\(\leq 1700\) lbsf) could reduce the number of life-threatening entanglements for large whales by at least 72%, and yet could provide sufficient strength to withstand the routine forces involved in many fishing operations. The authors concluded that “[a] reduction of this magnitude would achieve nearly all the mitigation legally required for U.S. stocks of North Atlantic right and humpback whales.” Id. (emphasis added).

The DEIS takes an overly conservative approach by crediting risk reduction for only the portion of the line above the lowest weak insertion. In taking this approach, NMFS assumes that a NARW is equally likely to encounter any section of the line, and therefore equally likely to be entangled at any section of a line. Although this assumption may be correct in areas where NARW forage and are therefore diving to greater depths (Baumgartner et al. 2017), this assumption is unsupported in areas where NARW spend the majority of time in transit (such as waters offshore of Maine).\textsuperscript{63} The DEIS does not explain why migrating NARW are equally likely to encounter line at the surface and seafloor. This assumption is particularly relevant to Maine fisheries because NARW have primarily used these waters since 2010 for transiting rather than foraging. Based on the best available information, NMFS should apply more risk reduction for weak line in areas where NARW transit and are therefore less likely to encounter line at greater depths.

Finally, in stark contrast to Canadian snow crab gear, lobster gear already incorporates many weak points in vertical lines through the routine rigging of multiple ropes into a single line with knots and splices. A NMFS gear specialist characterized snow crab gear as “heavy traps on knot free and fairly uniform large diameter ropes.”\textsuperscript{64} The lack of weak points in this Canadian gear provides a likely explanation of why snow crab gear, and not lobster gear, is routinely found on entangled whales and commonly associated with M/SI. The addition of 1700-pound weak points in a line will further reduce NARW M/SI and exceed the current estimate of 14 percent risk reduction.

Successful take reduction planning under the MMPA does not occur solely through mechanisms intended to avoid all marine mammal interactions. Weakening lines is a promising and well-supported method to reduce the severity of interactions and thereby convert NARW entanglements that might otherwise result in M/SI to non-serious encounters. The final rule must more accurately account for this important and effective method for reducing NARW M/SI, which will achieve more than a 14% risk reduction in the overall plan. Maine DMR developed an independent methodology to assess the reduction from weak rope. The result of this analysis was that weak points adopted within the Maine Lobster Fishery, as proposed in the DEIS’s Preferred Alternative, reduced risk by 25%, compared to the NMFS estimate of 11.8% credit for Maine.\textsuperscript{65}

\textsuperscript{62} AMY KNOWLTON, EFFECTS OF FISHING ROPE STRENGTH ON THE SEVERITY OF LARGE WHALE ENTANGLEMENTS (July 2015), https://doi.org/10.1111/cobi.12590.

\textsuperscript{63} BAUMGARTNER ET. AL., supra note 57.

\textsuperscript{64} DEIS, supra note 24, at 2-40.

\textsuperscript{65} DEIS, supra note 24, at 3-98.
D. The Proposed LMA1 Restricted Area is Unwarranted.

1. MLA opposes the proposed LMA1 restricted area because it was not recommended by the TRT and lacks a rational basis.

   The MMPA places significant emphasis on the judgment and recommendations of take reduction teams. When amending take reduction plans, as NMFS is proposing to do here, the Secretary “shall” take a team’s recommended plan into consideration and must provide a written “explanation of the reasons” for any changes the Secretary makes to the recommended plan when issuing implementing regulations. Here, NMFS has proposed the LMA1 restricted area, but the TRT did not consider or recommend the LMA1 restricted area or any other restricted area in Maine offshore waters. NMFS fails to sufficiently address this significant discrepancy or explain the reasons why it is proposing to alter the risk reduction approach set forth in the TRT’s near-consensus recommendation. This violates the MMPA and, in light of the deficiencies identified above and below, falls short of the rational basis for agency rulemaking required by the APA. The MLA therefore opposes the LMA1 restricted area.

2. The DEIS significantly underestimates the cost of the LMA1 restricted area.

   NMFS estimates that the LMA1 restricted area will reduce catch by 5 to 10 percent. NMFS bases this estimate on the following assumptions: (1) there is no additional cost to fishermen to reconfigure their gear to meet the minimum trawl length required in any area to which they relocate; (2) fishermen would fish the same number of end lines and traps as they used in the closed area; (3) fishermen will relocate to productive ground; and (4) fishermen will continue to make the same number of fishing trips. This assessment is deficient for the following reasons.

   First, NMFS presented no data to support its catch reduction estimate in LMA1 and has failed to address this data gap as required by law. NMFS admits that “[t]he data required to develop a rigorous estimate of potential catch impacts are not available.” This information is plainly “essential to a reasoned choice among alternatives” as NMFS itself has presented three options for the LMA1 restricted area and two of those options (automatic closure and triggered closure) were not recommended by the TRT or presented to the public for input during the NEPA scoping process. Accordingly, NMFS was required to obtain the data and include it in the DEIS if the “overall costs of obtaining [the data] are not unreasonable.” Alternatively, if NMFS determined that the costs of obtaining the data are unreasonable, it must present, in the

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67 See id. § 1387(f)(7)(B–F).
68 DEIS, supra note 24, at 6-212.
69 The NEPA implementing regulations establish a specific, detailed scoping process, which “shall be an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action.” 40 C.F.R. § 1501.7 (emphasis added). The LMA1 restricted area is plainly a “significant issue” but was never addressed during scoping.
70 50 C.F.R. § 1502.21(b).
DEIS, the analysis required by 50 C.F.R. § 1502.21(c). 71 The DEIS is legally deficient because it entirely fails to comply with 50 C.F.R. § 1502.21.

Second, NMFS’s assumptions regarding how fishermen will respond to the LMA1 restricted area are not supported by the best available information, and the agency provides no evidence or rationale to support those assumptions. Contrary to NMFS’s assumptions, many fishermen are unlikely to relocate to other, equally productive fishing grounds. An essential element of any lobstering business plan is to fish the most productive bottom available in the most cost-effective manner. Since the proposed LMA1 restricted area is located on the outermost edge of LMA1, lobstermen would not pay the high operating expense to steam that far offshore unless they are accessing the most productive fishing grounds. The LMA1 restricted area presents the combined adverse impact of losing access to the most highly productive fishing bottom while having to compete with other lobstermen fishing in less productive lobstering areas.

Third, Maine lobstermen cannot simply take up all their gear and shift it to the most productive fishing bottom. Under Maine’s lobster zone management program, lobstermen are significantly limited in where they can fish. Lobstermen must declare a home zone where they are required to fish a majority of their lobster traps, making it illegal to move all of their lobster gear to another fishing ground of choice. This significantly limits the spatial footprint of the Maine Lobster Fishery. Maine lobstermen bear the additional burden of having to double tag any lobster gear fished outside of their home zone. 72

71 Specifically, 50 C.F.R. § 1502.21(c) requires:

(c) If the information relevant to reasonably foreseeable significant adverse impacts cannot be obtained because the overall costs of obtaining it are unreasonable or the means to obtain it are not known, the agency shall include within the environmental impact statement:

(1) A statement that such information is incomplete or unavailable;

(2) A statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment;

(3) A summary of existing credible scientific evidence that is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment; and

(4) The agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community.

72 188-25-08 ME. CODE R. § A(5) (2021) (“A person who holds a Class I, Class II or Class III lobster and crab fishing license may not fish more than 49% of that person’s lobster traps in a limited entry zone unless that person's license identifies that zone as the declared lobster zone.”).
Furthermore, the Maine Lobster Fishery is highly territorial and lobstermen fiercely protect productive fishing bottom. Many fishing areas are dominated by lobstermen from particular harbors or towns or by members of a fishing lineage. It can take multiple years for a lobsterman to establish a fishing presence in a new area, and many attempts to do so end in failure. For those who are successful, it can take even more time to earn access to the most productive fishing bottom within a fishing territory.

*Fourth*, increasing fishing intensity in those areas where lobstermen relocate gear will not result in lowering catch by 5 to 10 percent compared to catch that would have otherwise been generated from operating in the LMA1 restricted area. During the closure period, all LMA1 lobster catch will be forfeited and overall catch reductions could be significant. Given the large number of participants in the Maine Lobster Fishery, NMFS must assume that lobstermen are already fishing areas to maximize catch within state and federal waters. Even with some spillover of lobsters at the closure boundaries, total catch is likely to be similar in areas surrounding the proposed LMA1 closure. Relocating fishing effort during the seasonal closure will result in more fishermen chasing fewer lobsters, producing less efficient fishing effort, lower catch shares for individual lobstermen, and declines in operating margins. Any potential for cost savings to result from reduced fuel usage will be lost as gross monthly revenue declines. As a result, some vessels will continue to operate at the lower margin while others will take fewer trips as it may be difficult to cover costs.

When fishermen re-enter the proposed LMA1 restricted area at the end of the seasonal closure, it is unlikely that they will fully make up lost catch. Some lobster will have migrated out of the area to deeper waters into Area 3 where Maine lobstermen are not permitted to fish. And there will be an incentive for Area 3 boats to significantly intensify fishing effort along the edge of the LMA1 closure while it is in place. The DEIS also fails to account for natural mortality that will reduce the abundance of lobster, including predation by cod, haddock, seals, and cannibalism by other lobsters. For the purpose of modeling lobster abundance in the Gulf of Maine, the American Lobster Technical Committee has used a natural mortality rate of 0.15. All of these contributing factors result in lower harvest and lower value within LMA1 throughout the year as a result of a four-month closure.

*Fifth*, the estimate of a 5 to 10 percent reduction in catch not only has no evidentiary basis, but also fails to account for historic trends in the value of lobster. December and January are two of the highest months for the price of lobster; the five-year average is $4.55/lb. and $5.05/lb., respectively. The prices are significantly higher than, for example, August and September when the price is $3.77/lb. and $4.02/lb., respectively. Not only is the price of lobster greater during December and January, but LMA1 is disproportionately more important to lobstermen in terms of landings during these months.

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74 Maine Department of Marine Resources, see https://www.maine.gov/dmr/commercial-fishing/landings/documents/LobByCntyMoZone.pdf
The MLA conducted a survey to solicit feedback on the assumptions in the DEIS to assess economic impacts of the Proposed Rule, and received 147 responses (Addendum 4). A total of 62 percent of respondents to MLA’s survey of lobstermen (Table 3, Addendum 4) reported an anticipated 50 to 100 percent loss of revenue during December as a result of the LMA1 closure. This number rises to 72 percent of respondents in the month of January, with 40 percent estimating between 75 and 100 percent loss of revenue. Even if the LMA1 restricted area merely displaced the timing of catch instead of reducing it, the losses to the fishery in terms of value would substantially exceed 5 to 10 percent.

Sixth, the estimates in tables 6.11 and 6.12 of the DEIS are gross underestimates based on expert input from lobstermen. There are more boats, more trips, and more catch per trap in the LMA1 restricted area during October through January, in addition to higher prices (Table 2, Addendum 4). The price of lobster is particularly inaccurate, perhaps because NMFS erred when converting price per pound to kilograms. Using NMFS’s arbitrary method of a 5 and 10 percent loss in catch, the revised total loss in revenue (using the correct data values) is $992,904 and $1,985,809, respectively.

<table>
<thead>
<tr>
<th>Month</th>
<th>Catch per Trap (kg)</th>
<th>Price ($/kg)</th>
<th>Total Traps¹</th>
<th>Total Catch (kg)</th>
<th>5% Value ($)</th>
<th>10% Value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>October</td>
<td>11.4</td>
<td>$9.00</td>
<td>35,329</td>
<td>210,261</td>
<td>94,597</td>
<td>189,193</td>
</tr>
<tr>
<td>November</td>
<td>12.3</td>
<td>$9.20</td>
<td>45,929</td>
<td>269,926</td>
<td>124,112</td>
<td>248,224</td>
</tr>
<tr>
<td>December</td>
<td>12.3</td>
<td>$10.01</td>
<td>55,108</td>
<td>300,768</td>
<td>150,534</td>
<td>301,068</td>
</tr>
<tr>
<td>January</td>
<td>6.8</td>
<td>$11.11</td>
<td>56,661</td>
<td>194,032</td>
<td>107,785</td>
<td>215,569</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>992,904</strong></td>
<td><strong>992,904</strong></td>
<td><strong>1,985,809</strong></td>
</tr>
</tbody>
</table>

The DEIS did not present the method for estimating total traps. Since the survey results demonstrate more vessels operating in LMA1 than estimated in the DEIS, we assume the additional vessels fish on average the same number of traps per vessel as estimated in the DEIS.

In sum, NMFS has substantially underestimated the impacts of the proposed LMA1 restricted area on lobster catch and the value of lobster traditionally caught during the proposed closure months that will instead be landed later in the season. NMFS must revise its estimate based on the expert information provided by nearly 150 lobstermen responding to the MLA survey. This information represents the best available commercial data, and NMFS should re-evaluate the net benefits of the proposed LMA1 restricted area accordingly.
MLA therefore recommends that NMFS use the MLA estimate of $992,904 and $1,985,809, which represents the best available commercial data, in the final EIS and evaluate the net benefits of the LMA1 restricted area accordingly.

3. **Uncorrected deficiencies in the DST result in an inaccurate assessment of potential risk in LMA1.**

As explained above, there remain significant flaws and uncertainty with the risk reduction estimates generated by the DST. With respect to the LMA1 restricted area, the “hot spot” NMFS identifies is primarily predicated on the density of fishing gear rather than observed whale abundance or behavior since the oceanographic regime shift that occurred in 2010.75 NMFS’s overreliance on gear density is a driving factor for the assumed entanglement risk to NARW in the proposed LMA1 restricted area. Were the DST improved as both MLA and independent experts recommend, we are confident that the LMA1 restricted area would not be necessary to meet the risk reduction target.

The results of the DST indicate that the LMA1 restricted area is the most significant source of risk reduction for Maine lobstermen, accounting for 23% of Maine’s risk reduction (10.8% for the region). This compares to less than 20% (12% for the region) for Maine’s trawling up measures and less than 12% (14% for the region) for weak point insertions. While the current DST analysis bears this out, these results are completely counterintuitive, contrary to the best available data, and underscore the fact that NMFS has artificially inflated the risk posed by the Maine Lobster Fishery (particularly in LMA1).

Whale sightings data available to the public through WhaleMap show sparse NARW sightings in the proposed LMA1 restricted area.76 Maine DMR mapped the NARW glider detections cited as a justification in the DEIS for the restricted area and determined that 73% of these detections were outside its boundaries and occurred in Area 3.77 Two Massachusetts waters closures in the Proposed Rule that are known for large seasonal aggregations of NARW receive similar or lower risk reduction scores. The MRA closure where three-quarters of the NARW population has been sighted in a season receives a risk reduction similar to LMA1 and the South Island closure, which has frequent high abundance of NARW, receives significantly less risk reduction. The MLA believes that appropriately weighting whale behavior within the DST would significantly raise the risk reduction benefit from these two important Massachusetts habitats.

75 The DEIS’s reference to Cole *et al.* (2013) at 3-72 lacks relevance because the BiOp discounts most demographic data (e.g., calving rate) prior to 2010 based on an understanding that a permanent oceanographic regime shift has occurred. See DEIS, *supra* note 24, at 7-32. The fact that LMA1 may be suspected as a breeding ground between 2002 and 2008 would not be relevant unless favorable oceanographic conditions returned to the area.

76 See https://whalemap.org/WhaleMap/.

This uncertainty must inform NMFS’s choice of the alternative for paragraph (c)(6)(ii) of the proposed regulations, particularly in light of the severe economic impact of the proposed closure. For reasons discussed here and elsewhere, the MLA believes the LMA1 restricted area is unnecessary, unduly burdensome, and not fully informed. However, if NMFS proceeds to implement the LMA1 restricted area (whether as modified or proposed), the need for improvement of the DST underscores the benefit of selecting Alternative 1-B, which would allow for further consideration and modification of the LMA1 restricted area before implementation, if and when a closure is triggered.

4. **Alternative 1-B to the LMA1 restricted area maximizes the net benefits under E.O. 12866 and is fully consistent with OMB Circular A-4.**

As explained above, the costs of the proposed LMA1 restricted area exceed the benefits, and it is likely that other measures, such as weakened lines, will reduce entanglement risk more than what is estimated in the DEIS. As stated above, the MLA is opposed to the proposed LMA1 restricted area. If, however, NMFS proceeds to implement the LMA1 restricted area, MLA strongly believes that Alternative 1-B—to implement the LMA1 restricted area only if certain triggers are met—maximizes net benefits under E.O. 12866, for the following reasons.

E.O. 12866 directs that “in choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.”\(^78\) The proposed LMA1 restricted area is predicated on reducing the risk of entanglements resulting in M/SI by 60 percent. As addressed in Section II.B supra and demonstrated in the MLA’s comments on the Draft BiOp, however, the target of 60 percent is likely higher than what is necessary to sufficiently reduce the potential risk posed by the Lobster Fishery. Moreover, NMFS proposes to impose a potentially unnecessary level of risk reduction on fishing in the LMA1 restricted area without making a “reasoned determination that the benefits of the intended regulation justify its costs.”\(^79\)

Alternative 1-B accounts for the uncertainty associated with the amount of risk reduction to be achieved by the Lobster Fishery under the Proposed Rule. As MLA has explained, sufficient uncertainties exist in NMFS’s assessment of risk reduction that the proposed measures either will not be accurately targeted to protect NARW from risks of M/SI or will prove to overshoot the statutory goal of reducing M/SI to a level at or below PBR. Under Alternative 1-B, however, an established procedural time frame would allow for a meaningful evaluation of the rule’s effectiveness.

During that time, NMFS would continue to improve its understanding of how whale behavior and gear configuration contribute to severe entanglements and refine and improve the DST to reflect the best available science as accurately as possible. New information on M/SI would be collected, including any changes as a result of recently enhanced Canadian regulatory measures. NMFS would also refine the population models, including the disputed estimate of

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\(^78\) E.O. 12866 § 1a.

\(^79\) Id. § 1a(6).
cryptic mortality. Should the Regional Administrator determine that the frequency of entanglements in the Northeast region has not been reduced by 60 percent, then the LMA1 restricted area could be put into effect without further rulemaking. By the same token, should the Regional Administrator find that M/Sl has been effectively reduced without implementation of the LMA1 restrictions, MLA members and other participants in the fishery would not have to bear its unnecessary costs.

The phased approach taken under Alternative 1-B, which authorizes a seasonally restricted LMA1 pending an evaluation of the effectiveness of the rule, is fully consistent with OMB Circular A-4. OMB’s guidance to agencies is that, “when uncertainty has significant effects on the final conclusion about net benefits, your agency should consider additional research prior to rulemaking. The costs of being wrong may outweigh the benefits of a faster decision.”80 The costs for being wrong in terms of a LMA1 restricted area are significant adverse impacts to the regional economy while achieving little in terms of recovering the NARW.

5. **Modifying the geographic area of the proposed LMA1 restricted area would impose less economic and social impacts without compromising risk reduction.**

If NMFS proceeds to implement the proposed LMA1 restricted area, the MLA, notwithstanding its objections, recommends that NMFS modify the geographic scope of the restricted area. Unfortunately, NMFS did not seek comments on any proposed closures off the coast of Maine during scoping, and this proposal was not discussed or recommended by the TRT. In the absence of required processes that would have informed both stakeholders and NMFS, Maine lobstermen are attempting (in a short 60-day comment period) to determine how NMFS’s proposed closure will affect the fishery and what alternatives may reduce adverse economic and social impacts while retaining conservation benefits. In this light, MLA offers the two recommendations below, recognizing that the process for determining impacts and benefits needs to be more thoroughly vetted.

*First*, the MLA recommends that NMFS move the LMA1 restricted area further offshore and split the closure area equally between Area 1 and Area 3. Maine lobstermen disagree with NMFS’s assessment of a lack of fishing effort on the Area 3 side of the line, and based on observation, believe it to be only slightly less than fishing effort on the Area 1 side of the line. Additionally, glider detections of NARW cited by NMFS in the DEIS to justify this closure occurred primarily in Area 3 as noted above. This would decrease the economic burden of the closure on Maine lobstermen by lessening the spatial extent of lost fishing grounds in Area 1 and spread it among more vessels by sharing the costs between Area 1 and Area 3 lobstermen.

*Second*, the MLA alternatively recommends that NMFS reconfigure the LMA1 closure to encompass an equal spatial area, but make the closure longer and narrower. This would potentially lessen the economic hardship on boats impacted under the current configuration and provide a more equitable and lesser economic among more lobster boats. Lobstermen typically set gear within an area so that they can haul through a set number of traps in a day. The

nearshore portion of the closure will be fished as they transit this area setting gear from west to
east, rather than lengthwise within the closure from north to south. Narrowing the restricted area
will reduce the amount of productive bottom lost. Making it longer will impact more lobstermen
along the coast but lessen the severity of economic impact for individual vessels. Presumably,
this would also provide significant conservation benefit for whales as it runs along NMFS’s
assumed offshore migration route.

The MLA is prepared to work with NMFS and DMR to explore these and other options
to minimize the impacts of the proposed LMA1 restricted area.

6. **Modifying the time period of the proposed LMA1 restricted area would
lessen economic impacts without compromising risk reduction.**

If NMFS finalizes a restricted area in LMA1, we request that the seasonal closure begin
September 1 and end December 31. Shifting the closure by one month would significantly
reduce the adverse economic impact on the Maine Lobster Fishery. As discussed in Section D.2
above, an estimated 89 vessels fish the area in January, making these productive grounds the
most important month of the year for many lobstermen. NMFS also identified January as the
most active month in the DEIS. Moreover, January is the month when the price of lobster is at its
near peak (Table 2, Addendum 4). Conversely, lobstermen utilize LMA1 to a much lower extent
during September and the price of lobster is similarly low. According to the DEIS, NARW are
also present in LMA1 during September.

NMFS should endeavor to maximize the cost-effectiveness of the rule both overall and
with respect to specific mitigation requirements. The disproportionately high use of LMA1 by
lobstermen during January makes a closure during this month highly impactful. In contrast, a
closure in September is much less impactful and may allow NMFS to reach its overall risk
reduction target. There are strong arguments for not including a seasonal closure or, if one is
included, predicing it on a subsequent review of the rule’s effectiveness (i.e., Alternative 1-B).
Were NMFS to finalize a LMA1 restricted area, we believe a one-month shift as described here
will meet the risk reduction target, particularly if the DST is revised as recommended to account
for whale behavior and gear threat (e.g., weak lines).

E. **Conservation Equivalencies are necessary to address impracticable non-closure
provisions.**

One size does not fit all for NARW conservation measures in the Maine lobster fleet.
Maine is special because there is a place for businesses of all sizes in the lobster fishery. The
Maine fleet is extremely diverse with significant differences in the size of the fishing operations
(vessel size, crew size, trap numbers), geographic differences and fishing styles among zones
(trawl length, bottom type, oceanographic conditions), and the inshore versus offshore fishery.

According to Maine DMR, roughly 20% of Maine’s lobstering vessels are less than 18
feet in length, with an outboard engine and limited deck space. These vessels are often operated
by older fishermen and students, typically fishing alone. Approximately 70% of Maine’s
lobstering fleet is made up of boats from 20 to 39 feet in length. Many of Maine’s medium-sized
vessels are fished by single operators or by the captain with up to two crew members. The
smallest portion of the Maine fleet (10%) is composed of its largest boats, typically ranging from 40 to 50 feet in length. These lobster boats generally operate with a small crew of two to four sternmen. The Maine Lobster Fishery is primarily a small boat, day-trip fishery in which lobstermen fish local territories that are close to shore.

In order to minimize the profound safety, operational, social, and economic impacts to Maine lobstermen resulting for many from trawling up and weak point inserts, the MLA urges NMFS to include conservation equivalencies, as recommended below, to allow each lobsterman as much flexibility as possible in implementing the required risk reduction. This flexibility may save lobstermen from having to size up a boat, abandon traditional fishing grounds, or hire more crew and fish more traps to comply with the regulations. Specifically, MLA supports inclusion of conservation equivalencies to allow lobstermen to fish minimum trawl lengths with two endlines or break trawls in half with one endline resulting in an equivalent number of endlines and protection for right whales. NMFS must also consider proposals for conservation equivalencies developed by each of Maine’s seven lobster zone councils working in collaboration with Maine DMR to adapt the trawling up and weak insert requirements to allow fishing areas to achieve an equal risk reduction based on local fishing conditions. For many lobstermen, implementing the zone’s conservation equivalency proposal will go a long way in reducing the negative impacts described below. Maine DMR will provide the specifics of the current proposals. The MLA urges NMFS to create a process to allow for future requests for conservation equivalencies once the actual operational, safety, and economic impacts of the plan are more fully understood.

1. **Trawling Up by Distance from Shore**

NMFS’s Preferred Alternative 2 adopts many elements of the plan submitted by Maine DMR to require longer trawls that increase by distance from shore, and the insertion of weak points in vertical lines. Of concern to MLA is the omission of a provision for conservation equivalencies, as noted above. NMFS proposes to require Maine lobstermen to deploy the following minimum trawl lengths and weak point insertions:

<table>
<thead>
<tr>
<th>Distance from Shore</th>
<th>Min traps/trawl</th>
<th>Weak Insertions</th>
</tr>
</thead>
<tbody>
<tr>
<td>exempt waters</td>
<td>status quo</td>
<td>1 located ½ way down</td>
</tr>
<tr>
<td>exemption line to 3 miles (“sliver”)</td>
<td>3 traps</td>
<td>2 located 1/4 &amp; ½ way down</td>
</tr>
<tr>
<td>3 to 6 miles</td>
<td>8 traps</td>
<td>2 located 1/4 &amp; ½ way down</td>
</tr>
<tr>
<td>6 to 12 miles</td>
<td>15 traps</td>
<td>2 located 1/4 &amp; ½ way down</td>
</tr>
<tr>
<td>12+ miles</td>
<td>25 traps</td>
<td>1 located 1/3 way down</td>
</tr>
</tbody>
</table>

Although many lobstering operations in the Maine fleet would be able to adopt the trawling up and weak point provisions, many others have significant concerns with both trawling

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81 Letter from Patrick Keliher, Me. Dep’t Marine Resources Commissioner, to Michael Pentony, Regional Administrator of Greater Atlantic Regional Office of NOAA Fisheries (Sept. 16, 2019) (attached as Addendum 5).

up and weak points as stand-alone management measures, and greater reservations over the impacts of these measures combined. Specific issues with trawling up include:

a. The vessel and crew size limit the number of traps and amount of rope that can be safely handled aboard a vessel. This concern includes lobstering operations of all sizes that do not operate adequately sized boats to handle longer trawls in the areas they fish. This issue arises relative to boat length and number of trawls. For example, a 38-foot boat could handle hauling a 15-trap trawl but will face significant challenges in hauling and resetting a 25-trap trawl. By contrast, a 32-foot boat may not be able to handle a 15-trap trawl, but could safely haul an 8-trap trawl. These boats may be operating in the same area and would face significantly different challenges in complying with these rules.

b. Captains and crew, and single operators in particular, face additional difficulties in handling longer trawls on deck as it is extremely arduous to operate the vessel and manage multiple traps and large amounts of rope. The presence of more traps and rope aboard the vessel significantly increase the potential for accidents as deck space becomes limited. With so much rope and gear moving quickly, lobstermen are vulnerable to getting fingers, hands, and arms caught in the rope, which can result in severe injuries, especially when unsnarling trawls. Untangling snarled gear puts tremendous strain on the line that could give out while a lobsterman works to free that gear, particularly if it is near a weak point. If a lobsterman or crew’s leg or gear gets caught up in rope or snagged on a trap, s/he can be pulled overboard in an instant when gear is being reset. While man overboard situations are dangerous for all lobstermen, the risk is significantly higher for single operators with no crew to help the victim get back aboard the vessel. Lobstermen fishing longer trawls on hard bottom or in strong tides and currents also face elevated safety risk as there are more sinking groundline which may get hung up under rocks, creating tremendous strain on the line as the captain attempts to haul the gear aboard. If the gear parts, it will snap, causing a hazard to the person operating the hauler.

c. Due to vessel limitations, many lobstermen may have to make a difficult choice to (1) either purchase a larger vessel and fish harder to continue to lobster in waters 12 miles or more offshore, (2) make modifications to an existing vessel, or alternatively, (3) turn their fishing effort closer to shore, which creates more fishing pressure and gear conflict in those areas. Gear conflict will occur when relatively larger boats set a greater proportion of lobster traps closer to shore, often set as longer trawls in areas where this fishing style is not the norm. Not only does this create conflict between larger and smaller fishing operations, but also poses a tremendous safety risk to the operator of the smaller vessels if shorter trawls are set over by longer trawls due to congestion. Smaller vessels are not equipped to haul back and handle the number of traps or the strain of the gear which occurs when one trawl is set over another.

d. Lobstermen who choose to upgrade to a larger vessel capable of safely fishing longer trawls must take on large payments, and in turn hire more crew and increase effort to generate the revenue necessary to cover boat payments and increased operating costs. These lobstermen would concentrate more effort further from shore. This also contributes to a growing divide between smaller and larger vessels that are forced to segregate and specialize in different parts of the fishery. It also leaves the small boat fleet vulnerable to extreme congestion and fishing pressure, and reduced catches, if these larger vessels choose to fish closer to shore.
Adding more traps to each trawl often results in a loss of trap efficiency. Smaller gangs of gear take longer to haul, so lobstermen fish this way because they are able to deploy traps more strategically on the bottom to maximize catch. When lobstermen are forced to fish a certain number of traps in each trawl, they are not able to efficiently work the productive bottom and catch per trap will go down. Lobstermen cannot effectively set longer trawls on unique patches of hard bottom or into holes and crevices. Lobstermen who attempt this often find that the gear gets hung down and parts off during hauling leading to gear loss and corresponding loss of catch. While lobstermen will attempt to grapple this gear back, it is often difficult to locate it, especially if it has been dragged by a storm or interaction with other fishing gear. Furthermore, because of sinking groundlines and traps, lobster gear is nearly impossible to see on bottom sounders. When gear is lost, lobstermen must purchase new traps and replacement tags, or forgo the income from the lost gear.

Based on the foregoing concerns, the MLA makes the following recommendations:

• The MLA recommends that NMFS remove the trawling up requirement for Maine LMA from 3 to 6 miles because it receives less than 1% credit.

• The MLA recommends that NMFS consider conservation equivalencies for trawling up measures to allow gear modifications identified by lobstermen to be fished inside of 12 miles, where there is a lower probability of NARW interaction with lobster gear.

• The MLA recommends that NMFS continue to research additional options for gear modifications and accessible technologies to reduce interactions between NARW and lobster gear. These include:
  o cap rope diameter at 3/8”;
  o use a weak rope topper consisting of 5/16” rope at the top 1/3 of the line;
  o allow the potential for colored ropes to deter NARW;
  o issue best practices to limit the scope of vertical lines and the use of extra rope in the surface system;
  o promote industry use of whale sightings smart phone app.

2. Weak Rope Insertions

Many of the concerns stated above will be magnified if weak points are inserted into line. Not surprisingly, weakening ropes is highly suspect to most lobstermen as the success of their business depends on their ability to haul back each trap or trawl. Lobstermen must know that gear will remain where it was set, and that it can be efficiently and reliably hauled back. Most lobstermen are understandably worried that weakening endlines will lead to gear loss, loss of catch, and additional ghost gear. This becomes even more of a concern as they are asked to trawl more traps to each endline while making each endline weaker. They fear that adding more weight and strain to weaker vertical lines will lead to (1) higher failure rate of endlines due to storms and gear conflict, (2) higher failure rate during hauling due to strain on the line, (3) increased number of traps lost per failed endline, and (4) and limited ability to grapple lost gear back due to sinking groundlines.
Maine DMR has worked closely with the region’s industry associations and lobstermen to (1) test the average strength of vertical lines currently deployed in the fishery; (2) measure the typical strain on vertical lines as they are being hauled under a variety of fishing, oceanographic, and weather conditions; and (3) try a variety of methods to insert weak points into vertical lines including knots, splices, and manufactured devices. These options have been tested repeatedly to demonstrate that lines predictably break at 1700 lbs. and leave a bitter end that will not catch in baleen. This research has demonstrated that when lines made up of more than one rope type are broken, the rope breaks consistently on the weaker (smaller diameter) side of the knot or splice.

Lobstermen have volunteered significant time to these projects, donated a substantial amount of rope, and worked to innovate a variety of methods to achieve a 1700-lb. breakaway. The DMR’s proposal reflects many of the findings of this work, such as requiring only one weak point insertion in gear fished outside 12 miles as it experiences higher strain than ropes fished closer to shore. DMR is preparing a list of knots and splices, and is exploring manufactured devices that can be inserted into the line to reliably break at 1700 pounds of force or less. These approaches have buy-in from lobstermen, and therefore, can be quickly adopted and provide immediate benefit to NARW.

In addition, Maine DMR is working with the region’s lobster associations to field-test time tension line cutters (“TTLC”). A TTLC can be rigged into any section of the vertical line and will cut the rope after it senses a certain tension on the line that occurs for a set period of time (as programmed in the device). If a whale encounters the line, thereby applying tension, the device will cut the rope as prescribed by the TTLC. TTLCs could be used to reduce the frequency and severity of entanglement in heavier lines providing a mechanism for strong line to break free if encountered by NARW where 1700-pound weak points are too weak to allow for safe retrieval of gear.

Under the Proposed Rule, weak points would not be inserted in the bottom half of the line where lobstermen require stronger rope to safely haul back gear due to documented safety concerns. TTLCs may provide a viable alternative to incorporate a mechanism that will break at 1700 pounds of pressure over a specified time providing additional protection for NARW while allowing lobstermen to haul gear safely. If used as an equivalency for a weak insertion at the bottom of an endline, it could effectively provide an equivalent to a full weak rope and reduce entanglement risk considerably more than is assumed in the Proposed Rule. This device has already been through substantial engineering, testing and field research, and provides another option to reduce the severity of entanglement in heavier lines that could be implemented in the near-term.

In sum, DMR has tested a variety of options to achieve a 1700-lb. weak point insertion, many of which were considered and recommended by lobstermen. However, the Proposed Rule

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does not specify how lobstermen can meet the weak point requirements. Accordingly, the MLA
makes the following recommendations:

- The MLA recommends that NMFS adopt a robust and flexible list of options, including
all options submitted by Maine DMR such as knots, splices, and manufactured options,
and allow additions and refinements to be made over time as new data become available.
Many of these options already have buy-in from lobstermen and can be more readily
integrated into their fishing gear to provide immediate benefit to NARW.

- The MLA recommends that NMFS review the results of the DMR’s project to test
TTLCs as a conservation equivalency for weak points. This technology could be phased
into the highest risk areas of the fishery, outside of 12 miles, to further reduce the risk of
M/SI.

- The MLA recommends that NMFS conduct an analysis of the potential risk reduction
that could be achieved by incorporating a TTLC at the bottom of the vertical line in
various regions, by distance from shore, in the Lobster Fishery.

F. The MLA Supports NMFS’s Gear-Marking Proposal.

The MLA fully supports NMFS’s proposal to require lobstermen from each state and
LMA3 to mark gear with a unique color, and require more frequent and larger marks. Maine
lobstermen regulated under the TRP have already expanded the size of each mark, increased the
number of gear markings, and changed each gear marking from red to purple with a green tracer
in the top mark. In addition, Maine is requiring lobstermen fishing in exempt waters, who have
never been required to mark gear, to incorporate three purple marks into each vertical line.

This new gear marking scheme is significantly more complex than the previous
requirement under the TRP. Further, implementation in exempt waters impacts thousands of
lobstermen who were not subject to this requirement previously. This gear marking plan strikes a
balance to differentiate lobster gear fished in exempt waters from lobster gear fished in waters
regulated under the TRP in a manner that allows lobstermen to comply when they shift gear back
and forth between the areas by adding or removing a green tracer in the top portion of the line.
The MLA does not support a more complex gear marking program as suggested by other
stakeholders because it would be difficult to implement and reduce compliance.

The DEIS does not include the compliance costs for gear marking experienced by Maine
lobstermen who complied with the TRP gear-marking requirement before implementation of the
final rule. Maine lobstermen incurred this cost in order to comply with the federal gear plan and
expedite a better understanding of the origin of fishing gear that is known to entangle whales.
The MLA therefore recommends that NMFS include the compliance costs for gear marking for
the state of Maine.
G. **The Proposed Rule underestimates economic impacts and is economically significant under E.O. 12866.**

In Section III.D.2 above, we present the cost of the proposed LMA1 restricted area based on expert input from many affected fishermen and the five-year average price of lobster. These costs are nearly $2 million and five times more than estimated in the DEIS. Survey respondents identified numerous other aspects of the Proposed Rule, for which NMFS also underestimates economic impacts (Table 4, Addendum 4), summarized as follows.

- **Gear marking:** Respondents estimated that it would take 6 minutes longer per vertical line (34 minutes) than estimated in the DEIS.
- **Weak point insertion:** Respondents estimated that it would take 9 minutes longer per insertion (13 minutes) than estimated in the DEIS.
- **Reconfiguration of traps:** Respondents estimated that it would take 12 minutes longer per trap (26 minutes) than estimated in the DEIS.
- **Cost of labor:** Respondents estimated the cost of labor to be $15.25 more per hour ($41) than estimated in the DEIS.
- **Gear loss:** Respondents estimated gear loss as a consequence of the Proposed Rule to be on average 15 percent. The DEIS assumed no additional gear loss.
- **Additional crew:** Respondents estimated adding an average of 0.79 crew members to comply with the Proposed Rule. The DEIS acknowledged that some vessels would add crew but did not provide an estimate.

These estimates are based on the expert opinion of more than 100 Maine lobstermen and represent the best available information. NMFS must recalculate its estimates of economic impacts and revise accordingly. Considering that the upper bound cost of the Proposed Rule is $61 million, it is likely that the revised calculations will demonstrate that the Proposed Rule is economically significant under E.O. 12866 and a major rule under the Congressional Review Act. We request that NMFS review and revise the designation of the final rule accordingly.

H. **The Final Rule Must Be Phased In Because Lobstermen Cannot Reconfigure and Mark Gear During the Fishing Season.**

NMFS has stated that it anticipates the release of the Final Rule in early summer—a time when the lobster season is already in full swing. Most lobstermen haul all or portions of their gear out of the water during the winter months. Lobstermen work through their gear during haul out to mark or remark ropes, replace or repair worn ropes and traps, prepare new warps and reconfigure gear to be reset in the spring. Late spring through late fall comprise the peak fishing months for Maine lobstermen when nearly all license holders have gear actively deployed. It would be nearly impossible for Maine lobstermen to comply with new regulations while gear is actively fished.
The MLA therefore recommends that NMFS adopt a phased in implementation schedule for the provisions of the Final Rule with the understanding that lobstermen cannot reconfigure and mark gear in the middle of the fishing season.

I. **Ropeless Gear Is Not Commercially Viable for the Reasonably Foreseeable Future.**

As the comments filed by MLA and other fishing associations in response to the Draft BiOp explain in greater detail, ropeless gear is not a realistic alternative for the Lobster Fishery for the reasonably foreseeable future. Although NMFS is not mandating its use in the Proposed Rule, the agency is setting an expectation that this sort of fishing will soon be necessary. However, ropeless fishing is not commercially viable for technological, operational, cost, safety, and enforcement reasons that cannot be ignored for purposes of this rulemaking and the future management of the fishery. The DEIS appropriately recognizes that “[a] number of technological, regulatory, financial, and operational barriers must be addressed before [ropeless] fishing gear can be considered operationally feasible on a broad scale.” But the DEIS does not fully disclose or analyze those barriers and, accordingly, we provide the following additional information (as well as the detailed comments provided in response to the Draft BiOp).

**Technological constraints.** The ropeless system depends on reliable and efficient technology, including an acoustic trigger and release mechanism, dependable vessel-to-satellite and vessel-to-fleet communication systems that protect private data and function in real time, and the ability to incorporate this technology across a very diverse fleet that includes many small- to medium-sized boats that lack the necessary GPS and computer capability, and deck workspace as well, a problem even for larger vessels. As Dr. Mark Baumgartner of Woods Hole Oceanographic Institute, has warned: “We are in the early stages of development – mostly proof of concept with prototypes that are not yet designed for operational fishing by hundreds to thousands of fishermen…. Every system… will need to go through a redesign process to (a) incorporate gear location system, (b) work for fishing at scale (e.g., ruggedized design, long endurance), and (c) enable mass production at low cost.”

**Operational and economic concerns.** The economic model for the Lobster Fishery is based on a high volume of landings caught with a gang of 800 traps or less (1,945 or fewer in LMA3) traps, where lobstermen compete for prime bottom. This requires efficient and predictable hauling and redeployment of gear. Depending on location, 100 to 400 traps per day must be hauled, using an approach that involves frequent movement to varying fishing areas depending on catch levels. Any hauling and deployment system that results in fewer traps hauled per day would significantly and adversely impact the New England lobstering business model.

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85 DEIS, supra note 24, at 3-60.
87 In contrast, the one fishery in the world that uses ropeless gear fishes less than 20 traps per day and does not share fishing territories with other fisheries. See Letter from Kristan Porter, President of Me. Lobstermen’s Ass’n, Inc. to TRT Ropeless Fishing Subgroup (Mar. 14, 2020)
Reduced profits would, in turn, make it more difficult for lobstermen to pay for the high capital and operating costs required to operate a ropeless system. The current best estimate is that existing technology for ropeless systems will cost ten times or more per trap compared to gear currently in use.\(^8\) These systems require significant investment in technology, including a computer system, acoustic detector, trigger devices, and rope storage systems. Given the failure rate of current systems, fishermen would also need to invest in redundancy.\(^9\) And in view of the currently distressed state of the Lobster Fishery resulting from the harsh adverse economic impacts of the COVID-19 pandemic, as noted above, the real-life commercial feasibility of ropeless fishing is far from being a realistic option.

**Safety risks.** Ropeless fishing also poses significant safety risks to fishermen in both the Lobster Fishery and fisheries that overlap with it. The increased handling time on deck required in using ropeless gear is a particular concern for fishermen who operate their vessels alone and must maintain constant steering vigilance to ensure safe vessel maneuvering within high traffic areas and in high seas. Eliminating the current surface buoy and vertical line system would remove visible notice to other ocean users of the presence of lobster gear on the ocean floor. In a fishery that operates coextensively with other fisheries in the same fishing grounds, all of these fisheries would have to use interoperable tracking and communications software so the location of fishing gear is known to any vessel or law enforcement accessing an area, but this type of interoperability is not in existence today. To the contrary, all of the ropeless systems under development currently use unique acoustic and release devices, rope storage options, and monitoring and communications software. Without such a coordinated approach, conflict is inevitable as mobile gear drags through sunken trap gear, risking loss of catch from nets, trawls, and traps, and endangering vessels and crew seeking to retrieve costly gear. And even if the diverse fleets were outfitted with compatible detection systems, weather or interaction with mobile gear can displace sunken lobster traps from their marked location, resulting in “ghost gear” along with economic losses and unwanted impacts on valuable target species.

**Enforcement challenges.** In June 2018, the Atlantic States Marine Fisheries Commission’s (“ASMFC”) Law Enforcement Committee (“LEC”) reviewed the enforceability of ropeless pop-up buoy gear technologies that were under consideration to reduce impacts on NARW.\(^9\) The LEC concluded that deployment of ropeless gear would significantly impede law enforcement’s ability to enforce lobster conservation rules. The concerns identified by LEC include: (1) the time and cost required to retrieve and re-deploy ropeless gear would significantly reduce the number of vessels and traps inspected for compliance; (2) the need to access multiple


\(^8\) See Brief for Me. Lobstermen’s Association as Intervenor-Defendants’, Decl. of N. Oppenheim, Ctr. for Biological Diversity v. Ross, 2020 U.S. Dist. LEXIS 149837, Civil Action No. 18-112 (JEB)(Aug. 19, 2020) (Attached to Draft BiOp Comment Letter as Addendum F) [hereinafter Oppenheim Decl.].

\(^9\) Id. at 12.

pop-up buoy gear technologies and retrieval/mapping systems would represent a financial burden and logistical challenge; (3) unanswered questions on systems to be used to store and secure trap location information raised serious concerns; and (4) the vulnerability of acoustic and radio frequencies to hacking or stolen data posed risks of illegal hauling of gear by others.91

In sum, many significant issues must be addressed before ropeless technology can reasonably be considered for fishery-wide adoption. These examinations must address the technological, operational, and economic impediments that undeniably exist, and which vary significantly depending upon the scale at which the technology is adopted. Collaboration with fishermen, and the associations that represent them, is essential for both understanding these issues and finding appropriate and effective solutions.92


As reflected in the DEIS (Table 6.22), Alternative 3 would be significantly more expensive than the preferred Alternative 2. The two largest drivers of the cost are the requirements to convert full weak rope in the top 75 percent of both buoy lines, and to cap line allocations at 50 percent of average monthly lines in federal waters. Neither of these requirements are necessary to meet the applicable statutory requirements, nor are they nearly as cost-effective as the measures proposed as part of Alternative 2.

Under Alternative 2, the trap/pot fisheries would convert over 26 percent of the rope in buoy lines outside of Maine exempt waters at an estimated cost of $2.2 million dollars, or $81 thousand for each percent of line converted. Alternative 3 weak line measures would convert over 73 percent of the rope at an estimated cost of $10.2 million, or about $139 thousand for each percent of line converted. In other words, the compliance costs of Alternative 3 per unit of


92 Even if ropeless fishing were currently viable, NMFS has effectively eliminated any incentive to fish in the proposed LMA1 restricted area because the authorization process to do so is highly uncertain and onerous. Any vessel that wishes to access the LMA1 restricted area must receive separate authorization through an exempted fishing permit (“EFP”). Although NMFS endeavors to process an EFP within 60 days, controversial permit applications frequently take much longer. As noted in the DEIS, an EFP to access a closure in federal waters would need to comply with ESA and NEPA, further extending the timeline to review and approve an application in addition to delay factors associated with a potential legal challenge from groups hostile to the lobster fishery. The DEIS also suggests a permit may include a requirement to carry an observer, which increases cost, reduces operational flexibility, and may further discourage potential applicants. The DEIS does not explain the evidentiary basis for placing additional requirements on the use of ropeless gear in restricted areas. The DST upon which the LMA1 restricted area is based did not assume such additional conditions when estimating the amount of risk reduction achieved through ropeless fishing. Based on these considerations, it is reasonably foreseeable that the LMA1 restricted area will be a hard closure during the time period it is closed and, beyond potential pilot studies, will not be accessed using ropeless gear.
rope are nearly double that of the preferred alternative. Yet, there is little additional corresponding benefit as a result of converting 75 percent of a buoy line to weak. Published literature (Knowlton et al. 2015, Arthur et al. 2015) has identified 1,700 lbs. as the threshold below which whales can break free of line, and research conducted by Maine DMR has demonstrated that rope always breaks at its weakest point.

Therefore, converting large sections of buoy line to weak line is not necessary to reduce entanglement risk. Rather, the best available information strongly suggests that well-placed weak links are sufficient. We agree with NMFS’s determination to reject the weak line measures in Alternative 3.

Additionally, the proposed measure in Alternative 3 to cap line allocations at 50 percent of average monthly lines in federal waters would have a devastating impact on the Maine Lobster Fishery. As recognized in the DEIS,93 it is certain that fishermen will be constrained by vessel size, rope storage constraints, hauling block capacity, number of crew, or other operational constraints. The cost to make major modifications to the vessel or hire additional crew will be prohibitive to many fishermen. The only option for many fishermen will be to reduce the number of traps fished by up to 50 percent of their current trap level.

There is no analysis or plan in the DEIS for how a line cap would be achieved. It is reasonably certain that such requirements would have disproportionate and acute impacts on small vessels and certain rural, coastal communities where fishing with small vessels is more common. Small vessels would be uniquely disadvantaged by line caps because larger vessels have additional crew and deck space to adjust to the additional traps per trawl. While the cost of a line cap may also be substantial for larger vessels, they could potentially continue to fish the same number of traps and benefit from the reduced fishing effort by smaller vessels. A line cap would curtail the catch of small vessels while facilitating additional catch by larger vessels, thereby creating significant inequity in the fishery with ramifications throughout Maine, particularly with respect to small businesses and disadvantaged small and rural communities. These significant effects are not analyzed in the DEIS, despite the legal requirement to do so.94

Alternative 3 would also extend the seasonal closure to February for a total of five months. Including the month of February, which is outside the time period when LMA1 is characterized as a “hot spot,”95 would exacerbate the adverse economic impacts without commensurate benefits in terms of reducing the risk of entanglement. Moreover, the price of lobster is historically higher in February (6.41/lb.) than the months of October through January. February is also the most important month in terms of accessing LMA1, with 76 percent of survey respondents landing a majority of their catch in LMA1. For reasons discussed elsewhere in our comments, we strongly oppose any expansion of the time period of the proposed LMA1 restricted area, as well as potentially shifting the closed period to include February.

93 DEIS, supra note 24, at 6-222.
94 50 C.F.R. § 1508.1(g)(1).
95 DEIS, supra note 24, at 3-72 (Fig. 3.4).
Finally, the MLA is aware that other stakeholders have suggested that NMFS limit lobstermen to only one endline per trawl. This suggestion is baseless. The need for two endlines on a trawl has been well established through the TRT process. The MLA strongly opposes the proposal.96

In sum, Alternative 3 is neither reasonable as defined at 50 C.F.R. § 1508.1(z), nor is it analyzed in sufficient detail to comply with NEPA. We strongly oppose including any of the measures in Alternative 3 in the final rule.

K. The TRT Process Leading to TRP Recommendations Was Rushed and Flawed.

The process leading up to the April 2019 TRT meeting was rushed and flawed. The TRT met several times during 2017 and 2018 to discuss the need for management action and consider preliminary risk reduction proposals to aid in the recovery of NARW.97 In September 2018, the NEFSC released a controversial technical memo (NMFS-NE-247),98 which was presented to the TRT that month via webinar. That memo set the stage for NMFS to focus its management effort on the Lobster Fishery.99

NMFS convened the TRT the week of April 23 to 26, 2019, with the objective to “develop consensus recommendations on a suite of measures that will achieve a 60 to 80% reduction in mortalities and serious injuries of right whales in U.S. fisheries to support NMFS rulemaking that will be initiated in May 2019.”100 Yet the agency had belatedly presented the

96 The standard fishing practice is to deploy trawls with two endlines. Endlines are commonly lost for a variety of reasons including boat traffic, weather and gear set overs, so a second endline is needed to prevent gear loss and creation of ghost gear. In Downeast Maine, lobstermen must be able to haul back gear from either end of the trawl depending on the direction of the strong tides and currents. A second endline is also necessary to allow lobstermen to retrieve gear if one end gets hung down (under rocks or due to gear set overs in congested areas which is common). This puts tremendous strain on the line and lobstermen must haul back from the other end in order to safely retrieve the gear.


99 See Letter from Me. Dep’t Marine Res. to Dr. Jon Hare (Oct. 3, 2018) (“While many category I and category II fisheries from Maine to Florida are regulated under the Atlantic Large Whale Take Reduction Plan, the content of the Memo is almost exclusively limited to the lobster fishery in the Gulf of Maine.”) (attached as Addendum 6).

risk reduction goal to the TRT via email on April 5, 2019, and unveiled the DST—which was still in development—via webinar on April 16, 2019. This left TRT members with no meaningful amount of time to consider and evaluate the DST. As MLA explained to NMFS in a letter dated April 22, 2019:

[T]he MLA is deeply disturbed by the timing of NMFS’s release of new information to guide discussions at this week’s TRT meeting. Our last TRT meeting was six months ago. NMFS only announced the Take Reduction Target and presented a draft of the Decision Support Tool in recent days. Given NMFS’ directive to begin rulemaking at the conclusion of the meeting, the MLA is extremely frustrated to receive such critical and complex information just days before. TRT members are unrealistically expected to reach consensus on management alternatives before the Team has had any input on the Take Reduction Target itself or had adequate time to evaluate and grasp the implications of the new information presented.

Based on its incomplete understanding of the available science and under extreme pressure exerted by NMFS, Maine’s TRT members reluctantly agreed to the TRT’s recommendations to achieve a 60% risk reduction in the Lobster Fishery. Due to unresolved concerns with the timeliness and accuracy of information provided to TRT members, the MLA subsequently undertook a careful review of NMFS “2000-2018 Right Whale Incident Data” and corresponding Atlantic Large Whale Entanglement Reports and North Atlantic Right Whale SARs. The MLA identified substantive errors in NMFS data that show a “distinctly different understanding of relative risk” posed by Northeast lobster fishing gear to right whales.

MLA’s review of NMFS’s entanglement data revealed several errors that changed its understanding of known causes of right whale entanglement. The 2018 NARW stock assessment incorrectly coded four NARWs as “gear unknown.” Two of these were determined to be from non-trap gear, one was from Canadian trap/pot gear, and the only U.S. entanglement was from gear that did not originate from Maine. Maine’s TRT members would never have agreed to regulate only the Northeast trap/pot fishery or the 60% risk reduction if accurate data on the known entanglement cases had been presented to the Team.


102 Letter from Me. Lobstermen’s Ass’n to NOAA Greater Atl. Reg’l Fisheries (Apr. 22, 2019) (attached as Addendum 7).

103 The TRT meeting summary states, “A broad-based recommendation that the Agency/Team revisit the Team’s recommendations if revisions to the model suggest: (1) a distinctly different understanding of relative risk....” Nat’l Marine Fisheries Serv. Atl. Large Whale Take Reduction Team Key Outcomes Memo., at 7 (Apr. 23-26, 2019), https://media.fisheries.noaa.gov/dam-migration/final--atlantic_large_whale_take_reduction_team_meeting_april23-26_kom_(508).pdf.
Given these findings and lingering concern with the TRT process and outcome, Maine’s five lobster industry TRT members withdrew support for the “near consensus agreement.” Unfortunately, although NMFS pledged to address shortcomings in the DST before it was used for management decisions, a number of those flaws persist, as explained elsewhere in these comments.

III. CONCLUSION

The MLA appreciates NMFS’s consideration of the comments and recommendations provided in this letter. The MLA remains committed to working with NMFS to ensure that this rulemaking process achieves a result that maximizes conservation benefits while also—and very importantly—minimizing adverse economic, operational, and social impacts to the Maine Lobster Fishery. The recommendations provided above will help to accomplish that balance and ensure that any final rule is consistent with the best available scientific and commercial data. If you have any questions or would like additional information, please do not hesitate to contact me at 207.967.4555 or patrice@mainelobstermen.org.

Sincerely,

Patrice McCarron
Executive Director

cc: Dr. Paul Doremus, Acting Assistant Administrator NOAA Fisheries
    Sam Rauch, Deputy Assistant Administrator for Regulatory Programs
    Jennifer Anderson, Assistant Regional Administrator for Protected Resources
    Senator Susan Collins (via Cameron O’Brien)
    Senator Angus King (via Peter Benoit and Chris Rector)
    Representative Chellie Pingree (via Lisa Pahel and Rhiannon Hampson)
    Representative Jared Golden (via Eric Kanter and Morgan Urquhart)
    Honorable Janet Mills, Governor of Maine (via Tom Abello)
    Patrick Keliher, Commissioner, Maine Dept of Marine Resources
    Thomas Nies, Executive Director, New England Fishery Management Council
    Robert Beal, Executive Director, Atlantic States Marine Fisheries Commission
Addendum 1 to MLA
Proposed Rule
Comments
February 19, 2021

Via Email to nmfs.gar.fisheriesbiopfeedback@noaa.gov

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Re: Comments of the Lobster Fishing Associations to the Draft Biological Opinion on 10 Fishery Management Plans in the Greater Atlantic Region and the New England Fishery Management Council’s Omnibus Habitat Amendment 2 (Released January 15, 2021)

Dear Dr. Doremus:

Thank you for the opportunity to comment on the above-referenced draft Biological Opinion (“Draft BiOp”) released on January 15, 2021. The following comments are submitted on behalf of the Maine Lobstermen’s Association, the Massachusetts Lobstermen’s Association, Atlantic Offshore Lobstermen’s Association, New Hampshire Commercial Fishermen’s Association, Maine Coast Fishermen’s Association, Maine Lobstering Union, Downeast Lobstermen’s Association, Southern Maine Lobstermen’s Association, Maine Lobster Dealers Association, Maine Center for Coastal Fisheries, Maine Aquaculture Association and the O’Hara Corporation (collectively, the “Lobster Fishing Associations” or “Associations”). While the extremely short comment period has not allowed for as thorough a response as this lengthy and complex document warrants, we appreciate the National Marine Fisheries Service’s (“NMFS”) consideration of these comments, which we provide in the spirit of refining and improving the Draft BiOp to present an accurate assessment of the proposed actions consistent with the standards of Section 7 of the Endangered Species Act (“ESA”).

1 In a letter dated February 5, 2021, the Associations requested a 10-day extension of the comment period for the Draft BiOp to align with the public comment period on the proposed Atlantic Right Whale Take Reduction Plan rule that is concurrently posted for public review and comment (“Proposed TRP Rule”). See 85 Fed. Reg. 86,878 (Dec. 31, 2021). Similar requests were made by the State of Maine, Atlantic States Marine Fisheries Commission, and Maine’s Congressional delegation. NMFS regrettably denied the requests. The Associations appreciate that NMFS is working against a litigation deadline, but its denial of a modest 10-day extension request to allow stakeholders to coordinate their comments on two inextricably linked regulatory proposals that could fundamentally alter the management, operational integrity, safety, and financial viability of the fisheries is unreasonable. The Lobster Fishing Associations strongly encourage NMFS to consider the comments submitted on the Proposed TRP Rule as it revises and finalizes the BiOp.
I. THE LOBSTER FISHING ASSOCIATIONS HAVE STRONG INTERESTS IN THE FUTURE OF THE NORTHEAST LOBSTER FISHERY AND SURVIVAL OF THE NORTH ATLANTIC RIGHT WHALE

The Lobster Fishing Associations represent members who are active participants in the U.S. Northeast Lobster Fishery (the “Lobster Fishery”) or who are otherwise active in businesses and organizations directly connected to the extraordinary marine resource that makes up the Lobster Fishery. A description of each association’s membership, mission and interest in this proceeding is presented in Addendum A.

The Lobster Fishing Associations share a commitment to support the continued viability of the Lobster Fishery under principles of sound resource management that promote sustainability and ensure best practices for the protection and conservation of all marine resources in the area. They are also dedicated to an effective management plan incorporating practices and measures built upon the best available commercial and scientific data that supports the health of the endangered North Atlantic right whale (“NARW”).

As professionals with a deep understanding of our ocean environment, we have specialized knowledge, experience and perspective to inform this issue. We draw our livelihoods from the ocean and recognize the fragility of our shared marine environment. Our fisheries have been well-managed by generations of fishermen who feed our nation with healthy, sustainably harvested seafood.

The Northeast Lobster Fishery has long been an integral part of the region’s culture, heritage and economy supporting tens of thousands of jobs and hundreds of ancillary businesses.2 The fishery remains the most valuable in the United States value at more than $640 million in 2019 and contributing more than $2 billion to the region’s economy3. For rural coastal communities, the lobster fishery is the economic engine that keeps many small towns alive as detailed in Addendum B.

These comments focus only on those portions of the Draft BiOp relevant to interactions between NARWs and anthropogenic sources. As summarized in Section II below and set forth in detail in Section III, these comments identify significant questions and concerns associated with the data and analyses presented in the Draft BiOp. Our comments present recommendations for additional data and analyses to be considered and undertaken by NMFS in order to ensure accurate identification and analysis of the relative risk to the species and the associated application of Section 7(a)(2) of the ESA.

The Draft BiOp has profound implications for the future of the Lobster Fishery. It is therefore essential that the Final BiOp issued by NMFS comprehensively and accurately considers all of the best available scientific and commercial data, and correctly applies Section 7(a)(2)’s standards. With these comments, we seek to ensure that the Final BiOp presents a

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2 Maine's lobster fleet directly supports more than 10,000 jobs (3,670 captains, up to 5,750 crew, and 1,095 students).

defensible assessment of the reasonably certain effects of the proposed actions and addresses actual sources of harm credibly identified and supported by verifiable scientific observations, data and analysis.

It is of paramount importance to the Associations that the Final BiOp meets these standards because our members will be asked to implement any additional measures. Such measures must be plainly demonstrated—based on the best scientific and commercial data available—to promise positive benefits for the NARW population so that the Associations’ members will have confidence that any additional sacrifices are worthwhile.

II. SUMMARY OF COMMENTS

The Draft BiOp is an expansive document with far-reaching implications for New England’s iconic fisheries and cultural heritage. The Associations are alarmed that NMFS has developed a BiOp that assigns highest priority for NARW population recovery to the Lobster Fishery despite evidence that the most urgent risks are vessel strikes and entanglements in Canadian fisheries, which do not implement mitigation measures nearly as protective as those undertaken by the Lobster Fishery. The relative risks presented by the Lobster Fishery—which have already been substantially mitigated over the last decade—do not justify unsupported agency mandates that could eliminate an economic and fishing heritage that has sustained our coastal communities for centuries and is an integral part of New England’s identity.

With that said, the Associations remain committed to working with NMFS and other stakeholders to design an effective program for avoiding and minimizing impacts to the NARW population. We have carefully reviewed the Draft BiOp and provide detailed comments in Section III below, which are summarized as follows:

1. The Lobster Fishery has substantially reduced the risk it presents to NARWs over the past decade through implementation of risk reduction measures. The best available data shows that those measures have been effective, and the Final BiOp’s environmental baseline should fully reflect the benefits of such measures. The Associations encourage NMFS to focus on implementing effective measures in areas where there is demonstrated risk. In particular, ropeless gear is not economically viable at this time and there are numerous technical and operational challenges that must be addressed before it can be substituted for gear using vertical lines, as explained in greater detail below.

2. NMFS should not be considering a management strategy that holds U.S. fishermen accountable for NARW M/SI in Canada. The U.S. must engage directly with Canada in an open and transparent manner. The Associations implore NMFS to engage more directly and aggressively with Canada to ensure that effective and measurable risk reductions are implemented bilaterally.

3. The Draft BiOp presents an inaccurate assessment of the effects of the Lobster Fishery by relying upon unsupported assumptions that artificially inflate the risk from the Lobster Fishery. The result is that the Draft BiOp does not present an effects scenario that is “reasonably certain to occur” or supported by the best scientific and commercial data available.
a. NMFS arbitrarily assigned a level of risk to the Lobster Fishery that is unsupported by the evidence. NMFS must correct this flaw by adopting a uniform probabilistic approach, based on observed data, to apportion all unknown human causes. Additional data, information and expert judgment should be used to refine risk allocation and adapt the proposed management program. This methodology should apply to apportionment of (1) unknown human causes to vessel strikes versus entanglements, (2) unknown entanglements between U.S. and Canada, and (3) unknown entanglements among U.S. fisheries.

b. NMFS based the “North Atlantic Right Whale Conservation Framework for Federal Fisheries in the Greater Atlantic Region” (‘‘Conservation Framework’’) on an unreliable model that arbitrarily ignored sublethal impacts. In doing so, it failed to capture the full benefits from mitigation requirements under Phase 1.

c. NMFS arbitrarily selected data from the 2010-2019 time period. It assumed that unfavorable trends in oceanographic conditions would continue but did not take a similar approach with favorable trends in observed data on the sources of entanglements. These latter trends demonstrate disproportionately more entanglements due to Canadian fisheries and, in the U.S., more entanglements from non-trap/pot gear. Nonetheless, NMFS allocated more mortality and serious injury (“M/SI”) incidents to the Lobster Fishery than is supported by the best available information.

d. The estimate for cryptic mortality is not reliable. This estimate, based on the Pace et al. model (2017), is highly sensitive to new data and therefore, given the foreshortened time frame on which it relies, not suitable yet for long-term planning. Further, these models assume no natural mortality despite well-established research to the contrary.

e. NMFS failed to give appropriate weight to mitigation measures that reduce the severity of entanglement (e.g., weak links). These measures may substantially reduce or eliminate risks from trap/pot fisheries, based on published scientific literature.

f. The Decision Support Tool (“DST”) assigns equal weight to whale density, gear density, and gear type even though reviewers believe that whale behavior and gear type/configuration are the most relevant factors in determining entanglement risk. We suggest both approaches be evaluated.

4. Phases 3 and 4 of the Conservation Framework are likely unnecessary once NMFS performs a more robust and accurate assessment of the effects of the action. We recommend that NMFS undertake a comprehensive assessment of Phases 1 and 2 that includes the participation of the states and the fisheries to ensure that the process is fully informed by the best scientific and commercial data available. The assessment should be reviewed by the Center for Independent Experts (“CIE”). This will inform whether Phases 3 and 4 are necessary and, if so, how they should be modified.
The Conservation Framework’s benchmark of 0.11 M/SI is arbitrary and unsupported by the best available science or the law. NMFS provides no explanation supporting this metric or an explanation of how it was calculated. In any event, a “jeopardy” determination under Section 7(a)(2) of the ESA does not turn on a single metric, much less one that is far more stringent than would be required to achieve the more protective goals of the Marine Mammal Protection Act (“MMPA”). NMFS’s requirement that the M/SI rate “needs to be reduced” to 0.11 to achieve a “no jeopardy” determination has no precedent in the law or practice, and arbitrarily demands a result that exceeds the requirements of both the ESA and the MMPA.

It is unclear how NMFS intends the Conservation Framework to be implemented through, or in conjunction with, the two primary sources of authority that govern the ongoing federal regulation of the Lobster Fishery—i.e., the Atlantic Coastal Fisheries Cooperative Management Act (“ACFCMA”) and the MMPA. These statutory processes should be integrated into the Conservation Framework.

We offer a number of specific recommendations for refinement and improvement of the Draft BiOp’s reasonable and prudent measures and associated terms and conditions. These are set forth in Section III.E below.

III. COMMENTS ON DRAFT BIOLOGICAL OPINION

A. The Lobster Fishery Has Significantly Reduced Risk to the NARW.

NMFS initiated the Section 7 consultation leading to the Draft BiOp against the backdrop of an unusual mortality event (“UME”) declared in mid-2017 that tragically interrupted a prolonged period of improvement in the prospects for recovery of the NARW. The population growth trajectory had been favorable for many years under the guidance of the Atlantic Large Whale Take Reduction Team (“TRT”) and the associated Atlantic Large Whale Take Reduction Plan (“ALWTRP”) implemented by NMFS pursuant to Section 118(f) of the MMPA. Collaborative work by lobster harvesters, researchers, fishery managers, and other stakeholders had contributed to scientific knowledge of NARW behavior and interaction with fishing gear and other human activities across its migratory range.4 This work led to a series of enhanced measures to mitigate risk to the species from fishing gear. In addition, harvesters worked alongside fishery regulators, whale scientists, and the private sector to develop

4 The MLA and its members have collaborated with scientists in developing and testing fishing gear to reduce the risk of entanglement. The MLA partnered with the NMFS gear team in the 1990s to measure gear profiles, test weak links and explore gear modifications; worked with researchers in the 2000s to establish methods and standards to deploy weak links, develop buoy line marking methods, deploy remotely operated vehicle (“ROV”) and sensors to measure groundline rope profiles, and tested a variety of vertical line modifications such as weak rope, stiff rope, glow rope and time tension line cutters. Since 2010, MLA and its members have worked with scientists to publish a resource describing lobster gear and configurations deployed in the New England lobster fishery, map lobster fishing effort, develop a fishing gear/right whale risk model, document wear issues associated with sinking groundlines and recommendations to improve wear of that line, describe options for best fishing practices, test colored vertical lines, measure the breaking strength of existing vertical lines, test new versions of weak rope and update time tension line cutters. In addition, individual MLA members have collaborated with researchers and developers seeking to design a viable system for ropeless fishing.
innovative fishing practices and gear deployment strategies intended to reduce harmful interactions between whales and fishing gear.  

The Associations have been key participants in the TRT process, helping to develop and successfully implement enhanced protections for NARW with demonstrated success. Since 2009, a robust new regulatory environment has significantly reduced the risk of NARW entanglement in American lobster fishing gear by implementing a comprehensive overhaul in gear configuration and fishing practices over the past 10 years. Regulations developed and imposed at the state and federal level, including those implemented under the ALWTRP, have significantly reduced both (1) the amount of lobster fishing gear on the water, and (2) the risk of a severe outcome if a NARW encounters such gear. The principal elements of the enhanced measures that have been implemented to protect whales are summarized below.

- **Sinking groundline requirement.** Implemented under ALWTRP in 2009, these regulations preclude the use of “floating groundlines” connecting lobster traps and, instead, require the use of “sinking groundlines.” This eliminates the potential for whale entanglement in floating lines near the ocean bottom. These regulations removed over 27,000 miles of floating groundlines from New England waters.

- **Vertical line reduction.** Implemented under ALWTRP in 2014, these regulations establish minimum traps per trawl based on geographic area and distance from shore, resulting in the removal of approximately 2,740 miles of rope from the water.

- **Massachusetts Restricted Area.** In 2015, ALWTRP regulations established a 3,000 square mile area spanning Cape Cod Bay, Massachusetts Bay, and outer Cape Cod, which has been closed to lobster gear from February 1 to April 30 annually. The state waters portion of this closure is managed by the Massachusetts Division of Fisheries (“DMF”), which has extended applicability to recreational fishermen and moved the closure date beyond April 30 as appropriate.

- **Universal Gear Requirements.** A suite of gear modifications has been established to reduce entanglement risk to NARW, prohibiting the use of floating line at the surface and

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5 MALA works cooperatively with the Massachusetts Division of Marine Fisheries (“DMF”) in efforts to further reduce risk of entanglement to NARWs. Among other things, MALA is partnering with the Lobster Foundation of Massachusetts (“LFoM”) and the DMF on an effort to field test 1700lb weak red rope to further reduce interactions with NARWs and vertical lines. The LFoM and MALA worked to distribute over 700 coils of the 1700lb weaker red rope to lobstermen in Massachusetts to be field tested during the 2020 fishing season. The goal is to acquire viable and acceptable “weak contrivance” options to be off-the-shelf ready for implementation in the 2021 fishing season in Massachusetts.

6 The Associations have been actively involved in the TRT process. TRT members include MLA’s Executive Director, Patrice McCarron (more than 15 years); MLA President and commercial fisherman, Kristan Porter; MALA Executive Director, Beth Casoni; MALA President, Massachusetts Marine Fisheries Commissioner, and commercial fisherman, Arthur Sawyer; AOLA Executive Director, David Borden; NH Commercial Fishermen’s Association member and lobsterman, Bob Nudd, Jr.; and Association members who are commercial lobstermen Dwight Carver, John Williams, and Mike Sargent.

wet storage of gear for more than 30 days, and requiring the incorporation of weak links in the top of buoy line and to any attachments along the buoy line. Federally regulated fixed gear fishermen are required to mark vertical lines to aid in identifying the source of gear involved in an entanglement. In 2020, Maine implemented new regulations to require unique and expanded gear markings.

- **Effort Reduction.** The Lobster Fishery has reduced effort across all jurisdictions since the inception of the ALWTRP. Area 3 has implemented mandatory annual trap allocation limits of 5% per year, Massachusetts has a long-standing moratorium on lobster licenses, and Maine has established a limited-entry program, all of which has resulted in a significant reduction in the risk of entanglement to NARWs.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Confirmed U.S. Lobster Entanglement 1997-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997-2000</td>
<td>4 Non-serious injuries</td>
</tr>
<tr>
<td>2000-2010</td>
<td>1 Mortality; 4 Non-serious injuries</td>
</tr>
<tr>
<td>2010-2019</td>
<td>1 Non-serious injury</td>
</tr>
</tbody>
</table>

As illustrated in Table 1, continuous enhancements of whale protective measures have been followed by significant declines in NARW entanglements attributed to American lobster fisheries. From 2000 to 2010, U.S. lobster gear comprised 45% of known cases of such entanglements (6 cases out of 13). However, since 2010, U.S. lobster gear comprises only 0.04% of known cases (1 case out of 25). Since 2014, there has been only one entanglement (a non-serious injury) in New England lobster gear. During this same time period, no NARW is known to have died or suffered serious injury arising from entanglement in gear attributed to American lobster fishing. This is significant since efforts to monitor and study NARW, including expanded survey effort and NARW health status, have substantially improved since the beginning of the TRT process so the likelihood of detection and identification of sources of harm has improved.

In sum, the best available scientific and commercial data demonstrate that since the implementation of additional protective measures by American lobster fishermen through the MMPA’s take reduction planning process, the Lobster Fishery has significantly lowered the risk profile of its gear and fishing practices to the extent they interact with NARW. Although the Draft BiOp acknowledges that “risk reduction measures implemented in U.S. fisheries over the past two decades have reduced impacts to NARW from U.S. fisheries,” the benefits of such measures have not been accounted for, as they must, in the environmental baseline.

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8 Salvador declaration at 8 (Addendum C).
9 *Id.*
10 Draft BiOp at 224.
11 See 50 C.F.R. § 402.02 (“The environmental baseline includes the past and present impacts of all Federal, State or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation process.”); ESA Consultation Handbook at 4-22 (Environmental baseline should incorporate actions that may benefit the species.).
sustained downward trend in observed entanglements with Northeast lobster gear, attributable to
the comprehensive actions taken by fishery regulators and harvesters to minimize and avoid
entanglements, is a significant feature of the environmental baseline that cannot be arbitrarily
dismissed or overlooked.12

The Final BiOp will not accurately analyze the risk of adverse interactions between
NARW and lobster gear unless it clearly identifies and considers: (1) the documented reduction
in observed incidents of entanglements with lobster gear since 2010, and (2) the absence of any
incidence of M/SI from such entanglements during that time period. Although entanglement
continues to be a significant factor affecting NARW, NMFS’s most recent data as presented in
the Draft BiOp show that, from 2010-2019, 18 cases (16%) of known entanglements were
attributed to Canada (18% M/SI) and only 8 cases (7%) were attributed to the US (4% M/SI).
The trend shifts significantly during the last four years of this time series with 16 cases (33%)
attributed to Canada (39% M/SI) and only 3 cases (6%) attributed to U.S. (0% M/SI). The
percent of unknown entanglements over these four years declined by 61% compared to 77% over
the last ten years.13

As discussed in more detail below, the performance of Canadian fisheries since 2010 has
been troublesome, with a spike in observed entanglements in recent years. A failure to
appropriately consider the increasing trend in incidents occurring in Canada will result in an
arbitrarily high assignment of risk to the Lobster Fishery. The consequences of an inaccurate risk
assignment are non-trivial. The species is experiencing a UME that started in 2017 and recent
scientific observations report declines in species population health status.14 This places a
premium on accurate identification and assessment of sources of harm to NARW so that limited
conservation resources are effectively deployed. The Final BiOp should include a probabilistic
analysis of the relative risk posed by lobster fishing gear and other gear types that have been
identified in entanglement and M/SI incidents over the last decade, as well as relative difference
between Canadian and U.S. fishery risk.

B. The Draft BiOp Arbitrarily and Substantially Overestimates the Impact of the
Lobster Fishery.

1. The BiOp must present an objective assessment of the “reasonably certain”
effects of the action, based upon the best available scientific and commercial
information.

Section 7 of the ESA requires NMFS to use the “best available scientific and commercial
information” when developing a BiOp. 16 U.S.C. §1536(a)(2). The “obvious purpose” of this

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12 NOAA law enforcement has reported excellent compliance rates with fishery regulations, including

13 Draft BiOp, Table 56 at 223.

14 While there are likely a multitude of factors involved, low calving has been linked to poor female
health (Rolland et al. 2016) and reduced prey availability (Devine et al. 2017, Johnson et al. 2017,
BiOp at 94-95.
requirement “is to ensure that the ESA not be implemented haphazardly, on the basis of speculation or surmise,” particularly when doing so would cause “needless economic dislocation.” Bennett v. Spear, 520 U.S. 154, 176 (1997). Relatedly, although the ESA’s legislative history suggests that a federal agency, when faced with uncertain data, should give the “benefit of the doubt” to the species, that concept does not excuse NMFS from its obligation to objectively evaluate the “effects of the action,” that are “reasonably certain to occur.” 50 C.F.R. § 402.02; see 84 Fed. Reg. 44,976, 44,993 (Sept. 26, 2019) (“‘reasonably certain to occur’ determination must be based on clear and substantial information, using the best scientific and commercial data available” and is not altered by the “benefit of the doubt” concept); see id. at 45,007. The “benefit of the doubt” concept does “not absolve federal agencies from . . . developing adequate information on which to base a biological opinion.” Miccosukee Tribe of Indians of Fla. v. U.S., 566 F.3d 1257, 1267 (11th Cir. 2009), quoting H.R. Rep. No. 96-697, at 12 (Conf. Rep.), as reprinted in 1979 U.S.C.C.A.N at 2576.

At numerous points in the Draft BiOp, when faced with uncertainty, NMFS selects the variable at the extreme end of a spectrum of choices that assumes the greatest possible impact from the Lobster Fishery on the basis that it must give the “benefit of the doubt” to the species. Many such precautionary assumptions, when compounded throughout the modeling analysis, result in a substantial overestimation of the effects of the Lobster Fishery that is not “reasonably certain to occur.” This is not how Congress or the Services intended the “benefit of the doubt” concept to apply. The concept applies only to NMFS’s overarching determination as to whether an action is likely to jeopardize (after objectively evaluating the “effects of the action”) and “suggests only that agencies, including the Service, cannot hide behind uncertain scientific data to shirk their duties under the Act.” Miccosukee Tribe, 566 F.3d at 1267; see Conner v. Buford, 848 F.2d 1441, 1454 (9th Cir. 1988) (agency may not “ignore available biological information”). The “benefit of the doubt” concept does not permit or compel NMFS to construct implausible effects scenarios built upon compounded precautionary assumptions, as it has done in the Draft BiOp. The Draft BiOp’s key errors in this regard are addressed in the following sections.

2. **The Draft BiOp does not evaluate reasonably certain sublethal effects, resulting in a substantial overestimate of the effects of the proposed actions.**

Phases 3 and 4 of the Draft BiOp’s Conservation Framework are predicated on NMFS’s assumption that implementation of Phases 1 and 2 will be insufficient to avoid jeopardizing the existence of the NARW. The population model described in Linden (2021) is an important basis for this finding, as it projects a declining NARW population even after implementation of all four phases of the Conservation Framework under Scenario 2. Phases 3 and 4 are also based on the qualitative understanding that “[the] operation of the federal fisheries is likely to contribute to decreased calving rates due to the sublethal effects.” The Draft BiOp notes that “some of the risk reduction measures in Phase 1 and 2 are designed to reduce the severity of entanglements and not the likelihood” (emphasis added), implying both are necessary. The Draft

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16 Draft BiOp at 338.
BiOp goes on to explain that the “risk reduction requirements in Phase 3 and 4 of the Framework” are necessary to address assumed sublethal effects to NARW.¹⁷

The imposition of additional risk reduction requirements in Phases 3 and 4 to address non-lethal effects is problematic in two ways. First, the Draft BiOp does not quantify sublethal impacts but rather discusses them qualitatively and makes no effort to further investigate the potential magnitude of these effects based upon the best available science. Most NARW that become entangled apparently clear themselves of the gear although they continue to bear scars after they recover from the direct effects of the encounter.¹⁸ A total of 63 percent of entanglements are minor in severity when they occur,¹⁹ but the BiOp notes that “[t]he sublethal stress of entanglements can have a serious impact on individual health and reproductive rates (Lysiak et al. 2018, Pettis et al. 2017, Robbins et al. 2015).”²⁰ The Draft BiOp cites no scientific literature that allows for a population-level understanding of sub-lethal impacts.²¹ Yet, Phases 3 and 4 still impose numerical risk reduction to address an impact that is not shown by clear and substantial evidence to be reasonably certain to occur.

Second, Linden (2021) does not incorporate sub-lethal impacts in its model.²² It states:

The projection outputs do not consider any increase in the female right whale population trajectories due to a reduction in sublethal effects (i.e., ALWTRP proposed rule, any future risk reduction measures). The reduction of sublethal effects expected from reducing entanglements is expected to improve the animal’s heath and reproductive capacity. However, these reductions cannot be quantified as they are confounded by other stressors (e.g., environmental factors).

The consequence of not considering improvements in the condition of NARW from fewer overall entanglements and fewer severe, non-lethal entanglements as a result of Phase 1 and 2 measures (and by extension an enhanced calving rate of NARW) is that the population

¹⁷ Id. at 338-339.
¹⁹ Maintenance of the North Atlantic Right Whale Catalog, Whale Scarring and Visual Health Databases, Anthropogenic Injury Case Studies, and Near Real-Time Matching for Biopsy Efforts, Entangled, Injured, Sick, or Dead Right Whales October 1, 2020 at 50.
²⁰ Draft BiOp at 146.
²¹ “However, at this time, there is no further evidence to make the conclusion that sublethal effects from fishing gear entanglement alone causes a decline in large whale health. Based on the best available scientific and commercial data, we believe at least some of the observed variability in right whale calving rates is due to the sublethal effects of entanglements in U.S. federal fishing gear, but cannot quantify the degree to which entanglements are affecting calving rates at this time.” Draft BiOp at 221.
²² Id. at 331.
model *underestimates* the stock size under all three scenarios.23 The Draft BiOp acknowledges this problem: “All scenarios are expected to result in an increase in calving. This increase is not considered in the population projections, therefore, the three scenarios representing the implementation of measures to reduce M/SI are conservative.”24 One independent reviewer went further in her characterization, stating that Linden 2021 presents “overly pessimistic conclusions” and that the absence of a quantified relationship between fecundity and entanglement represents a “worst case scenario.”25 But the Draft BiOp does not provide any further analysis to address the problem.

The overwhelming majority of entanglements are non-lethal, and they are either important with respect to demographic rates or they are not. If sublethal impacts are important to the point that the Draft BiOp imposes draconian risk reduction requirements in Phases 3 and 4 of the Conservation Framework, then the analysis must fully consider sublethal impacts in the population model upon which these additional phases are predicated. And there is available scientific information (some of which is cited in Linden 2021) that confirms sub-lethal impacts occur. Taking sublethal impacts into account in the model would likely generate different results where calving rates improve and the population is growing under the Conservation Framework. In fact, the Linden (2021) population model appears to be sensitive to calving rates, with the author noting that “using a calving rate averaged across the years 1990-2018 produces positive population trajectories under all three scenarios.”26 It goes on to state:

Finally, the population model does not consider the relationship between entanglement injuries and calving probability (Pettis et al. 2017). It is possible that mitigation measures aimed at reducing the risk of entanglement mortality would also reduce sub-lethal entanglements to reproductive adult females that may be partially responsible for suppressed calving rates in recent years. Thus, the scenarios represented here may be underestimating the benefits of risk reduction to the population by focusing only on mortality. [Emphasis added.]

The Draft BiOp expressly recognizes that its treatment of sub-lethal effects underestimates population growth.28 But where, as here, available data can be used to further evaluate this effect and address the flawed underestimate, NMFS must carry out that analysis because it must evaluate effects that are “reasonably certain to occur.” See Section III.B.1 *supra.*

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23 Id. at 333-335 and 341.
24 Id. at 340.
26 Linden (2021) at 9.
27 Id., see Figure 2, Draft 2020 Status Assessment Report, growth rate of 2.8 percent for years 1990-2011, whereas the overall decline in abundance between 2011 and 2018 was 14.35% (CI=11.67% to 16.6%). Id. at 46.
28 “We expect calving rates will likely improve following the implementation of the Framework as sublethal effects will be reduced. Calving rates are also likely to improve at a similar rate in the no federal fisheries scenario. It is likely that both projections are an underestimate, and the right whale population would fare better than population projections indicate.” Draft BiOp at 341.
If NMFS were to perform this analysis and it indeed shows a more favorable population trajectory under Scenario 2, NMFS may determine that additional risk reduction in Phases 3 and 4 is either unnecessary or can be scaled back from what is currently proposed.

Similarly, if sub-lethal impacts are determined to be insignificant to the population growth trajectory, then the focus of the Conservation Framework should be on actions that specifically reduce the severity of entanglement events. Despite NMFS’s worst-case modeling scenarios, the agency recognizes that “the population is capable of recovering at lower levels than the current estimate,” referring to NARW abundance estimates of 162 animals in 1980 and 270 animals in 1990, figures that ultimately grew to 483 whales in 2010 (Pace et al. 2017).29

In short, Phases 3 and 4 are not premised on a complete analysis of the best available scientific data. Performing a complete analysis, as outlined above, would inform both (1) whether Phases 3 and 4 are necessary and (2) if so, how risk reduction measures in Phases 3 and 4 should be targeted. Moreover, implementation of Phases 3 and 4 should be predicated on a review of the effectiveness of Phases 1 and 2 in reducing the severity of entanglements. As it currently stands, the Conservation Framework, on one hand, imposes a severe quantitative risk reduction requirement at Phases 3 and 4 to, in part, address an uncertain variable (sub-lethal effects) and, on the other hand, ignores that same variable despite acknowledging that conservation measures would improve sub-lethal effects. This arbitrarily inflates the effects of the action beyond what is “reasonably certain to occur.”

3. The best available science demonstrates that more entanglements are occurring in Canadian fisheries.

The Draft BiOp allocates half of all entanglements of unknown origin to U.S. fisheries. This determination is one of the most significant assumptions in the Draft BiOp because 96% of all mortality attributed to the commercial trap/pot fishery is the result of fishing gear of unknown origin. The Draft BiOp justifies this allocation with the following rationale:

Although right whales spend more time in U.S. waters than Canadian waters, for the purposes of this Opinion, we assume that 50% of the observed right whale entanglements where the country of origin is unknown occurred in the United States. This assumption is supported by the analysis of recovered entangling gear. The heavy traps and large diameter, high breaking strength lines used to target snow crabs in Canada are more lethal than most U.S. fishing gear.[30] Additionally, risk reduction measures implemented in U.S. fisheries over the past two decades have reduced impacts to right whales from U.S. fisheries.[31]

29 Draft BiOp at 340.

30 The fact that Canadian fishing gear is observed to be more lethal than U.S. gear is supported by other data and analyses, including information provided in the Salvador Declaration at 5. However, the statement is inexplicably contradicted at page 96 of the Draft BiOp where it is stated that Canadian and U.S. lobster fisheries use similar gear. The latter statement is incorrect and should be removed or clarified because it is contrary to the weight of available evidence.

31 Draft BiOp at 224.
The Draft BiOp goes on to identify several factors that were considered to determine the 50-50 allocation: (1) that NARW spend more time in U.S. versus Canadian waters; (2) the relatively higher number of fishing lines in U.S. waters; (3) the “heavy traps” and lethality of fishing gear used by Canadian snow crab fisheries; (4) the success of risk reduction measures implemented in U.S. fisheries; and (5) an analysis of recovered entangling gear. However, the Draft BiOp does not quantify or otherwise explain how these factors were weighted to reach a 50-50 allocation. A close look at these assumptions shows that NMFS’s 50-50 allocation determination is not consistent with the best available scientific data, including NMFS’s own data.

First, the Draft BiOp improperly discounts the value of observed data, noting that “[a]ssignment of an observed entanglement event to a specific fishery or country of origin is rarely possible.”32 In fact, NMFS’s data show that this is not rare, with 39% of entanglement cases confirmed to a country from 2016 to 2019.33

Second, NMFS’s assumption that NARW spend more time in U.S. waters than Canadian waters is not supported by the best available data. By NMFS’s own admission, there are no data to substantiate the claim that NARW spend more time in U.S. versus Canadian waters.34 Moreover, the amount of residency time in U.S. waters generally is irrelevant for the purpose of ascertaining the entanglement risk of commercial fisheries. NMFS should instead compare the time spent by NARW in the portion of U.S. waters where a fishery operates. Residency time in more southern locations is not indicative of the entanglement risk of the Lobster Fishery. We therefore encourage NMFS to look more closely at NARW behavior (e.g., transiting vs. foraging) within areas where fishing gear is deployed because the nature of animal behavior across commercial fisheries is variable and is likely to be more relevant than residency time. This same concern was stated in the CIE review of the DST.35

Third, although the Draft BiOp acknowledges that the rapidly expanding Canadian snow crab fishery uses heavier and more lethal gear,36 Canada had few, if any, risk reduction measures

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32 Draft BiOp at 223.
33 Draft BiOp, Table 56.
34 In GARFO’s April 18, 2019 email to the TRT, introducing the 50:50 US/CN apportionment, GARFO states: “Because our Stock Assessment Reports have not included a determination on the fraction of time North Atlantic right whales spend in U.S. and Canadian waters, we do not have a data-based residency estimate to apply at this time.” (see Coogan email in Addendum D)
36 Draft BiOp at 224.
in place prior to 2017.\textsuperscript{37} \textsuperscript{38} Meanwhile, beginning in 20019, both U.S. fisheries and maritime transportation sectors implemented a series of regulatory enhancements in an effort to reduce NARW serious injury and mortality in U.S. waters,\textsuperscript{39} but similar efforts were not undertaken by Canada at the time.\textsuperscript{40} U.S. fisheries implemented additional measures in 2014 to reduce the number of vertical lines.\textsuperscript{41}

As illustrated by Table 2, observed data demonstrate the lethality of Canadian snow crab gear. Out of 26 entanglements with confirmed origin of fishing gear since 2010, Canadian pot gear accounts for 16\% of entanglement and 17\% of M/Sl. The last four years of the data show the true lethality of the gear when it accounts for 31\% of known entanglement and 36\% of M/Sl.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|}
\hline
 & \multicolumn{2}{|c|}{2000-2019} & \multicolumn{2}{|c|}{2016-2019} \\
\hline
 & Entanglement & MSI & Entanglement & MSI \\
\hline
All events & 114 & 52 & 51 & 25 \\
CN & 18 (16\%) & 9 (17\%) & 16 (31\%) & 9 (36\%) \\
US & 8 (7\%) & 2 (4\%) & 3 (6\%) & 0 (0\%) \\
Unknown & 88 (77\%) & 41 (79\%) & 32 (63\%) & 16 (64\%) \\
\hline
Source: Adapted from Draft BiOp, Table 56
\end{tabular}
\end{table}

Although this difference is not statistically significant,\textsuperscript{42} it is arbitrary to ignore the difference because there are underlying factors that strongly suggest a divergence between the two regions with respect to entanglement risk associated with differences in the fixed gear profiles used in each country.

A previous version of this data was provided to the TRT at its April 2019 meeting. At that time, investigations were still underway and not all of the Canadian cases had been identified. Further, the data contained several transcription errors that erroneously determined


\textsuperscript{38} Not only is the risk from Canadian fishing gear improperly weighed, but the Draft BiOp does not include in the environmental baseline recent measures undertaken by Canada. Failure to do so results in a worst case scenario being analyzed in the jeopardy assessment of the draft BiOp at 333.

\textsuperscript{39} See discussion of U.S. regulatory measures above at Section III.A.

\textsuperscript{40} Although increased NARW migration into the Gulf of St. Lawrence was observed as early as 2015, Canadian regulators did not implement enhanced protective measures for vessels until 2017 and fisheries until 2018. See NARW sightings data at https://apps-nefsc.fisheries.noaa.gov/psb/surveys/MapperiframeWithText.html.

\textsuperscript{41} See Section III.A. above for a summary of the primary mitigation measures implemented in U.S. waters since 2009.

\textsuperscript{42} Based on a Student’s T-Test (2-tailed), the difference is not significant at p < 0.05. Walpole, Ronald E. (2006). Probability & statistics for engineers & scientists. Myers, H. Raymond. (7th ed.). New Delhi: Pearson.
confirmed non-trap cases as unknown. Based on this incomplete data, TRT members were instructed by NMFS to concentrate their efforts on reduction of entanglements from the Lobster Fishery because the fishery posed the most significant threat to the species, a claim that does not comport with observed data as described below.43

Glenn Salvador, who spent more than two decades as a gear specialist at NMFS, performed a careful examination of NMFS entanglement data, with updated Canadian cases and corrections included, and concluded that the April 2019 presentation does not accurately reflect the threat level presented to NARW by the American lobster fishery. 44 45

Specifically, Mr. Salvador reviewed data available for 138 documented entanglement cases in U.S. and Canadian fisheries of all types from 2000-2018, and concluded that there has been a significant decline in NARW entanglements in U.S. lobster gear since 2010. Moreover, he noted that since 2014 there has been only a single, non-serious entanglement in lobster gear attributed to the New England lobster fishery, and observed that rope removed from entangled whales since that time is not characteristic of ropes used in the New England lobster fishery.46 Based on these findings, he concluded that “the decline in lobster gear entanglement is due to the success of whale protection measures implemented by lobstermen and a significant distributional shift of NARW into Canadian waters where they encounter Canadian fishing gear.”47 Mr. Salvador concluded that “[t]he largest entanglement threat is now posed by Canadian snow crab gear trap/pot gear.”48 The data supporting his conclusion are illustrated in Figure 1 below. As noted, updated data presented in the Draft BiOp show that this trend has worsened.

Figure 1

43 See NMFS presentation at April TRT meeting at https://archive.fisheries.noaa.gov/garfo/protected/whaletrp/trt/meetings/April%202019/Meeting%20Materials/overview_of_relative_risk_reduction_decision_support_tool__04_23_201.

44 Salvador declaration at 5 (Addendum C).

45 pdf and additional meeting materials at https://archive.fisheries.noaa.gov/garfo/protected/whaletrp/trt/meetings/April%202019/01_april_2019_meeting_materials.html.

46 Id.

47 Id.

48 Salvador declaration at 5 (Addendum C).
Mr. Salvador’s analysis of data compiled and presented by NMFS also undermines NMFS’s 50-50 risk allocation between Canada and the U.S., as proposed in the Draft BiOp. His analysis strongly supports a finding that, notwithstanding the significant volume of rope the U.S. lobster fishery deploys in the water column, Canadian fisheries now represent the greater entanglement threat to NARW.49

Fourth, the Draft BiOp does not address the difference in observation effort between Canadian and U.S. waters. Survey effort has historically been significantly greater in U.S. waters, as NMFS conducts aerial operations on nearly a year-round basis. As a result, entanglement events in Canadian waters were likely under-sampled prior to 2017, the year when survey effort in Canada was increased with the assistance of NMFS.50 Greater survey effort in the U.S. relative to Canada increases the likelihood that an entanglement event would be observed. A small number of additional observed entanglements in Canadian waters would be sufficient to make the difference between the U.S. and Canada statistically significant. This factor also undermines the Draft BiOp’s 50-50 allocation.51

Fifth, NMFS’s peer review of this method did not provide conclusive advice on the allocation method. The report concludes:

The current approach for apportioning human-caused mortality by country may not be the most appropriate approach. There has been a clear recent shift in the spatial distribution of NARW which has been coupled with a shift in the source of known serious injuries or mortalities to more Canadian records. Therefore, a different method from the 50:50 split of unknowns to US and Canadian fisheries should be examined.52

Reviewer Jason How acknowledged the lack of scientific basis for the 50-50 split and offered a different approach to address the uncertainty:

The current 50% apportionment of unknowns to US fisheries does not reflect the current shift in NARW distribution and the recent increase in Canadian fisheries involvement in SI-M. Discussions between industry and government should therefore be entered into to find a compromise solution, whereby the recent shift in NARW abundance is accounted for, but fishers are still required to address

49 Salvador declaration at 5, 8-10 (Addendum C).

50 NMFS data presented at the October 2018 TRT meeting shows that while surveillance in Canada increased significantly in 2017 and was greater than U.S. efforts (95 hours in Northeastern US, 152 hours in CN), surveillance efforts were similar in 2018 (150 hours Northeastern U.S. vs. 152 hours in Canada).

51 M. Cryer, CIE Independent Peer Review of the North Atlantic Right Whale Model Projects (May 2020), states the 50:50 split “does not seem to have much supporting evidence in the documentation provided” at 5.

the SI-M issues which likely arise from their fisheries noting the large number of unknown SI-M which can’t be attributed to a particular country.\[53\]

Finally, the Draft BiOp overemphasizes the quantity of vertical lines and insufficiently evaluates available data regarding the threat of different gear types and configurations. The Draft BiOp’s cursory consideration of gear type is inconsistent with how it attempts to weigh these factors in the DST. Using a quantitative approach, the DST places equal emphasis on gear type and gear density in its calculations of entanglement risk.\[54\] Independent reviewers consistently noted the inherent challenge and problems with how the DST incorporated the risk of entanglement posed by various fishing gear types.\[55\] 56 57

Moreover, multiplying gear density by severity is merely an initial assumption that lacks sufficient scientific basis.\[58\] 59 60 This inadequate approach has significant implications for the Conservation Framework. Should overall entanglement risk be significantly more sensitive to the gear type and/or how it is fished than gear density,\[61\] then the Framework has overemphasized the importance of reducing vertical lines when, instead, it should be focused on reducing the impact of specific gear types and how those gear types are fished.\[62\] As discussed in other sections of


\[54\] As discussed below, we believe the DST may actually underweight gear type and configuration as a contributing factor to entanglement.


\[57\] During its April 2019 meeting, the TRT acknowledged the importance of identifying the threat of various gear types and configurations but rejected NMFS’s approach of relying on the mean of seven expert groups. Further, from the Associations’ perspective, certain groups that do not work in commercial fisheries would have little insight on the threat of any fishing gear. Others, such as those involved with disentanglement, would have little expertise with gear that is not typically found on NARW. Yet, these groups ranked nearly all gear types, however unlikely they were to entangle whales, as at least a “9.”


\[59\] W.D. Bowen. (2019) Independent Peer Review of the North Atlantic Right Whale Decision Support Tool. At 9. “Little is known about the circumstances that lead right whales to become entangled or those that result in the whale becoming disentangled.”

\[60\] J. How. (2019) Center for Independent Experts Independent Review of the North Atlantic Right Whale Decision Support Tool. At 2. “Currently there is too much uncertainty regarding the mechanisms surrounding an entanglement and how these are likely to be impacted by changes to gear configuration and whale size etc”.

\[61\] Knowlton et al. 2016, at 325.

\[62\] For example, nowhere in the scientific record cited in the Draft BiOp is there an explanation why the DST uses (gear density) x (whale abundance) x (gear severity) = risk instead of (0.5)(gear density) x (whale abundance) x (gear severity) = risk. As the three DST reviewers noted, there is ample uncertainty about the circumstances of entanglement. NMFS’s initial assumption of the importance of gear density to
these comments, factors such as rope strength, gear configuration, weakened points in line, and, ultimately, presence of large aggregations of whales and whale behavior, drive risk.

In sum, the Draft BiOp arbitrarily assigns a 50-50 split rather than using a probabilistic approach informed by observed entanglements from 2010-2019. This inflates the effects of the actions and presents a scenario that is not “reasonably certain to occur.” For the foregoing reasons, the Final BiOp should be revised to reflect an allocation of risk between Canada and the United States that is supported by the best scientific and commercial data available regarding relative risk, and the underlying DST definition of risk should be adjusted accordingly to meet that standard.

4. The best available science does not support assigning all entangled whales with unknown gear to the commercial trap/pot fisheries.

The Draft BiOp makes a significant assumption by allocating all M/SI entanglements of unknown gear type to U.S. commercial trap/pot fisheries, making these fisheries responsible for an additional 38% of entanglements with no evidence of the fisheries’ involvement. NMFS justifies this allocation as follows:

Additionally, 99.7% of vertical lines in the action area are from trap/pot lines (2016 IEC, unpublished data). Given this information and for the purposes of this Opinion, we are assuming that all of the presumed U.S. entanglements in unknown gear were from trap/pot gear (2016 IEC, unpublished data).

Allocating all of the entanglements involving unknown gear to the trap/pot fishery is arbitrary when observed entanglements suggest that NARWs are more often entangled in gear types other than lobster gear. Where the type of gear involved in an entanglement event is known, and Canadian trap/pot incidents are excluded, the ratio between non-trap/pot gear and trap/pot gear is 1.75 : 1. In other words, observations involving confirmed gear type suggest that NARW are nearly twice as likely to be entangled in gear other than commercial trap/pot fisheries. We understand that gear is recovered in a relatively small proportion of entanglement incidents, and that the gear type is identified in even fewer incidents. However, to completely discount the distinction in observed data and assign all entanglements of unknown gear type to trap/pot fisheries is without scientific support and arbitrary.

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risk assessment, therefore, can by no means be treated as a “reasonably certain” effect of the proposed action. A more rigorous analysis of the DST’s risk calculation is required.

63 78% of M/SI are unknown; the BiOp allocates half of this to the U.S.

64 Draft BiOp at 224.

### Table 3
**Summary of Entanglement Incidents – By Gear Type -- 2000-2019**

<table>
<thead>
<tr>
<th>Gear Type</th>
<th>Entanglement</th>
<th>MSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>All events</td>
<td>114</td>
<td>52</td>
</tr>
<tr>
<td>Gear known</td>
<td>25</td>
<td>12</td>
</tr>
<tr>
<td>Trap/pot</td>
<td>18</td>
<td>10</td>
</tr>
<tr>
<td>trap/pot – CN crab</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>trap/pot – US</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>trap/pot – US lobster</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>trap/pot – Unknown</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Non-trap</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Non-trap – US</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Non-trap – country unknown</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Gear unknown</td>
<td>89</td>
<td>40</td>
</tr>
<tr>
<td>No gear present</td>
<td>52</td>
<td>18</td>
</tr>
<tr>
<td>Gear not recovered</td>
<td>33</td>
<td>19</td>
</tr>
<tr>
<td>Gear undetermined</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: NMFS NARW Entanglement Data 2000-2019

Although the number of lines in U.S. waters is overwhelmingly from trap/pot fisheries, NMFS has recognized that not all lines pose the same risk to right whales. NMFS developed the DST to assess the variable threat from different gear types and configurations in its risk assessment. A methodology is under development to assess risk of lobster lines based on the type of rope fished (i.e. diameter) and the configuration of the gear (i.e. length of line, length of trawl).\(^{66}\) Even with an incomplete understanding of the threat of various gear types, early results of the DST show that line density as a singular factor is not a good indicator of risk to whales. For example, the state of Maine, using the DST, determined that 70% of risk to NARW in Maine waters gear occurs in an area where only 10% of lines are fished.\(^{67}\) This information should be more fully considered in the Final BiOp and should be applied, as appropriate, to the definition of risk in the DST as indicated in Section III.B.3 and n. 62.\(^{68}\)

Additionally, the best available data show that both the entanglement risk and potential of a severe entanglement differ between trap/pot and non-trap gear. Just as encounters with strong, large diameter line fished in Canadian trap/pot fisheries have been responsible for the majority of NARW M/MSI in recent years, it is likely that a NARW encountering gear spread across the water column would have a high likelihood of entanglement. It is important to recognize that a vertical

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\(^{66}\) See Presentation on Decision Support Tool at April 2019 TRT meeting at [https://archive.fisheries.noaa.gov/garfo/protected/whaletrp/trt/meetings/April%202019/02_presentation_on_risk_reduction_tool.html](https://archive.fisheries.noaa.gov/garfo/protected/whaletrp/trt/meetings/April%202019/02_presentation_on_risk_reduction_tool.html).

\(^{67}\) Erin Summers, Maine DMR personal communication on 2/12/2021. Similar presentation in DEIS, Appendix Volume 2, page 3-105 with preliminary risk analysis “Maine federal waters from the 3- mile line out to 12 miles constitutes 11% of Maine’s annual NARW occurrence and 88% of Maine’s NARW presence is contained beyond 12 miles.”

\(^{68}\) We also urge NMFS to seek expert judgment from those with a deep understanding of the dynamics of fishing gear – fishermen – to develop this portion of the DST, and to also expand this tool to assess the risk of non-trap gear.
line occupies less than an inch across the water column while non-trap gear is fished in wide strings that could pose greater risk if deployed where they coincide with whales engaged in higher risk behaviors.\textsuperscript{69} A methodology has been developed by Woods Hole Oceanographic Institute in collaboration with the fishing industry to attribute risk to gear based on proportion of water column occupied.\textsuperscript{70} This information should also be considered in the Final BiOp.

Finally, the Draft BiOp does not address the potential for a whale to shed trap versus non-trap gear, which is highly relevant considering that fishing gear is shed in the majority of incidents. Two-thirds of all entanglement events are minor,\textsuperscript{71} meaning that whales frequently shed fishing gear without serious injury to the individual. It is reasonable to assume that the entanglement profile of fishing gear influences the likelihood of its being shed and therefore constituting a “minor” entanglement. The Draft BiOp does not analyze differences between trap and non-trap fisheries with respect to the potential to cause M/SI. Instead, it arbitrarily assigns all M/SI resulting from unknown gear type to trap/pot fisheries rather than using a probabilistic approach informed by observed entanglements.

We urge NMFS to take a consistent probabilistic approach for all apportionments in the BiOp. This would first consider apportionment based on observed data. It should also consider additional data, information, and expert judgment, as appropriate, and apply them in a manner that refines the allocations based on observed data. As currently written, the Draft BiOp arbitrarily assigns all M/SI from unknown gear to trap/pot fisheries despite undisputed evidence to the contrary. Again, this inflates the effects of the trap/pot fisheries and presents a scenario that is not reasonably certain to occur.

5. The BiOp does not account for the full benefits of using weak links.

Certain mitigation measures implemented through Phase 1 of the Conservation Framework can be expected to reduce minor, moderate, and severe (\textit{i.e.}, those resulting in M/SI) entanglements by equal amounts. For example, mitigation measures that reduce the number of lines in the water (\textit{e.g.}, trawling up or a closure) would reduce the risk of entanglements of all severities. Weak points inserted in rope, however, may significantly reduce the severity of entanglements because weak points in the line allow the whale to break free of the gear as the individual whale applies force to swim free. There is a rational basis to assume that weak points inserted into vertical lines more effectively reduce the likelihood of M/SI relative to other mitigation measures. However, the Draft BiOp does not consider the benefits of insertion of weak points. Were the requirements for weakened vertical lines to reduce risk of severe entanglements by more than 60 percent, thereby significantly reducing M/SI, then the need for further mitigation requirements under Phase 3 and 4 may be reduced or eliminated entirely.

\textsuperscript{69} NOAA List of Fisheries at https://www.fisheries.noaa.gov/national/marine-mammal-protection/northeast-sink-gillnet-fishery-mmpa-list-fisheries.


\textsuperscript{71} Maintenance of the North Atlantic Right Whale Catalog, Whale Scarring and Visual Health Databases, Anthropogenic Injury Case Studies, and Near Real-Time Matching for Biopsy Efforts, Entangled, Injured, Sick, or Dead Right Whales October 1, 2020 at 50.
Further, the Draft BiOp appears to discount scientific literature that suggest actions that reduce only the severity of entanglement (and not the likelihood) may be sufficient to recover the NARW. Knowlton et al. (2015) found that, “broad adoption of ropes with breaking strengths of \( \leq 7.56 \text{ kN} \) (\( \leq 1700 \text{ lbsf} \)) could reduce the number of life-threatening entanglements for large whales by at least 72\%, and yet could provide sufficient strength to withstand the routine forces involved in many fishing operations. A reduction of this magnitude would achieve nearly all the mitigation legally required for U.S. stocks of North Atlantic right and humpback whales” (emphasis added).

In the Lobster Fishery, vertical lines do not maintain their manufactured breaking strength over time. Vertical lines consist of at least two pieces of rope, and often more if fished in deeper waters. The majority of vertical lines are fished for five or more years and become significantly weaker than the manufactured strength, degrading within the first few months in the water, and further over time, due to wear from the hauler, contact with the traps and bottom substrate, and exposure to sun. The majority of these ropes are joined together with a knot, and less commonly with a splice. A knot will weaken the line by up to 50\% because it creates a curve in the rope in which the outer circumference is greater than the inner part. The difference in length creates stress across the width of the rope when put under tension, which undermines its strength. Splices are stronger than knots but will typically reduce rope strength, though this result varies widely depending on the type of splice and the number of tucks into the line. A typical inshore vertical line consists of a 5/16” sink rope at the surface (the U.S. does not allow floating line on the surface), knotted or spliced into a 3/8” floating line, which runs to the trap. Single or multiple pre-cut lengtheners are added to the line as gear is shifted into deeper waters.

Although lobster gear is already fished with rope that is below manufacturers’ rated strength specification and in a manner that incorporates weak points throughout the vertical line, Maine DMR has been conducting research, with funding from NMFS and in collaboration with the Associations, to develop and test manufactured weak points, specific knots and splicing techniques that break at 1700 pounds pressure or less and leave a bitter end that will not get caught in baleen. This research has demonstrated that rope always breaks at its weakest point. When lines made up of more than one rope type were broken, the rope always broke on the weaker (smaller diameter) side of the knot or splice. DMR is preparing a list of knots and splices and exploring manufactured devices that can be inserted into the line to ensure it will break when it experiences 1700 pounds of force or less. These approaches have buy-in from lobstermen and could be quickly adopted and provide immediate benefit to NARW.

Maine DMR, in collaboration with the Associations, is also field-testing time tension line cutters (“TTLC”) as an option to allow rope encountered by a whale to break while maintaining enough strength to be safely fished in areas where 1700-pound weak points are too weak to allow for safe retrieval of gear. A TTLC is rigged into the vertical line and will cut the rope after it


73 Maine DMR tested the breaking strength of vertical lines used by lobstermen; ropes consistently broke well below manufactured rope specifications. Draft Environmental Impact Statement; ALWTRT Risk Reduction Rule, Appendix I.

senses a certain tension on the line that occurs for a set period of time (as programmed in the device). If a whale encountered the line thereby applying tension, the device would cut the rope as prescribed by the TTLC. NMFS should consider this to reduce the frequency and severity of entanglement in heavier lines, as an alternative solution to weak points, that would allow strong line to break free if encountered by NARW. This device has already been through significant engineering, testing and field research and provides another option to reduce the severity of entanglement in heavier lines that could be implemented in the near-term.

There is evidence in the literature that NARW are capable of applying enough force to break ropes weakened with insertions of 1700-pounds or less\(^75\), and that those encounters rarely result in a severe entanglement. Lobster gear already incorporates many weak points in vertical lines through the routine rigging of multiple ropes into a single line. The addition of 1700-pound weak points in line will further reduce NARW M/SI. The Final BiOp must account for the full conservation benefit of incorporating 1700-pound weak links in vertical lines to accurately characterize the effects of the action.

6. **NMFS overestimates the contribution of cryptic mortality to annual M/SI.**

Without explanation, the Draft BiOp fails to attribute any NARW mortality to natural causes.\(^76\) This omission ignores published scientific literature that documents two natural sources of mortality: (1) predation by white sharks and (2) recent, unfavorable oceanographic conditions resulting from climate change.

Taylor *et al.* (2013)\(^77\) document predation events by white sharks on NARW calves in southeast U.S. waters. In addition, Curtis *et al.* (2014) report that juvenile and adult white sharks have been observed scavenging on NARW carcasses on several occasions.\(^78\) The authors point to evidence the sharks may be drawn to NARW calving grounds during the calving season.\(^79\) Curtis *et al.* also present relative abundance analyses for these NARW predators that “offer a more optimistic outlook for NWA [Northwest Atlantic] white sharks than previous reports.”\(^80\) The Draft BiOp should, at a minimum, consider this qualitative evidence that NARW calves are known to be subject to predation by a shark population that appears to be growing and, therefore, presents the risk of increased predation for juvenile NARW. These reports of risk from natural predators are consistent with the draft 2020 NARW Stock Assessment Report that also discusses


\(^{76}\) Draft BiOp at 225.


\(^{79}\) *Id.*, at n.76.

\(^{80}\) *Id.*, at n. 21, 27, 77.
natural mortality, noting that 14.5 percent of the 124 recorded NARW mortalities between years 1970–2018 were “believed to have died from perinatal complications or other natural causes.”

As discussed elsewhere in these comments, climate change is another natural threat to the NARW population that is not appropriately examined and considered in the Draft BiOp. The Draft BiOp states that climate change may “have several indirect effects on marine mammals, which may include changes in distribution; displacement from ideal habitats; decline in individual and population fitness; increased susceptibility to disease and contaminants; and changes in abundance, migration patterns, community structure, and reproductive success (Jenssen 2006, MacLeod 2009, Simmonds and Eliott 2009).” However, the Draft BiOp makes no credible effort to evaluate the probable impact of climate change on the population over time even though there is ample evidence of indirect effects on marine mammals like NARW in the form of “changes to the range and abundance of competitors and predators (Learmonth et al. 2006)” Notably, Gutbrod-Meyer (2018) found that a regime shift attributed to climate-forcing in the 1990s produced “[l]ow prey abundances [that] reduced calving rates, demonstrating the significant impact prey availability can have on NARW demography.” Given the undisputed changes to migratory patterns driven by changes in prey availability and associated non-trivial impacts on the fitness of marine mammals such as neonates, the Final BiOp would be arbitrarily deficient if it were to assume no impact of climate change on NARW M/SI.

In sum, it would be arbitrary for the Final BiOp to assume that there is no natural mortality in the population despite published literature to the contrary. Ignoring natural sources of mortality has the effect of underestimating the reproductive capacity of the species and ability of the population to rebound in response to a reduction in anthropogenic mortality and more favorable oceanographic conditions. Further, based on this assumption, the Draft BiOp attributes all cryptic mortality to anthropogenic sources, thereby unjustifiably overestimating the impact of the Lobster Fishery. This again contributes to an effects scenario that is “not reasonably certain to occur.”

7. **Linden (2021) is an unreliable study and an inappropriate basis for making 50-year projections.**

   a. **The Linden (2021) model is overly sensitive to new data.**

   Linden (2021) is based on observed calving and modeled mortality rates derived from 2010-2018, a period characterized as a “regime shift” due to warmer temperatures and changes in NARW prey distribution. The BiOp scenarios are parameterized on a different time period than reported in Linden (2021), 2010-2019, but documentation of these model runs is not included. This is significant because the Linden model relies on output from the Pace et al. (2017) model which has demonstrated the sensitivity of estimated demographic rates to incremental additions of additional years of data. Therefore, the addition of another year of data (i.e., 2020 data) is likely to produce a markedly different projection because the resultant life

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82 Id., at 207.
history parameter estimates may be dramatically different, just as they differed from the 2010-2018 estimates after adding 2019 data. We acknowledge that independent reviewers supported the time period to begin in 2010; however, these favorable reviews do not negate the fact that the Linden model is very sensitive to new data. The addition of one year of data will provide a different NARW population projection over the next 50 years.

Three versions of the Pace et al. (2017) state-space mark-recapture population model (“SSMR”) demonstrate changing demographic parameter values each time new data are added to the model. The Pace model estimated the survival probabilities of NARW females from 1990 to 2014. Linden (2021), as documented in the Draft BiOp Appendix 3, updated the model to include data through 2018, and Linden (2021B) included data through 2019 as the basis for the Draft BiOp scenarios. Figure 2 below demonstrates how with each addition of new data, the estimated adult survival rates change, sometimes dramatically. The addition of 2019 data (Linden 2021B) in particular, alters the survival estimate for other years in the time series, affecting at least eight years prior to the added year (2010).

![Figure 2](image)

The assumed demographic rates on which Linden (2021) relies are not the demographic rates used in Linden’s model version as the basis of analysis in the Draft BiOp. The addition of the 2019 data produced new survival (and other vital) rates that imply a substantial change in the demographic parameters used in the matrix population model, which is particularly problematic because the elasticity (Table 2 in Draft BiOp Appendix 3) of the Linden model demonstrates that adult survival “had the greatest potential to affect growth rate.” The addition of 2019 data dramatically changes the estimates of demographic parameters on which population projections are based. Note also that 2019 data are the most recent available. The extent to which 2020 data, which have already been collected, will again change estimates is unknown.

Both the Pace and Linden models are relatively new and highly sensitive to additional years of data. For example, including data from 2009, the highest year on record for new NARW calves, could fundamentally change the projections of the Linden model. By selecting 2010 as a precise demarcation of regime change effects, the analysis no longer reflects the variability
evident within longer time frames and only narrowly excludes the highest value in observed number of calves. The Associations recommend conducting a sensitivity analysis on the demarcation of the “regime shift” period, for both beginning and end data years, to inform how reliant the model projections are on a precise definition of an inherently imprecise environmental process.

In addition, four of the nine years upon which the Linden model is based were associated with a significantly lower probability of re-sighting individual NARW. The probability of re-sighting an individual subsequently increased to historic levels in years 2017-2019. The driver for this decline in re-sighting is not explained. The Pace model treats it as an indicator of the probability of detection. However, it is likely a result of the documented shift in NARW geographic distribution. Once NMFS completely redesigned its NARW survey, individuals were re-sighted in subsequent years, and the mortality estimates from these prior years would have been upwardly revised.

Because both the Pace and Linden models are relatively new and highly sensitive to new data inputs, the addition of one year of data will likely provide very different NARW population projections over the next 50 years. These models are not sufficient to fully inform the long-term actions required under the Conservation Framework and result in an overestimate of the risk reduction that NMFS believes is needed.

b. The Linden (2021) model improperly parameterizes calving rate.

Linden (2021) is also flawed because it arbitrarily treats NARW calving rate differently than survival. The Linden model erroneously treats the calving rate with more certainty in its matrix model simulations than the survival parameters, preventing the full distribution of credible calving rates to be considered. This locks model outcomes to a relatively small number of specific observed low calving rates even though there is extensive variability and uncertainty in calving rates over time. Specifically, in each year of each model simulation run used in the BiOp, the survival parameters are derived from the full posterior distributions of adult female survivorship supplied from Pace’s SSMR model for 2010-2019. For the calving rate, however, the value for each year was not drawn from the full posterior distributions estimated by the SSMR model. Instead, the calving rate is drawn as only one of the ten annual means of calving rates from 2010-2019, even though the full posteriors would have been available for these derived values during 2010-2019. This method severely limits the potential range of calving values represented in the model. Importantly, calving rates were reported without 95% credible


86 Draft 2020 NARW stock assessment, at 48, “During 1990–2017, at least 447 calves were born into the population. The number of calves born annually ranged from 1 to 39, and averaged 16 but was highly variable.”

87 Pace et al. (2021) clarifies that derived values may be treated as a posterior because it is derived from posteriors.
intervals, making it additionally difficult\textsuperscript{88} to assess how the disparity in life history parameters from the SSMR model inputted into the matrix model affect the population projections. The Associations therefore recommend that NMFS re-run the model simulation scenarios using the full derived posterior distributions of calving rates from 2010-2019.

c. The Linden (2021) model improperly assumes an equal sex ratio.

An equal sex ratio is not reflective of the current NARW population as determined by Pace \textit{et al.} (2017). The matrix model further assumes all individuals share the same demographic parameters, but for small populations individual variation can be important to modeling survival. To this point, the SSMR model reports that additional stress on females has led to an increasingly male-dominated population. Applying an assumption that 50% of observed deaths are female is, therefore, unreasonable. If males make up a larger portion of the population (Pace \textit{et al.} 2017), males are statistically more likely to encounter and become entangled in fishing gear. Alternatively, females are thought to be at greater risk of death from an entanglement when an incident does occur.

Thus, there are two opposing forces on sex ratio—males are at greater risk of encountering fishing gear, but females are at a greater risk of mortality when entangled—but it cannot be assumed that these forces balance each other out in all cases. Importantly, if entanglement is one of the sources of stress disproportionality causing female mortality, as Pace \textit{et al.} (2017) suggest, then we could expect the male/female ratio to respond differently to alternative mortality reduction scenarios.

The Associations recommend including males in the population model, as done by Fujiwara and Caswell (2001), in what Linden calls, “the motivating example for this modeling framework.” Similar concerns about the treatment of the male/female ratio were also raised by Cryer (2020) during model review.\textsuperscript{89} An individual-based modeling framework would be more appropriate for incorporating this variation, as well as for incorporating sublethal entanglement effects. Such a model appears to be under development by the Population Evaluation Tool Subgroup of the Northeast Implementation Team. The Associations recommend that this individual-based model should be used in place of the matrix projection model.

d. The Linden (2021) model improperly assumes constant and unfavorable environmental conditions will persist for 50 years.

Additionally, Linden (2021)’s projections of future NARW populations are inappropriately based on the assumption that the environmental conditions of the Gulf of Maine and North Atlantic drive NARW demographic parameters and that these environmental conditions and subsequent demographic parameters will persist for 50 years into the future. Historical trends in environmental conditions for this region indicate regime changes are

\textsuperscript{88} The intervals could be recalculated based on Supplement 1.

\textsuperscript{89} Cryer (2020) at 5. “Similarly, it is also assumed without much documented support, that males and females are equally vulnerable to entanglement in pot fisheries (and to all anthropogenic mortality in Canada). Is the evidence for this assumption strong, or is it plausible that the lower survival rate of females is partly due to higher fishing-related or ship-strike mortality than males?”
common (Morse et al. 2017), and no evidence is provided in the draft BiOp to suggest that fluctuating oceanographic conditions will cease.

Furthermore, Linden’s analysis of model projections using the full time period (1990-2018) to parameterize the model (Supplement 4) demonstrate that the model outcome is very sensitive to the assumptions regarding what historical period will be representative of future conditions. Similar concerns were raised by New (2020) during the CIE review, noting that the assumption that 2010-2018 conditions will continue for 50 years is “a strong one, especially given the observed variability in calving from 1990-2018.”

e. **The model improperly finds that adult survival has the greatest potential to affect growth rate.**

Model elasticity is reported in Table 2 (Draft BiOp, Appendix 3), which Linden interprets to indicate that adult survival “had the greatest potential to affect growth rate” and as justification to focus the model on adult survival (to the exclusion of calving rate, as discussed above). In contrast to all other evaluations of the model (except for Supplement 4), these elasticities were based on the average demographic parameters from the full time series, 1990-2018, and not on the 2010-2018 time series, from which model projections were derived, nor the 2010-2019 time series on which the Draft BiOp is based. New (2020) also noted in her model review the need to perform perturbation analyses (of which elasticity is one type). The Associations recommend recalculating the elasticity using the 2010-2019 demographic data to better understand the relative effects of different parameters on model outcomes.

f. **The retrospective validation for the Linden model (2021) is not reliable.**

The “retrospective validation” (Figure 7) performed on Linden (2021) is not reliable. It was performed using the same data that provided the model parameters. That is, the Pace et al. (2017) SSRM model was fit using data from 1990-2018, and the estimated parameters were input into the matrix model and then used to retrospectively predict 1990-2009. It should be expected that the model would perform well on the same data used to build the model. Importantly, however, the retrospective analysis significantly underestimates the population size in the later years of the retrospective analysis. The end of the prediction series is where the “process” error in the projection would accumulate most dramatically, as systematic errors (e.g., chronic under or over estimation) multiply in each year. Figure 7 suggests incipient systematic underestimation of the number of females after 20 years.

This same underestimation could be expected to be further compounded in the 50-year projections. No quantitative assessment of model performance is provided, only a visual interpretation of the model fit. The Associations recommend that a quantitative measurement of model fit (e.g. root mean squared error) and potential for bias should be provided. Additional validation should be performed in silico using the simulated populations described and fit by Pace et al. (2017) to test the SSAM model, and New (2020) and Getx (2020) suggestions of the addition of a validation check in their reviews of Linden (2021) should be incorporated.
8. In sum, the Draft BiOp presents an effects scenario that inflates the assumed risk from the lobster fishery and is not “reasonably certain to occur.”

As explained in Section III.B.1 supra, NMFS must objectively evaluate the effects of the action that are “reasonably certain to occur” based upon the “best available scientific and commercial information.” The effects analysis fails to meet this standard because, as set forth in the sections above, it presumes effects that do not occur and overestimates the impact of other assumed effects. We urge NMFS to make the corrections recommended above. Without those corrections, the BiOp arbitrarily presents an effects scenario that is not based upon the best available scientific commercial information and is not reasonably certain to occur, as required by law.

C. The Conservation Framework Must be Improved.

1. Certain proposed TRP measures will further reduce impacts and certain measures are arbitrary or unnecessary.

The Associations support risk reduction measures that are based on the best available science and appropriately designed to achieve applicable legal standards. To do so, the scope of management alternatives must accurately reflect the risk posed by each commercial fishery contributing to M/SI from entanglement. NMFS’s management scope has been, and currently is (as evidenced by Phase 1), disproportionately and unjustifiably focused on the Lobster Fishery. As described in the comments above, NMFS is not sufficiently addressing other, more substantial sources of NARW M/SI. NMFS must address the entanglement risk posed by all commercial fisheries in order to fulfill its legal obligations.

Additionally, NMFS has not acknowledged data showing that the Lobster Fishery has substantially reduced the risk it presents to NARW over the past decade through implementation of risk reduction measures. Instead, as explained in the comments above, NMFS relies on assumptions that artificially inflate the risk of the Lobster Fishery based solely on number of lines fished—an assumption it rejects in its DST, which calculates risk based on whale density, gear density, and risk of gear fished. 90

For all of the reasons stated above, the Associations object to the risk reduction goal set by NMFS for the Proposed Rule. The Associations urge NMFS to adopt a uniform probabilistic approach, relying on observed data to apportion all unknown human causes. When available, additional data, information and expert judgment should be used to refine proportions. This methodology should apply to apportionment of (1) unknown human causes to vessel strikes versus entanglements, (2) unknown entanglements between U.S. and Canada, and (3) unknown U.S. entanglements among U.S. fisheries.

The Associations are concerned with several elements contained in the Proposed Rule for which we will provide more detail in our comments on that proposed action by March 1. These concerns are summarized as follows:

90 As indicated at n. 62, the Associations believe the DST calculation of risk nevertheless gives undue weight to gear density to the detriment of whale behavior and other factors.
The Proposed Rule does not include a provision for conservation equivalencies. This is necessary to allow fishing areas to adapt proposed management measures based on local fishing conditions.

The Proposed Rule does not allow lobstermen to split trawls in half and fish with one endline. This would have equivalent conservation benefit to NARW while allowing smaller vessels within the fleet to more safely manage gear.

The Proposed Rule, and the supporting DEIS, include additional measures that were not proposed or vetted by the TRT or by the jurisdictions that submitted draft plans for fisheries in their respective areas. The Preferred Alternative includes restricted areas which effectively create ropeless fishing areas. The LMA1 restricted area, for example, has not been previously identified for more aggressive management by the TRT or any of the jurisdictions. The basis for these closures lacks support or analysis on the record. The Associations recommend that NMFS explore development of minimum criteria that must be met to consider triggering a buoy line closure, such as minimum NARW aggregation size, presence of NARW aggregation for a minimum time period, and recurrence of NARW aggregations over a minimum number of years. This is reflective of the rationale used for the Massachusetts Bay Restricted Area.

The Proposed Rule’s Preferred Alternative to establish areas for buoy line closures does not address the inability of the lobstermen to fish buoy-less gear based on significant unanswered concerns regarding the availability, reliability, safety and cost of buoy-less gear systems, and additional challenges with gear conflict and enforcement. These concerns are outlined in more detail below.

The Proposed Rule does not specify how lobstermen can meet the weak point requirements. Maine DMR has been working closely with the Associations to develop a list of methods that would meet this requirement. The Associations recommend that NMFS ensure a robust and flexible list of options be made available to lobstermen, and refinements to this list can be made over time as new data become available. This should include weak point equivalents such as time tension line cutters.

The Proposed Rule grossly underestimates the economic impact of the measures in the Preferred Alternative on the fishing industry. The Associations will provide more detail about those impacts in our comments on the Proposed Rule.

2. The benchmarks proposed in Phases 3 and 4 of the Conservation Framework are arbitrary, unsupported, and very likely unnecessary.

We strongly believe that Phases 3 and 4 will not be necessary once NMFS reevaluates the trap/pot fisheries after correcting the errors outlined above. At a minimum, the revised evaluation should allocate M/SI using a probabilistic approach based on observed data and consider natural mortality. NMFS should re-run the Linden (2021) model using a calving rate that is both responsive to improvements resulting from risk reduction measures pursuant to Phases 1 and 2 (such as by evaluating the sensitivity of the projections to a calving rate that increases over time) and uses the full derived posterior distributions of calving rates from 2010-2019. Given the
sensitivity of the Pace and Linden models to new data, all models should be updated at the end of Phases 1 and 2 before NMFS requires subsequent mitigation measures.

The worst-case scenario constructed by the Draft BiOp also assumes that Canada does not reduce the number of M/SI incidents occurring from its own activities, despite the fact that it implemented numerous actions since 2017. Although we believe Canada must go much further to reduce its impacts on NARW, it is likely that the risk to the NARW population from Canadian fisheries will measurably improve as a result of Canada’s actions. And we implore NMFS to engage more directly and aggressively with Canada to ensure that equivalent risk reductions are implemented bilaterally. Before proceeding with Phases 3 and 4, NMFS should review its allocation of M/SI between the two countries and update its models to reflect the performance of Canada’s mitigation programs.

3. **The Phase 4 Benchmark of 0.11 M/SI in the Conservation Framework is arbitrary and inconsistent with law.**

NMFS states that it “determined that M/SI in the federal fisheries needs to be reduced to 0.11 on average annually, within 10 years under a phased implementation (see below), to ensure that the fisheries will not appreciably reduce the likelihood of survival and recovery of the species.” Conservation Framework at 4. However, although NMFS analyzes a scenario in which 0.11 M/SI is reached in 10 years, NMFS provides no legal or scientific support for its determination that M/SI “needs to be reduced to 0.11.” NMFS could almost certainly determine that an action causing only 0.11 M/SI annually is not likely to jeopardize the NARW. But that does not mean that a 0.11 M/SI rate is necessary to achieve no-jeopardy. Nor is it necessary or proper for NMFS to affirmatively make that determination.

The ESA requires NMFS to evaluate an action as proposed and to determine whether, under Section 7(a)(2), the action is “likely to jeopardize the continued existence of any endangered species or threatened species.” 16 U.S.C. § 1536(a)(2). In so doing, NMFS must examine whether the proposed action “reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.” 50 C.F.R. § 402.02 (emphases added). This question—framed in qualitative terms—is not capable of being reduced to a single metric. Indeed, we are aware of no biological opinions issued by NMFS or its sister agency, the U.S. Fish and Wildlife Service, in which the agency reduced the jeopardy inquiry to a single metric that “needs to be” met (much less a metric measured to the hundredth of a decimal point).

To the extent that the quantitative metrics used for MMPA purposes—such as M/SI, as referenced in the Conservation Framework—are relevant to the “jeopardy” standard, they do not provide any hard and fast answers to the nuanced question presented by ESA Section 7. To be sure, at least two courts have determined that MMPA standards are qualitatively more stringent—i.e., more protective of marine mammals—than analogous ESA standards. See Ctr. for Biological Diversity v. Salazar, 695 F.3d 893, 913 (9th Cir. 2012) (MMPA “negligible impact” more protective than ESA “jeopardy” standard); In re Polar Bear Endangered Species Act Listing & 4(d) Rule Litigation, 818 F. Supp. 2d 214, 233 (D.D.C. 2011) (approving Service’s “exhaustive analysis in which it determined that the MMPA is comparable to, or even stricter than, the take provisions of the ESA in most respects”). But no court has held that achievement
of an MMPA metric (such as a particular M/SI rate) is necessary for a no-jeopardy determination. And even if it were possible to reduce the jeopardy inquiry to a single metric, there is no rational basis for NMFS to conclude that an M/SI rate of approximately one-eighth of the established “potential biological removal” rate (“PBR”) is necessary for a no-jeopardy finding.

Indeed, PBR is one of the MMPA’s most precautionary (i.e., protective) metrics which, by statute, represents the “maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population.” 16 U.S.C. § 1362(20) (emphasis added). “Optimum sustainable population,” in turn, means “with respect to any population stock, the number of animals which will result in the maximum productivity of the population or the species, keeping in mind the carrying capacity of the habitat and the health of the ecosystem of which they form a constituent element.” Id. § 1362(9) (emphasis added). We are aware of no case law or other authorities that compare the MMPA’s PBR standard with the ESA’s jeopardy standard. However, at the very minimum, it is an open question whether an action causing some level of M/SI at a rate (equal to PBR) that, by the MMPA’s definition, allows the species to achieve its maximum productivity will nevertheless “appreciably reduce” (i.e., jeopardize) the likelihood of the species’ survival or recovery. And it certainly cannot be the case that an M/SI level that is a tiny fraction of the rate (equal to PBR) that allows a species to achieve maximum productivity is necessary to avoid jeopardy.

Moreover, a collective M/SI rate of 0.11 across all of the ten fisheries would almost certainly not be necessary to meet the take reduction goals of MMPA Section 118. Under Section 118, the “immediate goal” of a take reduction plan is to reduce a marine mammal stock’s M/SI from commercial fisheries to below PBR. 16 U.S.C. § 1387(f)(2). In addition to that goal, Section 118 establishes a “long-term goal” to reduce the MSI “to insignificant levels approaching a zero mortality and serious injury rate, taking into account the economics of the fishery, the availability of existing technology, and existing State or regional fishery management plans.” Id. (emphasis added). The 0.11 metric is far below PBR for NARW. Although not stated by NMFS, a 0.11 M/SI rate may be aimed at achievement of the Section 118 long-term goal of levels approaching zero M/SI. But NMFS fails to explain how an M/SI rate of 0.11 across all ten fisheries can be reached taking into account—as NMFS must—“the economics of the fishery, the availability of existing technology, and existing State or regional fishery management plans.” Id.

Regulating the fisheries down to an M/SI rate of 0.11 would mean the economic decimation, if not elimination, of the U.S. lobster fishery. That means achievement of 0.11 M/SI would be inconsistent with, and indeed would undermine the MMPA’s long-term take reduction planning goal, which expressly requires that take reduction plans consider impacts on fishery economics. It should go without saying that an M/SI rate reduction that exceeds requirements to meet MMPA goals and likely renders a fishery economically non-viable far exceeds the agency’s obligations under the statute. Given the substantially over-precautionary assumptions built into NMFS’s analysis, and the significant uncertainties noted in these comments about the scientific grounding for that analysis, the Associations submit that the Draft BiOp is scientifically and legally unsupportable.
“Jeopardy” for NARW cannot be reduced to a single metric, given the complexity of the factors described above when applied through Section 7(a)(2)’s qualitative framework. Moreover, it is arbitrary and unreasonable to establish a metric that is far below PBR when the basis for that metric is both (1) unexplained and (2) far more stringent than what would be required to achieve the more protective goals of the MMPA, including those stated in Section 118. NMFS’s statement that the M/SI rate “needs to be reduced” to 0.11 to achieve a “no jeopardy” finding misconstrues the jeopardy standard and demands a result that is not required by either the ESA or the MMPA.

4. **Phases 3 and 4 of the Conservation Framework unreasonably minimize the role of existing statutes and related processes.**

Two primary sources of authority govern the ongoing federal regulation of the Lobster Fishery: the ACFCMA and the MMPA. It is unclear how NMFS intends the Conservation Framework to be implemented through, or in conjunction with, these statutes. The Framework states:

NMFS will *consider* input from the New England and Mid-Atlantic Fishery Management Councils and the Atlantic States Marine Fisheries Commission in developing and implementing mitigation measures under this Conservation Framework. We anticipate that the ALWTRT will be convened at least annually to evaluate incidental entanglement mortality and serious injury, right whale population status, gear monitoring, gear research, and compliance, as required by the MMPA. Any ALWTRT recommendations and associated MMPA rulemaking will be *considered*.

Conservation Framework at 7 (emphases added). The problem is that NMFS does not simply “consider” processes that are mandated by federal law and govern the prosecution of the Lobster Fishery. Those processes will be ongoing (as required by law) over the 10-year period of the Conservation Framework (and beyond), will inevitably result in management changes to the Lobster Fishery and, accordingly, must be taken into account.

The ACFCMA was enacted by Congress to “support and encourage the development, implementation, and enforcement of effective interstate conservation and management of Atlantic coastal fishery resources.” 16 U.S.C. § 5101(b). To carry out this purpose, Congress explained:

The responsibility for managing Atlantic coastal fisheries rests with the States, which carry out a cooperative program of fishery oversight and management through the Atlantic States Marine Fisheries Commission. *It is the responsibility of the Federal Government to support such cooperative interstate management of coastal fishery resources.*

16 U.S.C. § 5101(a)(4) (emphasis added). Under the ACFCMA, the Lobster Fishery is managed by the Atlantic States Marine Fisheries Commission, which updates and implements the
American Lobster Fishery Management Plan ("FMP"). The Fishery will continue to be managed under the FMP for the next 10 years (and beyond). This must be taken into account in the Conservation Framework.

In addition, the Lobster Fishery is subject to management under Section 118 of the MMPA. It is formally included within the scope of the ALWTRT. Under MMPA Section 118, the TRT makes recommendations for accomplishing the short- and long-term goals of Section 118 (described above). NMFS implements those recommendations through promulgation of federal regulations. 16 U.S.C. § 1387(f)(7). MMPA Sections 117 and 118 set forth the standards and processes governing the issuance of take reduction planning regulations, and the Conservation Framework has no legal bearing on that process. For example, NMFS cannot issue regulations under Section 118 that serve to regulate a fishery down to an M/SI rate below PBR that cannot be achieved when "the economics of the fishery, the availability of existing technology, and existing State or regional fishery management plans" are taken into account. Id. § 1387(f)(2). Thus, both the MMPA and ACFCMA must be integrated into the Conservation Framework as they will govern the prosecution of the Lobster Fishery for the foreseeable future.

5. The Conservation Framework must build in a more specific adaptive management component.

For the reasons set forth in all of the comments above, Phases 1 and 2 of the Conservation Framework are sufficient to support a no-jeopardy conclusion.91 The Associations recommend that NMFS perform a comprehensive assessment of the fisheries within some reasonable time after the effectiveness of the implementation of Phases 1 and 2 can be evaluated. In this respect, the Associations support elements of the adaptive management provisions of the Conservation Framework. Specifically, the Associations agree that “[a] primary tenet of adaptive management is to evaluate the efficacy of management actions.” Conservation Framework at 5. The Associations also agree that the Conservation Framework must “include[] a comprehensive evaluation mid-way through implementation to determine whether target reductions in M/SI specified for the final five years of the Framework need to be fully implemented” (or implemented at all). Id.

Furthermore, the U.S. must engage with Canada in a more direct and transparent manner. To date NMFS has provided only intermittent updates on what is characterizes as “positive” developments with Canada, yet NARW continue to die in large numbers in Canada. There has been no transparency or accountability in this process. If NARW are to recover, the U.S. must ensure that Canada has effective and measurable conservation measures in place.

91 The Associations maintain that implementation of Phase 1 is sufficient to support a no-jeopardy determination for the Lobster Fishery, which is a separate action evaluated in the BiOp. See 50 CFR § 402.14(c)(4) (“Any request for formal consultation may encompass, subject to the approval of the Director, a number of similar individual actions within a given geographical area, a programmatic consultation, or a segment of a comprehensive plan. The provision in this paragraph (c)(4) does not relieve the Federal agency of the requirements for considering the effects of the action or actions as a whole.”) (emphasis added); see also 50 CFR §§ 402.14(g), 402.14(h)(1), 402.14(i) (referring to the Services’ obligation to make jeopardy determinations and issue ITSs with respect to an action). The Draft BiOp fails to make separate jeopardy determinations, and to issue separate ITSs, for each of the proposed actions. Id.
The Associations further agree that all of the factors set forth at the top of page 7 of the Conservation Framework should be considered in a comprehensive assessment of the effectiveness of Phases 1 and 2. In addition to those factors, the comprehensive assessment should consider:

1. A full and accurate evaluation of all of the issues addressed in Sections III.B.2-7 above.

2. The likelihood of entanglement of NARWs based on whale abundance, behavior, and gear type. In other contexts, researchers have developed models to predict the abundance and distribution of whales in certain areas based upon oceanographic, ecosystem, and biological variables. The Draft BiOp’s assessments of entanglement risk primarily focus on the geographic distribution and quantity of fishing gear. Those assessments should be improved by understanding the likelihood of entanglement based on both the occurrence and behavior of NARWs and the severity of entanglement based on fishing gear type and configuration.

3. The likelihood of entanglement by specific gear types and the likelihood of M/SI by specific gear types, taking into account evidence of the effectiveness of management measures to reduce entanglements or M/SI.

To achieve this, NMFS must expedite and complete development of Population Evaluation Tool (“PET”) before the 2023 Evaluation. If this cannot be achieved through the Northeast Implementation Team (“NEIT”) model, NMFS must hire an expert to complete this work. NMFS must also update the DST so that it includes (1) the entire U.S. Atlantic coast (and eventually Canada), (2) all federal U.S. fixed gear fisheries, (3) an incorporation of whale behavior into the whale density model, and (4) a gear threat tool to incorporate the risk of all federal fixed gear fisheries. The fishing industry should be consulted to provide expert advice in the development of this model within the DST.

The comprehensive assessment of Phases 1 and 2 should be supported by research and monitoring undertaken during Phases 1 and 2 as necessary to fully evaluate all of the factors set forth above and on page 7 of the Conservation Framework. NMFS should also solicit the participation of the states and the fisheries to ensure that the process is fully informed by the “best scientific and commercial data available.” 16 U.S.C. § 1536(a)(2) (emphasis added). All of this information should be fully and objectively evaluated by NMFS and documented in a thorough report. That report should then be reviewed by the CIE before it is inputted into updated models. If the evaluation, including the CIE report, indicates that the Lobster Fishery, as managed under Phases 1 and 2, may be likely to jeopardize the existence of the NARW, then

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NMFS should reinitiate consultation and assess the status of the proposed actions at that time under ESA Section 7(a)(2). See 50 C.F.R. § 402.16(a).


The Draft BiOp cites Kenney (2018) at page 95 in support of the hypothesis that reducing mortality from entanglements would be sufficient to recover the NARW if all known or suspected sources of impacts remained constant. However, this population exercise fails to account for basic biological processes, namely, death. To assess the population size in the absence of mortality from entanglement, dead whales cannot simply be added back into the population. Age is not an independent factor and the distribution of ages in the population in one year affects population size in subsequent years.

In Kenney (2018)’s exercise, adding back a whale in a given year assumes that particular individual goes on and stays in the population forever. In fact, these “zombie” whales, along with living whales in this exercise, would be expected to die at a certain rate in subsequent years from other causes. No other causes of mortality are considered, natural or anthropogenic to act on the zombie whales. Further, calves have natural mortality rates that are ignored during scenarios when they are included in this model. See Draft 2020 SAR (14.5 percent of the 124 recorded mortalities between years 1970 – 2018 were “believed to have died from perinatal complications or other natural causes”). Kenney assumes a constant calving rate of one calf per 5yr (0.2/yr). This process is a vast oversimplification of the life history process of NARW, and Kenney’s value of the calving rate is far higher than the “best” current estimate of 0.04 in the Draft Stock Assessment Report (SAR 2020), and would be 4th highest calving rate observed since 1990 according to Linden (2021, Figure 3).

For these reasons, Kenney (2018) does not reflect the best available information and the BiOp’s effects and jeopardy assessments should not rely on or utilize Kenney (2018).

E. The Reasonable and Prudent Measures Should be Further Refined and Improved.

The Associations provide the following comments and recommendations for improvement of the reasonable and prudent measures (“RPM”) and associated terms and conditions (“T&C”) set forth in the Draft BiOp. We do so mindful of the ESA’s limitations on RPMs and T&Cs, namely: “Reasonable and prudent measures, along with the terms and conditions that implement them, cannot alter the basic design, location, scope, duration, or timing of the action and may involve only minor changes.” 50 C.F.R. § 402.14(i)(2).

NMFS should not be considering any management strategy that holds U.S. fishermen accountable for NARW M/SI in Canada. The U.S. must engage directly with Canada in an open and transparent manner to ensure that Canada implements effective and measurable conservation measures.

1. RPM 1

a. General comments on RPM 1.

The Associations agree with the core premise of RPM 1—i.e., that “NMFS must continue to work with the fishing industry and partners to promote, fund, conduct, and/or review research on gear modifications to reduce incidental takes, and the severity of interactions that do occur, of ESA-listed species.” We present the following modifications and additions to improve the effectiveness of RPM 1:

- This RPM and associated T&Cs should express a clear requirement that NMFS will invest in gear research and evaluation. Such research must focus on: (1) understanding the specific risks from existing gear, by fishery and gear type; and (2) investigation of more immediate and practical gear modifications other than ropeless fishing that can be implemented to reduce entanglement risk and severity. Such possible modifications include improved gear marking methods, limits on diameter of ropes fished as vertical lines, weak rope insert options, time tension line cutters, newly engineered ropes, alternative trawling and rigging configurations, trap reductions, and dynamic management if adequate NARW surveillance is possible. The research should be scoped and undertaken based on direct engagement and consultation with fishermen and fishing industry representatives, who are best positioned to identify creative and effective gear modifications.

- The process for developing a “Roadmap to Ropeless Fishing” must expressly state that the process will involve direct engagement and consultation with the Lobster Fishery. As described in detail below, there are numerous economic, safety, operational, and enforcement limitations and questions on appropriate scale of implementation that must be resolved in a “Roadmap to Ropeless Fishing.” The T&Cs should specify that a draft Roadmap development will include collaboration and consultation with the fishing industry and provided for review and comment by industry stakeholders, after which a final Roadmap will be produced. It must also consider the results of “The Ropeless Fishing Gear Feasibility Study” underway through the Massachusetts Division of Marine Fisheries (DMF) and other current and future ropeless fishing feasibility studies. It is essential that the Roadmap be developed in this fashion to ensure that it addresses appropriate scale of implementation (restricted areas versus broad-scale adoption) engineering questions related to the function and reliability of the technology as well as the substantial economic, safety, and operational issues posed by a fleet as diverse as the Lobster Fishery. This will help to achieve a level of “buy in” from the fishing industry. Without that “buy in,” the Roadmap will be impracticable and unlikely to succeed.

- The T&Cs identify priorities for gear research but specify no timelines. The T&Cs should specify timelines to ensure that these important research tasks are accomplished.

b. Specific concerns regarding development of ropeless fishing.

The Associations have concerns with regard to the accelerated trajectory for development and implementation of ropeless gear technology. Analysis of this nascent gear technology must address significant concerns with its present state of development, with particular focus on methods to ensure the technology can be deployed on a safe and sound operational basis; that it can address gear conflicts; and that it can offer an efficient, practicable method of harvesting consistent with regulatory and economic conditions in the fishery. Moreover, current research and development programs for ropeless gear have not identified a reasonably viable business model for deployment in the diverse conditions of the Lobster Fishery. In the following sections, we describe these issues in more detail and recommend that NMFS account for these in RPM 1, as recommended above.

(i) Technological limitations, cost, and operational constraints make ropeless gear not presently economically viable.

Numerous technological issues must be resolved before ropeless fishing will be commercially viable. The ropeless system aboard each vessel must function reliably and efficiently. Specifically, the technology must include an acoustic trigger and release system to allow for efficient and reliable deployment and hauling of gear, the communications system from the vessel to satellite system must protect private data and function in real-time, and the communication system which translates data from individual vessels to the fleet and enforcement must be developed. According to Dr. Mark Baumgartner of Woods Hole Oceanographic Institute: “We are in the early stages of development – mostly proof of concept with prototypes that are not yet designed for operational fishing by hundreds to thousands of fishermen…. Every system… will need to go through a redesign process to (a) incorporate an interoperable gear location system, (b) work for fishing at scale (e.g., ruggedized design, long endurance), and (c) enable mass production at low cost.”

These technological challenges are compounded by the need to incorporate this technology across a very diverse fleet which ranges from single operators fishing from vessels less than 30 feet in length to medium size boats up to 40 feet with a small crew to larger vessels of 65 feet of more that fish in deep offshore waters with crews of up to five. The smallest vessels have very limited workspace and rarely use sophisticated computer or navigational systems. While medium and larger vessels may have greater potential to incorporate GPS and computer technology into a fishing operation, the deck size also remains very limited.

Additionally, there are operational and economic constraints to widespread use of ropeless gear. The economic model for the New England lobster fishery is predicated upon a high volume of landings caught with a gang of 800 or less (1,945 or fewer in LMA 3) traps, where lobsters compete for prime bottom. This requires lobstermen to efficiently haul and redeploy gear in a predictable manner. Inshore lobstermen may haul 100 to 200 traps per day, working four days on and one day off on a weekly cycle. These boats often deploy small gangs of gear as singles, pairs or triples, that are strategically set on productive hard bottom to

Baumgartner_nearterm_developments_for_distribution_20191113.pdf.
maximize catch. Area 1 federal waters vessels may haul 300 to 400 traps per day, working through a full gang of traps every two days. This gear is typically deployed as trawls across a variety of hard and gravel bottom. Traps are frequently loaded onboard and moved to other fishing areas depending on catch levels. Any hauling and redeployment system that results in fewer traps hauled per day would significantly impact the business model of lobstering operations.97

Reduced profits would, in turn, make it more difficult for lobstermen to pay for the high capital and operating costs required to operate a ropeless system. The current best estimate is that existing technology for ropeless systems will cost ten times or more per trap compared to gear currently in use.98 These systems require significant investment in technology, including a computer system, acoustic detector, trigger devices, and rope storage systems. Given the failure rate of current systems, fishermen would also need to invest in redundancy.

Kristan Porter, President of the Maine Lobstermen’s Association, traveled to New South Wales in eastern Australia to experience first-hand a commercial lobster operation using ropeless fishing system that has been touted as a model for U.S. fisheries. The business model for the eastern Australia lobster fishery is different than the New England lobster fishery. It is a quota-based fishery with a small number of lobstermen who do not share territory and deploy single traps that are hauled every three to four weeks. The catch is extremely valuable with the price per pound typically six times higher than U.S. lobster price, making this fishery highly vulnerable to poaching. As a result, these lobstermen sought methods to hide gear. Mr. Porter observed:

On the day we fished, Scott hauled 14 single traps and did not reset most of the gear because he had already caught most of his quota. Scott and his crew were very skilled at fishing the system, particularly in matching each pot to the computer so that it was properly recorded and could be relocated, and the setting of the burn wire in the acoustic release system. He used a torque wrench to perfectly set the bolts on either side of the burn wire to hold it in place; if it was too tight, the wire would break, too loose and the wire would fall out. Either would result in a failure of the acoustic release. This was a highly precise process. Setting the burn wire properly would be difficult to do if handling a high volume of gear or on a day with rough seas.99

U.S. fishermen who have tested ropeless gear have raised concern over transferability of this technology to U.S. trap/pot fisheries. Massachusetts lobsterman Dave Casoni tested a ropeless system and worried about the practicability of his peers adopting this technology,

97 By way of contrast, the one fishery in the world that uses ropeless gear fishes less than 20 traps per day and does not share fishing territories with other fishermen.

98 The Oppenheim Declaration, which was filed in Ctr. for Biological Diversity v. Ross, Civ. Action No. 18-CV-112-JEB, as Document 115-7 (D. D.C., filed June 18, 2020), at 10 (Addendum F).

particularly those who are elderly or otherwise have little experience and familiarity with digital technology, touch screens, and other electronic equipment required to operate many pop-up buoy gear systems.\textsuperscript{100} Similarly, West Coast Dungeness crab fishermen who have tested ropeless systems found that these systems have an unacceptably high failure rate resulting in loss of expensive equipment, hauling and retrieval were extremely time-consuming, there was inadequate deck space to store ropeless equipment when stacking traps onboard, and gear and catch were lost because traps landed upside down preventing the retrieval of the gear. Fishermen have noted that these issues will be compounded in rough seas and cold weather conditions.\textsuperscript{101} Fishermen have also observed that they will have to make extensive, costly modifications to their vessels in order to operate many of the pop-up buoy gear systems that are currently available, requiring new haulers, wiring for electronics, or custom-built platforms or shelving to stabilize gear while it is being re-coiled or re-spooling.\textsuperscript{102}

(ii) Ropeless gear presents safety risks.

Ropeless fishing also poses significant safety risks to fishermen in both the Lobster Fishery and fisheries that overlap with it. The increased handling time on deck required by ropeless gear is a particular concern for fishermen who operate their vessels alone. Fishermen who fish alone must handle gear on deck while maintaining a vigilant watch to ensure safe vessel maneuvering within high traffic areas or in a high sea state. Fishermen are very concerned about safety issues surrounding gear conflict due to an increase in gear being set over gear on bottom, or mobile gear unknowingly hauling through fixed gear.

A key function of the surface buoy and vertical line is to allow lobstermen to locate their traps and safely haul them from the ocean floor to the fishing vessel. Another important function is to alert other ocean users of the presence of lobster gear. The removal of the surface system would result in significant conflict among lobstermen and between competing gear types. All of the ropeless systems under-development use unique acoustic release devices, rope storage options, and tracking and communications software. For ropeless fishing to work, all of these systems must be interoperable so location of fishing gear is known to any vessel or law enforcement accessing an area. There are several commercial fisheries that operate within the same fishing grounds as lobster fisheries, including groundfish trawl and gillnet fisheries, crab fisheries, scallop, tuna and shrimp fisheries. Any sunken gear that cannot be detected by other vessels puts the vessel at risk and may result in loss of catch. Mobile gear that unknowingly drags through sunken trap gear can lead to loss of catch by damaging nets and creates serious safety risks to the vessel and crew by hanging down nets and hauling back heavy tangled gear. Similarly, a lobster trawl set over the top of an unknown sunken trap on bottom is very dangerous to haul due to the tremendous strain that is exerted on the line. Often the hauling line will part and the gear and catch will be lost.

A ropeless Lobster Fishery would therefore require all lobstermen, and other fisheries that overlap with lobster gear, to install and successfully operate computer systems to track and detect sunken lobster trawls to avoid gear conflict. Even if the fleet is outfitted with compatible

\textsuperscript{100} Oppenheim Declaration at 14 (Addendum F).
\textsuperscript{101} Id. at 12 (Addendum F).
\textsuperscript{102} Id.
detection systems, weather or interaction with mobile gear can drag sunken lobster gear from its marked location putting it out of range of the vessel’s release unit resulting in loss of gear. This “ghost gear” on the ocean floor is both a risk to protected species and may continue to capture economically valuable target species.

(iii) Ropeless gear presents enforcement challenges.

Ropeless fishing also poses enforcement challenges that must be addressed. In June 2018, ASMFC’s Law Enforcement Committee (LEC) reviewed the enforceability of ropeless pop-up buoy gear technologies to reduce impacts on NARW. The LEC concluded that deployment of ropeless gear would significantly impede law enforcement’s ability to enforce lobster conservation rules. The concerns identified by LEC include: (1) the time and cost required to retrieve and re-deploy ropeless gear would significantly reduce the number of vessels and traps inspected for compliance; (2) the need to access multiple pop-up buoy gear technologies and retrieval/mapping systems would represent a financial burden and logistical challenge; (3) unanswered questions on systems to be used to store and secure trap location information; and (4) the vulnerability of acoustic and radio frequencies to be hacked or stolen data that lead to illegal hauling of gear by others as presented in Addendum G.

We encourage NMFS to identify these issues for further analysis and investigation in the “Roadmap to Ropeless Fishing.” In the immediate term, this technology should be examined for implementation in restricted areas where deployment of buoy lines is not allowed. However, there are significant issues that must be addressed before this technology could reasonably be considered for fishery-wide adoption. These examinations must address the technological, operational, and economic impediments that undeniably exist, and vary significantly depending upon the scale at which the technology is adopted. Collaboration with fishermen, and the associations that represent them, is essential for both understanding these issues and finding appropriate and effective solutions.

2. RPM 2

The Associations agree that it is essential that NMFS work to “identify correlations with environmental conditions or other drivers of incidental take within some or all of the action area.” NMFS’s current risk assessments are disproportionately weighted to simply assume risk occurs because fishing gear is present. To more accurately assess risk, NMFS must devote more resources to assess the likelihood that whales will be present, and whale behavior, in areas with fishing gear in the first place. In this regard, NMFS should build upon habitat distribution models that have already been developed in other contexts to develop a more sophisticated habitat distribution model for NARWs. Such a model should include the monitoring and integration of variables such as sea surface temperature, plankton distribution, presence of prey, and other factors that explain the temporal and geographic distribution of NARWs. These models should be groundtruthed with whale sightings data. Ecological studies should also include additional monitoring data pursuant to our recommendation on RPM 4.

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The Associations also agree that NMFS must review and assess “all data available on the observed/documented take” of NARW. This review and assessment must include takes that occur in Canadian fisheries and in Canadian waters, and this should be expressly stated in the T&Cs for RPM 2. In this regard, NMFS should use all diplomatic and political means necessary to obtain data from Canada on species distribution, including surveys that allow for individual identification that can be included in models. NMFS should also request data on the density and type of fishing gear deployed (especially snow crab and lobster) in Canadian waters so that it can work effectively with Canada on equitable solutions to reduce risk entanglement.

Finally, we note that RPM 2 states that, after undertaking review, “NMFS must take appropriate action to reduce large whale, sea turtle, Atlantic sturgeon, Atlantic salmon, and giant manta ray interactions and/or their impacts.” The Associations agree that appropriate actions should be taken. However, any such action(s) must occur through the legally required processes and cannot occur pursuant to RPMs and T&Cs if they are not limited to “minor changes” that do not “alter the basic design, location, scope, duration, or timing of the action.” 50 C.F.R. § 402.14(i)(2).

3. RPM 3

While we recognize that disentangling NARW is dangerous and requires training, the Associations believe that lobstermen would readily volunteer to be trained and serve as first-responders when entangled whales are sighted. Historically, some lobstermen have already received such training. NMFS should also explore new and innovative ideas to improve disentanglement techniques. We recommend that this concept be included in RPM 3.

With respect to the fifth T&C, the Associations recommend that NMFS invest in state of the art technology to provide responders and sightings surveillance teams with high resolution cameras that have a laser scale built in. This would provide the information necessary to determine the type of gear and size of rope, if any, on an entangled animal. NMFS should also provide responders with high resolution drones to obtain better, higher-resolution images of entanglement and any gear associated with an entanglement. Such data is essential to informing management measures tailored to addressing actual risks.

Finally, the T&Cs for this RPM should ensure that the U.S. and Canada incorporate standardized methods and protocols for data collected during disentanglement and chain of custody and analysis of gear removed from NARW.

4. RPM 4

The T&Cs for this RPM require NMFS to “continue to monitor” the fisheries but provide no detail on what type of monitoring should occur or at what levels. We recommend that the T&C include more detailed specifications for monitoring to ensure that monitoring efforts are properly directed and effective. Such monitoring must be targeted to specific fisheries and

104 See https://www.capecodtimes.com/article/20130716/NEWS/307160322.

105 See The Nature Conservancy collaborative research project to develop new disentanglement technology. https://www.youtube.com/watch?v=_nj9rATdHQs&ab_channel=TheNatureConservancyinCalifornia.
require specific reporting by fishery and area, which would be included in comprehensive reporting to more accurately assess levels of risk by fishery and area.

NMFS must also increase NARW surveillance within the action area. A recent report by a NMFS expert working group states: “It is clear that long-term satellite tags could help provide valuable data about NARW habitat use, including discovery of unknown foraging areas, return to previously used foraging areas, and other shifts in distribution that might occur.” Long-term satellite tags and other methods should be prioritized and funded as possible ways to obtain better surveillance of NARW distribution.

NMFS should fund implementation of 100% harvester reporting by all jurisdictions and develop and implement a cost-effective vessel tracking technology for trap/pot fishery that has been piloted by ASMFC.

5. RPM 5

NMFS should make a concerted effort to employ a more reliable modeling framework that can support future decisions. While some minor improvements to the matrix model are suggested in other sections, the development of an individual-based model should be expedited. In an individual-based model, each individual of a population is tracked and allowed to have unique demographic parameters and follow rules about interactions with other individuals and the environment. In contrast, the assumption of a matrix model is that all individuals represented in a matrix have identical demographic parameters and behavior. In very large populations, the law of large numbers suggests that this assumption of matrix models may be close to the truth, and some significant computational advantage is gained with this assumption. In small populations, however, individual variations in demographic rates can be very important. In the case of NARW, the detailed catalog of individual identifications over long periods of time suggests an individual approach may be beneficial. In fact, the SSMR model takes an individual approach, providing survival probabilities for every individual NARW in the record. The matrix model then sweeps this individual level information into population-wide summary statistics. An individual-based model approach would be much more consistent with the available data and the Pace et al. (2017) modeling approach. Indeed, the individual-based model approach appears to be the selected method of the PET Subgroup of the NEIT. Getz (2020) also suggests the use of an individual-based model in their model review.

In addition, RPM 5 must include a direction to NMFS to better investigate and understand sources of NARW natural mortality, particularly for newborn (neonate) calves that are subject to predation. Natural mortality already occurs and is not well understood by NMFS, yet is a critical factor in understanding population growth rates of NARW. Moreover, natural mortality of neonate calves could become a serious problem in the future as white shark populations continue to grow.

IV. CONCLUSION

We appreciate the opportunity to provide comments on the Draft BiOp. The Associations are committed to working with NMFS through legal and evaluative processes that are based upon objective assessments of the best scientific data available. As explained above, we have significant concerns about the Draft BiOp, such as its inaccurate portrayal of the effects of the Lobster Fishery through numerous incorrect or overly conservative assumptions. We respectfully request that NMFS address these concerns. We also appreciate NMFS’s consideration of our other recommended improvements, such as the construction of a more specific adaptive management framework and proposed refinements to the reasonable and prudent measures. If you have any questions or would like additional information, please do not hesitate to contact Patrice McCarron at 207-967-4555 or patrice@mainelobstermen.org.

Sincerely,

Patrice McCarron
Executive Director
Maine Lobstermen’s Association

Beth Casoni
Executive Director
Massachusetts Lobstermen’s Association

David Borden
Executive Director
Atlantic Offshore Lobstermen’s Association

Erik Anderson
President
New Hampshire Commercial Fishermen’s Association

Ben Martens
Executive Director
Maine Coast Fishermen’s Association

Rocky Alley
President
Maine Lobstering Union

Sheila Dassatt
Executive Director
Downeast Lobstermen’s Association

Laurin Brooks
President
Southern Maine Lobstermen’s Association

Annie Tselikis
Executive Director
Maine Lobster Dealers Association

Paul Anderson
Executive Director
Maine Center for Coastal Fisheries

Casey O’Hara
Vice-President
O’Hara Corporation

Sebastian Belle
Executive Director
Maine Aquaculture Association

cc: Sam Rauch, Deputy Assistant Administrator for Regulatory Programs
Mike Pentony, Regional Administrator, Greater Atlantic Regional Office
Jennifer Anderson, Assistant Regional Administrator for Protected Resources
Senator Susan Collins (via Cameron O’Brien)
Senator Angus King (via Peter Benoit and Chris Rector)
Representative Chellie Pingree (via Lisa Pahel and Rhiannon Hampson)
Representative Jared Golden (via Eric Kanter and Morgan Urquhart)
Senator Jeanne Shaheen (via Sarah Holmes)
Senator Maggie Hassan (via Victoria Williams)
Representative Chris Pappas (via Ashley Motta)
Senator Elizabeth Warren (via Bruno Freitas)
Senator Ed Markey (via Nolan O’Brien)
Representative Bill Keating (via Andrew Nelson)
Representative Seth Moulton (via Olivia Hussey)
Representative Katherin Clark (via Ilina Shaw)
Representative Stephen Lynch (via Megan Hollingshead and Bruce Fernandez)
Senator Jack Reed (via Steven Keenan)
Senator Sheldon Whitehouse (via Karen Bradbury)
Representative David Cicilline (via Matthew McGinn)
Representative James Langevin (via Peter LaFountain)
Honorable Janet Mills, Governor of Maine (via Tom Abello)
Honorable Governor Chris Sununu, Governor of New Hampshire
Honorable Charlie Baker, Governor of Massachusetts (via Kristen Lepore)
Honorable Gina Raimondo, Governor of Rhode Island
Patrick Keliher, Commissioner, Maine Dept of Marine Resources
Cheri Patterson, Director, NH Department of Fish and Game
Dan McKiernan, Director, Massachusetts Division of Marine Fisheries
Janet Coit, Director, RI Department of Environmental Management
Thomas Nies, Executive Director, New England Fishery Management Council
Robert Beal, Executive Director, Atlantic States Marine Fisheries Commission
Addendum A

Overview of The Associations

Maine Lobstermen’s Association (MLA)

The Maine Lobstermen’s Association’s (MLA) was founded in 1954 and is the oldest and largest fishing industry association on the east coast. The MLA advocates for a sustainable lobster resource and the fishermen and communities that depend on it. The MLA engages in advocacy, education, stewardship and sustainable resource management, collaborative research and cultural exchange. For more than 65 years, the MLA has ably represented the interests of the Maine lobster industry and educated the public about the importance of this industry.

Massachusetts Lobstermen’s Association

The Massachusetts Lobstermen’s Association was established in 1963 by the fishermen, for the fishermen, and is presently one of the leading commercial fishing industry associations in New England. On behalf of its 1,800 members, the MALA works to maintain both the industry and the resource. The MALA strives to be proactive on issues affecting the lobster industry and is active in the management process at both the state and federal levels.

MALA has become a trustworthy voice for the industry on important issues and is looked to by both the fishing industry and the management community. The Massachusetts Lobstermen’s Association is a member-driven organization that accepts and supports the interdependence of species conservation and the members’ collective economic interests.

Atlantic Offshore Lobstermen’s Association

The Atlantic Offshore Lobstermen’s Association (AOLA) is the sole organized voice for the federal offshore lobster industry, representing a majority of the active fleet with members from New Hampshire to New Jersey. The Association supports the efforts of the offshore lobster industry to develop and maintain a strong, stable, and sustainably minded fishery. Offshore lobster fishing is pursued by a relatively small fleet (approximately 65 active vessels) in an area 40-120 miles from shore that spans from the Canadian border to the mid-Atlantic.

The Executive Director of AOLA has held a seat on the Atlantic Large Whale Take Reduction Team (TRT) since its inception in 1996 and has participated in the development of all Atlantic Large Whale Take Reduction Plan conservation provisions since that time, including provisions undertaken since the 2014 Endangered Species Act Biological Opinion. David Borden has been the AOLA Executive Director since 2013. He also serves as a Commissioner for the Atlantic States Marine Fisheries Commission (ASMFC) with a seat on the Lobster Board. Grant Moore is AOLA’s President, alternative TRT member, and Chairman of the ASMFC’s Area 3 Lobster Conservation Management Team.

Since 2018 AOLA staff and members have been participants on collaborative research projects to develop whale protections. Work has included load and breaking strength testing of existing vertical lines, testing manufactured 1700lb breaking strength rope and weak rope contrivances, and testing of acoustic release (ropeless) technologies. AOLA members have also provided researchers and managers
with critical information about fishing operations to inform fisheries characterizations, model development, and gear technology specifications.

**Maine Coast Fishermen’s Association**

The Maine Coast Fishermen’s Association (MCFA) is an industry-based non-profit that identifies and fosters ways to restore the fisheries of the Gulf of Maine and sustain Maine’s iconic fishing communities for future generations. Established and run by Maine fishermen, the objectives of MCFA are to provide a voice for our fishing communities, to rebuild the Gulf of Maine ecosystem, and to support diverse fishing businesses throughout Maine. MCFA strives to ensure that Maine's fishing communities can thrive today, tomorrow, and forever. We do this by advocating for policies and regulations that create healthy and sustainable fisheries, securing access to those fisheries through protecting working waterfront and permit banking, and supporting profitable fishing businesses through research and community development.

**New Hampshire Commercial Fishermen’s Association**

The New Hampshire Commercial Fishermen’s Association works to recognize, promote, and encourage all commercial fisheries in the State of New Hampshire in a manner that enhances resource conservation, effective management, wise laws and a friendly spirit of co-operation among all commercial fishermen. The association’s members have consistently and currently participate in all aspects of fishery management at levels that effectively contribute to the discussions and outcomes in the best interest of the resource and industry. Our members are active on the Area 1 LCMT, ALWRT, a variety of ALWRT rope workshops and initiatives along with ongoing collaborations specific to lobster issues.

**Maine Lobstering Union**

Maine Lobstering Union (MLU) is a nationally backed organization working through solidarity to bring support to Maine’s Lobstermen. The MLU provides education, upholds traditional sustainable lobstering practices and advocates for the fishermen that rely on them. The MLU is dedicated to improving the quality of life for our fishermen. Lobster 207 is the first Union-owned, fair-trade lobster co-op. Our members own their product, “From the ocean floor to your door”.

**Downeast Lobstermen’s Association (DELA)**

The Downeast Lobstermen’s Association was formed in 1990 by a small group of lobstermen in the Jonesport, Maine area to maintain traditional lobstering for fishermen and their families and to maintain our lifestyle for our future generations. Since its humble beginning, DELA has become known state and nationwide, representing lobstermen from Kittery to Eastport, and from nearby states including New Hampshire and Massachusetts. DELA’s members share the same interest and concerns about their fishery. DELA’s work includes representing the Maine lobster industry on the Lobster Institute, the Research, Education and Development Board, Maine Fishermen's Forum Board and we collaborate on a variety of research projects with Maine Department of Marine Resources, Gulf of Maine Lobster Research Institute, and more.

**Southern Maine Lobstermen’s Association (SMLA)**
The Southern Maine Lobstermen’s Association was formed in 1972 as a non-profit cooperative. SMLA has served southern Maine’s commercial lobstermen through the collective purchase of fishing gear and supplies and advocating lobstermen on a variety of regulatory issues. SMLA members have served on the Lobster Advisory Council, the Lobster Research Education and Development board, and as well as collaborative with state and federal agencies on a variety of oceanographic survey, dredging, and collaborative research projects.

**Maine Lobster Dealers Association (MLDA)**

The Maine Lobster Dealers’ Association was formed in 1985 to support the interests of lobster wholesalers and processors. Together with our members, we proactively work towards solutions to the regulatory and commercial challenges in the lobster supply chain worldwide. MLDA’s members are the businesses that procure lobster from Maine’s commercial lobster fishermen and add value to it by grading it for specific sizes and quality or process it into value-added products like lobster meat or frozen tails. Without our hardworking fishermen, there is no product for us to ship around the world; without live lobster wholesalers and lobster processors, there is no connection between our small coastal towns and the domestic and global market place. We work hand in hand with our commercial fishermen and we are concerned about their fishing future because our member companies and the 6,000 jobs that exist in Maine’s lobster supply chain, depend upon a biologically and economically sustainable fishery.

**Maine Center for Coastal Fisheries**

The Maine Center for Coastal Fisheries (MCCF) mission is to sustain commercial fishing and Maine’s coastal fishing communities in eastern Maine and beyond. We are not an association of fishermen, but we are located in Stonington, Maine’s largest lobster landing port, and we have several fishermen on our Board of Directors. We conduct collaborative research with fishermen and we are a boundary spanning organization promoting collaborative management strategies that are based on local knowledge and sound science. Our long-term goal is to help transform fisheries management to more ecosystem-based to be more responsive to natural and social changes affecting fisheries and communities. Dr. Carla Guenther, Chief Scientist is a co-investigator on a current study of the socio-economic stressors on Maine’s lobster fishery that is being funded by the National Sea Grant Program. MCCF endorses the comments and concerns that are included in this response to the draft Biological Opinion.

**O’Hara Corporation**

The O'Hara Corporation is a family held company that has owned and operated commercial fishing vessels for over 114 years. Our home office is located in Rockland Maine, which is the homeport of our 2 Atlantic herring vessels that supply bait to our local lobster communities through our shoreside division of O'Hara Bait.

**Maine Aquaculture Association**

The Maine Aquaculture Association (MAA) is the oldest state aquaculture association in the country. Founded in 1977, MAA represents the commercial aquatic farmers of Maine. Our members grow 23 different species, and directly employ over 700 Maine citizens in year-round jobs with an additional 300 seasonal employees generating more than 150 million dollars in economic activity annually. The MAA is a co-founder of the Maine Working Waterfront Coalition that served as the model for the creation of
the National Working Waterfront Coalition. In cooperation with a number of environmental advocacy groups (ASF, TU, CLF), MAA developed third party audited environmental management systems designed to reduce the environmental footprint of our farms and minimize any interactions with species listed under the Endangered Species Act.
Addendum B

Economic Importance of the Northeast Lobster Fishery

The Northeast Lobster Fishery has long been an integral part of the region’s culture, heritage and economy supporting tens of thousands of jobs and hundreds of ancillary businesses.¹ The fishery remains the most valuable in the United States. In 2019, lobster landed in the states of Maine, New Hampshire, Massachusetts and Rhode Island were valued at nearly $640 million, with Maine and Massachusetts representing 91% of the revenue. The lobster fleet contributed an additional $12 million in Jonah crab landings (Table 1). The lobster distribution supply chain in Maine alone was estimated to contribute $968 million to the Maine economy supporting over 5,500 workers.²

<table>
<thead>
<tr>
<th>Table 1</th>
<th>2019 Ex-vessel Value of Lobster and Jonah Crab</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lobster</td>
</tr>
<tr>
<td>Maine</td>
<td>$486,639,304</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>$94,414,921</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>$35,428,408</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>$10,988,713</td>
</tr>
<tr>
<td>Total</td>
<td>$627,481,346</td>
</tr>
<tr>
<td>Total lobster and crab</td>
<td>$639,474,944</td>
</tr>
</tbody>
</table>

Source: NOAA Fisheries

For rural coastal communities, the lobster fishery is the economic engine that keeps many small towns alive. The majority of the lobster fleet is owned and operated by a vessel Captain who lives, works, and spends earnings locally.³ As a business sector, commercial lobstering is a primary economic driver. Each dollar earned by a lobsterman generates several more, generating jobs and economic value for local economies. Overall, he lobster fishery is estimated to contribute more than $2 billion to the region’s economy.⁴ When lobstermen are paid for their product at the dock, they spend those earnings on everything from meals at local restaurants and gas for their trucks and boats to new traps, boats, and homes in their local communities.

While the lobster fishery is the economic engine of coastal economies, it is comprised of a very diverse fleet of small businesses. The fishery takes place over a vast area under varied bottom habitats and conditions ranging from shallow coastal areas to deep offshore waters. The fleet varies dramatically in vessel size, size of gear fished (traps and rope), gear configuration, number of crew and spatial extent of the fishery.

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¹ Maine’s lobster fleet directly supports more than 10,000 jobs (3,670 Captains, up to 5,750 crew, 1,095 students)
³ Maine Revised Statutes, Title 12, Chapter 619, Subchapter 1, §6431-G
In 2018, Maine issued 4,830 commercial lobster licenses and 1,095 student licenses. Massachusetts has an estimated 850 active lobster licenses, New Hampshire has an estimated 320 active lobster licenses. In 2017, National Marine Fisheries Service reported 2,034 federal lobster trap permits for Lobster Conservation Management Areas (LMAs) managed under the Atlantic States Marine Fisheries Commission. The majority of federal lobster permits (79%) are issued for Lobster Management Area 1 (1,601). In most cases Area 1 federal permit holders also hold a state permit. NMFS issued 107 Area 3 permits with approximately 65 active vessels.

The inshore state waters fleets are comprised of small to medium sized boats that fish several days a week during the spring, summer and fall months in local territories that are close to shore. These inshore coastal fleets are comprised of small vessels (less than 20 feet in length), some operated by students and elderly fishermen, typically with only the Captain aboard. The state waters fisheries also include medium-size vessels (20 to 39 feet in length) which fish out to the state waters three-mile line. These vessels are fished by single operators or carry a small crew of up to two.

Approximately 20% of state waters lobstermen also hold a federal Area 1 permit which allows them to fish in federal waters. Many fish year-round from larger vessels (40 to 50 feet in length) with a crew of two to four sternmen. The Area 3 fleet operates differently from state waters and the Area 1 fishery. An Area 3 fishing trip usually lasts four to ten days aboard vessels ranging from 50 to 100 feet in length carrying a four to five crew.

For more than a century Maine’s lobster fishery has been a stable presence along New England’s waterfronts. It is an icon of the region, and an integral part of the region’s culture, traditions and economy. The future of many New England coastal communities depends upon the continued success of the lobster fishery.

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5 Maine DMR estimates that 70% of commercial licenses are actively fished (cite email from DMR)
6 Beth Casoni, Massachusetts Lobstermen’s Association, personal communication.
7 Renee Zobel, New Hampshire Fish and Game, personal communication
9 David Borden, Atlantic Offshore Lobstermen’s Association, personal communication.
I, Glenn Salvador, state and declare as follows:

1. I have significant first-hand knowledge of New England, mid-Atlantic and Southeast Atlantic commercial fisheries, including knowledge of target species and bycatch interactions, the type of gear and rigging strategies deployed for various fisheries, and operation of vessels and equipment.

2. I have 22 years of professional experience as the Gear Specialist and Fisheries Liaison for NOAA Fisheries (NMFS) serving in this role from 1996 to 2018. I worked for the Northeast Regional office based in Gloucester, MA. In addition to working as NMFS Gear Specialist, I also served as the Fisheries Liaison for the Northeast Fisheries from 1996 to 2002 and Mid-Atlantic Fisheries from 2003 to 2018. My duties included working with fishermen to develop and test gear innovations to reduce the likelihood of entanglement, answering fishermen’s questions about how to comply with whale protection requirements, and investigating the source of gear removed from entangled large whales. This work was achieved by attending industry meetings, trade shows and workshops, meeting fishermen on the dock, publishing columns in trade
magazines, and going on commercial fishing trips with regulated fishermen. During all of these years, I worked closely with my counterparts throughout the Northeast, Mid-Atlantic and Southeast regions.

3. I worked as a commercial fisherman for 15 years in the Gulf of Maine, from 1970 to 1985, in the inshore and offshore lobster and gillnet fisheries. I also owned and operated a commercial fishing vessel working in trap and mobile gear commercial fisheries in the West Indies from 1982-1985. I worked briefly as a boat building apprentice in Beals, Maine for two years in the late 1980’s, as a field agent and research vessel Captain for the state of Maine Department of Marine Resources from 1987 to 1990, and as a senior at-sea fisheries observer for Manomet from 1990 to 1996 collecting commercial fishing data on east coast fisheries operating from Maine to Florida, including inshore and offshore lobster and gillnet fisheries.

4. I am a certified U.S. merchant marine officer with a 100-ton Master License, a certified Master Fisherman by the World Food and Agriculture Association, and a certified Marine Surveyor by the U.S. Surveyors Association. I have received several awards from the U.S. Department of Commerce including the 2004 Bronze Medal for forging cooperative relationships with fishermen and developing gear modifications; the 2007 Bronze Medal for excellence in managing a fishing gear buy-back program; the 2007 Silver Medal for reducing the bycatch of marine mammals and turtles in commercial fisheries; and the 2016 Bronze Medal for exceptional leadership, innovation and collaborative approach in working with commercial fishermen and stakeholders.

5. As NMFS’s Fisheries Liaison, I led the region’s collaborative research efforts with fishermen to develop entanglement mitigation strategies that are safe and operationally practical for the fleet. There was strong interest from the fishing community to participate in research to
develop whale-friendly fishing gear and deployment strategies. These projects included
documenting operational needs of the lobster and gillnet fisheries, including the loads
encountered on lines during hauling and setting of gear and observing vertical and bottom
profiles of gear when they are fished. I coordinated many collaborative research projects with
fishermen. Gillnet research included modified float lines and lead lines to weaken the net
through the use of knots, lighter ropes, weak links and “Chinese fingers.” Lobster gear research
included testing of low profile ropes, acoustic releases, mechanical weak links, bottom weak
links and buoy line messenger systems, gear marking techniques, weak link testing, gear retrieval
with lighter buoy lines, low profile groundlines and time tension line cutters. I also conducted a
variety of workshops with fishermen including whale disentanglement workshops for fishermen
focused on proper identification of whale species and safely executing successful
disentanglement strategies for fishermen, and several gear development workshops. I learned
early in the process that fisheries are extremely diverse and because of that, there are no simple
solutions.

6. I was personally involved in analyzing much of the gear removed from entangled large
whales, including North Atlantic right whales. In investigating these cases, I interviewed those
who observed the whale entangled at sea, were involved in efforts to disentangle the whale, the
necropsy team and the fishermen who set the gear when this information was available. The
results of these investigations were included in National Marine Fisheries Service annual Atlantic
Large Whale Entanglement Reports from 1999 to 2018. \(^i\)

7. There are only a few instances where a right whale has been observed encountering
and becoming entangled in commercial fishing gear. This makes analyzing gear removed from
entangled whales extremely complicated because we are trying to reverse engineer an
unobserved event. This requires a complex investigation to determine the origin of the fishery (such as country or state/province), the category of fixed gear (such as netting, trap/pot, long line), and the target fishery. The gear team also makes determinations on whether or not the entangling gear was compliant with regulatory requirements. This requires intimate knowledge of the range of surface systems, types of rope used to deploy the gear and the size and scale of the fishing gear, such as traps or nets commonly used in a range of fisheries. Once NMFS received the entangling gear from the disentanglement team, all gear was inventoried, measured and logged. Gear was categorized as part of the surface system (buoys, buoy sticks, highflyers, weak links, etc.) or bottom system (traps, nets, hooks, etc.), ropes were measured by lengths recovered, diameter and unique features (float, sink, lead-lined, etc.), and unique identifying features were noted, such as various flotation devices, knots and splices, gear marking or other elements. Conclusive determinations were challenging because often only a portion of the gear system was retrieved, and many fisheries deploy similar pieces of gear. Identifying the responsible fishery can be determined if identifying marks were retrieved, such as a license number on a buoy, mandatory gear marks, or other distinguishing features.

8. For this declaration I have reviewed the data on gear fishing gear removed from right whales since records were officially maintained by NMFS beginning in 1997. Specifically, I referenced the database prepared by NMFS for the Atlantic Large Whale Take Reduction Team (ALWTRT) as background information for its April 2019 meeting. These data clearly show that since 2010 lobster fishing gear and ropes have been rarely removed from North Atlantic right whales, something that was common prior to 2010. Based on this review and my cumulative professional experience as a gear specialist and commercial fisherman, it is my opinion that the changes in gear and fishing practices in the American lobster fishery implemented in 2009 and
2014 have significantly reduced the risk of the New England lobster fishery to right whales. The largest entanglement threat is now posed by Canadian snow crab gear trap/pot gear.

9. The analysis of fishing gear removed from right whales, for which I was a key member of the investigative team until 2018, indicates that entanglement in New England lobster gear has declined by 90% since 2010. From 1997 through 2010, lobster gear was removed from 10 North Atlantic right whales. In the last decade, lobster gear has been removed from only one right whale, which did not result in a serious injury. The majority of rope removed from right whales since 2010 is large diameter rope that is rarely deployed in the New England lobster fishery. The decline in lobster gear removed from entangled right whales reflects the success of key conservation measures implemented by fishermen, such as sinking groundlines. The 2009 requirement to replace the floating rope deployed between traps with rope that sinks resulted in the removal of 27,000 miles of floating groundlines from New England’s waters. Since then, there have been no instances of groundlines removed from entangled right whales.ii The 2014 requirement to reduce vertical lines removed an additional 2,740 miles of rope from the water.iii

**Right Whale Entanglement**

10. When a live whale is reported entangled at sea, a response team is deployed to assess the whale and its condition and efforts are made to disentangle the whale. The success of this effort is highly dependent upon weather, location of the whale and complexity of entanglement. Disentanglers attempt to retrieve any gear removed from whales, but this is not always possible. Often gear that is cut in an effort to free the whale will sink to the bottom, or cuts to the gear that are made to simplify the entanglement configuration allow the whale to shed the gear at sea on its own so the gear is not recovered. Any gear retrieved from an entangled whale is turned over to the NMFS gear team which conducts a thorough investigation of the case. A report is prepared
for each case which includes a summary of the case, a description of the gear removed from a
whale and conclusions regarding gear type and target fishery when determined.

11. As an example, NMFS entanglement case E02-17 involved an entangled right whale
#3530, known as Ruffian, first observed off the Georgia coast during an aerial survey in January
2017 by Florida Fish and Wildlife Conservation Commission (FWC). The case was reported to
the Georgia Department of Natural Resources (GA DNR) which responded on scene. GA DNR
attached a telemetry buoy to the whale so that it could be relocated for disentanglement the next
day. The response team made a strategic cut near the head, and the whale shed the remaining
gear the next day. Upon analysis by the NMFS gear team, the gear description noted “451 feet of
5/8” line was recovered with a large conical steel trap (134 lbs) that had empty bait bags, and a
partially destroyed plastic funnel. Cut-out areas in the mesh of the trap were consistent with
those required in the snow crab fishery per DFO [Canada’s Department of Fisheries and
Oceans]. Some of the line recovered also has a unique core build that is not used in any known
U.S. Atlantic fishery but has been identified in other confirmed Canadian snow crab cases.” The
gear team commented, “No twine remained in the mesh cut-outs suggesting that the trap was in
the water for at least a period of four months per DFO. No trap tag or surface buoy was present
to help identify the exact location of the fishery or fishery.” The gear team concluded,
“Recovered gear is consistent with the Canadian snow crab fishery. Growth on the trap, line and
the missing escape vents suggest that the gear was in the water for at least a period of 4 months.”
This gear is now located at NMFS gear facility in Narrangansett, RI.

12. In my experience, there are many cases in which right whales are reported entangled
but are observed gear-free in future sightings. The majority of entanglements do not result in
serious injury or death. The 2019 draft Right Whale Stock Assessment (page 142) notes,
“Whales often free themselves of gear following an entanglement event.”iv Knowlton, et al, 2012, published the first significant research on right whale encounter rates with fishing gear from 1980 to 2009, finding that “Most right whales that become entangled apparently clear themselves of the gear and are left with only scars.” This research documented that an average of 98.8% of these right whale encounters with fishing gear do not result in serious injury over the 30 year time series.v

Decreasing Trend in American Lobster Gear associate with Right Whale Entanglement

13. My former colleague, David Morin, NOAA Fisheries Large Whale Disentanglement Coordinator, provided a database to the Atlantic Large Whale Take Reduction Team at its April 2019 meeting containing records of right whale vessel strikes and entanglements documented between 2000 and 2018.vi This database includes all of the known information on fisheries and gear associated with right whale entanglements during this time period. Earlier versions of these data formed the basis to classify the American lobster fishery as a Category I fishery under the Marine Mammal Protection Act’s annual List of Fisheries determination. These data and corresponding categorization established the basis for the formation of the ALWTRT and development of the Atlantic Large Whale Take Reduction Plan (ALWTRP).

14. This database also contains data on vessel strikes which remain a source of right whale serious injury and mortality. From 2000 to 2018, there were 70 documented vessel strikes with right whales. Of these, 33 were attributed to U.S. vessels, 7 to Canadian vessels and 30 were undetermined. Of the U.S. vessel strikes, 16 occurred prior to 2009 when the US ship strike plan was implemented and 17 have occurred since; seven of the latter resulted in serious injury or mortality. Additionally, a right whale calf born in 2020 was struck by a vessel and was last
observed in poor condition. Of the Canadian vessel strikes, 3 occurred prior to 2009; 4 have occurred since. All resulted in serious injury or mortality.

15. Based on my years of experience working as a commercial fisherman and analyzing gear removed from whales for NMFS, it is often difficult to determine the fishery from which the entangling gear originated. While there may be a case to rule out a certain fishery, NMFS does not track that data. For example, a whale sighted with a small piece of netting and section of rope would be reviewed by the NMFS gear team. Without specific identifying marks, the rope could be from any number of fisheries, such as whelk, black sea bass or other fishery. The netting could be from fixed gear or pelagic net fishery. It also is impossible to determine conclusively that the two pieces of gear recovered originated from the same commercial gear deployment. This hypothetical example would likely be determined as “unknown,” although there are many fisheries that one could likely rule out.

16. It is important to understand that discussion of “commercial fishery entanglement rates” encompasses a wide diversity of commercial fisheries located in two countries. Of extreme relevance to this court proceeding, it is not synonymous with entanglement rates from the American lobster fishery.

17. From 2000 to 2018, there were 164 documented entanglements representing a range of commercial fisheries in the U.S. and Canada. There were 38 cases for which the entangling gear could be traced to a fishery; 13 of those cases occurred before 2010 and 25 cases occurred over the last decade. These data show two significant trends.

18. The first important trend is the significant decline in right whale entanglements in U.S. lobster gear since 2010. From 2000 to 2010, U.S. lobster gear comprised 45% of known cases (6 cases out of 13). However, since 2010 U.S. lobster gear comprises only 0.04% of known
cases (1 case out of 25). Since 2014, there has been only one entanglement, a non-serious injury, in New England lobster gear. As detailed below, ropes removed during this time period are not characteristic of ropes used in the New England lobster fishery. In my expert opinion, the decline in lobster gear entanglement is due to the success of whale protection measures implemented by lobstermen and a significant distributional shift of right whales into Canadian waters where they encounter Canadian fishing gear.

19. The second important trend is the dramatic increase in right whale entanglements in Canadian trap/pot gear since 2010. From 2000 to 2010, 23% of known entanglements were in Canadian trap gear (3 out of 13). This has increased to 52% since 2010 (13 out of 25). Seven of these recent cases resulted in serious injuries or mortalities to right whales.

20. Gillnet gear also emerged as a known threat to right whales. There has been a slight increase in trend in gillnet gear or netting removed from right whales, with one case documented prior to 2010 and seven cases over the last decade; three of these recent cases resulted in serious injuries. There was also a significant increase in entanglements that could not be attributed to a fishery since 2010. In recent years, the proportion of these cases with no gear present has increased.

21. There has been a significant change in the size of ropes removed from right whales in recent years. Prior to 2010, 84% of rope removed from right whales was smaller than ½” diameter (26 of 31 samples) and representative of ropes that may be deployed in New England’s lobster fisheries. Since 2010, the diameter or ropes removed from entangled right whales has increased dramatically. Ropes ½” in diameter or larger now represents 79% of rope removed from entangled right whales (19 of 24 cases), up from 16% in the previous decade. This trend is significant because the New England lobster fishery deploys predominantly smaller ropes. The
most commonly fished rope is of 3/8” diameter, although smaller ropes of 5/16” diameter and slightly larger ropes of 7/16” diameter are also deployed frequently. Maine Department of a Marine Resources conducted a study of New England lobstermen in 2019 which documented that 94% of lobstermen from Maine, New Hampshire, Massachusetts and Rhode Island fish with ropes smaller than ½” diameter.\(^1\)

22. Overall, from 2000 to 2018, there were 164 documented entanglements representing a range of commercial fisheries. Of these 17 were attributed to U.S. fisheries, 21 to Canadian fisheries and 126 were not traced to either country. Of the U.S. entanglements in commercial fishing gear, nine occurred prior to 2010 when major modifications to the Atlantic Large Whale Take Reduction Plan were implemented banning the use of floating groundlines in fixed gear fisheries managed under the plan; eight have occurred since, two of which resulted in serious injury or mortality. Of the Canadian entanglements in commercial fishing gear, 5 occurred prior to 2010 and 16 have occurred since, six of which resulted in serious injury or mortality.

23. I worked on the analysis of entangled right whale 3911, now known as Bayla, that died in 2010. The acute cause of death of this whale was shark predation, although the necropsy team noted significant entanglement trauma on the head, mouth and flippers. The gear team examined approximately 435 feet of 7/16” diameter polypropylene (floating) rope, which had six to seven gangions along this rope with portions of bridles attached. Some of the bridle ends are attached to plastic coated wire mesh, measuring 2” by 2” center to center. This gear is consistent with floating groundline used in the trap/pot fishery prior to April 2009 in U.S. trap/pot fisheries regulated under the ALWTRP. Floating groundline was banned from use in most U.S. trap/pot

\(^1\) This does not include data from the Area 3 lobster fishery. See https://archive.fisheries.noaa.gov/garfo/protected/whaletrp/trt/meetings/April%202019/Meeting%20Materials/Interssional/assessment_of_vertical_line_use__in_ne_trap_pot_fisheries__summer_et_al.pdf
fisheries in April 2019. The gear team did not determine that this entanglement was caused by lobster gear for several reasons because there were several trap/pot fisheries that could not be ruled out. Importantly, there was no surface system or trap tags found to identify the target fishery. This gear had characteristics consistent with several trap/pot fisheries including Canadian lobster, jonah crab or conch.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Executed on June 18, 2020 at Belle Haven Virginia

____________________
/s/
Glenn Salvador

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i NMFS Gear Entanglement reports are located at https://archive.fisheries.noaa.gov/garfo/protected/whaletrp/reports/index.html

ii The two most recent right whale trap/pot fishery groundline entanglement involved floating and not sinking line. These were right whale 3911 (2010) and right whale 3311 (2011).


iv U.S. Atlantic and Gulf of Mexico Draft Marine Mammal Stock Assessment, North Atlantic right whale (Eubalaena glacialis): Western Atlantic Stock, 2019 draft report


TRT Members and Alternates:

Good morning.

Mike Asaro and I have received thoughtful questions from some of you regarding the take reduction target that we identified in my April 5th email to you all. We thought it would be helpful to share our thinking with you in advance of the meeting.

As we tackled this question, we considered several potential approaches to assigning unattributed mortalities and serious injury to Canada or U.S. fisheries. Below is our assessment of these different approaches.

Approach 1: One approach would be to apply the ratio of gear associated with documented mortalities and serious injuries (M/SI) that has been identified to country’s fishery across the unattributed M/SI cases to establish the portion of M/SI that should be assigned to each country. Under this approach, the U.S. contribution to M/SI for the period between 2012-2016 would be about twice PBR (meriting a 50% reduction target). Due primarily to 2016 and 2017 documented entanglements, the U.S. portion of M/SI under this approach would drop during the 2014 - 2018 time period (data are still preliminary) to about PBR.

Discussion: Given the high level of scrutiny that the Gulf of St. Lawrence has been under since 2017 (4 - 6 aircraft actively surveying the Gulf - a fairly closed system so high detection rates) and, the highly recognizable rope used in the snow crab fishery (i.e. gear marking is not required to identify it -even outside of the Gulf of St. Lawrence), takes in the snow crab fishery, particularly within the Gulf of St. Lawrence, have a higher likelihood of being documented and identified than takes in gear from other portions of right whales’ range. For example, takes in open waters of the Gulf of Maine, where carcasses can drift further offshore, would be less likely to be detected. Some years, carcasses in the Gulf of Maine or other New England waters are detected with entanglement injuries but no gear. And as you know, even when gear is retrieved, our ability to accurately identify and assign retrieved rope to other fisheries continues to be limited under current gear marking schemes.

Conclusion: Given the many variables that allow us to identify gear on right whales (presence or absence, gear marking or other recognition factors, detection/observer effort overlap with fishery, etc), we do not consider the subset of entanglements with retrieved gear that can be identified to be a representative ratio toward apportioning unattributed M/SI cases. We opted not to pursue this approach.

Approach 2: Apportion PBR and unattributed M/SI according to the fraction of time that right whales spend in each country.

Discussion: This approach is consistent with the 2016 Guidelines for Preparing Stock Assessment Reports. In recent years, up to half of the right whale population appears to spend up to six months, in the Gulf of St. Lawrence. Following the 2016 Guidelines which call for consideration of residency patterns, we could reasonably assign 25% of the PBR to Canada and 75% to the U.S, dropping the U.S. PBR to 0.68.
Similarly, the relative amount of time that North Atlantic right whales are exposed to fishing gear in U.S. waters exceeds that in Canadian waters. Consequently, up to 75% of the unattributed M/SI could be assigned to U.S. gear based on the duration of exposure. The reduction in M/SI following this assignment of PBR would have generated the highest target risk reduction for U.S. fisheries (90 to 93%).

Conclusion: Because our Stock Assessment Reports have not included a determination on the fraction of time North Atlantic right whales spend in U.S. and Canadian waters, we do not have a data-based residency estimate to apply at this time. Additionally, area closures, sinking ground lines, weak links, and other risk reduction efforts taken by U.S. fishermen justify a reduced assignment of the impact of U.S. gear on right whales relative to Canadian gear. Therefore we did not choose to apply this approach.

Discussion: Although right whales spend more time in U.S. waters, area closures, sinking ground lines, weak links, and other risk reduction efforts taken by U.S. fishermen reduce the impact of U.S. gear on right whales relative to Canadian gear. For most of the period considered in our M/SI estimates - that is, until 2018 - there were no targeted right whale risk reduction measures to prevent entanglements in Canadian fisheries.
Conclusion: This is the approach we took, identified in the April 5th email. Apportioning half of the unattributed M/SI entanglements to U.S. and half to Canada results in a target risk reduction for U.S. fisheries of 60% to 80%.

Additionally, we want to share a few other considerations that shaped our thinking:

- In 2018, Canada implemented new regulations in the Gulf of St. Lawrence to protect right whales from entanglement in the Gulf to fishing gear. These regulations were likely responsible for the decrease in observed entanglements in that area for 2018. If they continue to implement closures and monitoring in this area of high co-occurrence of right whales and snow crab gear, Canadian gear may not be identified as responsible for a greater percentage of take in future years.
- During that same year of intensive monitoring of the Gulf of St. Lawrence, two dead right whales with no gear remaining but showing signs of acute entanglement were observed in New England waters. USCG hindcast models did not indicate these whales came any great distance from where they were documented. Right whale carcasses do decompose quickly in the ocean so given the USCG hindcasts, we cannot attribute these mortalities to Canadian fisheries.
- Right whales have demonstrated high variability in their residency patterns in some of what we previously considered to be key habitats. Although their stay duration in some areas has decreased, surveys and acoustic detections confirm that these habitats have not been entirely abandoned. We need to ensure that our regulations need to include measures that are more resilient to changes in right whale distribution, as well as in fishery distribution patterns. (i.e., they will protect right whales no matter what their residency patterns). Past use and persistent occurrence remains the greatest predictor we have for future distribution.

Canada's involvement in Take Reduction efforts: Under the MMPA, the TRP process does not enable or require Canada to directly participate in the U.S. TRT process. However, bilateral engagement has been amplified and will continue with an eye toward continued and sustainable fishery mitigation measures throughout the North Atlantic right whale population’s range.

As has been true since the TRT began deliberations over 20 years ago, we are challenged by our inability to precisely identify how and where right whale entanglements occur. Nearly 100 right whales a year exhibit new scars indicating interactions with rope. Despite numerous efforts and the ongoing guidance of the TRT, we have not been successful at bringing the rate of mortalities and serious injuries in U.S.
fixed gear fisheries as low as needed to meet and sustain the PBR prescribed by the MMPA for such an endangered population. Given the reduced rate of calving, the rapid decline in the North Atlantic right whale population in just a few years, and the evidence of a continued high rate of entanglement, it is our best judgment that both U.S. and Canada must take and sustain additional efforts to reduce the mortality and serious injuries in fisheries.

Thank you all for thinking carefully about our challenges next week, and weighing these considerations. We look forward to working with you in Providence.

Colleen and Mike

--
Colleen Coogan
Marine Mammal Take Reduction Team Coordinator
NMFS, Greater Atlantic Region
978 281-9181
Hi, Patrice,

Colleen forwarded you the spreadsheet I was prepping for you and the rest of the TRT members. Along with adding the 2019 events, I did make a few minor corrections to a handful of previous events, so definitely use this updated version for any analysis.

Based on Colleen's email it looks like this will be on the TRT website soon so you'll have a new link to provide.

Happy Holidays to you as well!
Allison

On Wed, Dec 23, 2020 at 4:40 PM Patrice McCarron <patrice@mainelobstermen.org> wrote:

Hi Allison

Thanks for the note. I was wondering if I got lost in the end of the year shuffle but hadn’t found my way to get an email out to check in!

Glad that it is in the works. It would be great if I have it in hand at the new year so I can wrap my head around the official data as we prepare to comment on the next RW SAR and the draft rules and biop.

There are so many iterations in the media that it gets confusing.

As a side issue, it would be good to have a way to cite this data directly (rather than just NMFS) as I am often asked about data sources. For the last year and half, I have been able to send the link to the spreadsheet that Dave gave to the TRT in April. Would be good if we have a common source of info to reference. Not sure if that is possible.

Happy Holidays – I hope you and your family are doing well.

It sure has been one crazy year!

Patrice
Hi, Patrice,

I promise I have not forgotten this request. I'm just waiting on some sighting history information that hopefully will be coming by next week. I apologize for not checking in with you sooner.

Happy Solstice - I hope everything gets brighter along with the days!

Allison

On Wed, Oct 14, 2020 at 6:04 PM Patrice McCarron <patrice@mainelobstermen.org> wrote:

Hi Allison

The most recent ‘official’ data I have access to is the spreadsheet prepared in March 2019 for the April TRT meeting.

It is posted at the bottom of this page: https://archive.fisheries.noaa.gov/garfo/protected/whaletrp/trt/meetings/April%202019/19_april_2019_trt_meeting.html

It would be great to see all of the data, including non-human, to get a sense of how many there are in that data set. For timing, I’d love it as soon as you are able to do it. I really have no idea what the official data says for the end of 2018 or 2019, so I’d like to get up to speed on where things are truly at.
General fields based off Dave’s spreadsheet for consistency sake (to the extent that these are available). But, I’m happy to take whatever you have ready to go.

Date first observed
RW ID/Name
NMFS ID
Location description
Narrative
Initial condition
Exam
Cause (EN, VS, etc)
Fate: MT, SI, NS, PR
Value against PBR
Country of origin
Country of origin conf code
Gear analysis
Gear type
Gear retrieved
Gear analysis

If there are any fishery notes or rope size, that would be great, but I’m guessing that has not all been analyzed.

I really appreciate this.
Thank you!
Patrice
Hi Patrice,

Sorry for the late response. Yes, these data are hard to track and I appreciate you coming to me directly. I'm happy to pull them for you - when do you need them by and what fields are you looking for? I assume the usual basic sighting info (date, general location, narrative) and determination results. Do you want all RW events or just the ones with confirmed human interactions? Since my focus is the whale and its outcome, I'll let Dave (cc'd) add in the relevant gear data to ensure that component is the most up to date as well.

I'm doing as well as can be expected in these crazy times and hope you are as well.

Cheers,

Allison

On Tue, Oct 6, 2020 at 2:17 PM Patrice McCarron <patrice@mainelobstermen.org> wrote:

Hi Allison

Can you please send me a spreadsheet with the RW serious injury and mortality from 2010 to present (date of most up to date info)?

This information is very difficult to track and I want to be sure I am up to date on NMFS’ determinations for these entanglements.
I hope you are well with all that is going on these days.

Thank you.

Patrice
Patrice McCarron

From: Colleen Coogan - NOAA Federal <colleen.coogan@noaa.gov>
Sent: Thursday, December 24, 2020 11:55 AM
To: Patrice McCarron
Cc: Allison Henry - NOAA Federal; David Morin - NOAA Federal; Marisa Trego - NOAA Affiliate; Kate Swails; Jennifer Goebel; Jennifer Anderson
Subject: Re: Boston Globe article on RW

Follow Up Flag: Follow up
Flag Status: Flagged

Patrice,

Rather than wait until we have the fully vetted 2020 entanglement incident analyses, Allison Henry has provided the attached 2000 to 2019 updated right whale incident data. We will share with the full team early in the New Year.

This includes all incidents, not just entanglements, and not all listed incidents are serious injuries and mortalities so as usual please note the column header descriptions and caveats (described in the first two tabs) when filtering the data.

We agree with you that Dave Abel’s reported numbers are not supported by these data.

Thanks to Allison for getting this to us!

And Merry Christmas, hope you and your family have a happy and healthy 2021!

On Fri, Dec 18, 2020 at 4:57 PM Patrice McCarron <patrice@mainelobstermen.org> wrote:

Hi Colleen

I just read Dave Abel’s article on RW in the Globe from December 17, and I question a few of the facts in his piece. Unfortunately, I do not have access to the most up to date data, so I am not able to do that on my own. Are you able to clarify whether or not these statements are fact?

“Over the past decade, the population of right whales has plummeted by more than a quarter, and millions of vertical buoy lines used in the Gulf of Maine have been the leading cause of death”

I am not aware of any data that indicates that “millions of VBL used in the GOM have been the leading cause of death.”
“Between 2010 and 2019, 43 right whales were found to have died as a result of entanglements from the lines that extend from buoys at the surface to traps on the seafloor, according to the National Marine Fisheries Service. By contrast, 14 are known to have died as a result of vessel strikes.”

The table that Dave Morin shared with the TRT for the April 2019 meeting shows from 2010 to 2018, there were 23 ENT mortalities and 20 VS mortalities. The numbers cited by Abel don’t seem to make sense in light of the data from last year. Can you clarify if Abel's numbers are accurate?

Here is a link to the article, which I’m sure you have already read.


I appreciate your feedback on this. Thank you Colleen!

Patrice

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Patrice McCarron

Executive Director, Maine Lobstermen’s Association

President, Maine Lobstermen’s Community Alliance

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2 Storer St, Suite 2013, Kennebunk, ME 04043
Colleen Coogan
Marine Mammal Sea Turtle Team
NMFS, Greater Atlantic Region
Desk: 978 281-9181
Cell: 978 675-5562 - if texting please identify yourself in initial text
ALWTRT current webpage
ALWTRT archived pages
MARINE ANIMAL HOTLINE: 866-755-NOAA (6622)
I, Noah Oppenheim, state and declare as follows:

1. I am the Principal of Homarus Strategies, a Limited Liability Corporation formed in April 2020. Homarus Strategies is a consulting firm focused on enhancing marine resource sustainability and productivity, supporting coastal communities and their access to the living marine resources on which they depend. Homarus Strategies is engaged in work on behalf of commercial fishing organizations to support their engagement in public processes that pertain to the prosecution of fisheries and to ensure that their voices are heard by decision makers whose experience rarely includes the perspectives or expertise of professional fishermen who have spent their careers working at sea.

2. I am a marine scientist and fisheries policy expert who has worked as a federal fisheries observer in the fixed and mobile gear groundfish fisheries in the Bering Sea and as a commercial salmon fisherman in Alaska. I received master’s degrees in marine biology and marine policy from the University of Maine’s School of Marine Sciences. The focus of my graduate research was the American lobster fishery in New England. I developed a population dynamics model forecasting lobster fishery recruitment and commercial harvest for fishing areas from Rhode Island to New Brunswick, Canada based on a survey of larval lobster abundance and environmental factors
including warming ocean temperatures driven by climate change. I also studied the perceptions and utility of scientific information and fishery management policies from the perspectives of lobster fishermen for whom scientific information is sometimes intended but often not appropriately designed or scaled.

3. During my graduate studies from 2013-2016 involving research on the American lobster fishery, I became familiar with various measures implemented to reduce entanglement risk to large whales from lobster gear, including the use of colored line marking to identify gear with its fishery of origin, weak links, the use of line that sinks rather than floats between traps set on bottom, and regulatory requirements for trawling (colloquially known as ‘trawls’ or ‘gangs’) multiple traps on bottom that are connected to a buoy at the surface via a vertical line at one or both ends of the trawl. I also became familiar with measures being developed or proposed to further reduce alleged whale entanglements in the American lobster fishery, including ‘cutter’ systems, expansion of weak link systems in buoy lines and the development of ‘pop-up buoy gear’ (also known as ‘on-call’, ‘ropeless’, or ‘buoy line-less’ gear, although a majority of such systems include buoys and one or more segments of rope). During my studies I engaged with numerous commercial lobstermen, marine scientists, and fishery managers about the various regulatory and technological proposals to address whale entanglement in the lobster fishery, including the viability of using pop-up buoy gear.

4. Pop-up buoy gear is class of fishing equipment that removes or greatly reduces static vertical lines in the water column as a gear retrieval system and instead uses various alternative buoyancy mechanisms and communications technologies to mark the location of fixed gear, identify the owner/operator of the gear, and retrieve the gear. Most prototype or commercially available pop-up buoy gear equipment uses the submersion of a buoyancy device and acoustic signaling to actuate the surfacing of the buoyancy device. Pop-up buoy gear can be divided into two primary types or classes: ‘lift bag gear’ which uses compressed air (for example, SCUBA tanks) to fill a bag to bring submerged gear to the surface for retrieval; and ‘remote coupler gear’ which uses coiled or spooled lines and buoys that are released from traps or separate weighted
anchors to reach the surface using a timed-release mechanism or after receiving an acoustic signal (Figure 1). Some remote coupler-type pop-up buoy gear systems require the use of a destructible component that must be reloaded for re-use. Many pop-up buoy gear systems require the use of GPS-based mapping platforms, specialized networked telecommunications equipment, acoustic modems for transmitting coded acoustic signals, and specialized equipment for re-coiling, re-arming, or re-deploying the equipment.

Figure 1: A diagram illustrating two types of pop-up buoy gear systems. The top diagram illustrates remote coupler gear and the bottom diagram illustrates lift bag gear. Accessed from the California Ocean Protection Council website at www.opc.ca.gov.

5. From January 2016 through January 2017 I was a Sea Grant Policy Fellow in the US Congress. During this time, I was responsible for the natural resources portfolio in the office of Congressman Jared Huffman, at the time the Ranking Member of the Water, Power and Oceans Subcommittee of the House Natural Resources Committee. My duties as Policy Fellow included legislative development, office and committee engagement on state and federal fisheries policy matters, assistance with executing the oversight functions of the Congress over the National Oceanic and Atmospheric Administration (“NOAA”) (including the National Marine Fisheries
Service or “NMFS”), and engaging with the constituents of California’s second congressional district.

6. During my tenure with Congressman Huffman I became aware of the issue of whale entanglement in the west coast Dungeness crab fishery as well as various proposed solutions to minimize and mitigate interactions between ESA-listed whales and Dungeness crab fishing gear. During this time I became aware of the existence of proposals to test pop-up buoy gear in Dungeness crab fishing grounds, as well as the proposals by some non-governmental organizations to mandate its use in the Dungeness crab fishery.

7. From February 2017 to April 2020 I was the Executive Director of the Pacific Coast Federation of Fishermen’s Associations ("PCFFA") and PCFFA’s sister organization, the Institute for Fisheries Resources ("IFR"). In that capacity I directed all of PCFFA’s and IFR’s fishery management policy, environmental advocacy, and litigation in support of the commercial fishing communities of the West Coast. IFR and PCFFA are especially engaged in legal action to prevent harm to the living marine resources on which their members depend as well as to prevent the implementation of policies that unduly or arbitrarily preclude their access to those resources.

8. In the course of executing my responsibilities at PCFFA and IFR I engaged with numerous Dungeness crab fishermen about their experience with and concerns about pop-up buoy gear. I worked closely with two Dungeness crab fishermen who have first-hand knowledge of buoy-less or pop-up buoy gear systems which they tested from their vessels.

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1 PCFFA is a 501(c)(5) nonprofit trade association established in 1976. PCFFA is the largest trade organization of commercial fishing families on the west coast. PCFFA is a federation of 15 smaller commercial fishermen’s associations, vessel owners’ associations, port associations, and marketing associations, with member associations in most major ports in California north of Point Conception. Collectively, PCFFA’s port and member associations represent approximately 750 commercial fishing families West-Coast-wide who are small and mid-sized commercial fishing boat owners and operators, most of whom derive part or all of their income from the harvesting of Dungeness crabs.

IFR is a 501(c)(3) non-profit, public interest marine resources protection and conservation organization incorporated in the State of California which is closely affiliated with PCFFA and with similar Board structure, general membership, and staff. IFR was created in 1993 by PCFFA to help fund, manage, and advocate for PCFFA’s fisheries habitat conservation and restoration agenda, particularly for protecting and restoring and improving fisheries that have suffered from poor inland and coastal water quality and the impacts of climate change including drought and harmful algal blooms. IFR has many supporting members coastwide, most of whom are commercial fishermen and women, or individuals who have a personal interest in protecting fish and the integrity of seafood markets.
9. In my position as Executive Director of IFR, I also supervised and directed all of IFR’s many fisheries conservation programs in Oregon, Washington, and California. Much of IFR’s work focuses on efforts to restore and protect fishery resources within the coastal waters and watersheds of these three states. IFR, in particular, has been an active and important voice in habitat protection and restoration issues coastwide for the benefit of increased harvest of public trust fishery resources. I am currently the commercial fishing representative to the Pacific Fishery Management Council’s Habitat Committee.

10. The California Dungeness crab fishery and the New England lobster fishery are similar in many respects. Each are considered models of sustainable fishery management in their region and populations of Dungeness crabs and lobsters are stable and healthy throughout core ranges of both fisheries. These fisheries have developed similar management strategies that are implemented through differing management measures. Each have systems of limited entry, trap limits, size limits and protections of females or gravid females. The economic model for both fisheries is dependent upon a high volume of landings, requiring significant effort by repeatedly retrieving and redeploying traps. Dungeness crab fishermen can haul and redeploy 300-400 traps per day which is similar to some Maine lobstersmen who fish further from shore on larger vessels in order to remain competitive. Others, who fish in smaller boats closer to shore, would haul on average 200 or less traps per day.

11. Both the California Dungeness crab fishery and American lobster fishery are required by law to affix a buoy attached by a line to enable the location of gear, identify the individual to whom the gear belongs, and to provide a mechanism by which to retrieve the gear from the seafloor. While the lobster fishery allows for the deployment of multiple traps on bottom, known as a ‘trawl’ or a ‘gang’, this practice is unlawful in the Dungeness crab fishery. In the Dungeness crab fishery, each line and buoy setup is coiled and placed entirely within its corresponding trap to maximize stacking volume and to increase safety and handling efficiency on deck (Figure 2). A typical Dungeness crab trap, line, and buoy costs around $200. An equivalent set-up in the New England lobster fishery also costs around $200.
12. In California, Dungeness crab fishing occurs from November 15th to July 15th. Frequent intense storms and strong currents throughout the water column can flip and transport fishing gear and mobilize the ocean substrate to such a degree that traps become buried in the sand, often requiring the use of specialized high-velocity water pumps to retrieve them; the nozzles attached to these pumps must ‘chase’ a line with a buoy to a stuck trap in order to retrieve it.

13. The American lobster fishery is open year-round with the exception of targeted closures implemented to protect North Atlantic right whales. However, the majority (~80%) of Maine lobstermen hold only state licenses and thus are limited to fishing in state waters located within 3 miles from shore. These vessels typically fish from May through November. Those who hold federal American lobster permits are more likely to fish year-round. Lobstermen who fish in the Outer Cape Cod area and in Downeast Maine also work in areas with intense bottom currents and tides which requires additional ballast to hold gear in place and prevent gear loss.

14. A marine heat wave in the Pacific Ocean that began in late 2013 and persisted for three years affected the timing and distribution of marine mammals off the coast of California. It also caused an increase in the abundance and toxicity of various Pseudo-nitzschia plankton species...
which are sometimes known to produce elevated levels of the potent neurotoxin, domoic acid. Concentrations of domoic acid exceeding US Food and Drug Administration (FDA) action levels were detected in Dungeness crabs prior to the scheduled opening of the 2015/16 commercial fishing season in November, resulting in a five-month delay and a phased-in opening of the fishery. This resulted in a significantly greater than normal concentration of fishing gear that corresponded with a very early springtime migration of endangered humpback whales. The whales swam abnormally close to shore in search of forage, resulting in a high level of interactions between fishing gear and humpback whales. According to NOAA, there were 19 confirmed entanglements of humpback whales with California Dungeness crab fishing gear in 2016, compared with an average of 0.84 confirmed entanglements with humpback whales over the previous thirteen years (2003-2015).

15. In September 2015, the California Department of Fish and Wildlife (CDFW), in partnership with California Ocean Protection Council and National Marine Fisheries Service, established the California Dungeness Crab Fishing Gear Working Group ("Working Group") to address an increase in large whale entanglements in Dungeness crab fishing gear. From July 2019 to April 2020 I was a member of the California Dungeness Crab Fishing Gear Working Group ("Working Group") which developed fishing gear best practices to reduce entanglement risk. The Working Group identified four factors that served as primary indicators of increased risk of entanglements between ESA-listed whales and commercial fishing gear to be used in a management framework called the Risk Assessment and Mitigation Program ("RAMP").

16. In October 2017 the Center for Biological Diversity (CBD) filed a lawsuit against the California Department of Fish and Wildlife (CDFW) alleging that continued management of the California Dungeness crab fishery violated the ESA due to the occurrence of ‘take’ of ESA-listed Distinct Population Segments (DPS) of humpback whales and other listed species absent an Incidental Take Permit ("ITP").

to join *CBD v. Bonham* as Defendant-Intervenors. In March 2018 PCFFA’s motion to intervene was filed and subsequently approved.

17. In July 2018 I participated in a meeting convened by pop-up fishing gear proponents with fishing industry members, CDFW Law Enforcement Officers, and pop-up gear manufacturers. The meeting included presentations from the manufacturers of ‘remote coupler’ and ‘lift bag’ systems and discussions about the various impediments and problems with each system, including challenges of use on board vessels, challenges with the interaction of pop-up buoy gear with mobile and other fixed gear, and challenges for law enforcement officers regarding location, retrieval, and redeployment of pop-up gear.

18. In November 2018 CDFW announced it would develop a Habitat Conservation Plan pursuant to an application for an ITP for its management of the Dungeness Crab Fishery. In March 2019, Judge Maxine Chesney of the US District Court in San Francisco informed the parties to *CBD v. Bonham* she was inclined to rule in favor of the plaintiff’s motion for summary judgment resulting in a settlement agreement for a stay agreement signed by all parties dated March 26, 2019. CBD attorneys insisted on the inclusion of provisions to the stay agreement for certain fishing areas to be “only open to ropeless fishing gear by default” and for “[CDFW to] continue to support development of ropeless gear technology, or any other alternative gear, and explicitly allow for its testing and use in the RAMP regulation”\(^3\). Further, the settlement requires CDFW to “…amend existing regulations or finalize new regulations by November 1, 2020, that allow alternate gear, including ropeless gear, that meets the enforcement criteria to be used in any area closed to commercial Dungeness crab fishing to protect whales or sea turtles”\(^4\).

19. In April 2019 I attended the Atlantic Large Whale Take Reduction Team meeting and engaged with New England lobstermen, scientists, agency staff, and environmental nonprofit organization staff about risk assessment and mitigation approaches in the New England lobster

\(^3\) Case 3:17-cv-05685-MMC Document 71 Exhibit A pp. 2
\(^4\) *ID.* at 4.
fishery. I specifically explored the state of knowledge and engineering development of pop-up buoy gear.

20. I am familiar with three California commercial Dungeness crab fishermen who have tested pop-up buoy gear systems on their vessels. I have worked extensively with two of them, Captain John Mellor of San Francisco and Captain Dick Ogg of Bodega Bay, to understand their experience testing this gear and its potential as an entanglement mitigation strategy that can be scaled across the fishery. Each of these fishermen has experienced operational and technical challenges with this gear and have stated that they do not believe pop-up buoy gear is compatible with commercial fishing as it currently exists.

21. Mr. Mellor tested the FioBuoy (spooled line) and Desert Star (line-in-bag) pop-up buoy gear systems affixed to his Dungeness crab traps in San Francisco Bay, California, a sheltered area with limited wave action, in shallow water at slack tide with little wind (atypical conditions for the Dungeness crab fishery). He successfully deployed and retrieved each type of pop-up buoy gear once. He noted that on the final deployment it became difficult to determine the location of the buoyant float released from the trap because the tide had begun to run slightly. He reported that he does not believe the equipment he tested to be compatible with his fishing operation because the equipment was difficult to handle, there is no spatial mapping software platform or package that would enable him to confidently track the deployment and retrieval of his gear, and the equipment was neither robust enough nor compact enough to fit inside his traps for stacking or handling the rigors of loading and unloading or repeated deployments.

22. Mr. Ogg also tested the FioBuoy and Desert Star pop-up buoy gear affixed to his Dungeness crab traps in the ocean waters off the coast of Bodega Bay, California in shallow water with relatively calm sea state conditions. In his first deployment of the FioBuoy system, he was unsuccessful in activating the gear’s release mechanism, but successfully activated the release mechanism on a second attempt. He also deployed the Desert Star system, successfully

establishing communication with the system and confirming the activation of the release mechanism, although the buoy was not released by the system. He was unable to retrieve the gear and attempted to have the gear retrieved by a SCUBA diver. Unfortunately, this gear was lost and is now a piece of marine debris. Mr. Ogg believes the Desert Star gear may have landed underneath his trap when it contacted the seafloor or that current may have caused his trap to roll over on top of the pop-up buoy gear. It is common in fixed gear fisheries for traps to land upside-down or roll over. The successful retrieval of the pop-up buoy systems he tested is dependent upon the gear landing on bottom in a stable upright position. Based on his experience, Mr. Ogg believes that gear loss resulting from this system would be a common and costly occurrence under normal fishing conditions.

23. Mr. Mellor, Mr. Ogg, as well as many other Dungeness crab fishermen who are familiar with pop-up buoy gear, have described the problems and challenges they see with the use of the gear. Many of these problems and challenges pertain to the ease of use of the systems, including but not limited to the amount of time necessary to use them on board their fishing vessels.

24. Pop-up buoy gear systems are currently, or foreseeably, unreliable and cost prohibitive. Current commercial units cost 10 times or more per trap compared to gear they currently use. Fishermen would also have to purchase or lease expensive electronic equipment to arm and retrieve pop-up buoy gear. For example, if a California Dungeness crab fisherman who owns a tier 1 permit were required to purchase $5,000 pop-up buoy units for each of her 500 traps, she would incur a cost of $2,500,000. This same fisherman would have to reduce the number of traps she fishes from 500 to 20 if she wished to maintain the same budget for fishing gear after switching to pop-up buoy gear. The economic model could not be supported by the fishery.

25. Fishermen have observed that they will also have to make extensive, expensive modifications to their vessels in order to operate many of the pop-up buoy gear systems that are currently available, requiring new haulers, wiring for electronics, or custom-built platforms or shelving to stabilize gear while it is being re-coiled or re-spoled.
26. Mr. Ogg and other fishermen are concerned that the pop-up buoy gear systems that have been tested have an unacceptably high failure rate, resulting in losses of very expensive equipment. The typical failure or loss rate of traps for the California Dungeness crab fishery over the course of a seven month fishing season is around 1.5%. A fisherman might typically cycle through his or her gear twenty times in a typical season, meaning that the failure or loss rate of a typical Dungeness crab trap can be estimated to be around one in 1,250 trap pulls. I am not aware of any existing pop-up buoy gear systems that have a failure rate within two orders of magnitude of ‘traditional’ line and buoy gear configurations when affixed to Dungeness crab or American lobster traps.

27. Increased losses of fishing gear due to the failure of pop-up buoy gear to deploy when signaled would occur if such gear were put into widespread use today. Marine debris resulting from lost ‘ghost gear’ is a recognized problem in fixed gear fisheries and may pose entanglement risk to whales.

28. The Ropeless Fishing Consortium was organized to advance the development of fishing with pop-up buoy gear as a right whale entanglement mitigation solution. The group has held three workshops in 2017, 2018 and 2019. Dr. Mark Baumgartner of Woods Hole Oceanographic Institute (WHOI), a founding member of the group, made two significant observations during the 2019 meeting in response to his question, “When can we go ropeless?” He observed, 1) “We are in the early stages of development – mostly proof of concept with prototypes that are not yet designed for operational fishing by hundreds to thousands of fishermen,” and 2) “Every system you have seen today will need to go through a redesign process to (a) incorporate an interoperable gear location system, (b) work for fishing at scale (e.g., ruggedized design, long endurance), and (c) enable mass production at low cost.”

29. NOAA Fisheries released a concept paper in 2010 to investigate the feasibility of piloting the use of buoy line-less gear in the Great South Channel Restricted Area (GSCRA)

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which is already closed to trap/pot and gillnet fishing under the Atlantic Large Whale Take Reduction Plan (TRP). NOAA did not support moving forward with rulemaking to allow buoy line-less gear to be fished in this closed area citing several reasons including: 1) the potential increase in risk to large whales from a malfunctioning device (e.g. vertical line present in the water column for a period of time) compared to the current status quo (i.e. closure), 2) the lack of creation of an incentive to develop innovative gear, 3) the potential for gear conflicts, 4) the lack of viable technologies or methods for fishing without buoy lines, and 5) the need to address regulatory hurdles under the American Lobster Fishery Management Plan and ALWTRP. NMFS concluded that development of fisheries management measures that would include the use of buoy line-less gear could be explored in the future if the gear conflict and other regulatory issues associated with its use were addressed.  

30. Based on conversations I have had with fishermen who have tested this gear in both California and New England, the issues identified by NOAA in 2010 have not been addressed at this time. Fishermen continue to observe that the operation of pop-up buoy gear systems significantly slows the pace of fishing operations, poses safety challenges, and challenges their ability to operate in a safe, cost effective manner. Fishermen are concerned that there are specific times at which gear handling would be adversely time-consuming: 1) during retrieval and re-spooling or re-coiling of gear, 2) during re-arming or resetting of the pop-up release mechanism itself, 3) during use of any electronic equipment used to arm, set, or locate the gear, and 4) during the time spent searching for gear that has been moved due to the current. Increased handling time is exacerbated by cold weather operations, which are common in both the Dungeness crab and American lobster fisheries. Cold weather significantly decreases fine motor function and requires the use of gloves, which must be removed to arm most pop-up buoy gear systems and to operate the interfaces of the electronic equipment used to track deployment locations and transmit acoustic signals from vessels to the gear. The increased handling time on

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deck required by pop-up buoy gear is a particular concern for fishermen who operate their vessels alone. Fishermen who fish alone must handle gear on deck while maintaining a vigilant watch to ensure safe vessel maneuvering within high traffic areas or in a high sea state; several such fishermen have communicated to me that they would be concerned for their personal safety if they were to have to use pop-up gear and fish alone. In 2018, 1,390 Maine lobstermen were Class 1 lobster license holders, which does not allow them to take crew.

31. A Maine commercial lobster fisherman, Kristan Porter, (President of the Maine Lobstermen’s Association), tested the Desert Star System in 2013 during a research trip to eastern Australia to investigate potential whale entanglement mitigation tools for the American lobster fishery. This technology was adopted by some fishermen in the Australian rock lobster fishery to hide gear from poachers because each trap in that fishery is set out for 30 days and each trap haul is worth thousands of dollars. The Australian rock lobster fishery is the sole fishery that operates within lobster fishing grounds, negating gear conflict between fishing sectors. Mr. Porter hauled 14 single traps during his fishing trip there, whereas he typically hauls around 200 per day in the Maine lobster fishery. He reported fishing the pop-up system to be time consuming, frustrating, and tedious. Operation of this equipment required a high level of skill to properly record each gear set in the system, and to reset the burn wire for the acoustic release after each haul. Mr. Porter met others in the Australian lobster fishery who were not able to successfully fish the system. He noted that this technology would not easily transfer to the New England lobster fishery because the system greatly limits that number of traps that can be hauled in a day, lobstermen fish much more tightly together, share bottom with other lobstermen and with fishermen active in other fisheries.8

32. A Massachusetts lobsterman, Dave Casoni, has tested the Desert Star pop-up buoy gear on several occasions from his fishing vessel. Mr. Casoni has expressed concerns about the

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practicability and use of pop-up buoy gear systems on his fishing vessel and those of his peers. Mr. Casoni fishes without a hired crew member and does not feel that pop-up buoy gear would be safe or workable for fishermen operating alone. Additionally, Mr. Casoni has identified the technologies used in pop-up buoy gear systems he is familiar with as highly complicated when compared to the relatively simple technology of a traditional buoy line setup. Many commercial lobstermen are elderly or otherwise have little experience and familiarity with digital technology, touch screens, and other electronic equipment required to operate many pop-up buoy gear systems. Mr. Casoni believes that a significant number of commercial lobstermen would be unable to operate the pop-up buoy gear systems he is familiar with. Required use of these systems would preclude a significant segment of the lobster fishery from being able to participate, based to a large extent on their age and familiarity with certain modern technologies.

33. The Atlantic States Marine Fisheries Commission (ASMFC) has jurisdiction over the Fishery Management Plan for American Lobster, Amendment 3 and its addenda, under the Atlantic Coastal Fisheries Cooperative Management Act. In June 2018, ASMFC’s Law Enforcement Committee (LEC) reviewed the enforceability of pop-up buoy gear technologies under consideration to reduce impacts on right whales. The LEC raised several concerns about the impact of pop-up buoy gear technology on the enforceability of lobster conservation rules. The LEC found that the time and cost required for enforcement officers to retrieve and re-deploy pop-up buoy gear would significantly reduce law enforcement agencies’ ability to ensure compliance with fishery regulation and lobster conservation laws because gear could not be hauled regularly, resulting in fewer lobster traps inspected per trip, reducing incentives for compliance. The LEC noted that the adoption of multiple pop-up buoy gear technologies and retrieval/mapping systems would represent a financial burden to law enforcement agencies and a logistical challenge for law enforcement, which would need to be equipped to deal with different systems. There were concerns raised about the storage and security of trap location information and the potential for poachers to steal other’s acoustic data and unlawfully activate pop-up buoy gear.
34. The widespread deployment of pop-up buoy gear in commercial lobster fishing grounds would result in significant conflict amongst fishermen and between competing gear types. These conflicts reflect both the spatial incompatibility of mobile gear (trawl gear, troll gear) and other types of fixed gear (gillnets, longlines, and ‘traditional’ trap equipment) with pop-up buoy gear that is unmarked at the surface. There are several commercial fisheries that operate within the same fishing grounds as lobster fisheries, including groundfish trawl fisheries, crab fisheries, and scallop fisheries. The deployment of pop-up buoy gear in a fixed gear fishery would require that all other fisheries operating in the area to purchase and use expensive electronic mapping and communications equipment in order to be able to detect and avoid traps deployed with pop-up buoy gear. Alternatively, it would require the delineation of zones of the ocean for specific fisheries or gear types, prioritizing access to resources to some and denying it to others.

35. I am not familiar with any fishery management or marine spatial planning process that could legally facilitate an ocean zoning scheme that would prevent gear conflict between fishing sectors if one or more were required to use pop-up buoy gear. An ocean zoning process that excluded commercial fishing in one or more sectors solely because of the presence of a gear type from another fishery could be in violation of the guiding principles of the Magnuson-Stevens Fishery Conservation and Management Act (16 USC §§1801 et seq.) that call for maximized efficiency in the use of the nation’s fisheries resources. It is my opinion that the prevention of the efficient operation of mobile and fixed gear fisheries in areas of the US Exclusive Economic Zone in which pop-up gear is deployed would constitute inefficient management of the nation’s fishery resources.

36. In addition to the challenges of conforming to fishery management principles espoused in federal statute, any requirement to use of pop-up buoy gear in the American lobster fishery would violate both federal and state fishery management laws. Federal gear marking requirements for the American lobster fishery include Universal Trap/Pot Requirements on the buoy, including vessel registration number and/or US vessel documentation number, federal commercial fishing permit number or positive identification as required by the vessel’s home-port state. Lobster trawls
of three or fewer traps fished in federal waters must be attached to and marked with a single buoy; lobster trap trawls of more than three traps must be marked with a radar reflector and a single flag or pennant on the westernmost end and radar reflector only on the easternmost end. Individual states also have gear marking requirements.\textsuperscript{9} For example, Maine law states that “[a] person may not fish for or take lobster by any method other than conventional lobster traps…”\textsuperscript{10} and requires that “[a] lobster or crab trap or trawl must be marked by a lobster buoy as described in subsections 3 and 4. The buoy must be visible at the surface.”\textsuperscript{11} In Massachusetts, state regulations require a single buoy with a flag to mark the north (or west) end of the trawl and a double buoy on the south (or east) end. The double buoy can be two buoys tied together or can be two buoys on a 3- to 4-foot-long stick.

37. Based on my professional experience and for the reasons stated above, it is my opinion and belief that there does not currently exist a pop-up buoy gear system that could be practicably implemented for use today in the Dungeness crab fishery or the American lobster fishery. Further, it is my opinion and belief that there are significant legal, operational, safety, and economic challenges that would be necessary to address, likely requiring years of research, testing, and communication with commercial fisheries stakeholders as well as changes to one or more states’ laws before pop-up buoy gear could become feasible for widespread use in any American fixed gear fishery including Dungeness crab or American lobster fisheries.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Executed this 18th day of June, 2020, at Brunswick, Maine.

\[ /s/ \]
Noah Oppenheim

\textsuperscript{9} https://archive.fisheries.noaa.gov/garfo/protected/whaletrp/trt/meetings/March\%202018\%20Ropeless\%20subgroup/ropeless_subgroup_lobster_gear.pdf
\textsuperscript{10} MRSA, Title 12, §6432(1)
\textsuperscript{11} MRSA, Title 12, §6432(2)
Michael Pentony
Regional Administrator
National Marine Fisheries Service
55 Great Republic Drive
Gloucester, Massachusetts 01930

Dear Mike,

The Atlantic States Marine Fisheries Commission (Commission) is concerned about the status of the North Atlantic right whale population and is committed to identifying solutions that support the recovery of this endangered species.

Among the measures under consideration as a means of reducing impacts on right whales are ropeless fishing technologies. The Commission tasked its Law Enforcement Committee (LEC), composed of marine fisheries enforcement officers from the states and federal agencies, to review the enforceability of ropeless fishing technologies in the American lobster fishery. This letter provides an overview of the Commission’s review of the LEC report to the Board and the issues identified based upon our review. These issues are being communicated in order to aid in the development of technologies which improve the status of the right whale population while maintaining valuable Atlantic coast fisheries.

The LEC considered several types of ropeless fishing technologies including those employing spools, lift bags, and bagged line to enable the retrieval of traps from the ocean floor. Its review identified significant concerns about the impact of ropeless fishing technology on the enforceability of rules governing lobster fishing. Many management measures used to ensure a sustainable lobster resource, including trap tag allocations and vent sizes, are verified through frequent retrieval of fishing gear by law enforcement. Given the significant costs associated with the new technology at this point and the additional time needed to return inspected gear to the ocean floor, either by deploying a new spooled rope, re-bagging line, or replacing air canisters, the adoption of ropeless technology would likely result in a diminished ability to inspect gear. These restrictions in budget and enforcement time would likely result in fewer lobster traps inspected, thereby reducing incentives for compliance in the lobster fishery. Non-compliance is a particular concern given the rapid increase in the fishery’s value over the last decade. Moreover, a reduced ability to enforce regulations would be detrimental to the sustainability of the lobster fishery.

Based upon its consideration of the LEC’s report on ropeless technologies, the Commission also expressed concern regarding the potential for multiple ropeless fishing technologies to be adopted in the lobster fishery. It was noted that if multiple technologies are approved for use along the
Atlantic coast, enforcement vessels will need the capability to retrieve lobster gear with all of the approved technologies. This would represent not only a financial burden on enforcement agencies but also a logistical challenge given many of the technologies require additional deck space to store rope and/or spools. If enforcement vessels do not have the ability or space to haul all types of ropeless gear, such limitations would further increase concerns regarding diminished gear inspection capacity and increased non-compliance in the fishery.

The Commission had several questions regarding the storage and security of trap location information. Specific questions included: Who will be in charge of storing information on individual trap locations? How will this data be protected? There were also questions about the potential ability of persons to ‘steal’ acoustic and radio frequencies and retrieve lobster traps which belong to other harvesters. The LEC noted the security of location and frequency information should be a priority moving forward. The LEC also questioned the ability to conduct covert operations with ropeless fishing gear given that, in the case of some of the technologies, fishermen are immediately notified when their gear reaches the surface.

Finally, the Commission notes the adoption of ropeless fishing involves all vessels, not just those that participate in the lobster fishery. Since the removal of surface systems would eliminate the visual signal of where traps are located, all vessels, including those who participate in mobile gear fisheries, would need to have an acoustic modem in order to locate submerged traps and minimize gear conflicts. Given the large numbers of vessels that would be impacted by the adoption of ropeless fishing, the Commission requests that a comprehensive cost analysis is conducted if NOAA takes the next step to consider any of the devices as a gear requirement. The Commission would stress the importance of fully vetting and testing these devices to ensure the ability to track and locate traps if the technology fails. It would be detrimental the lobster and other fisheries resources if an increase volume of “ghost” gear were caused by this new technology.

While we have raised concerns regarding the enforceability of ropeless fishing, the Commission fully recognizes that, in the past, many technological improvements have greatly improved the ability to enforce fishery management measures. As a result, the Commission supports the continued development of all technologies which may improve the status of Atlantic right whales and allow for the continuation of Atlantic coast fisheries. The decline of right whale populations since 2010 is a serious concern to the Commission and the need to develop effective solutions is of utmost importance.

We invite NOAA Fisheries to draw upon the experience and expertise of the ASMFC and its member states as we continue to collaborate on these important issues. If you have any questions or comments, please do not hesitate to reach out.

Sincerely,

Robert E. Beal

cc: American Lobster and ISFMP Policy Boards
Addendum 2 to MLA Proposed Rule Comments
Patrice McCarron

From: David Morin - NOAA Federal <david.morin@noaa.gov>
Sent: Thursday, August 15, 2019 10:22 AM
To: Patrice McCarron
Cc: John Higgins; Colleen Coogan; Allison Henry; Michael Asaro
Subject: Re: Confirm gear determinations

Correct

On Thu, Aug 15, 2019 at 10:16 AM Patrice McCarron <patrice@mainelobstermen.org> wrote:

Can you explain what you mean by “nearby gear”.

I am asking about the basis of the US designation. I want to be sure I understand it. The condition of the carcass and the fact that it was anchored in place are the justification for the designation as US gear. This must mean that you have determined that the whale encountered that gear at or very close to the area where it was sighted; hence, it is US gear.

Do I understand this correctly?

From: David Morin - NOAA Federal <david.morin@noaa.gov>
Sent: Thursday, August 15, 2019 10:10 AM
To: Patrice McCarron <patrice@mainelobstermen.org>
Cc: John Higgins <john.higgins@noaa.gov>; Colleen Coogan <colleen.coogan@noaa.gov>; Allison Henry <Allison.Henry@noaa.gov>; Michael Asaro <Michael.Asaro@noaa.gov>
Subject: Re: Confirm gear determinations

Patrice,

The condition of the carcass, which indicated it was a recent entanglement, indicated the country of origin was U.S. We’ve never assigned gear type based on nearby gear. I never said anything about the state besides I cannot say it is MA.

On Thu, Aug 15, 2019 at 9:10 AM Patrice McCarron <patrice@mainelobstermen.org> wrote:

Thanks Dave. I guess that is part of my confusion, you say “We’ve never assigned an origin based on gear nearby.”

However, you (or someone) did assign an origin. The origin is “US”, the fishery/gear is “unknown”.
If the premise is that it is US gear because it was anchored in place, then doesn’t it hold true that this could not be Maine gear. The assumption is the entanglement happened in proximity to where it was found. Otherwise, it could have been gear from anywhere.

I am just trying to understand the rationale of the final designation for this case and its implications.

Thank you.

Patrice

From: David Morin - NOAA Federal <david.morin@noaa.gov>
Sent: Wednesday, August 14, 2019 10:28 AM
To: Patrice McCarron <patrice@mainelobstermen.org>
Cc: John Higgins <john.higgins@noaa.gov>; Colleen Coogan <colleen.coogan@noaa.gov>; Allison Henry <Allison.Henry@noaa.gov>; Michael Asaro <Michael.Asaro@noaa.gov>
Subject: Re: Confirm gear determinations

Scientific papers have different interpretations all the time. Very common. The gear team did not author this paper. We saw a draft but basically at the very end just before publication.

The necropsy report speculated as to the origin of gear and we did not author that report either. No gear was recovered or analyzed closely. All that exists for that case is the 4 photos I showed you. We've never assigned an origin based on gear nearby.

On Wed, Aug 14, 2019 at 10:12 AM Patrice McCarron <patrice@mainelobstermen.org> wrote:

I would also note that the first case is in the published literature and this paper has already been cited widely. I don't see how you can dismiss one finding from the paper and dismiss another.
Hi Dave

For the first one, there should be photos documenting the float buoys and line across the body. According to Allison, GARFO has those so she was not able to share them. I would appreciate if you would check your files and share those with me.

A follow up question for that case, if it was anchored in US waters, I assume the entanglement happened at that site so this would be attributed to Mass gear. I know there is no official designation for that but it is typically noted when that information is understood.

For the second case, NMFS determined "Monofilament mesh and line of unknown fishery and origin" in the entanglement report.

You have already confirmed that is the correct determination in a previous email. However, the spreadsheet codes it as unknown. My question is how does that error get corrected at NMFS?

Thanks again for your time.

Patrice
From: David Morin - NOAA Federal <david.morin@noaa.gov>

Date: 8/14/19 7:45 AM (GMT-05:00)

To: Patrice McCarron <patrice@mainelobstermen.org>

Cc: John Higgins <john.higgins@noaa.gov>, Colleen Coogan <colleen.coogan@noaa.gov>, Allison Henry <Allison.Henry@noaa.gov>

Subject: Re: Confirm gear determinations

Patrice,

E22-14 - Gear in proximity to a carcass that was no longer present is not enough for us to make a gear determination. I also have no evidence for "a line of floats lying along its body". However, due to the animal's anchored state we felt comfortable in calling it U.S. unknown gear. Naturally, it's possible someone had additional records to could change our determination but I don't have anything currently to change it.

E44-16 - That spreadsheet we provided to the TRT is not something we use, nor am I updating it. It was provided to the team to provide a simple one-time summary of all right whale cases. We do not code gear into categories for our determinations like that. I think partly what you're getting at is why didn't we call it gillnet? There was not enough evidence (no gear recovered, just photographs) to make that conclusion.

Best,

David

On Tue, Aug 13, 2019 at 10:00 PM Patrice McCarron <patrice@mainelobstermen.org> wrote:

Hi John and Dave

Higgy, great to see you tonight. Here’s the info on the cases I was asking about. I want to close the loop on the gear determinations. Once I’m clear on NMFS gear determination, I want to be sure I code it properly in the spreadsheet.
1. Case NMFS E22-14 (aka IFAW14-156Eg). This is coded as US unknown. Allison Henry said the documentation is from the Sharp et al, 2019 paper. The Sharp paper says:

“One of the unexamined entangled whales (IFAW14-156Eg) was possibly entangled and anchored in fixed gear south of Nantucket, MA, USA, based on the presence of a line of floats lying along its body, 2 endlines present in the initial report images, and a stationary position at sea for multiple days. This carcass could not be examined by responders due to poor weather. When conditions improved, fixed gear with large polyballs similar to that documented on the entangled whale were identified at the coordinates of the carcass, but the whale was no longer present.”

Allison said because it was there for two days in a row, it is deemed US gear. The necropsy report in the Sharp et al supplement says “Based on the presence of the line with float buoys along the body of the whale, the entanglement gear type was most likely gillnet” (attached, page 49). This is different than the findings in the entanglement report. Just want to confirm the gear determination for this whale since the necropsy says gillnet.

2. One of the “unknown” SIM whales from 2016 (NMFS E44-16) has an official finding in the entanglement report: Monofilament mesh and line of unknown fishery and origin”. Dave, you have already confirmed this finding with me. I just want to understand how you will code it in the spreadsheet so I can update mine.

Thank you!

Patrice
David Morin

Large Whale Entanglement Response Coordinator

Greater Atlantic Fisheries Regional Office

National Marine Fisheries Service, NOAA

Protected Resources Division

55 Great Republic Drive

Gloucester, MA 01930

O# 978-282-8472

C# 978-479-9727
From: David Morin - NOAA Federal <david.morin@noaa.gov>
Sent: Wednesday, August 14, 2019 10:11 AM
To: Patrice McCarron
Cc: John Higgins; Colleen Coogan; Allison Henry
Subject: Re: Confirm gear determinations
Attachments: Whale (1).jpg; Whale (2).jpg; Whale (3).jpg; Whale (4).jpg

E22-14 - That whale was spotted 36 NM south of Nantucket, so I don't think it is appropriate to call it MA gear. Especially since gear was not recovered or analyzed closely. Attached are photos.

That table will not be corrected. It was a one-time supplement for the TRT. GARFO makes the gear determination and our records and report have it correctly. I'm sure NEFSC will adjust their records to match. Please remember that the table was a combination of multiple sources and not surprisingly some differences showed up between those sources.

On Wed, Aug 14, 2019 at 9:53 AM Patrice McCarron <patrice@mainelobstermen.org> wrote:
Hi Dave

For the first one, there should be photos documenting the float buoys and line across the body. According to Allison, GARFO has those so she was not able to share them. I would appreciate if you would check your files and share those with me.

A follow up question for that case, if it was anchored in US waters, I assume the entanglement happened at that site so this would be attributed to Mass gear. I know there is no official designation for that but it is typically noted when that information is understood.

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You have already confirmed that is the correct determination in a previous email. However, the spreadsheet codes it as unknown. My question is how does that error get corrected at NMFS?

Thanks again for your time.
Patrice

Sent from my Verizon, Samsung Galaxy smartphone

-------- Original message --------
From: David Morin - NOAA Federal <david.morin@noaa.gov>
Date: 8/14/19 7:45 AM (GMT-05:00)
To: Patrice McCarron <patrice@mainelobstermen.org>
Cc: John Higgins <john.higgins@noaa.gov>, Colleen Coogan <colleen.coogan@noaa.gov>, Allison Henry <Allison.Henry@noaa.gov>
Subject: Re: Confirm gear determinations

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Best,
David

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Thank you!
Patrice McCarron
207-967-4555 (office) * 207-205-4544 (cell)

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Not a member? Join today! www.mainelobstermen.org

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David Morin
Large Whale Entanglement Response Coordinator
Greater Atlantic Fisheries Regional Office
National Marine Fisheries Service, NOAA
Protected Resources Division
55 Great Republic Drive
Gloucester, MA 01930
O# 978-282-8472
C# 978-479-9727

--
David Morin
Large Whale Entanglement Response Coordinator
Greater Atlantic Fisheries Regional Office
Patrice McCarron

From: Allison Henry - NOAA Federal <allison.henry@noaa.gov>
Sent: Tuesday, August 13, 2019 4:58 PM
To: Patrice McCarron
Subject: Re: questions on entanglement spreadsheet

There are a few guys on the gear team, but I'd start with David Morin.

Glad to be of help. Got your vacation bounce back. Enjoy your time off! I'm going on one soon myself. :)

Allison

On Tue, Aug 13, 2019 at 4:55 PM Patrice McCarron <patrice@mainelobstermen.org> wrote:
That makes sense. Do you know who at GARFO is responsible for gear determinations?

I really appreciate all of your help.

Patrice

Sent from my Verizon, Samsung Galaxy smartphone

-------- Original message --------
From: Allison Henry - NOAA Federal <allison.henry@noaa.gov>
Date: 8/13/19 4:28 PM (GMT-05:00)
To: Patrice McCarron <patrice@mainelobstermen.org>
Subject: Re: questions on entanglement spreadsheet

Hi, Patrice,

Glad you found it helpful. I am not the one who makes decisions about gear type or fishery. I rely on the gear analysts at GARFO to do that. My hands are already full with the injury and mortality component! When there isn't an identified fishery, in some cases we can assign it to at minimum a country based on things like freshness of carcass, weighted/anchored, sighting history, and/or proximity to EEZ among other details. I can't comment on whether or not it's Massachusetts gear and/or gillnet as that's not my area of expertise and suggest you pose these questions to GARFO.

Regarding cause of death - Since the carcass was not recovered and a necropsy was unable to be conducted, this is an event where we apply our Center's mortality criteria (see Caveats tab in that incident spreadsheet). This carcass fits #2 and #3 of the Table 2. entanglement mortality which is why we are considering it confirmed.

Best,
Allison

On Tue, Aug 13, 2019 at 3:59 PM Patrice McCarron <patrice@mainelobstermen.org> wrote:

The description in the Sharp report sounded like gillnet gear, and this supplement states it clearly, “Based on the presence of the line with float buoys along the body of the whale, the entanglement gear type was most likely gillnet.”
Two questions:

1. Since this whale is anchored and therefore considered to have been entangled in US gear, wouldn’t also be true that this was entangled in Massachusetts gear given its location?

2. Given the photographic evidence and description of the gear, shouldn’t this case be recorded as gillnet gear? The findings of the death are “probable”; it seems there is just as much probable evidence that the gear is gillnet gear.

I appreciate your time on this. Thank you.

Patrice

---

From: Allison Henry - NOAA Federal <allison.henry@noaa.gov>
Sent: Tuesday, August 13, 2019 3:32 PM
To: Patrice McCarron <patrice@mainelobstermen.org>
Subject: Re: questions on entanglement spreadsheet

Hi, Patrice,

Attached is Sharp's paper (if you don't already have it) and the supplemental material which provides more details on E22-14 (aka IFAW14-156Eg). Mendy and/or David should have the original images for this event. I only have ones already embedded in documents like Sharp's report.

Allison

---

On Tue, Aug 13, 2019 at 3:02 PM Patrice McCarron <patrice@mainelobstermen.org> wrote:

Hi Allison

I am interested in reviewing the necropsy report for this whale (E22-14). Can you send me a link or a copy of the report?
Also, I would like to view the photos of the anchored whale you reference, and are referenced in the Sharp report. Can you send those as well?

Thank you.

Patrice

---

From: Patrice McCarron  
Sent: Tuesday, August 06, 2019 4:14 PM  
To: Allison Henry - NOAA Federal <allison.henry@noaa.gov>  
Cc: David Morin <david.morin@noaa.gov>  
Subject: RE: FW: questions on entanglement spreadsheet

Yes, that explains the mismatch between the reports. I don’t have access to those necropsy reports.  
Thank you!

------------

Patrice McCarron  
Executive Director, Maine Lobstermen’s Association

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From: Allison Henry - NOAA Federal <allison.henry@noaa.gov>  
Sent: Tuesday, August 6, 2019 2:32 PM  
To: Patrice McCarron <patrice@mainelobstermen.org>  
Cc: David Morin <david.morin@noaa.gov>  
Subject: Re: FW: questions on entanglement spreadsheet

Hi, Patrice,

Michael Moore at WHOI created an investigation report with a timeline summary and other details. USCG originally reported it as a humpback on 9/27 and NMFS did not receive photos to confirm species as a right whale until later (GARFO can confirm date received. Distributed USCG images to response team on 10/2). A NMFS shorebird survey documented the carcass in the same position on the following day 9/28 and reported it on 9/29. Weather prevented a mounted response until 10/4.
Images show a fresh carcass with no signs of bloating or emaciation.

I hope that helps,

Allison

On Tue, Aug 6, 2019 at 2:10 PM Patrice McCarron <patrice@mainelobstermen.org> wrote:

Thanks for the prompt reply.

What is the source of info for E22-14? I only have access to the entanglement report which doesn’t match your notes.

The Entanglement report states: “USCG aerial survey sighted and documented the animal. Carcass was not reported until the next day and poor weather prevented an immediate search for the animal. A search conducted days later did not relocate the carcass.”

And concludes

**Gear Type:** Unknown

**Target Species:** Unknown

**Gear Description:** Red polyball and line visible. Wraps around the right flipper and line is seen laying across the head and body. Polyball on the ventral side of the whale.

**Comments:** Photographs do not show any distinguishing characteristics or markings to conduct detailed gear analysis. Conclusions: Wraps around the right flipper are visible and line is seen laying across the head and body. Polyball on the ventral side of the whale. Gear of unknown origin.

*****************

Patrice McCarron

Executive Director, Maine Lobstermen’s Association
Hi, Patrice,

Just back in the office after many days of flying. I'll start with these two cases you asked about specifically and then go back through the email thread to see if I need to chime in elsewhere.

E22-14: we have as US since carcass appeared to be anchored/weighted in position. Sharp et al 2019 has Proximate COD = acute entanglement and Ultimate COD = probable drowning/asphyxiation. So, most parsimonious that it was an acute event in US waters, rather than a chronic one of unknown origin.

Regarding RW 3993 and RW unknown in 2011 - I have no genetic results. Let me check in with the folks at NEA and see if there's anything new on that front.

Cheers,
Allison

On Tue, Aug 6, 2019 at 1:42 PM Patrice McCarron <patrice@mainelobstermen.org> wrote:

Hi Allison

Are you able to provide information on these two right whale cases? It is regarding the information in the spreadsheet distributed by NMFS for the TRT meeting:

It’s at this link: https://www.greateratlantic.fisheries.noaa.gov/protected/whaletrp/trt/meetings/2020/19_april_2019_trt_meeting.html, entitled “2000-2018 Right Whale Incident Data 03/19/2019”

I’m sure you have seen the thread that I emailed Dave, but he singled out these two that you may be able to answer:
9/27/2014, RW unknown, E22-14 states “gear of unknown origin”; NMFS entanglement spreadsheet has gear origin “US”. Shouldn’t this be “first seen in US” and not confirmed in US gear?

2/13/2011, RW 3993 and 3/16/2011, RW unknown. These were potentially the same whale, pending genetic analysis. What were the results of this? Should this be one record or two?

Thank you.

Patrice

***************

Patrice McCarron

Executive Director, Maine Lobstermen’s Association

---

From: David Morin - NOAA Federal <david.morin@noaa.gov>
Sent: Monday, August 5, 2019 3:41 PM
To: Patrice McCarron <patrice@mainelobstermen.org>
Cc: Allison Henry <Allison.Henry@noaa.gov>; Colleen Coogan <colleen.coogan@noaa.gov>; Mark Minton <mark.minton@noaa.gov>; John Higgins <john.higgins@noaa.gov>; Michael Asaro <Michael.Asaro@noaa.gov>
Subject: Re: questions on entanglement spreadsheet

No. What I’m saying is when I keep track of entanglement cases, I only include cases where gear was documented on the animal. Cases where entanglement trauma was the only indication, or entrapments such as weirs, NEFSC also includes those cases as they are needed for SI determinations.

The spreadsheet was meant to give the TRT a general summary of cases and like I stated, not surprisingly, there are some errors that slipped through the cracks from such large multiple data sets. My understanding is we are not providing that spreadsheet on a periodic basis, it was rather meant as a one-time product. Determinations often change as new information comes forward. Feel free to update your version as you see fit.

On Mon, Aug 5, 2019 at 3:32 PM Patrice McCarron <patrice@mainelobstermen.org> wrote:

Thanks Dave

Believe me, I understand the confusion surrounding keeping this all straight.
Are you saying that those first 6 cases should NOT be included in the entanglement records? I know one is listed as an SI. Just want to be clear.

Regarding the second set of whales, you have confirmed that case E44-16 should be “monofilament mesh and line”. However the entanglement spreadsheet has it listed as “gear unknown”. It seem that this field should be updated on that spreadsheet to MF or NE or something to reflect that information. Is this correct?

***************

Patrice McCarron  
Executive Director, Maine Lobstermen’s Association

From: David Morin - NOAA Federal <david.morin@noaa.gov>  
Sent: Monday, August 5, 2019 3:20 PM  
To: Patrice McCarron <patrice@mainelobstermen.org>  
Cc: Allison Henry <Allison.Henry@noaa.gov>; Colleen Coogan <colleen.coogan@noaa.gov>; Mark Minton <mark.minton@noaa.gov>; John Higgins <john.higgins@noaa.gov>; Michael Asaro <Michael.Asaro@noaa.gov>  
Subject: Re: questions on entanglement spreadsheet

That spreadsheet was mostly NEFSC SI database, with some gear information provided by me. Naturally, as soon as a database is created it is already out of date. It is very difficult to keep track of all these cases and not surprisingly when multiple sources are used to compile data some errors or confusion occurs, especially for old cases

I'm only commenting on the gear aspect of the cases you have listed. NEFSC might be able to provide more comments.

E03-03 - No gear present

E04-05 - Unclear if entangled or just scars

E06-06 - No gear present

7/05/15 - Herring weir - I don't count these as entanglements in my data

3/01/17 - No gear present

E07-13 - Unclear as to the Cause of Death
E44-16 - Our gear report conclusion (this is the official gear determination) - "Monofilament mesh and line of unknown fishery and origin".

4/16/15 - Without knowing the details... likely the animal does not have enough information to assign it a catalog number, but can be identified in certain scenarios.

9/04/14 #4001 - No, 1st entangled sighting is in Bay of Fundy. General assumption is right whales can easily travel 50 miles a day. 2 weeks is plenty of time for it to come from U.S.

E22-14 - NEFSC will have to comment on.

2/13/2011, RW 3993 and 3/16/2011, RW unknown - NEFSC will have to comment on.

6/27/2010 - Not sure what happened with this one. Gear appeared to be recovered from necropsy. I believe I have some photos of the gear, but will need the gear team to check the warehouse to confirm. By the pictures, it is a mesh, but not monofilament, although again I’m not sure this is the correct associated gear. **Hig and Mark - please check j062610**

On Mon, Aug 5, 2019 at 12:52 PM Patrice McCarron <patrice@mainelobstermen.org> wrote:

Hi Dave

I’ve finally had time to go through the whale spreadsheet you provided in April. I have a few questions.

Based on my records, you are missing several entanglements:

E03-03 (SI 0.75)

E04-05

E06-06

7/5/2015, RW4140 in a herring weir fishery, NFS

3/1/2017, 2479 in CCB, NSI healing injury, no gear present

E07-13, whale was found dead, but is listed as NS

Can you let me know if these should or should not be included as part of the entanglement database?
Questions on Whales with SI/M

E44-06, 12/4/2016, RW 3405, NMFS entanglement report states “monofilament mesh and line of unknown fishery and origin”; NMFS entanglement sheet has gear type unknown; Why isn’t this recorded as “netting” or “gillnet” with fishery and origin unknown?

4/6/2015, RW CT04CCB14, how does this case have an incident on or before date recorded if the whale is not in the RW catalog?

9/4/2014, RW 4001, This whale has an incident date on or after 8/20/20104. This is only 2 weeks. Could this be assumed to be likely entangled in CN gear?

9/27/2014, RW unknown, E22-14 states “gear of unknown origin”; NMFS entanglement spreadsheet has gear origin “US”. Shouldn’t this be “first seen in US“ and not confirmed in US gear?

2/13/2011, RW 3993 and 3/16/2011, RW unknown. These were potentially the same whale, pending genetic analysis. What were the results of this? Should this be one record or two?

6/27/2010, RW 1124, “carcass has net marks suggesting drowning from gear entanglement”. Is this evidence of netting or gillnet involved?

Thanks.
Patrice

***************
Patrice McCarron
Executive Director, Maine Lobstermen’s Association
President, Maine Lobstermen’s Community Alliance
207-967-4555 office * 207-205-4544 cell
2 Storer St, Suite 2013, Kennebunk, ME 04043

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David Morin

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David Morin

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National Marine Fisheries Service, NOAA
Protected Resources Division
Allison Henry
Fishery Biologist
NOAA Fisheries
Allison.Henry@noaa.gov
508.495.2048
http://www.nefsc.noaa.gov/psb/
Addendum 3 to MLA
Proposed Rule
Comments
Dear Mr. Oliver:

I am writing to inform you that Maine’s five lobster industry members of the Atlantic Large Whale Take Reduction Team (TRT) are forced to withdraw support for the near-consensus agreement reached during the April 2019 TRT meeting due to serious flaws in the data presented to the TRT and in how the process was conducted. NMFS’ failure to present data fully and accurately led the TRT to an outcome that is in conflict with available data.

Substantive errors in NOAA Fisheries’ (NMFS or the Agency) data and its last-minute announcement of a U.S. risk-reduction target that was fully assigned to the Northeast lobster fishery led the TRT to work with an erroneous assumption about the relative risk to North Atlantic right whales from that fishery and discount the relative risk posed by other sources.1 As a result, the Agency’s current rulemaking does not address the full scope of known human causes of decline in the species and will be insufficient to reverse the right whale population’s downward trend.

Following the TRT meeting, MLA undertook a careful review of data available from the Agency, due to unresolved concerns with the timeliness and accuracy of information provided to TRT members.2 3 Our review revealed substantive errors in NMFS data and the omission of critical information that shows a

2 MLA expressed significant concerns prior to, during and since the April 2019 meeting. See, e.g., MLA letter to Michael Pentony, GARFO on 4/22/2019.
“distinctly different understanding of relative risk” posed by Northeast lobster fishing gear to right whales.⁴

Specifically, and as discussed in more detail below, the NMFS data contained errors that significantly impact our understanding of human causes of serious injury and mortality to right whales. The corrected data show that gillnet gear and netting play a much larger role in entanglement cases than was previously understood. Further, NMFS’ failure to investigate a pronounced increase in observations of unknown gear, particularly the increase in cases since 2015 with no gear present, leaves significant unanswered questions about the responsibility of Canadian fisheries for these entanglements. As a result, the data presented to the TRT and fishing industry erroneously overstate the share properly attributable to the Northeast lobster fishery and downplay the role of other gears in right whale serious injury and mortality.

The MLA’s analysis found that gillnet and netting gear were the most prevalent gear (other than Canadian snow crab gear), and the Northeast lobster fishery (and the Maine lobster fishery in particular) were the least prevalent in right whale entanglements from known causes. This finding means the 60% conservation target stipulated by the Agency and allocated solely to the Northeast lobster fishery is unsupported by the best available data, and any package of remedial measures designed to meet it cannot credibly generate the conservation benefits anticipated. At a minimum, the U.S. risk reduction target must be shared amongst the fisheries contributing to entanglement.

Furthermore, the MLA’s findings reveal evidence — also not presented to the TRT — that the current Take Reduction Plan is working. Since the plan was amended in 2009 and 2014, there has been a strong downward trend in the incidence of entanglement cases involving U.S. lobster gear, from seven cases prior to 2010 to only one case — a non-serious injury in Massachusetts lobster gear — since then. The data show only one confirmed right whale entanglement in Maine lobster gear, which dates back to 2002, with no known serious injuries or mortalities attributable to that gear. NMFS’ data also show that ropes removed from right whales in recent years are not representative of ropes used in Maine’s lobster fishery.⁵

Based on these findings, the MLA has grown even more concerned that the TRT deliberations were conducted without sufficient data from the agency to inform its efforts to select appropriate mitigation measures that address risk.⁶ In short, the rules proposed are misaligned and too narrow in scope to effectively protect right whales.

MLA’s findings further reinforce our agreement with Governor Mills’ expressed concern over the “disturbing lack of evidence connecting the Maine lobster industry to recent right whale deaths” and her directive to Commissioner Keliher “to evaluate a risk reduction target for Maine that is commensurate to any actual risk posed by the Maine lobster industry.”

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⁴ Page 7 of the draft April 2019 TRT meeting summary states, “A broad-based recommendation that the Agency/Team revisit the Team’s recommendations if revisions to the model suggest: (1) a distinctly different understanding of relative risk....”

⁵ Since 2010, larger diameter ropes of ½” or greater represent 79% of the gear removed from entangled whales. Maine DMR research has determined that 92% of Maine lobstermen fish with smaller diameter ropes.

⁶ MLA scoping statement presented at NMFS Scoping Meetings on August 12, 13, 14 and 15.
Given the significance of the deficiencies identified, the MLA and Maine’s five lobster industry TRT members can no longer adhere to the outcome of the April 2019 TRT meeting. The MLA cannot responsibly recommend its members undertake changes in fishing practices when whales may continue to become entangled in fishing gear, such as gillnets, which are not included in the current rulemaking. The MLA stands ready to implement new conservation measures in the Maine lobster fishery to protect right whales but must have assurances that the Agency is adequately addressing all known human-caused threats to right whales and that the science indicates proposed conservation measures are likely to further the goal of species recovery.

The MLA calls for the Agency to publish a thorough analysis of its own data regarding known sources of entanglement risk to right whales and conduct a new analysis of the risk reduction target, including the new information identified by the MLA. The Agency should then re-convene the TRT so it can appropriately advise the Agency on effective management approaches to aid in the species recovery based on a comprehensive understanding of known entanglement threats.

The remainder of this letter will identify specific concerns that need to be addressed in order to achieve that goal.

1. **NMFS’ Technical Memorandum Erroneously Assumed the Northeast Lobster Fishery is the Most Significant Human Cause of Serious Injury and Mortality**

In September 2018, NMFS issued a Technical Memorandum entitled “North Atlantic Right Whales – Evaluating their Recovery Challenges in 2018”. As MLA articulated during the October 2018 TRT meeting, the memo wrongly forced TRT members to presume, for purposes of their deliberations, that the Northeast lobster fishery presents the most significant human cause of right whale serious injury and mortality without evidence to support that assumption.

NMFS’ reliance on the September 2018 Technical Memo distracted the Agency from fully considering the best available data from its entanglement database. NMFS did not adequately analyze its data on human-caused serious injury and mortality so the TRT did not have the benefit of reliable information to accomplish its task. NMFS’ failure to present data fully and accurately led the TRT to an outcome that is in conflict with available data.

Maine DMR wrote to the Northeast Fisheries Science Center (NEFSC) on October 3, 2018 stating its concern that the memo is “based on conjecture, without sound scientific basis” and that “the net result of the oversimplified picture painted by this Memo is likely to be regulations imposed on a fishery or in an area that will result in very little conservation benefit for the right whale”. To date, the memo has not been withdrawn or substantively updated and thus remains a source of misinformation on the challenges facing North Atlantic right whales. The MLA urges NMFS to withdraw the technical memo and conduct a thorough, accurate review of data on known human causes of serious injury and mortality.

NMFS must also correct its presentation of data on entangled right whales. Since the release of the technical memo, NMFS has consistently implied that serious injury and mortality from the Northeast lobster fishery exceeds Potential Biological Removal (PBR), even though this assertion is not supported by the data. The Agency has repeatedly – at the TRT and elsewhere – presented a graph of

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8 Maine DMR letter to Dr. Jon Hare, NEFSC on October 3, 2018.
entanglements first sighted in U.S. waters as *de facto* evidence that U.S. fishing entanglements exceed PBR.\(^9\) Given that the rulemaking process addresses only the Northeast lobster fishery, the public assumes these entanglements result from that fishery. Further, it is well understood that the initial sighting location of an entangled whale is not indicative of where an entanglement occurred. For example, of the 16 entanglements confirmed in Canadian fishing gear since 2014, four were first sighted in U.S. waters. NMFS also continues to present a misleading map from the technical memo depicting cases where the location of the entangling fishing gear is known.\(^10\) This includes 10 entanglement cases in U.S. lobster gear, eight of which occurred prior to the 2009 and 2014 amendments to the Take Reduction Plan. The two cases since then were in Massachusetts lobster gear and were successfully disentangled. In fact, other than two cases from Canada, none of the entanglements depicted resulted in right whale serious injuries or mortalities.

The cumulative result of misinformation in the technical memo and NMFS’ other data presentations was to create the erroneous inference that the Northeast lobster fishery is the most significant threat to right whales as the basis for the TRT deliberations. Because of this error, the TRT decision-making process was not based on data most relevant to the task of selecting management measures appropriate to address risk.

2. **NMFS’ Stipulated 60% Risk Reduction Target is Inconsistent with its Own Data and was Imposed Without Consultation with the TRT**

The MLA supports the development of a risk reduction target because it is necessary to gauge the effectiveness of proposed management measures intended to aid in the recovery of right whales. Given the high level of uncertainty surrounding sources of human-caused right whale serious injury and mortality, an effective risk reduction target must be informed by the best available data. NMFS has not acted in accordance with these principles.

On April 5, 2018, NOAA Fisheries issued a press release to TRT members stating “we believe that to achieve this goal [to reduce right whale serious injury and mortality to below PBR], mortalities and serious injuries in U.S. fisheries will likely need to be reduced by 60 to 80% from current levels.”\(^11\) The Agency provided neither documentation on the data and methodology used to calculate the risk reduction goal nor an opportunity for the TRT to offer input on the target.

The MLA — and other members of the TRT — raised questions with the Agency on the assumptions used to set this risk reduction target.\(^12\) \(^13\) Despite its initial statement that “mortalities and serious injuries in U.S. fisheries will likely need to be reduced by 60 to 80% from current levels” *(emphasis*

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\(^9\) NMFS has presented this information on multiple occasions to the New England Fishery Management Council, Atlantic States Marine Fisheries Commission, Take Reduction Team, August 2019 scoping meetings, and others. See e.g. in Appendix 9.

\(^10\) Ibid.

\(^11\) *Take Reduction Target Letter April 5, 2019* is located at [https://www.greateratlantic.fisheries.noaa.gov/protected/whaletrp/trt/meetings/April%202019/06_take_reduction_target_letter_april52019.html](https://www.greateratlantic.fisheries.noaa.gov/protected/whaletrp/trt/meetings/April%202019/06_take_reduction_target_letter_april52019.html)


\(^13\) For similar reasons, the MLA also objected to the inclusion of the Maine lobster fishery as a Category I fishery under the Marine Mammal Protection Act in the 2019 List of Fisheries. See, e.g., MLA comments to Shannon Bettridge on 11/23/2018 in response to 83 FR 53422, October 23, 2018.
added), the Agency declined to engage in dialogue or entertain input to revise the target. NMFS’ only explanation of the goal appears in an email responding to MLA’s questions, which NMFS then sent to the TRT.\textsuperscript{14}

In order for whale conservation measures to be effective, the risk reduction target must be derived from review of data showing the impact of all fisheries known to contribute to risk and must accurately reflect the risk posed by each fishery. The best way to establish such a target is not to adopt it by fiat and press release, but rather to develop it through a collaborative process with the Agency and members of the TRT using the best available data on all involved fisheries.

Based on MLA’s review of the data, the Agency’s designated risk reduction target has several significant flaws.

1. NMFS inappropriately assigned the full responsibility for the U.S. risk reduction to the Northeast lobster fishery, ignoring the risk posed by other U.S. fixed gear fisheries, including gillnets and trap/pot fisheries in the mid-Atlantic and south-Atlantic.

2. NMFS incongruously apportions serious injury and mortality from unknown gear equally between the U.S. and Canada. The Agency ignores known serious injury and mortality rates for U.S. and Canadian fisheries when apportioning these to each country. Further, NMFS assigns full responsibility for the U.S. portion of these to the Northeast lobster fishery, ignoring the risk posed by other U.S. fixed gear fisheries.

3. NMFS did not conduct an analysis of trends in serious injury and mortality from unknown gear, such as the recent increase in cases with no gear present, to inform its allocation of these to each fishery and country.

If risk is not effectively addressed where it occurs, the U.S. management plan cannot effectively recover the species.

In order to establish a target based on the best available data and evidence, NMFS must evaluate the relative risk from all known causes of harm, taking into account what is known about entanglement. MLA’s analysis of NMFS’ data (2010-2018) reveals a striking hierarchy of serious injury and mortality to right whales from known human causes, with the Canadian snow crab fishery accounting for 31%, gillnet and netting gear representing 13%, unknown trap/pot gear representing 4% and U.S. trap/pot gear representing 4%. U.S. and Canadian vessel strikes account for the remaining 48%. There are no known cases involving Northeast lobster gear.\textsuperscript{15}

A significant challenge in reducing entanglement risk is how to address the many entanglement cases where the origin of the gear is not known. While reliance on assumptions remains necessary, these assumptions must be informed by the best available data. Consideration of known causes of serious injury and mortality and deeper analysis of trends in unknown gear must be paramount considerations. The MLA identified a pronounced and increasing trend in NMFS’ data on gear of unknown origin, with the proportion of cases with no gear present increasing significantly beginning in 2015.\textsuperscript{16} This is

\textsuperscript{14} NMFS email to TRT on 4/18/2019.
\textsuperscript{15} See graph of all known human causes in Appendix 15.
\textsuperscript{16} See graph of Entanglement Serious Injury and Mortality, with unknown gear broken out to show cases with no gear present in Appendix 16.
coincident with the shift in large numbers of right whales to the Gulf of St. Lawrence and the significant increase in the incidence of right whale entanglements in Canadian snow crab gear.\footnote{See https://www.nefsc.noaa.gov/psb/surveys/MapperiframeWithText.html; See table of increase in Canadian snow crab entanglements and 2014 to 2019 Gulf of St. Lawrence sightings charts in Appendix 17.}

Under NMFS’ approach, this significant spike in unknown gear incidents remains unexplained and is arbitrarily split equally between the U.S. and Canada, with the U.S. portion attributed exclusively to the lobster fishery. NMFS has failed to provide a rational explanation for this split, which over-weights the contribution of U.S. gear during a time when whales are known to have spent increasing periods in Canadian waters and virtually all entanglements were known to be from Canadian gear.

The result is that NMFS’s risk reduction target will not achieve its intended result to reverse the right whale population decline. The Agency must reconsider this goal to address its flawed assumptions and omission of consideration of risk posed by other U.S. fixed gear fisheries.

The MLA understands there are data challenges that complicate assignment of risk associated with unknown gear. To help close the knowledge gap, the MLA proposes, for its part, to expand and uniquely mark Maine lobster fishing gear for Maine’s lobster fishery and to introduce gear marking in Maine’s exempted waters. The MLA urges NMFS to pursue a similar strategy in other fisheries so the Agency and the TRT will have the benefit of best available information on the origin of unknown gear.

3. **NMFS data contained substantive errors which render the Agency’s management priorities flawed**

In its review of NMFS’ data, MLA noted two cases with substantive errors that led the TRT to conduct its work without an accurate understanding of the role of Northeast lobster fishery and other gears in right whale serious injury and mortality.

Right whale 3405 (NMFS E44-16), which was found entangled in 2016, was determined to have been entangled in monofilament mesh and line of unknown origin. However, the pro-rated serious injury (0.75) was attributed in the 2018 right whale stock assessment to unknown gear and, therefore, is not accurately represented in NMFS’ data. After persistent requests by MLA, this error was acknowledged by the Northeast Fisheries Science Center (NEFSC) on August 15, 2019, nearly four months after the TRT meeting.\footnote{Emails from MLA to D Morin (GARFO) and A Henry (NEFSC) response to MLA on 8/15/2019.}

NMFS’ data also incorrectly categorizes a mortality case involving the floating carcass of an unknown right whale (NMFS E22-14) found in 2014. The whale was determined to have perished due to entrapment in fishing gear. Investigation of this case revealed that the stationary position of the whale, 36 nm south of Nantucket, and the fresh nature of the carcass led NMFS to determine that it was entangled in unknown U.S. fishing gear. Questioning by MLA confirmed that these circumstances rule out Maine as a source of the entangling gear.\footnote{Emails from D Morin (GARFO) to MLA on 8/15/2019 and A Henry (NEFSC) to MLA on 8/13/2019.} The necropsy findings recently published in *Diseases of...*
Aquatic Organisms concluded that “[b]ased on the presence of the line with float buoys along the body of the whale, the entanglement gear type was most likely gillnet”.  

This means that the only documented serious injury or mortality known to have occurred in U.S. fishing gear did not originate from Maine and likely resulted from gillnet gear, not lobster gear. In view of these findings, the MLA asks NMFS to reconsider the gear designation in this case due to the conflicting determinations between NMFS and the necropsy results on the entangling gear. The MLA concurs with the necropsy team, based on the photos of the right whale and the gear located at the entanglement site, that the entanglement gear was most likely gillnet.

These findings fundamentally change our understanding of the relative role of gillnet and trap/pot gear in right whale serious injury and mortality and demonstrate that the TRT’s advice does not address the primary cause of documented risk arising from U.S. fishing gear.

4. **NMFS Used a “Decision Support Tool,” Still in Development and Not Peer-reviewed, as the Basis of the TRT’s Recommendations**

The MLA fully supports the use of a model to assess the risk of right whale entanglement, spatially and temporally, to guide the development of effective management approaches to protect right whales. Such a tool must adequately characterize fisheries that have the potential to interact with right whales, the unique threat posed by varying gear types and configurations, and whale density and behavior. The NEFSC has done an admirable job in developing a decision support tool, however, the tool is still under development and is not yet ready to be used for reliable quantitative assessment of the effectiveness of proposed management measures.

NMFS announced its nascent decision support tool just one week before the April 2019 TRT meeting. This resulted in confusion among TRT members and inadequate time to understand the data and assumptions that serve as the basis for the tool. TRT members were required to use the tool to assess the effectiveness of management scenarios in achieving the stipulated minimum 60% risk reduction and, at the same time, were told to use the model’s output only as guidance.

During the TRT meeting, it became clear that while the tool holds promise to assess right whale management approaches, it has many limitations. The tool contains three inputs: fishing effort data, whale density data and an assessment of the risk of varying lobster gear, which are given equal weight. TRT members voiced many concerns with each of these components, which are contained in the draft meeting summary of the TRT meeting.

The MLA believes the data and design of the decision support tool must be significantly improved. The whale model portion of the tool was developed for U.S. Navy applications and does not adequately characterize whale density in important fishing areas. Since 2010, more than half the right whale mortalities have been cause by entanglement in gillnet gear.


21 See email from M Moore (WHOI) to MLA and necropsy timeline and information on 8/21/2019.

22 The decision support tool was introduced to the TRT on April 16, 2019 via a two hour webinar. Materials located at: https://www.greateratlantic.fisheries.noaa.gov/protected/whaletrp/trt/meetings/April%202019/02_presentation_on_risk_reduction_tool.html
population has been regularly sighted feeding in Massachusetts in and around Cape Cod Bay and in a significant new habitat south of Nantucket. As dense aggregations of right whales have increased in Massachusetts waters, the number of right whales detected along the Maine coast has declined, facts not adequately captured in the model's inputs. In fact, the whale model does not include data on the newly identified habitat around Nantucket, contains limited whale data on the Gulf of Maine and does not include any whale density data for coastal Maine. The tool cannot accurately reflect the risk of various fisheries to right whales unless these data issues are resolved.  

Furthermore, the whale model does not allow whale distribution patterns to be considered by year, particularly before and after 2010, when whale distribution patterns shifted significantly. This masks the risk to right whales in current high use habitats where they did not have a significant presence prior to 2010. NMFS has stated that this issue will be addressed in October 2019, but it will not be available in time to analyze options in the Draft Environmental Impact Statement. The whale model also does not weight the risk of an entanglement based on the whale's behavior, such as feeding versus transiting, an important consideration in assessing entanglement risk. The MLA is concerned that without addressing these deficiencies, the decision support tool cannot effectively assess proposed management approaches. Due to these and other concerns, the TRT has asked that the tool be peer-reviewed before it is used to assess options, and further that the TRT have input into the Terms of Reference.

In developing the decision support tool, the NEFSC developed a gear “severity index” to determine the risk of various gear types that may be encountered by a right whale. NMFS developed this index by polling TRT members on the risk of certain lobster gear configurations. The index accounts for one-third of the assessment tool input. TRT members raised strong concerns with this approach, in part because the results of the exercise significantly impact the assessment of management approaches such as weak rope.

The MLA remains concerned that the responses to the poll were analyzed by caucus, resulting in a lower weight to votes from fishing industry members, who are the most knowledgeable about fishing gear, and higher weights to votes from all other TRT members. While NOAA Fisheries has pledged to revisit this methodology, the TRT has not received any updates on its progress. The MLA is also concerned that the severity index considers only lobster gear.

NMFS continues to publish broadly the preliminary results of the tool’s assessment of management scenarios presented to the TRT as the basis for developing rules, even though it has conceded that the tool remains under development and has not been peer reviewed. This has created confusion among industry members about the effectiveness of management measures proposed by various jurisdictions.

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23 See [https://www.greateratlantic.fisheries.noaa.gov/protected/whaletrp/trt/meetings/April%202019/narwdensitymodel.mp4](https://www.greateratlantic.fisheries.noaa.gov/protected/whaletrp/trt/meetings/April%202019/narwdensitymodel.mp4) and [https://www.greateratlantic.fisheries.noaa.gov/protected/whaletrp/trt/meetings/April%202019/17_model_documentation.html](https://www.greateratlantic.fisheries.noaa.gov/protected/whaletrp/trt/meetings/April%202019/17_model_documentation.html).

24 See email from C Coogan on 4/7/2019 regarding the development of the severity index.

25 Maine’s TRT members requested data on the number of respondents in each caucus. While data was not provided, S Hayes (NEFSC) stated during the TRT meeting that the fishing caucus had roughly double the number of respondents compared to all other caucuses which were equal. Also see slides 10 and 12 in [https://www.greateratlantic.fisheries.noaa.gov/protected/whaletrp/trt/meetings/April%202019/Meeting%20Materials/overview_of_relative_risk_reduction_decision_support_tool_04_23_2018.pdf](https://www.greateratlantic.fisheries.noaa.gov/protected/whaletrp/trt/meetings/April%202019/Meeting%20Materials/overview_of_relative_risk_reduction_decision_support_tool_04_23_2018.pdf).

as the industry weighs in on the scope of rulemaking. MLA objects to the use of the model’s assessment results until the infirmities identified above have been resolved.

5. **NOAA Fisheries Asserted Pressure to Reach Consensus to Avert Threat of a Jeopardy Finding in Pending Biological Opinion**

TRT members were pressured to reach a consensus agreement for measures that address risk to the Northeast lobster fishery under a threat that the April 2019 TRT meeting would provide the only opportunity for members to guide right whale risk reduction measures due to the pending Biological Opinion for the American Lobster Fishery. Based on our data analysis, the gillnet fishery is a significant source of risk and should be required to identify management measures to avert a jeopardy finding in its pending Biological Opinion.

The TRT did not discuss this because NMFS has effectively placed the full burden of the U.S. risk reduction on the Northeast lobster fishery. It has further failed to adequately review and discuss other human-based causes of right whale serious injury and mortality with the TRT. The MLA strongly urges NMFS’ Section 7 team undertaking the Biological Opinions for the American Lobster and Batched Fisheries to incorporate the new data discovered by MLA into the ongoing analysis.

6. **The Right Whale Decline is Part of a Larger Problem**

NMFS’ data and other recent scientific work indicate that the right whale population decline, including its deteriorating health and reproductive success, is driven by changing environmental conditions, resulting in a dramatic shift in right whale distribution and migratory patterns.27

The data are clear that Canadian entanglements and vessel strikes are now the most significant cause of right whale serious injury and death because right whales are spending significantly more time in Canada’s largely unregulated waters. There have been eight right whale deaths and three new entanglements in Canadian waters already this year.28

The MLA was disturbed to learn NMFS’ data show that since 2009, when the Take Reduction Plan required changes in lobster fishing practices and the U.S. ship strike plan was implemented, more right whales have been struck by U.S. ships than have been entangled in U.S. fishing gear. According to the 2018 right whale stock assessment, serious injury and mortality from U.S. ship strikes was 0.81 and U.S. entanglement was 0.4. In fact, U.S. (31%) and Canadian (17%) vessel strikes now account for 48% of known human-caused serious injury and mortality (2010-2018).29 NMFS has not acknowledged the ongoing contribution of ship strikes to right whale serious injury and mortality, but instead has brought attention only on the Northeast lobster fishery.30 The MLA is not aware of any planned rulemaking to address the risk to right whales due to U.S. ship strikes and urges the Agency to address this issue promptly.

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28 See 2019 Canadian Right Whale Incidents.
29 See Summary of U.S. Ship Strike Incidents.
30 See e.g., NMFS slide from 8/12/2019 Machias, ME scoping meeting.
The MLA is also concerned that NMFS is not objecting to other threats to right whales and their habitat such as seismic testing, offshore wind developments and offshore aquaculture. MLA believes it is arbitrary to focus conservation efforts so disproportionately on the lobster fishery, which has a demonstrated track record of implementing measures to protect endangered whales, while taking no action with respect to emerging threats to right whales and their habitat. These threats must be considered if we hope to have success in achieving long-term recovery of the species. If they are not addressed, the actions taken by fishermen will have no chance of success.

7. Moving Forward

The MLA remains committed to do its part to aid in the recovery of right whales. Since NMFS formed the Atlantic Large Whale Take Reduction Team (TRT) in 1997, MLA has been a full partner in working to reduce harm to large whales from entanglement in U.S. fishing gear. The MLA strongly supports measures to further our understanding of right whales and the risks they face. These measures include expanded and unique gear marking for Maine, 100% harvester reporting, vessel monitoring in federal waters, investment in the development of a tagging device to improve data on right whale distribution, increased right whale surveillance in regulated waters, stable funding for long-term plankton monitoring and development of right whale habitat suitability models.

While the MLA supports requiring gear marking on vertical lines in Maine’s exempted waters, our support is conditional on it being implemented by the state of Maine. The MLA will not support including this measure as part of the Take Reduction Plan as we remain strongly opposed to the expansion of any Take Reduction Plan measures into Maine’s exempt waters.

The MLA stands ready to work with NMFS, the TRT, the state of Maine and our members to identify measures that address the actual risk that the Maine lobster fishery poses to right whales. For the amendments to the Take Reduction Plan to be effective, the process must be based on sound science and carefully vetted data analysis that identifies actual risk to endangered whales.

Maine cannot stem the decline of the right whale population on its own. Maine’s lobstermen believe it is past time for all stakeholders in the effort to ensure a thriving future for right whales to examine and address the multiple stressors and threats to the species that occur outside of our waters.

Thank you.

Sincerely,

Patrice McCarron
Executive Director

Cc:
President Donald J. Trump (via Alexander Willette, Executive Office of the President)
Senator Susan Collins (via Cameron O’Brien)

31 See e.g., C Oliver testimony before Committee on Natural Resources, Subcommittee on Water, Oceans and Wildlife, U.S. House of Representatives on 3/19/2019.
Senator Angus King (via Peter Benoit)
Representative Chellie Pingree (via Kimber Colton and Rhiannon Hamspan)
Representative Jared Golden (via Eric Kanter)
Governor Janet Mills (via Thomas Abello)
Patrick Keliher, Commissioner, Maine Department of Marine Resources
Stuart Levenbach, Chief of Staff, NOAA
Sam Rauch, Deputy Assistant Administrator for Regulatory Programs, NOAA Fisheries
Donna Wieting, Director, Office of Protected Resources, NOAA Fisheries
Catherine Marzin, Deputy Director, Office of Protected Resources, NOAA Fisheries
Shannon Bettridge, Chief, Marine Mammals and Sea Turtles, Office of Protected Resources, NOAA Fisheries
Angela Somma, Chief, Endangered Species Conservation, Office of Protected Resources, NOAA Fisheries
Michael Pentony, Regional Administrator, GARFO
Mark Murray-Brown, Section 7 Coordinator, GARFO
Michael Asaro, Marine Mammal and Sea Turtle Branch Chief, GARFO
Colleen Coogan, Marine Mammal Take Reduction Team Coordinator, GARFO
Atlantic Large Whale Take Reduction Team members (via Colleen Coogan, GARFO)
Addendum 4 to MLA
Proposed Rule
Comments
Addendum 4 to MLA Proposed Rule Comments

Addendum 4: Survey Results of Maine Lobstermen

MLA conducted a survey of participants in the Maine lobster fishery from February 23 to February 26. 146 responses were received, though not all respondents answered all of the questions. Most respondents had a federal permit, and nearly 30 percent would be directly affected by the proposed LMA1 closure.

Table 1
Characterization of respondents to MLA survey

<table>
<thead>
<tr>
<th>Zone</th>
<th>#</th>
<th>Percent</th>
<th>Federal permit</th>
<th>Fish LMA1 RA during closure</th>
<th>Boat Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&lt;25</td>
</tr>
<tr>
<td>A</td>
<td>22</td>
<td>15%</td>
<td>12</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>25</td>
<td>17%</td>
<td>20</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>32</td>
<td>22%</td>
<td>28</td>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td>D</td>
<td>23</td>
<td>16%</td>
<td>14</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>E</td>
<td>16</td>
<td>11%</td>
<td>9</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>F</td>
<td>16</td>
<td>11%</td>
<td>10</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>G</td>
<td>9</td>
<td>6%</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>2%</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>146</td>
<td></td>
<td>99</td>
<td>43</td>
<td>3</td>
</tr>
<tr>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>68%</td>
</tr>
</tbody>
</table>

Table 2
Utilization of LMA1 during the proposed seasonal closure

<table>
<thead>
<tr>
<th>Month</th>
<th>Vessels</th>
<th>Trips</th>
<th>Catch (lbs.) / Trap</th>
<th>Price ($/lb.)(^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct</td>
<td>59</td>
<td>13</td>
<td>25</td>
<td>4.09</td>
</tr>
<tr>
<td>Nov</td>
<td>71</td>
<td>13</td>
<td>27</td>
<td>4.18</td>
</tr>
<tr>
<td>Dec</td>
<td>85</td>
<td>10</td>
<td>27</td>
<td>4.55</td>
</tr>
<tr>
<td>Jan</td>
<td>89</td>
<td>8</td>
<td>15</td>
<td>5.05</td>
</tr>
</tbody>
</table>

\(^a\) Based on 5-year average based on data provided by the Maine Department of Marine Resources.
### Table 3
Economic impact of LMA1 restricted area by month

<table>
<thead>
<tr>
<th>Impact reduced by</th>
<th>August</th>
<th></th>
<th>December</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Landings</td>
<td>%</td>
<td>Traps</td>
<td>%</td>
<td>Landings</td>
</tr>
<tr>
<td>Do not fish</td>
<td>22</td>
<td>73%</td>
<td>5</td>
<td>63%</td>
<td>0</td>
</tr>
<tr>
<td>&lt;25%</td>
<td>4</td>
<td>13%</td>
<td>1</td>
<td>13%</td>
<td>&lt;25%</td>
</tr>
<tr>
<td>25-50%</td>
<td>1</td>
<td>3%</td>
<td>0</td>
<td>0%</td>
<td>25-50%</td>
</tr>
<tr>
<td>50-75%</td>
<td>0</td>
<td>0%</td>
<td>1</td>
<td>13%</td>
<td>50-75%</td>
</tr>
<tr>
<td>75-100%</td>
<td>3</td>
<td>10%</td>
<td>1</td>
<td>13%</td>
<td>75-100%</td>
</tr>
</tbody>
</table>

| September | January | | |
|-----------|---------|--------|----------|--------|--------|
| Do not fish | 19      | 63%   | 4     | 50%   | Do not fish | 1   | 3%    | 0     | 0%    |
| <25%      | 7       | 23%   | 2     | 25%   | <25%    | 4    | 12%   | 1     | 9%    |
| 25-50%    | 1       | 3%    | 0     | 0%    | 25-50%  | 4    | 12%   | 4     | 36%   |
| 50-75%    | 0       | 0%    | 1     | 13%   | 50-75%  | 11   | 33%   | 1     | 9%    |
| 75-100%   | 3       | 10%   | 1     | 13%   | 75-100% | 13   | 39%   | 5     | 45%   |

| October | February | | |
|---------|----------|--------|----------|--------|--------|
| Do not fish | 10      | 31%   | 2     | 22%   | Do not fish | 1   | 3%    | 1     | 9%    |
| <25%     | 11       | 34%   | 3     | 33%   | <25%    | 4    | 12%   | 1     | 9%    |
| 25-50%   | 5        | 16%   | 2     | 22%   | 25-50%  | 3    | 9%    | 2     | 18%   |
| 50-75%   | 1        | 3%    | 0     | 0%    | 50-75%  | 13   | 38%   | 3     | 27%   |
| 75-100%  | 5        | 16%   | 2     | 22%   | 75-100% | 13   | 38%   | 4     | 36%   |

| November | March | | |
|----------|-------|--------|----------|--------|--------|
| Do not fish | 2      | 6%    | 1     | 9%    | Do not fish | 2   | 6%    | 1     | 10%   |
| <25%      | 8       | 23%   | 2     | 18%   | <25%    | 6    | 19%   | 2     | 20%   |
| 25-50%    | 12      | 34%   | 3     | 27%   | 25-50%  | 4    | 13%   | 0     | 0%    |
| 50-75%    | 4       | 11%   | 2     | 18%   | 50-75%  | 9    | 28%   | 4     | 40%   |
| 75-100%   | 9       | 26%   | 3     | 27%   | 75-100% | 11   | 34%   | 3     | 30%   |

2
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Addendum 5 to MLA
Proposed Rule
Comments
Michael Pentony  
Regional Administrator  
National Marine Fisheries Service  
55 Great Republic Drive  
Gloucester, Massachusetts 01930

Dear Mr. Pentony,

The Maine Department of Marine Resources (ME DMR) appreciates the opportunity to comment on the upcoming rule-making to amend the Atlantic Large Whale Take Reduction Plan (ALWTRP). Proposed changes to the ALWTRP are likely to have large impacts on Maine’s lobster fishery, the social and economic backbone of Maine’s coastal and island communities. In 2018, landings from the Maine lobster fishery were valued at over $486 million and a recent economic study determined the fishery has an economic impact of an addition $1 billion annually. This fishery not only encompasses the roughly 4,800 lobster license holders and 1,100 student license holders but also sternmen, dealers and distributors, bait dealers, and trap builders who contribute to this fishery and their communities. Understanding the full impact of these pending regulations on the Maine lobster fishery, and to the North Atlantic right whale population, will be critical to ensure the appropriate suite of measures is implemented.

A. Characteristics of the Maine Lobster Fishery

The Maine lobster fishery is comprised of a diverse set of vessels, fishermen, and fishing practices. According to data collected in 2018, roughly 20% of vessels registered to Maine lobster license holders are less than 18 feet in length while 10% of vessels are greater than 39 feet in length. Thus, most fishermen who participate in the lobster fishery use smaller boats and typically fish close to shore. In addition to length, vessels in the Maine lobster fleet vary in their construction and layout. Smaller vessels, less than 25 feet in length, tend to be outboards and have extremely limited deck space for the temporary storage of gear. Some boats have open sterns which allow individual traps, or trawls, to be easily set off the back of the vessel. However, other boats have closed sterns, requiring traps to be set over the side of the boat. As a result, safe and fishable trawl lengths are not only dictated by the size of the vessel but also its construction.

Fishing practices within the Maine lobster fishery vary between the eastern and western ends of the State, and between inshore and offshore fishermen. In most state waters, the average trawl length can be characterized by singles, doubles, and triples; however, this masks important regional differences.

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For example, as a long-standing convention, fishermen in Casco Bay often fish trawls with two endlines. In this area, recreational and commercial boat traffic is very high and, as a result, fishermen can experience significant buoy loss. Longer trawls allow these fishermen to reduce their number of buoy lines and minimize their potential loss. In contrast, fishermen in mid-coast Maine tend to fish smaller trawl lengths which allow for a higher degree of precision to set traps on specific ledges and cracks, the preferable habitat of lobsters. This increases a fisherman’s trap efficiency. An added benefit of fishing singles, pairs, and triples is that it reduces potential gear conflicts between other fishermen if, and when, traps are set over one another. In federal waters, trawl lengths increase, in part due to existing regulations in the ALWTRP. In some of Maine’s furthest fishing grounds (outside of 12 miles from shore), trawl lengths average around 15 traps per trawl.

Fishing operations also differ by the number of crew onboard. 29% of license holders have a Class I license, which allows only the individual named on the license to participate in lobster fishing. Therefore, at a minimum, a quarter of the fleet operates without an unlicensed crew. 39% of Maine lobster fishermen have a license which allows for one unlicensed crew member onboard while the remaining 32% have a license which allows 2 unlicensed crew onboard.

Landings in the Maine lobster fishery have spatial and regional patterns. While the pounds of lobster landed vary across the State, most landings occur within state waters. In 2008, 81% of pounds landed were harvested within three miles of shore. Federal waters, broken up by 3 to 12 miles and outside 12 miles from shore, landed 15% and 4% of the pounds in that year, respectively. Recently, the pattern of catch based on distance from shore has slightly shifted, with an uptick in federal waters landings. In 2016, state waters accounted for 68% of the pounds landed, while 3 to 12 and beyond 12 miles accounted for 23% and 9%, respectively. This pattern of landings does not, however, equate to an identical shift in effort offshore. Between 2008 and 2016, the number of trips recorded within state waters dropped by only 7%, while the number of trips outside 12 miles increased by just 3%.

B. Management Tools Considered

At the April Atlantic Large Whale Take Reduction Team (ALWTRT) meeting, several management tools were discussed which could reduce the risk of serious injury and mortality from entanglements. Some of the tools considered included: area closures, dynamic management areas, trap reductions, vertical line reductions, and 1700 pound rope. Following the ALWTRT meeting, ME DMR reviewed the measures to understand the potential conservation benefits to right whales versus the burden to fishermen. The intent was to consider a range of measures, and then take the most viable options out to industry for feedback.

ME DMR held seven industry meeting to get input from fishermen on the feasibility and implications of these management tools. Based on our internal analysis and the feedback obtained through industry meetings, the following comments are offered regarding the various management tools.

Area closures were proposed and discussed at the ALWTRT meeting but were ultimately not included in any of the final recommendations. Following the ALWTRT meeting, ME DMR continued to discuss the potential efficacy of area closures. Ultimately, ME DMR did not include an area closure in the June 2019 presentation (see Appendix I) to industry due to several pertinent concerns. First, the efficacy of area closures relies on the assumption that gear within the closure is brought to shore. While this assumption holds true in the existing Cape Cod Bay closure due to its
timing and location, the same assumption would not hold in Maine waters. Offshore fishermen deploy gear year-round, moving traps to various fishing grounds as lobsters respond to environmental changes. As a result, a federal waters closure, akin to some of the proposals discussed at the ALWTRT, would not result in traps taken out of the water but may instead result in fishermen moving gear to the boundaries of the closure, concentrating gear around an area intended to protect right whales. This ‘curtain effect’ may have the unintended consequence of increasing vertical line densities in areas of known right whale distribution.

Industry members also asked about the potential conservation benefits of a seasonal closure during the spring months in state waters. After conducting analysis, ME DMR found negligible reductions in risk through this type of measure given right whales are infrequently sighted in state waters and there is minimal lobster gear set during the spring months. As a result, a spring state waters closure resulted in more of a paper exercise than a meaningful conservation benefit for right whales. ME DMR found specific areas and times for closures which resulted in a meaningful risk reduction were hard to define due to a lack of right whale sightings, and their more diffuse and changing use of the habitats in the Gulf of Maine.

Also discussed at the ALWTRT meeting were dynamic management closures. A potential benefit of this approach is that protections are enacted only when right whales are present, lessening the burden on industry. ME DMR considered this approach but quickly came up with several concerns regarding their effectiveness in protecting right whales. The primary concern is that dynamic management is reactive; it relies on right whales being spotted to enact a management response. Given right whales are notoriously hard to observe and weather conditions along the Maine coast can impede sighting efforts, ME DMR questioned the ability to effectively patrol northern Gulf of Maine waters and spot whales. Furthermore, the resources needed to support successful dynamic management are intensive and expensive, raising concerns of whether dynamic management is a long-term solution for right whale protection. Ultimately, ME DMR concluded measures which can provide year-round protections to right whales are stronger given all whales are positively impacted, not just those sighted.

The ALWTRT briefly discussed trap reductions at its April meeting, particularly those that are ongoing in Lobster Management Areas 2 and 3. ME DMR evaluated the potential benefit of trap reductions as a right whale protection measure and presented these findings to the lobster industry to get feedback. The most frequent concern raised by industry regarding trap reductions was that the ratio between vertical lines and traps is not one-to-one. This means that, particularly offshore, a substantial trap reduction is needed to see a modest reduction in the number of vertical lines. Industry expressed concern that, as a primary management tool to save right whales, trap reductions could result in large economic consequences due to reduced catch and revenue. Others noted that focusing on trap reductions is ancillary to the conversation since it is vertical lines, not traps, which pose a risk to whales. In addition, the diversity of Maine’s lobster fleet, as well as varying levels of participation, make it challenging to implement a trap reduction which does not result in some individuals increasing their effort. This was the result of a substantial trap reduction in 1997; some individuals removed gear from the water while others increased their effort up to the new limit.

One of the primary management tools ME DMR discussed with industry was vertical line reductions via trawling-up. After analyzing many of the potential management tools, trawling-up appears to provide some of the strongest benefits; namely, it addresses serious injury and mortality considered under the Marine Mammal Protection Act as well as risk under the Endangered Species Act. Further,
it directly addresses the cause of entanglements: vertical lines in the water column. At the June industry meetings, a series of trawling-up scenarios were presented to industry. These ranged from doubles to quads in state waters and from twenty to forty trap trawls offshore. In response, industry provided critical input on the extent of trawling-up which is feasible and safe in the Maine lobster fishery. Specifically, while offshore fishermen expressed some ability to add traps to an existing trawl, they expressed grave concerns about moving to thirty or forty trap trawls. Several noted that only a few boats are safely equipped to handle forty traps, in addition to the mile of rope needed to fish at these trawl lengths. As a result, requiring fishermen to operate beyond their boat capacities would result in dangerous fishing practices and the loss of human life. Inshore fishermen also highlighted that trawling-up scenarios need to consider the feasibility of smaller boats, particularly skiffs, which have limited deck space and are often operated by a single individual. Moreover, fishermen noted that, at longer trawl lengths, those who operate alone may have to hire a crew.

Outside of safety concerns, fishermen also provided insight on the potential consequences of trawling-up on fishing operations. First, longer trawls may increase gear conflicts and gear loss as there is a higher chance of trawls being set over one another. Second, longer trawls may decrease a fisherman’s ability to maneuver traps on to specific ledges and cracks which produce high catch rates. This would reduce a trap’s efficiency. Third, industry highlighted that fishermen frequently move traps across regulatory boundaries (i.e. the three mile line, the six mile line, etc.). This movement needs to be considered to ensure ongoing fishing practices and new regulations are congruent. To this end, fishermen suggested that any trawling-up scenario differentiated by distance from shore be comprised of multiples of one another so trawl lengths can easily be extended or shortened. In addition, law enforcement personnel were asked to provide input on the feasibility of enforcing long trawl lengths; they noted that, with the current platforms available, it would be nearly impossible for enforcement to safely haul long trawls to check compliance with the ALWTRP and lobster resource management measures.

Finally, the implementation of 1700 pound rope was also considered by both the ALWTRT and ME DMR. One advantage of 1700 pound rope is it offers a level of protection for all lines left in the water and can substantially reduce the occurrence of a serious injury or mortality which results from an entanglement. However, it does not address the risk of an entanglement occurring. In its June industry meetings, ME DMR presented 1700 pound rope as a potential management tool for consideration. At the time, ME DMR presented this as 75% topper in federal waters. It became clear from several comments that, to accommodate a 75% topper, fishermen intended to increase the length of their vertical line to ensure there was enough rope strength at the bottom where the strain of hauling traps is highest. This result would be counter to the efforts of the ALWTRT and a clear example of the unintended consequences which can result from management action. Instead, several industry members felt that, with existing vertical line lengths, modifications to the top 50% of the rope would be more feasible. Industry also commented that 1700 pound rope should be achieved through modifications to existing rope, as opposed to requiring fishermen to buy new rope. This could be achieved through specific splices or the threading of existing swivels into the rope to achieve a 1700 pound breaking strength. Law enforcement personnel also provided guidance on the enforceability of 1700 pound rope. They noted a specific number of weak points in a rope is more enforceable than 1700 pound rope regulations based on depth fished or the length of the vertical line. They also highlighted that enforcement of a rope diameter, as a proxy for 1700 pound rope, would be challenging since rope can expand in the water and differs by manufacturer.
C. **Gear Marking**

It is widely recognized that one of the biggest challenges faced by the ALWTRT when discussing the entanglement of right whales is the lack of data on the source of entanglements. This creates large amounts of uncertainty about which fisheries and regions are contributing to serious injury and mortality. At its industry meetings in June, ME DMR proposed a Maine-only purple gear mark to the lobster industry. This purple mark would replace the current red mark used to distinguish the Northeast trap/pot fishery and would allow Maine to better understand its role in the right whale conversation. The use of a Maine-only gear mark was unanimously supported by fishermen at all seven industry meetings as fishermen expressed strong support for identifying their gear from other trap/pot fisheries.

As stated in a letter to NOAA dated July 10th, ME DMR fully supports the improvement of gear marking to better inform conversations on right whale entanglements. As a result, the State intends to implement a Maine-only gear mark ahead of the federal regulatory process. ME DMR has already begun the State’s regulatory process and, under the current timeline, the Maine-only gear mark could be required for Maine licensed lobster fishermen by spring 2020. Critical to this effort is guidance and confirmation from NOAA regarding the placement and color of the Maine-only mark. ME DMR highlights that it has not received a response to its July 10th letter to NOAA requesting written confirmation regarding the location and color of the Maine-only gear mark. This level of communication is needed to support Maine’s efforts to enact regulations ahead of the federal process. For example, it is unclear if additional gear marking areas, such as Jeffery’s Ledge and Jordan Basin, will be maintained as states move to their own marks. ME DMR recommends that, as a part of the proposed rule, NOAA re-evaluates these markings against recent sightings data to determine the usefulness of area-specific marks in addition to state-specific marks.

D. **Recommendations for the Proposed Rule-Making**

As NOAA engages in the writing of a proposed rule, ME DMR requests the agency consider two topics which were not fully discussed or voted on at the ALWTRT meeting. A question repeatedly raised at the ME DMR industry meetings was the continued use of Maine’s exemption line. As outlined in the 2007 Final Rule to the ALWTRP, the exemption line is based on the low number of right whale sightings in this area. NOAA has consistently defended the exemption line in previous rule-makings, commenting “NMFS does not believe that regulating the waters that will be exempted from the ALWTRP would have a significant benefit to large whales.”2 Additionally, studies have shown there are low concentrations of calanus copepods shoreward of the 100 meter isobath, which do not support the aggregation of right whales.3 As a result, NOAA did not include exempted waters as a part of the critical habitat designation for right whales. Instead, NOAA used the exemption line from the ALWTRP as the nearshore boundary, stating “late stage copepods in quantities sufficient to trigger right whale foraging are not present inshore of the Maine exemption line”4. Given no vote at the April ALWTRT meeting was taken in regards to the exemption line, ME DMR requests NOAA consider the impacts to industry versus the conservation benefits of establishing regulations within

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3 Runge 2012 Report “Summer distribution of the planktonic copepod, Calanus finmarchicus, along the coast of the Gulf of Maine”
the exemption line. Taking extensive action in areas where right whales rarely, if ever, visit will not have a measurable impact on the right whale population.

In addition, ME DMR requests NOAA include a method for conservation equivalency within the proposed rule. As previously described, a key feature of the Maine lobster fishery is its diversity. This breadth of vessel size, fishing location, and crew precipitates the need for different management approaches within the State. Allowing for conservation equivalency in the rule-making provides an opportunity for fishermen to develop equivalent, or more conservative, regulations in their region to meet the requirements of the ALWTRP. This flexibility is needed to ensure not only the long-term success of the lobster fishery but also the protections provided to right whales.

E. Conclusions

ME DMR appreciates the opportunity to comment on the upcoming proposed rule regarding right whales and the Northeast trap/pot fishery. The Maine lobster fishery has been an active participant in the conservation of right whales for over twenty years. While ME DMR recognizes the scope of this comment period pertains to US entanglements in the trap/pot fishery, the Department highlights that this scope does not encompass the full set of impacts on the right whale population. Specifically, entanglement records indicate the full risk reduction outlined by NOAA should not be solely on the Northeast lobster fishery and the apportionment of risk to Canada should reflect the stark increase in right whale mortalities resulting from the snow crab fishery and Canadian vessel strikes. ME DMR underscores that placing further regulations on the Maine lobster fishery will not improve the status of the right whale population if mortalities are happening elsewhere.

We appreciate NOAA’s consideration of these comments.

Sincerely,

Pat Keliher, Commissioner
Addendum 6 to MLA Proposed Rule Comments
October 3, 2018

Dear Dr. Hare,

I am writing in response to the recently released NOAA Technical Memorandum NMFS-NE-247, *North Atlantic Right Whales—Evaluating Their Recovery Challenges in 2018* ("Technical Memo" or "Memo"). Regrettably, I have significant concerns about the scientific merit of this document, which I have documented below in detail.

As I am sure you’ll agree, any measures developed to protect right whales must be based on sound science in order to be effective. For this reason, it is imperative that the Technical Memo provide a comprehensive picture of the best available science to inform the critical decisions that the TRT is being asked to make. The title of the Memo implies a comprehensive look at all stressors across the right whale’s range. While many category I and category II fisheries from Maine to Florida are regulated under the Atlantic Large Whale Take Reduction Plan, the content of the Memo is almost exclusively limited to the lobster fishery in the Gulf of Maine. There is little context offered for how right whales are utilizing expanded habitats in Canadian and Mid-Atlantic waters, and how that changing range and interactions with other fisheries affects risk of entanglement. Absent this information, any discussion on new regulations will be based on an incomplete picture, and provide uncertain benefit to whales. It is my sincere hope that you will endeavor to update and correct this document expeditiously, as we anticipate its use to inform the work of the Atlantic Large Whale Take Reduction Team (ALWTRT) at its upcoming meeting in Providence.

Overall, the Memo is inconsistent in its application and interpretation of various data sets and publications. In some cases, conclusions directly contradict statements and information previously presented by NOAA. In several instances, the paper lacks citations or cites inappropriate sources (i.e. industry documents instead of raw data; unpublished articles) and appears to be stating conclusions or opinions without any supporting data (i.e. that the 2015 vertical line regulations are making entanglements worse). Our most substantive concerns are addressed below but please note that this list does not represent an exhaustive list of the issues we identified, which range from minor technical points to omissions of core data sources.

First and most significantly, the Memo suggests that the 2015 vertical line regulations increased the strength of rope and therefore the severity of entanglements by altering fishing practices and encouraging the use of larger diameter ropes as vertical lines. There are no current data sets or analyses used to support this theory. The paper instead cites Knowlton et al. 2016. While the Knowlton paper accurately characterizes the change in rope strength through manufacturing processes over time, the data
used encompass the years 1994-2010. This time period was largely before any of the substantial changes in gear due to regulations, such as the sinking groundline regulation in 2009 and the vertical line rule in 2015, and overlapped with a time period in which right whales actually saw population increases. There has been no recent assessment that states that fishermen have been using larger diameter rope in response to the vertical line regulations in 2015.

Additionally, to our knowledge, there is no published analysis of ropes taken from right whales that includes the time period since the vertical line regulations went into effect in 2015, nor any assessment of the efficacy of those regulations. The most recent publication that details current instances of entanglements that resulted in serious injuries or mortalities, NOAA’s “Serious Injury and Mortality Determinations for Baleen Whale Stocks Along the Gulf of Mexico, United States East Coast, and Atlantic Canadian provinces, 2011—2015” (Ref Doc. 17-19) was published in 2017 and relies on data from 2011-2015 (prior to the implementation of the vertical line rule). Instead of using this most recent agency source, the Memo repeatedly cites Knowlton et al. 2012 to point out the increasing rate of entanglements and that 83% of the population has been entangled at least once. Knowlton et al. 2012 is a comprehensive 30-year retrospective of the right whale catalogue but does not provide an assessment of entanglements in the right whale population beyond 2009. While it is indisputable that entanglements are increasing, a more recent assessment would provide a more accurate picture of the current threats facing right whales, which are changing rapidly. In fact, due to the lack of data on this critical question, NOAA recently funded DMR’s current research project to improve understanding of gear usage, hauling load and vertical line breaking strength. In sum, the Memo fails to take a comprehensive look at how entanglement rates and severity have changed since the implementation of the sinking groundline and vertical line regulations went into effect in 2009 and 2015, respectively, nor does it assess changes or trends in entangling gear during that time period. It is therefore an unreliable assessment of current regulations.

Second, the Memo cites increased Maine landings to indicate increased effort. Most importantly, landings are not a proxy for effort, and have never been used as an accepted metric for increased risk of entanglement. The Memo cites Maine state landings data to demonstrate increased effort offshore without describing where the data apply in terms of fishing areas. It uses these landings to assert that there is an increased overlap and therefore level of risk “offshore.” The data provided by DMR staff represents landings generated from logbooks from 10% of randomly selected harvesters licensed by the state. Contrary to the assertion made in Figure 2c, Maine logbook reported landings have increased both inshore (which we define from 0-12 miles) and offshore (from 12 miles to the Area 1 boundary), but, when comparing the two areas, the inshore portion has increased at five times the rate of the offshore area. It appeared, from the webinar held at the time of publication, that NOAA interpreted “offshore” as being out to the Hague Line (based on the webinar presenter’s interpretation of heat map slides, which are not included in the Memo). These heat maps interpolate VTR data for lobster. While Area 3 has 50-100% of Federal licenses reporting through VTRs (ASMFC TC Memo July 2015), most Area 1 Federal lobster permit holders are exempt from VTR requirements and those with permits required to report represent less than 10% of Maine Federal permit holders and 3% of the total license holders in Maine (ASMFC TC Memo January 2017). Maine has only a handful of Area 3 license holders (permitted by NOAA), and the majority of effort that we categorize as being beyond 12 miles would end at the Area 1/3 boundary, approximately 40 miles from the coastline. Area 3 VTR data could characterize “offshore” effort but was not used in the Memo. It is unclear why NOAA would choose to use state landings records for only one state that is dominated by inshore effort if seeking to accurately characterize offshore effort, as the majority of the truly “offshore” effort (in Area 3) is from permitholders in other states.
While the State of Maine recognizes that the size of our fishery is the reason for the focus on our impact to right whales, effective management measures will require a clear picture of changing population distribution and abundance in recent years. The Memo repeatedly points to an expanding range and increasing overlap with fisheries as sources of increased risk. It notes decreased observations of right whales in the Gulf of Maine and Bay of Fundy during the summer months and southeast coast in the winter, and increased presence in the Gulf of St. Lawrence in the summer and off the mid-Atlantic in the winter. Despite the changes in distribution, the only fishery considered for “increased” overlap is the Gulf of Maine lobster fishery, despite the parallel assertion that the Gulf of Maine is an area of decreased presence and the fact that NOAA’s own observation resources have been diverted to Canada because of this shift. There is also little assessment of the unregulated fisheries they encounter in the Bay of Fundy, on the Scotian Shelf and into the Gulf of St. Lawrence, or the devastating interactions that resulted when right whales overlapped with changes in the snow crab fishery in 2017.

Additionally, there is no discussion of the role of other US regions or fisheries despite the fact that the Memo states that right whales are increasingly using other areas, such as the mid-Atlantic. Furthermore, the Memo includes little discussion of the impact of other U.S. or Canadian fisheries on right whales. All vertical lines do not present the same level of risk; the location, the season, the type of gear, and whether it incorporates conservation regulations (e.g. the use of weak links and sinking line in surface systems) all factor into the level of risk posed by a given line. Additionally, lines that overlap with right whale feeding aggregations inherently pose more risk of entanglement. A shift in habitat use out of the Gulf of Maine and into Canadian waters does not double risk, but rather it shifts the spatial intensity of the risk that exists. The Memo does not cite evidence for the assertion that closures are regionally effective, nor does it cite any basis for Figure 4’s assertion that vertical lines have increased in the Northeast since 2011. In fact, this claim directly contradicts a presentation made by Mark Murray-Brown to the New England Fishery Management Council in December 2017, pointing to the reduction of 2740 miles of vertical line achieved through implementation of the 2015 regulations.

There are additional instances where a more comprehensive data set is available but inexplicably not used. For example, Figure 5 seems to be trying to show the relevance of the lobster fishery in entanglements, but most of the entanglements shown are from years prior to when the sinking groundline and vertical line rules were implemented. This Figure shows only those entanglements where the set locations are known, and it is unclear whether it shows all entanglements or only those resulting in serious injury or mortality. Notably absent from the Memo is any reference to the much more robust dataset curated by NMFS that documents entanglements to confirmed fisheries, which would provide a much more comprehensive look at the causes of entanglements across the right whale’s range. Use of this dataset would also allow a look at how entanglements have changed, either by the confirmed fishery to which the entanglements are attributed, or by characteristics of the rope (i.e. diameter) over time. Two of the entanglements in Maine shown on this map also fail to note that Maine lobster gear was the secondary cause of entanglement. The use of range-wide, recent fishery confirmed instances of entanglement would inform consideration of what measures would most effectively curtail the current entanglement problem. Focusing on only entanglements where the set location is known drastically limits an already small dataset and could result in the misalignment of new regulations with the current entanglement risk.

I strongly believe the Maine lobster industry takes the threats to right whales seriously and will work to identify a meaningful solution appropriate to the risk posed by their fishery under current biological and environmental conditions and considering past regulatory actions. However, conclusions
based on conjecture, without sound scientific basis, will alienate their critical participation in this process. The net result of the oversimplified picture painted by this Memo is likely to be regulations imposed on a fishery or in an area that will result in very little conservation benefit for the right whale but will come at a great cost to the fishermen in terms of money, time, and safety.

I look forward to working with you and your staff to improve the accuracy of the information which will inform the ALWRT’s work going forward. If you have any questions or would like to discuss this further, please contact Erin Summers, email: erin.l.summers@maine.gov; telephone: (207) 633-9556.

Sincerely,

Patrick C. Keliher
Commissioner

Cc: Mike Pentony, Regional Administrator, Greater Atlantic Regional Office
    Mike Asaro, Protected Resource Division, Greater Atlantic Regional Office
Addendum 7 to MLA Proposed Rule Comments
Michael Pentony  
Regional Administrator  
Greater Atlantic Regional Fisheries Office  
National Marine Fisheries Service  
55 Great Republic Drive  
Gloucester, MA 01930  

April 22, 2019

Dear Mr. Pentony:

I am writing to share the Maine Lobstermen’s Association’s perspective and concerns regarding the ongoing process to identify and implement conservation measures to protect right whales. The MLA has been involved with the Atlantic Large Whale Take Reduction Team (TRT) since its inception and remains committed to working with your agency through this process.

The MLA is deeply disturbed by the timing of NMFS’s release of new information to guide discussions at this week’s TRT meeting. Our last TRT meeting was six months ago. NMFS only announced the Take Reduction Target and presented a draft of the Decision Support Tool in recent days. Given NMFS’ directive to begin rulemaking at the conclusion of the meeting, the MLA is extremely frustrated to receive such critical and complex information just days before. TRT members are unrealistically expected to reach consensus on management alternatives before the Team has had any input on the Take Reduction Target itself or had adequate time to evaluate and grasp the implications of the new information presented.

NMFS announced the Take Reduction Target of 60% to 80% on April 5 via email with no opportunity for discussion by any TRT member. The MLA communicated our concerns to NMFS staff during the past month about the approach used to set the Take Reduction Target, however staff has been unwilling to adjust the timetable or process in any way in order to preserve the goal of a collaborative, evidence-based stakeholder process that can achieve consensus on effective management alternatives.

Shared Responsibility between US and Canada

The MLA has also pointed out to NMFS staff a critical flaw in the current path the agency is following. The best available information about current risks to the right whale population indicate PBR will never be achieved with management measures implemented unilaterally by U.S. fisheries. The evidence indicates Canadian fisheries are playing an increasingly large role in right whale serious injury and mortality. NMFS has effectively ignored this evidence as it formulated the Take Reduction Target and, in the process, has made no apparent effort to allocate risk to Canadian fisheries in proportion to the significant role they are now playing.
In particular, the MLA has strong reservations about any methodology that attributes serious injury and mortality from unknown gear equally between the two countries as though, counterfactually, the risk from fishing practices in the two countries were equal. Using NMFS’ most recent data, serious injury and mortality from 2014 to 2018 is 6.2, with 1.6 confirmed to Canada, 0.2 confirmed to U.S. gear. Furthermore, the majority of rope removed from whales in recent years is larger rope, not consistent with nearshore U.S. gear, which is the majority of gear fished in U.S. waters.

While Canada has done an admirable job recently implementing whale protection measures in the Gulf of St. Lawrence, there has been little discussion of the amount of directed effort in the snow crab fishery from year to year. This year the Gulf of St. Lawrence snow crab quota will increase by 32% compared to last year. Canada has also not implemented whale protection measures in fisheries outside of that region even though right whales continue to use habitats that overlap with many Canadian lobster and snow crab fisheries. Unless the risk from Canadian lobster and snow crab fisheries is accurately reflected in the proposals presented to the TRT, any resulting management measures in U.S. waters cannot credibly be relied on to achieve PBR for the endangered whale population.

The MLA also strongly disagrees that U.S. fisheries should be held accountable for the estimated unobserved serious injuries and mortalities, for which there are no data, under the Take Reduction Plan.

Decision Support Tool

NMFS presented its nascent Decision Support Tool, still under development, to the TRT on April 16, just one week before the meeting. The information was presented via webinar and allotted only 30 minutes for questions from team members. While the MLA supports development of this tool to assess management alternatives, we have serious reservations because the tool is still under development and has not yet been adequately vetted or peer reviewed. Based on the tool’s preliminary results produced during the webinar, the MLA is concerned that it will generate unrealistic management alternatives during the TRT meeting, thus undermining the ability of TRT members to reach consensus on critical management issues.

It is our sincere hope that, when completed, the management advice produced by the Decision Support Tool will assist the TRT to identify approaches that will translate into real protections for right whales. As with any modeling effort, it is important that the model utilize the best available information on whales, fishing effort and risk of fishing gear so that its output reflects our general understanding of how these elements interact. Based on the MLA’s first look at the tool last week, it did not achieve this.

In order for the TRT process to be successful, stakeholders must have confidence in the analytical tool if we are to make decisions based on its assessment of alternatives. The MLA has numerous concerns regarding the assumptions and data streams used in the tool. We believe other TRT members are likely to have similar reservations about the quality of inputs to the tool. While we are confident that these concerns can be addressed, it is important that they be resolved before the tool is employed in the TRT process. As has often been the case in the past, management advice based on a model’s output could change significantly as the model is further refined.

The model uses three inputs: whale density, gear density and severity to determine risk. The model assumes equal weight for these inputs in producing a risk score. The MLA is concerned that equal weighting of these inputs does not produce an output that reflects our current knowledge of whales and the risks posed by fishing gear.
Based on the initial demonstration of the tool, the equal weighting of these inputs will always produce the same outcome: areas with the most gear pose the highest risk. Since the scale of gear density is exponentially higher than whale density, the gear signal swamps the other indicators. In some cases, this is likely an accurate reflection of risk. But in other cases, the tool may predict a higher risk for densely fished areas with little history of whale sightings compared to areas with fishing gear set around feeding aggregations of right whales, or to areas fished with larger, heavy gear often linked to serious injury and mortality.

We request that NMFS and the TRT explore options to add a weighting to the whale inputs based on habitat use, life history, and recent whale distribution shifts. Further, the whale data must be expanded beyond standardized tracks in order to adequately reflect the recent shift of right whales out of the Gulf of Maine and into new habitats, as noted in the published literature. The MLA also requests that NMFS and the TRT explore options to refine the rankings in the severity tool to incorporate data on known serious injury and mortality as it relates to gear type. These issues require further discussion and problem-solving cooperatively in order to realistically address the level of risk associated with whale behavior and recent changes in distribution. The MLA is ready to share ideas on how to improve the model with relevant NMFS staff.

Whale conservation cannot happen without input and cooperation from fishermen. Fishermen must understand the justification for each management measure and how implementation will benefit whale conservation goals. With a common understanding, fishermen can be trusted to adopt the new management plan and maintain their historically high compliance levels. Achieving high compliance is unrealistic if proposed measures have uncertain efficacy and cannot credibly be relied on to reduce risk for whales.

The MLA remains committed to the TRT process and to identifying conservation measures to improve protections for right whales. It is crucially important that those who will be affected by the results of the TRT process are in full support of the methodology and tools used in that process. Before the agency initiates rulemaking, it is imperative that the Decision Support Tool receive thorough consideration by the TRT and undergo a peer review before any management decisions are made. We urge NMFS to schedule a follow-up TRT meeting once the model is refined and a peer review of the tool completed. In the meantime, the MLA will continue to offer constructive feedback and engage our fishermen on the progress of the TRT.

Thank you for your consideration.

Best regards,

Patrice McCarron
Executive Director

cc. Jon Hare, Northeast Fisheries Science Center
Patrick Keliher, Maine Dept of Marine Resources
Senator Susan Collins
Senator Angus King
Representative Chellie Pingree
Representative Jared Golden
Re: Taking of Marine Mammals Incidental to Commercial Fishing Operations; Atlantic Large Whale Take Reduction Plan Regulations; etc.

Submitted electronically via the Federal eRulemaking portal

March 1, 2021

We submit the following comments addressing both the Draft Environmental Impact Statement: ALWTRP Risk Reduction Rule (DEIS) and the Proposed Rule to Amend the Atlantic Large Whale Take Reduction Plan to Reduce Risk of Serious Injury and Mortality to North Atlantic Right Whales Caused by Entanglement in Northeast Crab and Lobster Trap/Pot Fisheries (NOAA-NMFS-2020-0031) (PR) on behalf of Whale and Dolphin Conservation. Our comments largely focus on the impact of the DEIS and proposed rule on the recovery of critically endangered North Atlantic right whales. Understanding that the National Marine Fisheries Service (NMFS) is aware of the contributing anthropogenic risks leading to the population decline of the species, we have not provided additional background on these issues in our comments. Instead, we address specific aspects of the DEIS and PR.

Risk Reduction Goals Must Be Increased:

First, it is unclear why NMFS’s interim and long-term goals appear to only address Potential Biological Removal (PBR) as a threshold for recovery. According to the Marine Mammal Protection Act (MMPA), the actual threshold NMFS should be aiming to achieve is a Zero Rate Mortality Goal (ZMRG), or 10% of PBR. In its recent draft Biological Opinion of 10 Fisheries (BiOp), NMFS stated that “it is inconceivable that the species has ever been below PBR” and yet the Agency has proposed a rule which fails to meet PBR and completely disregards ZMRG.

The Agency provided the 60-80% risk reduction goal to the Atlantic Large Whale Take Reduction Team (TRT) nearly two years ago based on 2016 population estimates and a PBR of 0.9. At that time, NMFS indicated that, if cryptic mortalities were included in its analysis, the average annual rate of serious injuries and mortalities (SI/M) for North Atlantic right whales from entanglement in U.S. fisheries alone was 4.3, and “would have to be reduced by about 80% in U.S. fisheries to get below the stock’s PBR of 0.9”

However, NMFS has subsequently revised both the population abundance and average annual rate of serious injuries and mortalities for right whales resulting from incidental entanglements in U.S. fishing gear: in the draft BiOp, NMFS stated: “Using the methods in Pace et al. (2017), this year’s preliminary estimate is 366 (95% credible interval range of 353-377) individuals as of ¹


²Ibid.
January 2019.\(^3\) Using 366 as the Nmin, PBR is now 0.7.\(^4\) Table 57 of the BiOp estimates the annual average SI/M of right whales from U.S. fishery entanglements as 6.724.\(^5\) Using NMFS’ methodology and updated data, the risk reduction target required to reduce SI/M in US fisheries is closer to 90%.

<table>
<thead>
<tr>
<th>Risk Reduction Necessary to Reduce SI/M using data provided by NMFS</th>
<th>Population Est</th>
<th>PBR</th>
<th>SI/M (observed and cryptic)*</th>
<th>% risk reduction necessary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed Rule (PR) 2016 pop estimate</td>
<td>445</td>
<td>0.9</td>
<td>2.2</td>
<td>60</td>
</tr>
<tr>
<td>2016 estimate including cryptic mortality</td>
<td>445</td>
<td>0.9</td>
<td>4.3*</td>
<td>80</td>
</tr>
<tr>
<td>Updated data including cryptic mortality</td>
<td>366</td>
<td>0.7</td>
<td>6.724*</td>
<td>90</td>
</tr>
</tbody>
</table>

Neither the risk reduction targets in the preferred or non-preferred alternatives come close to what is necessary to reduce SI/M to below PBR.

In our view, a target aimed at reducing risk is not equivalent to a reduction in fishing effort, and there are ways in which the target could be achieved while minimizing further impacts on the industry. The proposed rule must be revised to reduce takes below PBR within five years, and ultimately achieve ZMRG. Ignoring these new data will not adequately protect right whales, and places an undue burden on the industry which will be told, once again, that despite implementing costly modifications, they were not enough.

**All measures counted toward risk reduction must be codified under the TRP:**

During the 2018 meeting of the TRT, to which we are appointed, the TRT agreed to a near-consensus proposal to achieve at least a 60% risk reduction in each Northeast Lobster Management Area, allowing states to collaborate with industry members to “refine the implementation approach.”\(^6\) WDC supported this proposal.

At no time during that meeting did NMFS indicate to the TRT that it intended to only consider measures for

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\(^4\) PBR = Nminx0.5(Rmax)xFr. In this case, 0.7=366x0.2x0.1


\(^6\) [https://media.fisheries.noaa.gov/dam-migration/final--atlantic_large_whale_take_reduction_team_meeting_april23-26_kom_(508).pdf](https://media.fisheries.noaa.gov/dam-migration/final--atlantic_large_whale_take_reduction_team_meeting_april23-26_kom_(508).pdf)
federally permitted fisheries in its proposed rule making. We were under the assumption that NMFS would adopt measures developed by the northeast states with their industry members in its Take Reduction Plan (TRP). Yet, according to the PR, a number of measures including, but not limited to, closed areas and gear marking, are mandated only by state regulatory processes and not incorporated into the PR. The Agency has no means to ensure that these measures will be implemented. For example, Table 1.1 of the DEIS includes a measure from the state of Massachusetts to require no single pots on vessels more than 29’ in length after January 1, 2020. Not only is this timeline clearly outdated, but the state did not implement this measure in its final rulemaking.7

Similarly, NMFS is problematically relying on lobster fishery management by the Atlantic States Marine Fisheries Commission (ASMFC) to reduce risk to right whales. According to the Agency, “ongoing and imminent (RIN 0648-BF01) Lobster Plan fishery management modifications that result in line reductions relative to the 2017 baseline would provide risk reduction in the lobster fishery that would be counted towards the 60 percent goal.”8 While these reductions may legitimately reduce risk if implemented, they remain in a proposed rule stage after two years, with no definitive date as to when, or if, they will be enacted.9 Any measures which are not codified under the TRP cannot be guaranteed to be implemented and should not be counted toward the 60% as risk reduction target.

In addition, we take issue with this statement in the DEIS: “Inclusion of risk reduction as a result of fishery management actions towards the risk reduction target was supported by the Team in their April 2019 recommendation.” This was not met with widespread Team support as indicated in the meeting summary which states “Effort reduction through trap allocation reductions was also discussed with mixed support.”10

The MMPA is clear that federal protections afforded to marine mammals do not solely apply to federal waters. Unless measures are implemented under the TRP, NMFS has no ability to require their application, enforcement, or permanence. We appreciate that the TRT serves only as an advisory body to NMFS and that the Agency has sole discretion and responsibility to implement the TRP. However, we would not have supported the measures proposed at the 2018 TRT meeting had we known that NMFS intended to restrict its authority to only measures in federal waters under the TRP. This is not in the best interest of right whales and violates the intent of the MMPA.

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**Trawling Up Measures:**

We acknowledge comments from the industry regarding the difficulty that trawling up can pose to smaller vessels, as well as the risks associated with heavier trawls. Heavy trawls also pose risk to whales who may be unable to swim away with gear and, instead, become anchored and drown. As a result, we believe that NMFS should choose its non-preferred alternative option capping endines at 50% of the average monthly lines fished in federal waters in 2017. A requirement to fish with only one endline could immediately achieve this reduction, without impacting smaller vessels or posing additional risk to fishermen or whales. Agreements about the direction of gear sets should be developed by industry members fishing in specific regions to avoid lay overs or conflicts with mobile gear fleets.

With regard to state waters, we ask for clarification on the Maine 3-6nm proposals of a minimum of 8 traps per trawl. It appears that the Maine proposal would allow 2 endlines for 8 traps, or 1 endline for four traps. However, the current TRP requires trawls of five traps or fewer to have only one endline. Is this proposal intended to modify the current TRP requirements?

As stated previously, the Massachusetts restriction banning single traps on vessels longer than 29’ was not included in the MA DMF final rule. We are therefore unclear as to how the percent reduction attributed to this measure has been reallocated.

We are also unclear as to what trawl requirements are intended for the LMA2/3 overlap. According to the preferred alternative, a minimum of 25 traps/trawl would be required in LMA2, but 45 traps/trawl are required for LMA3. What would be the minimum number required for the overlap area, and how was this calculated in the risk reduction percentage attributed to LMA3? As stated previously, we believe this is better resolved by requiring only one endline per trawl.

We ask NMFS to place a cap on all vertical lines in permitted US fisheries. All permits considered for fisheries using vertical line, including aquaculture, must be considered in this cap. Placing the sole burden of vertical line reduction on the lobster and Jonah crab fishery does not achieve adequate risk reduction if risk is increased by permitting other fisheries. In fact, based on the data provided in the DEIS, gillnets appear to pose a disproportionally high risk of entanglement to right whales. Table 2.2 in the DEIS shows that gillnet/netting represents 47% of known fishery entanglements to right whales, yet gillnets represent only 1.9% of vertical lines in non-exempt waters (Table 2.3 of the DEIS).\(^{11}\) NMFS must reduce entanglement risk to right whales by evaluating vertical line risk as a whole, not which fishery that line represents.

Lastly, as stated in our 2018 proposal to the TRT, it is our understanding that federal permit holders who hold only a lobster permit are not required to submit Vessel Trip Reports (VTR) and, therefore, data on the distribution and density of vertical lines, especially in offshore areas, are inadequate. According to the presentation provided to the ALWTRT on 9/18/2018, there appeared to be an increase in vertical lines in the Northeast region since the 2013 vertical line reduction rule was implemented. Even considering the possibility of a statistical error, there was no significant decrease detected from the implementation of the rule. Additionally, the Statistical Reporting Areas (SRAs) are currently too large to determine risk based on the very limited reporting. We recommend NMFS require vessels engaged in all fixed-gear fisheries that use vertical line be required to use VMS and/or AIS as well as submit VTRs. The vessel-specific data do not need to be made available to the public, but can provide NMFS the ability to evaluate distribution and density of lines from fisheries that pose risk to whales and assist NMFS in monitoring compliance with the TRP.

**Seasonally Restricting Buoy Lines:**

LMA1 Restricted Area Oct-Feb: First, it is odd that the Agency is specifically seeking comments to remove a restricted area from the PR: “commenters that believe these additional restricted areas are not warranted to achieve PBR should provide specific information or analysis in support of recommended removal of restricted areas from the proposed rule.” Any proposal to close an area to fishing should be based on science and demonstrate a tangible risk reduction for right whales. It is therefore unclear how a proposed closure would no longer be warranted simply based on public input. Furthermore, neither the PR nor the DEIS provide any insight into what conservation equivalencies would be established as an alternative to this closure.

Based on data available in the public domain, we support this proposed closure. Acoustical data indicate that this area is used by right whales, especially in December and January (Figure 1).

LMA3 Restricted Area May-Aug: Again, based on data available in the public domain, we agree that this area *does* warrant protection during the times proposed *at a minimum*. Even archival telemetry data appears to show that this may be a transit corridor for right whales moving between the Gulf of St. Lawrence and the Gulf of Maine (Figures 2). However, we note that gear displacement can increase risk if moved to an area where whales occur but, in the absence of survey effort, risk appears lower. Given the potential for the northern edge of George’s Bank to be regularly used as a route between the Gulf of St. Lawrence and the Gulf of Maine, we suggest that fishing with one endline be required from April-November along the entire northern edge of George’s Bank may be a more risk averse alternative to the seasonal closure. NMFS should analyze the difference in risk reduction between this 50% reduction in vertical line and the proposed closure with potential gear displacement.
**A: Large South Island Restricted Area:** We do not support the preferred alternative of a seasonal restriction which only includes the MA South Island boundaries from February through April. Both the detection data and previously established seasonal management measures support the Large South Island Restricted Area as the most protective to right whales (Figure 3).

NMFS has confirmed that the area south of the islands is a year-round habitat for the species.\(^{13}\) The preferred alternative measure does not protect whales west of the restricted area, for which a Seasonal Management Area (SMA) was established (red box) from November 1-April 30 (Figure 3) to reduce risk from ship strikes. The determination of this SMA itself indicates the importance of this area for right whales and warrants its inclusion in restrictions to reduce entanglements.

We ask NMFS to modify the timeframes of this restriction to begin in November, not only to be consistent with protections from vessel strikes, but also to protect what is likely a mating ground. Surface Active Groups have been documented in this region\(^ {14}\) and, given the gestation period of right whales, this behavior is more likely to result in pregnancy during the winter months. Furthermore, sightings data from the New England Aquarium indicate that at least some calving females do not migrate to the Gulf of St. Lawrence but do use the waters south of the islands. Sightings of this subset of females have been documented in this region between December and May \( (P. \text{ Hamilton, pers comm}) \)^\(^ {15}\).

Given that this area is of year-round use to the species, we further request that NMFS require only one endline between May and October to further reduce risk, as the heavier gear used in the offshore fishery is known to pose a more significant risk of SI/M to right whales.\(^ {16}\)

Given the likelihood that this area is a winter mating ground as well as preferred habitat for at least some calving females, it is essential that it be afforded significant protection from both vessel strikes and entanglements. As such, we strongly urge NMFS to modify the entire Large South Island Restricted Area as an SMA to simultaneously reduce vessel strike risks.

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\(^ {13}\) [https://repository.library.noaa.gov/view/noaa/25910](https://repository.library.noaa.gov/view/noaa/25910)


\(^ {15}\) Phillip Hamilton, Research Scientist, Anderson Cabot Center for Ocean Life, New England Aquarium, phamilton@neaq.org

We were not able to discern how NMFS evaluated risk from gear displacement as a result of seasonally restricted areas. NMFS has implied this PR would result in benefits to right whales and other large whale species yet the measures are clearly aimed at reducing risk to right whales only. While it is likely that some portion of gear would be moved from a seasonal restricted area, we could not find a risk analysis to determine what potential increase in risk may result from gear displacement to other large whales. We believe that NMFS must consider these potential risks before assuming broad scale benefits to other species purportedly covered by the rule.

**On-Demand Gear in Restricted Areas:**

We commend NMFS for its encouragement of the development of on-demand gear by enabling its use in restricted areas. However, we do not agree with NMFS’ assertion that the use of on-demand gear in the restricted areas should be evaluated as “neutral” risk. There are no data to substantiate that sinking groundline poses no risk to large whale species in general, or right whales specifically. We appreciate that NMFS has indicated they made this
statement based on an assumption that only a limited number of fishermen would trial on-demand gear in the restricted areas. However, we remind NMFS that as the technology advances, the use of this gear will increase. We support its use and believe it will substantially reduce risk, but it does not entirely remove risk and NMFS should not make statements that imply it can evaluate the use of on-demand gear as neutral in all cases. We ask NMFS to qualify its statement regarding “neutral risk” for any fishery using lines that can result in an accidental entanglement.

**Reduced Breaking Line Strength:**

We do not disagree that lines with higher breaking strengths pose more risk of SI/M to whales, but that does not mean lower breaking strength lines pose less risk to right whales. We have significant concerns about the Agency’s reliance on reduced breaking strength rope as the primary mitigation measure in the PR. The risk reduction from using weak rope is based on a single study, which itself concludes that risk is not reduced for right whale calves – an age class essential for recovery of the population – or reduce risk to other large whale species, for which the Agency has implied will benefit from this rule. In fact, the Agency states in the DEIS that “Knowlton et al. (2016) reported that age plays a role in a right whale’s ability to break free of rope and that adults may be better able to break free from ropes of lower breaking strength than ropes of greater breaking strength so these measures may benefit adults more than calves or juveniles” (emphasis added). Calves and juveniles are the future of the species, so it would seem their protection and survival is essential for species recovery. Weak rope itself also does not prevent entanglements, which may still cause stress and sub-lethal impacts to entangled whales. NMFS itself concluded in the DEIS that “continuous sublethal stress of entanglement could be impacting population health and contributing to increased reproductive intervals.”

Of further concern is NMFS’ intention to implement this measure through the use of breakaway links in vertical lines. During the February 25, 2021 ALWTRT public hearing, a member of the Center for Coastal Studies disentanglement team and co-author of the single study on reduced breaking strength rope expressed his concerns about lines breaking and making it more difficult for disentanglement teams to free entangled whales. NMFS clearly relies on disentanglement as a tool for reducing SI/M of right whales and notes that, between 2010 and 2018, seven right whales would have been added to the SI/M list had they not been disentangled. Without intervention, those whales alone would have exceeded PBR for the species. Implementing measures which may result in the loss of these whales by making

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disentanglement efforts more provides no benefit to the species or to the fishing industry, who will be once again asked to significantly modify gear at their expense because measures they were mandated to enact by the Agency did not work.

We have similar concerns with the proposed movement of the weak link/line requirement at the buoy. This appears to be an experiment that is being codified into the PR before it is tested for effectiveness. In responding to comments, we ask the Agency to provide all scientific information that this proposed measure is based on.

Removing line reduces risk, reducing its breaking strength and changing weak links based on untested theories trades one risk for another. Neither right whales nor the fishing industry should be subjected to swapping risks.

**Gear Marking:**

We have provided multiple comments over many years regarding our concerns about the woefully inadequate gear marking requirements for fixed-gear fisheries in the U.S.. Not only has the lack of gear marking hindered targeted management measures to reduce risk to endangered right whales, it is arguably the biggest source of frustration for the industry, which feels it is being asked to modify gear without any evidence of the risk posed by U.S. fisheries. Gear marking is not mitigation, and it is not intended to place blame: it is a tool that can help identify areas of risk to right whales and reduce impacts on fisheries that are not likely to pose risk. As such, we once again, strongly urge NMFS to require gear marking that is specific both to individual fisheries and to the region in which they are fished, as proposed in the non-preferred alternative, and to include groundline in the requirements. As gear marking is being implemented solely for the conservation benefit of protected species, it should not be managed by state regulations, but must be a requirement of the TRP.

**Economic Impact and Benefits of Species Recovery:**

We understand and appreciate that NMFS must evaluate potential economic impacts on fisheries as a result of the PR. However, the Agency does not appear to correct these estimates based on the actual impact, or lack thereof. For instance, in the 2013 DEIS for the previous vertical line proposed rule, NMFS estimated that the Massachusetts Restricted Area would cost between $560,000 and $830,000 per year. However, subsequent data presented in Myers and Moore (2019) found that “Massachusetts state landings value reached record highs for all three years for which

data are available since the closure was implemented (2015, 2016, and 2017).” They concluded that the “loss in landings during the high-price closure period has therefore been more than compensated for by growth in total landings.”

We urge NMFS to standardize a review of its economic analysis based on the actual impact of previous rules, and provide these data to the ALWTRT for review. We are concerned that the Agency’s broad assumptions may unnecessarily alarm industry members and their families, who view potential economic hardships that may not be born out to the extent presented.

We also believe that NMFS does a disservice to its economic review by discounting the potential benefit of reducing the need for disentanglement efforts. As stated previously, NMFS acknowledges disentanglement as a tool of the TRP and recognized that seven right whale entanglements did not result in SI/M as a result of disentanglement intervention. However, the economic value of disentanglement is not considered. It is likely that, in the absence of disentanglement, additional costly measures would have previously been required of the industry. As such, disentanglement should be viewed as an economic offset in the proposed rule. We ask NMFS to evaluate the annual average costs of retaining each disentanglement team, including its equipment, insurance requirements, and staff, and factor in this offset against the economic impact to the industry. Any additional costs per effort should also be included. As the teams must be available 365 days/year, we believe the cost for retention and response should be combined as the total value. It is important to note that the majority of these costs are currently the responsibility of the permitted NGOs, not the Agency nor the industry, which benefits from their actions. As such, we feel these costs are significant and should be considered as an offset to the economic impact of the PR.

The benefits of species recovery are also inadequately addressed. The DEIS addresses the “non-consumptive use benefits” of whale watching and the “non-use benefits” society may place on whales. However, the Agency entirely dismisses the ecological benefit of whale recovery. Whales play a role in helping to create a healthy ocean ecosystem, on which we rely to breathe, to eat, and to fight climate change. Emerging research underscores the critical role North Atlantic right whales play in the ecosystem by providing key nutrients for phytoplankton, which in turn produce most of the world’s oxygen and are the base on which fish stocks depend. Data supporting the direct link between healthy whale populations and the fight against climate change continue to grow. Researchers have found the role of whales so

https://darchive.mblwhoilibrary.org/bitstream/handle/1912/24899/Myers_Moore_pre_print.pdf?sequence=4&isAllowed=y

24 ibid.
25 https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0156553
significant they concluded that the “full recovery from one serious anthropogenic impact on marine ecosystems, namely the dramatic depletion of whale populations, can help to counter the impacts of another now underway—the decline in nutrients for phytoplankton growth caused by ocean warming.”

The pivotal contribution made by marine mammals to health of our shared planet should be a standard consideration for NMFS in all of its consultations and rulemaking for marine mammals.

Monitoring and Enforcement:

We were dismayed to find that the PR does not include a monitoring and enforcement plan. According to the Purpose and Need for Action, monitoring and compliance with regulatory actions is required, yet the DEIS states that “monitoring and enforcement will be developed in collaboration with the TRT and enforcement partners.” The substantial delay in the release of the PR and the lack of any proposed monitoring and enforcement plan only further delays protections to right whales.

Implementation Date:

During the February 16, 2021 public hearing regarding the PR, NMFS indicated that the final rule was not likely to be published until sometime during the summer of 2021. The publication of the rule, however, is not the same as implementation of the rule. For example, the most protective measures in the amended TRP issued in 2014 did not go into effect for a full year. A similar delay in implementation date for this PR would not only delay mitigation measures, but also delay the timeline of the conservation framework the draft BiOp is relying on. All subsequent delays come at the expense of right whales and the fishing industry, which is likely to be subjected to further restrictions as the species continues to decline due to NMFS’s inaction.

Other Large Whale Species:

We do not believe it is accurate for the DEIS to state that “most” of the Plan’s measures were designed to reduce risk to right whales when, in fact, all of the measures were designed with that intent. Any benefits to humpbacks, finbacks, or minkes will be incidental at best and, in some cases, this rule may result in negative impacts to these species if gear is displaced from areas of high use by right whales into areas of high use by other species.

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26 https://journals.plos.org/plosone/article/authors?id=10.1371/journal.pone.0013255
It is unclear why Sei whales were not mentioned in the DEIS. Sei whales overlap often with right whales as they prey on similar species. Additionally, there is evidence that this species is also subject to entanglements (9/16/2006 Jeffrey’s Ledge; 4/9/2008 GSC; 5/11/2016 Jeffrey’s Ledge; 4/26/2019 George’s Basin; and SI noted on 5/11/207 off NC). While SI/M for this species does not currently exceed PBR, we believe they deserve mention and consideration given they are likely feeding in proximity to right whales and risk is probably higher than what is reported.

**Right Whale Triggers:**

We ask NMFS to clarify its proposed trigger of three right whales in the Massachusetts Bay Restricted Area. Are three right whales inclusive of a cow/calf? We suggest that NMFS modify this trigger to include three individual right whales and/or the sighting of a cow/calf pair. The need to protect calving females and their progeny is paramount to the future of this species, and any sighting of a mother and calf should be a trigger for action.

**Messaging:**

We attended all listening sessions and public hearings offered by NMFS regarding the proposed rule and DEIS. Common themes were apparent: members of the general public had misunderstandings about why rulemaking was underway, the data used, and the efficacy of on-demand gear. We appreciate that these hearings were a place for NMFS to receive information and not respond to it, but we strongly urge NMFS to immediately and publicly respond accurately to the misinformation that is circulating and that the Agency helped perpetuate.

1. Rulemaking is not the result of NGO litigation. NMFS has a statutory obligation to redo the BiOp and modify the TRP based on the best available science. NGO litigation resulted from delays in NMFS actions to move forward, it did not cause the actions to be required. NMFS must clarify that it is operating based on its obligations, independent of any and all litigation or lobbying associated with these actions.
2. The data on population estimates for right whales are peer-reviewed, including by members of the Atlantic Scientific Review Group, which includes a scientist representing the Maine Department of Natural Resources.
3. On-demand gear is in progress. We do not agree with many of comments made by the industry or conservation community indicating that on-demand gear will never work or is not commercially viable at this time. Significant progress has been made over the past two years with the input of fishermen. NMFS should provide updates on its progress.
to all interested parties and prioritize the resolution of gear conflicts through geolocation as part of the TRP.

**Conclusion:**

The PR and accompanying DEIS do not consider an adequate range of alternatives, did not use the best available information on population abundance and PBR, and therefore do not achieve the risk reduction targets needed to protect right whales. As such, it also does not achieve significant risk reduction for the other large whale species it purports to protect. Implementing an insufficient rule is harmful both to right whales and to the fishermen impacted by these measures, who will inevitably be subject to additional changes and regulations as right whales continue to be accidentally entangled in their gear. We ask NMFS to immediately implement emergency measures while this PR is amended to provide sufficient protection and risk reduction to North Atlantic right whales and ensure long-term certainty for the fishing industry.

As longstanding members of the ALWTRT, we thank you for the opportunity to comment on these important documents.

Sincerely,

Regina Asmutis-Silvia  
Executive Director  
ALWTRT Conservation Member

Colleen Weiler  
Jessica Rekos Fellow  
ALWTRT Conservation Alternate
March 1, 2021

via regulations.gov


Dear Ms. Coogan,

On behalf of the Center for Biological Diversity, Conservation Law Foundation, Defenders of Wildlife, the Humane Society of the United States, Humane Society Legislative Fund, and our millions of members and supporters, we submit these comments to the National Marine Fisheries Service (NMFS) on its proposed rule to amend the regulations implementing the Atlantic Large Whale Take Reduction Plan (Plan or ALWTRP) and associated Draft Environmental Impact Statement (DEIS).

As conservation members and alternates on the Atlantic Large Whale Take Reduction Team (Team), we have forcefully advocated for NMFS to fulfill its obligations under the Marine Mammal Protection Act1 (MMPA) and Endangered Species Act2 (ESA) to protect large whales covered by the Plan, especially the critically imperiled North Atlantic right whale. The history of the Plan is the history of NMFS’s failure to meet these statutory mandates. The species—and the fisheries—now face the consequences of twenty-five years of agency denial and delay.

Since NMFS first promulgated the Plan in 1997, it has never complied with its MMPA obligation to bring mortalities and serious injuries (M/SI) in Category I and II fisheries to at or below the right whale’s potential biological removal (PBR), to say nothing of the zero mortality rate goal (ZMRG). NMFS has been equally cavalier with its ESA obligations, tacitly allowing unlawful right whale take in both state and federal fisheries without consequences. On NMFS’s watch, right whales don’t die of old age.

Yet time and again NMFS has dragged its feet in amending and implementing the Plan. It has refused to finalize proposed regulations until compelled to do so by litigation. It has failed to

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2 Id. §§ 1531–1544.
implement proactive, protective measures the right whale’s status demands and the law requires. It has acceded to certain industry demands to carve out exemptions and rollbacks from Plan requirements and caved in the face of resistance to basic measures like gear marking.

Now, nearly twenty-five years after the original Plan, the right whale—and the agency—are at a crossroads. In the decade since 2011, the right whale has lost nearly all the hard-won population gains it made the decade previously. From a peak of 483 individuals in 2011, the population has plummeted to 356 animals—only around 56 more than when the Plan was first finalized in 1997. Lethal and sublethal entanglements are killing off right whales and depressing their reproduction. Cryptic mortalities are nearly 2.5 times observed mortalities. Two-thirds of cryptic mortalities are entanglement-related. Mortalities are outpacing births by a significant and growing margin.

In short, the species is on a death march to oblivion that can only be reversed with decisive, large-scale, sweeping federal actions to address the existential threats of fishing gear entanglements and vessel strikes in U.S. and Canadian waters. If there was ever a time for NMFS to answer Congress’ clarion calls in the ESA and MMPA to save the right whale from extinction at human hands, that time is now.3

But while this crisis necessitates immediate and substantial reductions in entanglements, NMFS has proposed a rule that will accomplish neither. NMFS does not even pretend that this rulemaking will satisfy the MMPA’s immediate requirement to bring M/SI below PBR, explicitly putting off that goal for a full decade longer under its Conservation Framework. The proposed measures are highly unlikely to meet even the inadequate 60% risk reduction target NMFS set based on now-outdated data, let alone the much higher risk reduction target that new data on population estimates, PBR, and cryptic mortality necessitate. The DEIS does not satisfy the National Environmental Policy Act’s (NEPA) requirements for analyzing a full range of reasonable alternatives that meet the purpose and need of this rulemaking. And as described at length in our recent comments on the draft Biological Opinion (BiOp), NMFS cannot finalize that document as drafted without violating the ESA.

In short, NMFS cannot conclude this rulemaking within the parameters and proposals it has proffered for public comment without violating the MMPA, NEPA, and the ESA. If it proceeds as planned NMFS will inevitably face litigation while subjecting industry to costly, disruptive, and ultimately insufficient regulatory measures and wasting more months and years that the critically endangered right whale does not have to spare.

The only reasonable course of action is for NMFS to withdraw the proposed rule and take it (along with the DEIS and draft BiOp) back to the drawing board to bring them into compliance with the law. In the interim, NMFS must act on our December 2, 2020 petition for emergency rulemaking under MMPA section 118(g) by: (1) finding that the incidental mortality and serious injury of right whales from commercial fisheries is having an immediate and significant impact on the species; and (2) prescribing emergency regulations, including temporary closures, to protect right whales in the interim while developing, approving, and implementing Plan amendments that will satisfy NMFS’s legal obligations while setting the right whale and the

3 The United States must also aggressively engage in an open and transparent process with Canada to ensure that appropriate risk reduction measures are implemented bilaterally.
commercial fisheries on a sustainable path forward.

While revising the rule, the agency should clarify for the public and the industry that it must take this action to address long standing legal requirements under the ESA and MMPA, not only the court decision which required the agency to do what the law already required of it. In addition, the agency should clarify that a particular risk reduction target is not equivalent to the same reduction in fishing effort. Regardless, ignoring new scientific data will not adequately protect right whales or the industry which will be told, once again, that despite implementing costly modifications, they were not enough.

I. TIMING OF THE PROPOSED RULE/NEPA ANALYSIS RELATIVE TO THE FINAL BIOLOGICAL OPINION

The agency is well aware that it must complete its new biological opinion by May 31, 2021. Yet NMFS staff have stated several times during the course of informational meetings and public hearings on the proposed rule that the agency expects to complete the final rule and Final Environmental Impact Statement (FEIS) sometime this summer, with the Record of Decision (ROD) to follow after a 30-day minimum waiting period. We are deeply concerned that if NMFS follows through on its plan to complete the biological opinion months earlier than the final rule and FEIS/ROD, it will violate the ESA, the Administrative Procedure Act (APA), or both. This approach would also contradict representations that NMFS made in federal court—representations on which the Court based its decision.

A biological opinion must be coextensive with the agency action it analyzes and must analyze the effects of the entire agency action. Conner v. Burford, 848 F.2d 1441, 1453, 1457–58 (9th Cir. 1998); see also id. at 1453. We have already detailed the extensive defects in the agency’s definition of the proposed action in our comments on the draft BiOp. We need not reiterate those here to state the obvious: if NMFS has not yet decided on the measures to be promulgated in the final rule amending the Plan, it cannot complete a meaningful and lawful biological opinion without the certainty of what the final action—and thus the effects of the entire agency action—will be. See Ctr. for Biological Diversity v. Ross, Case No. 18-cv-112 (D.D.C.), ECF No. 111-1 (Fourth Declaration of Jennifer Anderson) at para. 14 (“Completion of the Biological Opinion is linked to completion of the rulemaking process, as the analysis of the effects of the fisheries as modified by the rulemaking necessitates knowing what measures will be in the final rule.”). A biological opinion issued when the agency action itself is not final is ipso facto incomplete and unlawful.

As is equally obvious, NMFS must have a valid biological opinion on the state of the world as it exists (i.e., on the ongoing authorization and management of state and federal fisheries as regulated by the Atlantic Coastal Fisheries Cooperative Management Act, the MMPA and the Magnuson-Stevens Fishery Conservation and Management Act), not a biological opinion on future measures not in effect yet. If NMFS issues a final biological opinion that relies on future measures in the final rule and FEIS/ROD, it will continue to be in violation of sections 7 and 9 of the ESA.

NMFS also risks violating the APA’s notice and comment requirements if it rushes to finalize its
MMPA decision for purposes of the ESA consultation but then publishes the final rule months later, particularly if it has still not finished analyzing and responding to public comments. The APA obligates NMFS not only to analyze and respond to the public’s comments on the proposed rule but to make reasoned choices in its final rule and to alter course where justified. That requires the agency to keep a mind sufficiently open to change based on public comments. See, e.g., *Grand Canyon Air Tour Coal. v. FAA*, 154 F.3d 455, 467–68 (D.C. Cir. 1998) (“An agency is required to provide a meaningful opportunity for comments, which means that the agency’s mind must be open to considering them”).

If NMFS renders its final decision on what measures to incorporate in the final rule amending the Plan for ESA consultation purposes but still has not completed its FEIS, let alone the ROD, it will have violated NEPA. That statute’s twin aims are informing decisionmakers and informing the public both to stimulate public involvement in federal agency decisionmaking and to ensure agency accountability. *See Dep’t of Transp. v. Public Citizen*, 541 U.S. 752, 768 (2004) (describing NEPA as intended to “provid[e] a springboard for public comment” (alteration in original)); *New Mexico ex rel. Richardson v. Bureau of Land Mgmt.*, 565 F.3d 683, 703 (10th Cir. 2009) (“By focusing both agency and public attention on the environmental effects of proposed actions, NEPA facilitates informed decisionmaking by agencies and allows the political process to check those decisions.”). NMFS must take this hard look “objectively and in good faith, not as an exercise in form over substance, and not as a subterfuge designed to rationalize a decision already made.” *Metcalf v. Daley*, 214 F.3d 1135, 1142 (9th Cir. 2000). If NMFS has already decided for ESA consultation purposes what its action will be long before the FEIS and ROD issue, the NEPA process will have been a meaningless exercise.

Additionally, in *Center for Biological Diversity v. Ross*, the Court vacated the previous 2014 biological opinion, but stayed that vacatur until May 31, 2021 based explicitly on NMFS’s representations for how much time it would need to complete the final rule, not just the new biological opinion. For example, the Court stated: “vacatur of the 2014 BiOp is appropriate, but [] relief shall be stayed until May 31, not January 31, 2021, to give Defendants time to complete the new rule and BiOp.” 480 F.Supp.3d 236, 240 (D.D.C. 2020) (emphasis added). The Court based its decision on the fact that:

NMFS currently estimates that it will publish a final amended Take Reduction Plan and implementing regulations by May 31, 2021. *See* Fourth Anderson Decl., ¶¶ 11–13. The agency intends to issue a new BiOp (presumably including an ITS this time, if required) for the lobster fishery simultaneously with publishing the final amended Plan, as the required “analysis of the effects of the fisheries [on the right whale] ... necessitates knowing what measures will be in the final rule.” Defs. Remedy Opp. at 10–11.

*Id.* at 243. Indeed, after finding that NMFS’s “timetable for completing the rulemaking process is reasonably consistent with the MMPA,” the Court stated: “[a]lthough the Court therefore finds the May 31, 2021, deadline acceptable, it will look with considerable disfavor on any future requests by NMFS for even more time to complete the new rule and BiOp.” *Id.* at 249 (emphasis added).
A. NMFS Has a Decades-Long History of Failing to Implement Measures Sufficient to Meet PBR

NMFS has lost sight of several critical aspects of section 118 in the nearly twenty-five years it has administered the ALWTRP. First, Congress did not intend to allow NMFS decades to reduce right whale M/SI to below PBR or to give the agency leeway to promulgate a Plan or amendments that admittedly will not meet this target at all. Second, Congress expressly stated that reducing M/SI to below PBR is only an interim goal on the way to ZMRG. Third, Congress explicitly allowed NMFS to take into account economic and other factors in a Plan only if M/SI is below PBR and on its way to ZMRG.


Section 118 requires NMFS to develop a take reduction plan for Category I and II fisheries that interact with “strategic stocks,” including ESA-listed marine mammals. Id. §§ 1387(f)(1), 1362(19)(C). The statute specifies that, as a short-term goal, each take reduction plan must contain regulatory measures to reduce fishery-related mortality and serious injury to below the species’ PBR within six months of the plan’s implementation. Id. § 1387(f)(2), (f)(5)(A), (f)(7)(F). The true goal of section 118 is not PBR but ZMRG. Id. § 1387(b). Therefore, the long-term goal of a take reduction plan must be to reduce, within five years of its implementation, incidental mortality and serious injury “to insignificant levels approaching a zero mortality and serious injury rate.” 4 16 U.S.C. § 1387(f)(2).

Congress did not entrust NMFS with the latitude to interpret a reasonable timeframe for accomplishing section 118’s goal for species like the right whale. Rather, it established section 118’s “immediate” goal “that the incidental mortality or serious injury of marine mammals occurring in the course of commercial fishing operations be reduced to insignificant levels approaching a zero mortality and serious injury rate within 7 years after April 30, 1994.” Id. § 1387(a)(1) (emphasis added); see also id. § 1387(b)(1) (“Commercial fisheries shall reduce incidental mortality and serious injury of marine mammals to insignificant levels approaching a zero mortality and serious injury rate within 7 years after April 30, 1994”).

Congress thus set clear expectations for NMFS to reduce M/SI of right whales in commercial fisheries to below PBR and to ZMRG by dates certain, as NMFS acknowledged in promulgating the original 1997 ALWTRP. See 62 Fed. Reg. 39,157, 39,159 (Jul. 22, 1997) (MMPA required Plan to reduce right whale M/SI below PBR of 0.4 animals per year by January 1998 and further reduce M/SI to ZMRG by April 30, 2001 while taking into account fisheries economics, etc.). Yet the Plan not only failed to accomplish these statutory mandates by the congressionally-set deadlines, it has not even managed to keep pace with the increasing rates of M/SI in U.S.

4 NMFS defines “insignificant levels approaching . . . zero” or “ZMRG” to mean 10% of a stock’s PBR. 50 C.F.R. § 229.2.
commercial fisheries.

Although NMFS cannot turn back the clock to comply with prior deadlines, it is equally obvious that it may not continue to push substantive compliance with the statute off to some future point one minute longer. Congress did not give NMFS a free hand to determine when a Plan or its amendments will fulfill section 118’s mandates, such as NMFS is now purporting to do with the proposed rule and Conservation Framework that optimistically (and unrealistically) project finally achieving M/SI reductions below PBR five to ten years from now.

Nor did Congress give NMFS a free hand to determine whether a Plan or its amendments will meet the statutory mandates at all. The language of section 118 allows no exceptions: any take reduction plan or amendments thereto shall include measures to reduce M/SI to below PBR, and, thereafter, shall be amended as necessary to meet section’s 118 requirements (i.e., ZMRG). See, e.g., 16 U.S.C. § 1387(f)(7)(C), (F).

B. Economics Only Comes into Play When Analyzing ZMRG

Section 118 does not authorize NMFS to promulgate amendments that yet again attempt merely to reduce the risk of commercial fisheries on right whales, e.g., 85 Fed. Reg. at 86,879; it must promulgate measures that will in fact meet the statutory targets of reducing M/SI to below PBR and ultimately to ZMRG. NMFS knows full well that the proposed rule will not meet PBR; at the very, very best, it will bring down M/SI to more than three times PBR.5

From the very outset, NMFS has imputed to itself discretion under section 118 to subsume the requirement to bring right whale M/SI below PBR through the Plan (which it has never succeeded in doing) to its desire to minimize economic impacts to the fisheries. See 62 Fed. Reg. at 39,159 (rejecting approach of extensive closures that would guarantee M/SI “but only at a high cost to many fishermen” and instead choosing an approach relying on untested gear modifications, limited closures, and disentanglement efforts); id. at 39,182 (“Widespread closures, although they might achieve the goals of the MMPA, would be economically costly. Such huge economic costs would not be necessary if disentanglement efforts and gear modifications are successful in reducing bycatch to MMPA standards.”). Yet section 118 itself does not support that exercise of discretion, as illustrated by the very different language Congress used in the two sentences composing section 118(f)(2)’s commands for a strategic stock such as the right whale. The first sentence reads:

The immediate goal of a take reduction plan for a strategic stock shall be to reduce, within 6 months of its implementation, the incidental mortality or serious injury of marine mammals incidentally taken in the course of commercial fishing operations to levels less than the potential biological

removal level established for that stock under section 1386 of this title.

16 U.S.C. § 1387(f)(2). Only after that goal has been accomplished does the second sentence allow the agency to balance how to accomplish the long-term goal, i.e., ZMRG, against the fisheries’ interests:

The long-term goal of the plan shall be to reduce, within 5 years of its implementation, the incidental mortality or serious injury of marine mammals incidentally taken in the course of commercial fishing operations to insignificant levels approaching a zero mortality and serious injury rate, taking into account the economics of the fishery, the availability of existing technology, and existing State or regional fishery management plans.

Id (emphasis added). Congress clearly intended NMFS to immediately reduce M/SI below PBR; only after that immediate goal has been achieved may NMFS balance the requirement to further reduce M/SI to ZMRG with fisheries economics and other concerns.

For twenty-four years now, NMFS has administered, and, from time to time, amended, a Plan based on the hope that gear modifications and limited closures will achieve in bringing right whale M/SI down to PBR, falling well short of the six-month deadline and the goal of the statute.

II. NONE OF THE PROPOSED MEASURES ADEQUATELY REDUCE RISK

Our organizations do not support either Alternative 2 (Preferred Alternative) or Alternative 3 in the DEIS for several reasons including: (1) that they cannot adequately reduce risk to right whales as packaged; (2) many of the assumptions upon which they allegedly reduce risk are unfounded; (3) to the extent they incorporate state measures they are not yet added to the TRP; and (4) an admitted lack of enforcement beyond 12 nautical miles makes their effectiveness questionable. Neither do we support Alternative 1, the “No Action Alternative,” as action is clearly needed.

According to the proposed rule, the Preferred Alternative will “achieve a greater than 60-percent reduction” in risk by ultimately implementing measures falling into four main categories: (1) gear modifications intended to reduce the number of vertical lines; (2) seasonal restricted areas that would allow ropeless fishing; (3) the replacement of buoy lines with weak rope or weak insertions; and (4) additional gear marking requirements. 85 Fed. Reg. at 86,881, 86,885. In the DEIS, NMFS estimates that the Preferred Alternative could reduce risk by up to 64.3%. DEIS Vol. I at 3-68.

Alternative 3 analyzes similar measures as well as: (1) larger, longer, and additional seasonal restricted areas; (2) a line cap allocation capped at 50 percent of the lines fished in 2017 in federal and non-exempt waters throughout the Northeast except in offshore LMA3; and (3) more robust gear markings. NMFS indicates that Alternative 3 could reduce risk by up to 72.6%. DEIS Vol. I at 3-69.
A. The Risk Reduction Targets are not based on the Best Scientific and Commercial Data Available

Nearly two years ago, NMFS provided the Atlantic Large Whale Take Reduction Team (TRT) with a 60-80% risk reduction goal based on 2016 population estimates and a PBR of 0.9. Id. at 3-47, 67. At the time, NMFS indicated that, if cryptic mortalities were included in its analysis, the average annual rate of serious injuries and mortalities from entanglement in U.S. fisheries was 4.3 and “would have to be reduced by about 80% in U.S. fisheries to get below the stock’s PBR of 0.9.” Since that time, NMFS has revised its population estimates and average annual rate of serious injuries and mortalities resulting from incidental entanglements in U.S. fishing gear. In its recently published draft BiOp, NMFS stated: “Using the methods in Pace et al. (2017), this year’s preliminary estimate is 366 (95% credible interval range of 353-377) individuals as of January 2019.” Using 366 as the Nmin, PBR is now 0.7. Table 57 of the draft BiOp estimates the annual average M/SI of right whales from U.S. fishery entanglements as 6.724. Thus, using NMFS’s own methodology and updated data, the risk reduction target required to reduce M/SI in US fisheries is closer to 90%.

The proposed rule needs to be revised to achieve M/SI below PBR (at minimum). That is especially true considering other new information, including an updated paper from Pace et al. (2021) that determined based on data from 2010–2017 that the observed mortality detection rate was only 29% of total mortality, leaving 71% of mortalities undetected, and the estimate from the New England Aquarium that the number of right whales alive at the end of 2019 was only 356 individuals, as few as 70 of which were breeding females.

B. The Gear Modifications Proposed to Reduce the Number of Vertical Lines Cannot Adequately Reduce Risk

The proposed rule describes 2 major gear modifications necessary to reduce the number of vertical lines in the Preferred Alternative: (1) increasing the number of traps on a trawl (“trawling up”); and (2) extending the maximum trawl length (distance between endlines) in LMA3. 85 Fed. Reg. at 86,881. NMFS also analyzes capping line allocations at 50 percent of average monthly lines in federal waters in the DEIS for Alternative 3. See DEIS Vol. I at 1-7. We address each of these in turn.

1. Trawling Up and Line Caps

Every vertical line in the water increases entanglement risk for right whales. Trawling up is one method to reduce the number of vertical lines and could encourage efficiency. However, trawling up will only be guaranteed to reduce the number of vertical lines in the water (and thus risk) if it is combined with a line cap providing a concrete metric for reductions from the baseline. See

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7 PBR = Nmin x 0.5 (Rmax) x Fr. In this case, 0.7 = 366 x 0.2 x 0.1.
DEIS Vol. II at 5-143 (indicating that a 50% line cap reduction would reduce entanglement risk by 45% in federal waters and stating that trawling up alone is insufficient to reduce vertical line numbers). According to a September 18, 2018 TRT presentation, the number of vertical lines in the Northeast region has increased since the 2013 vertical line reduction rule was implemented. Even considering the possibility of a statistical error, there was no significant decrease detected from the implementation of the rule. This combination would hold the fisheries accountable and could prevent latent effort from being realized. See DEIS Vol. II at 5-139 (discussing need for a mechanism to prevent latent effort from being activated).

It is not clear, however, that trawling up necessarily reduces risk to right whales (especially to juvenile and calves). Quantitative data on the relationship between gear configurations and the probability of causing serious injuries and mortalities is largely lacking. DEIS Vol. II at 3-12. For example, an inshore fisherman forced to fish 15 rather than 5 traps/trawl may choose heavier line thus increasing risk. On the other hand, an offshore fisherman forced to fish 45 rather than 25 traps/trawl is already using heavy line and probably does not significantly increase risk as a right whale will likely drown under either scenario given the weight of the gear. See e.g., DEIS Vol. II at 3-47-48.

Fishermen have raised safety concerns related to trawling up. It is logical to expect that trawling up could be more difficult on a smaller vessel (where the deck may not be able to accommodate the increased number of traps), or for Captains fishing alone. For those reasons, our organizations do not oppose the conservation equivalency proposed for LMA3, that would increase the maximum length of a trawl from 1.5nm to 1.75 nm to allow a limited number of vessels to fish more than 45 traps per trawl so that smaller vessels can fish less traps/trawl due to safety concerns. 85 Fed. Reg. 86,886.11

Although the proposed rule only seeks comment on the Northeast American lobster fishery, it is our view that all fisheries using vertical line, including but not limited to aquaculture, must be considered in this cap. Placing the sole burden of vertical line reduction on the lobster and Jonah crab fishery does little to reduce risk to right whales if risk is increased elsewhere by permitting other fisheries and activities. Data provided in the DEIS, indicate that gillnets pose a disproportionately high risk of entanglement to right whales. See DEIS Vol. I at Table 2.2 showing that gillnet/netting represents 47% of known fishery entanglements to right whales, yet gillnets represent only 1.9% of vertical lines in non-exempt waters (Table 2.3 of DEIS Vol. I)).

To reduce the number of serious injuries and mortalities below PBR, NMFS must evaluate the vertical line risk in all fisheries and identify a regulatory mechanism for implementing line caps as soon as possible.

2. **NMFS Should Require the Use of One End-Line**

The DEIS states that fishing with one end-line was “considered but not analyzed” due to industry concerns about safety, increased gear conflict, and increased gear loss. DEIS Vol. II at 5-138. Given that none of the measures in the proposed rule adequately reduce risk to right whales and

11 Pers. comm. with TRT member David Borden (only a limited number of vessels will want an exemption from the 45 trap/trawl requirement.)
that the remaining measures that would adequately reduce risk are not generally attractive to the industry either, NMFS should fully analyze this option as part of its do-over.

To immediately reduce the number of vertical lines outside of closures, NMFS should require all trap/pot fisheries operating in the Northeast to use a single surface end-line in those areas where right whales are known or expected to be (either socializing, transiting, feeding, or breeding). This immediate 50% reduction in endlines would reduce risk. Understanding that additional gear conflicts could occur in the absence of surface markings, agreements about the direction of gear sets should be developed by industry members fishing in specific regions and sharing agreements with the mobile gear fleet should be drafted (as they already are in certain areas).

C. The Seasonal Restrictions to Buoy Lines Proposed Will Not Adequately Reduce Risk

Both the Preferred Alternative and Alternative 3 propose new restricted areas that are inadequate to reduce risk sufficient to meet PBR. It is also difficult to discern how NMFS evaluated risk related to gear displacement for the specifically identified closures. See DEIS Vol. II at 3-36 (only analyzing redirected effort generally and modelling redirected effort for the Northeast Canyons and Seamounts National Marine Monument) While it is likely that some portion of gear (traps and lines) will be moved or removed, a risk analysis that looks at the impact of such gear displacement should be considered before assuming the costs or benefits. To the extent that NMFS relies on state measures to reduce risk, it must incorporate those into the Plan.

Our organizations support the following new Restricted Areas:

- The LMA1 Restricted Area in Alternative 3—Offshore ME LMA1/3 border, zones C/D/E—closed from October to February that allows fishing without buoy lines (with appropriate authorizations for exemption from surface gear requirements).

- The “Large Rectangular Area” in Alternative 3 in Southern New England, as modified to be a year-round restricted area closed to buoy lines with allowances for fishing without buoy lines (with appropriate authorizations for exemption from surface gear requirements).

1. The LMA1 Restricted Area in Gulf of Maine

Based on the best commercial and scientific data available in the public domain, including acoustic data, we support the LMA1 Restricted Area analyzed in Alternative 3 which closes the area to vertical buoy lines October - February. This area has been identified as a “foraging hotspot” for right whales using the Duke Habitat Model within the Decision Support Tool and poses a higher than average risk based on co-occurrence. DEIS Vol. I at 3-71, 72. It is also our understanding that based on the demographics of the fleet operating within the boundaries denoted and testimony at public hearings, that at least some of the gear will come out of the water minimizing risk due to shifted effort.
We oppose the trigger process described in the Preferred Alternative that allows the Regional Administrator the discretion to make a decision about this closure based on non-identified criteria. Any proposal to close an area to fishing should be based on sound science and demonstrate a tangible risk reduction to right whales, thus it is unclear how a proposed closure would no longer be warranted simply based on public input or whatever conservation equivalencies would be established in place of this closure if it is removed. Ironically, this is contradictory to what the agency has said elsewhere about its ability to do NEPA analysis on dynamic management.

2. The Massachusetts South Island Restricted Area in the Preferred Alternative is Insufficient

Our organizations do not support the Preferred Alternative - “South Island Restricted Area” - that closes an area south of Nantucket from February through April because the area is too small in time and space. A large body of science demonstrates a year-round presence of right whales in Southern New England. Based on this data, as well as the size of previously established restricted areas in the Plan, we support the “Large South Island Restricted Area” analyzed in Alternative 3. However, we urge the agency to make this a year-round closure to vertical buoy lines. Modifying the Large South Island Restricted Area to restrict vertical buoy lines year-round would be the most protective and fully account for the variable habitat use of this region by right whales.

Right whale distribution and habitat use has shifted since 2010 in response to climate change-driven shifts in prey availability. The best scientific and commercial data available, including aerial surveys, acoustic detections, stranding data, a series of DMAs declared by NMFS pursuant to the ship strike rule, and prey data, all indicate that right whales now heavily rely

16 NMFS Interactive DMA Analyses: https://www.nefsc.noaa.gov/rcb/interactive-monthly-dma-analyses/.
on Southern New England waters.\textsuperscript{18} In January 2019, an aggregation representing a quarter of
the population—100 whales—was seen in this area\textsuperscript{19} engaged in both foraging and social
activities, demonstrating that it is clearly more than just a migratory corridor. Southern New
England is important to all life history stages.\textsuperscript{20} Surface Active Groups have also been
documented in this region\textsuperscript{21} and, given the gestation period of right whales, this behavior is more
likely to result in pregnancy during the winter months.

Large, consistent aggregations of right whales in all four seasons, have led scientists and a
NMFS Expert Working Group to describe Southern New England as a year-round foraging
“hotspot.”\textsuperscript{22} Several other scientific data sources demonstrate that right whales use these waters
year-round.\textsuperscript{23} Further, a recent presentation at the North Atlantic Right Whale Symposium
discussed new evidence showing that 11 out of 15 newly catalogued whales identified south of
Cape Cod have never been sighted further north in the Bay of Fundy or the Gulf of St.
Lawrence,\textsuperscript{24} and suggesting this area may represent an end-point of the northern migration for
some portion of the population.

In addition to year-round use of the area, the relative abundance in the area has increased. For
example, there is evidence of a broader temporal shift in distribution resulting in greater
densities off Rhode Island and Massachusetts later in the year, through May and into the summer
months.\textsuperscript{25} April appears to be particularly important for females of reproductive age.\textsuperscript{26} Inter-
annual and inter-seasonal variability in aerial and acoustic detections imply that there are no
clear spatial patterns of habitat use across Southern New England and right whales should be
expected to be encountered equally across the region.\textsuperscript{27}

\textsuperscript{18} Although there are challenges in the use of opportunistic sightings data (no area systematically surveyed, effort
not corrected for, and potential for counting an individual whale more than once), they are a proxy for habitat used
by North Atlantic right whales, as validated by NMFS’ management actions based on these data, including the
implementation of DMAs.
\textsuperscript{19} NMFS, Voluntary Vessel Speed Restriction Zone in Effect South of Nantucket to Protect Right Whales (Jan. 28,
protect-right-whales.
\textsuperscript{20} Leiter et al. 2017, at 52–54.
\textsuperscript{21} Id.
NOAA Technical Memorandum NMFS-OPR-64, at Fig. 1.
\textsuperscript{24} Hamilton, P., “North Atlantic Right Whale Catalog Update, Recent Genetic Findings and Whale Naming
\textsuperscript{26} Leiter, S.M., et al., “North Atlantic right whale \textit{Eubalaena glacialis} occurrence in offshore wind energy areas near
\textsuperscript{27} Id.; DMAs; Redfern, J., Pendleton, D., O’Brien, O., Ganley, L., Hodge, B. and McKenna, K., “Tools to identify
and minimize risk to marine mammals,” Presentation to the Massachusetts Habitat Working Group (Dec. 11, 2020).
Finally, the Preferred Alternative could result in redirected effort into areas of high risk as the Commonwealth of Massachusetts did not close state waters south of the islands after all. Given the potential for this area to be a winter mating ground as well as preferred habitat for at least some calving females, it is essential that it be afforded significant protection from both vessel strikes and entanglements. We **strongly urge NMFS to modify the entire Large South Island Restricted Area as a Seasonal Management Area to simultaneously reduce vessel strike risks.**

3. **The Georges Basin Restricted Area**

Alternative 3 analyzes a buoy line closure in the “Georges Basin Restricted Area” between May and August. Our organizations support closures that do not cause predictable relocation of lines to areas of high co-occurrence with right whales, inadvertently displacing risk. This particular offshore area in Georges Basin is important to right whales as plankton data demonstrates its importance as foraging habitat and sightings data (albeit rare currently) as well as telemetry data suggest that this may be a transit corridor for whales moving between the Gulf of St. Lawrence and the Gulf of Maine. See DEIS Vol. II at 3-62 (showing increased right whale density along the northern edge of Georges Bank from April through September). However, those benefits are only afforded if gear does not shift into areas of increased risk. Given the size and demographic of the fishing effort there, it is our view that these traps/vertical lines are unlikely to come out of the water between May and August and it is more likely than not that they will relocate into equally high risk areas.

For that reason, we have concerns that a full closure of the area proposed could increase risk by shifting effort south and west resulting in even higher densities along the corridor. Given the potential for the northern edge of Georges Bank to be a regular route between the Gulf of St. Lawrence and Gulf of Maine, we **recommend that NMFS only allow trap/pot fishing with one end line along the entire northern edge of Georges Bank from April – September, as an alternative to the Georges Basin Restricted Area proposed.** While it would not entirely remove risk, it would reduce risk to a larger spatial area by 50% without incurring additional costs to the industry. In addition, NMFS should send an enforcement boat to the area on a regular basis (at least once per week) and perform additional surveys (aerial and vessel) to better understand right whale abundance and behavior while using the area.

28 Sean Horgan, Fish panel bans inshore lobstering during whale migration, Gloucester Times, Jan. 28, 2021 https://www.gloucestertimes.com/news/fish-panel-bans-inshore-lobstering-during-whale-migration/article_761e98de-6196-11eb-b9f6-c3c00dd2aecc.html; MA DMF, February 19, 2021, “New Protected Species Regulations Finalized for Fixed Gear Fisheries and Industry Outreach on Required Gear Modifications,” https://content.govdelivery.com/accounts/MADMF/bulletins/2c2930d. This highlights why NMFS cannot rely on any risk reduction measures unless those measures are specifically incorporated into the ALWTRP—only then can NMFS assure such measures will in fact be legally required as part of the ALWTRP. NMFS cannot delegate its legal obligation to adopt measures to reduce M/Sl to the states.


D. Weak Rope Will Not Reduce the Risk of Entanglement

1. “Weak Rope” and “Weak Insertions” are Unproven Conservation Measures

Our organizations do not support the weak rope or weak link insertions analyzed in the DEIS. The use of weak rope or weak insertions is unproven and cannot guarantee the projected risk reduction goals in the proposed rule.31 Any assumptions about the efficacy of weak rope or weak contrivances for reducing serious injuries and mortalities are just that—assumptions—that are largely theoretical and untested in the field.

We have previously expressed concerns regarding the efficacy of using 1,700 lb breaking strength rope. At this time, it is neither commercially available nor proven to reduce serious injury and mortality to right whales. The data presented in Knowlton et al. (2016) were obtained prior to 2011, before right whales significantly shifted their habitat use.32 In addition, the breaking strength does not appear to reduce risk of serious injury or mortality to right whales under two years of age. Indeed, the single paper on which the concept of weak rope as a mitigation measure was developed is based on the “suggestion” that “adult right whales . . . can break free from [] weaker ropes and thereby avoid a life-threatening entanglement.” Younger right whales (calves and juveniles), as well as smaller whales of other species, have a much lower force output than adult right whales,33 and are less likely to be able to break even lower-pound breaking strength rope.

NMFS’s application of the weak inserts is also problematic as they do not go the entire length of the rope. In the preferred alternative, weak insertions are only proposed down to 50 percent in the rope in nearshore areas and 35 percent in offshore areas. DEIS Vol. I at 1-15.

As NMFS acknowledges in the DEIS, lower-pound breaking strength ropes may reduce the severity of the entanglements, but they will not reduce the encounter rates and associated risk including serious injury or mortality and longer-term sublethal impacts depending on the complexity and specifics of an entanglement event. Id. For example, even so-called weak rope could wrap around a whale’s mouth and damage its baleen, thereby impeding its ability to feed, leading to weight loss and starvation. Even if that weight loss is not fatal in and of itself, in females it can contribute to delayed reproduction.34 During the February 25, 2021 ALWTRT public hearing, a member of the Center for Coastal Studies disentanglement team and co-author of the single study on reduced breaking strength rope, expressed his concerns about lines breaking and making it more difficult for disentanglement teams to free entangled whales.35

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31 DEIS Vol. I at 3-68, Table 3.4.
On that note, NMFS inappropriately relies on disentanglement as a tool toward reducing M/SI of right whales and notes that, between 2010 and 2018, seven right whales would have been added to the M/SI list had they not been disentangled. DEIS Vol. I at 2-30; see also id. at 3-76. Without intervention, those whales alone would have exceeded PBR for the species. Implementing measures which may result in the loss of these whales by making it more difficult to disentangle them provides no benefit to the species or to the fishing industry who will be once again asked to modify gear at their expense because measures they were mandated to enact by the Agency did not work.

We have similar concerns with the proposed movement of the weak link/line requirement at the buoy. This appears to be an experiment that is being codified before it is tested. In responding to comments, we ask the agency to provide the scientific information that this proposed measure is based upon.

The agency’s reliance on weak rope, contrivances or toppers to reduce risk, especially in offshore areas, is particularly unreasonable where (1) lobstermen use a large number of pots per trawl, and have expressed concerns about safety and lost gear; (2) the area is of particularly high risk for right whales due to the heavier line and increased number of traps used there; and (3) there is evidence that whales that become entangled near the bottom (where there will not be nearby weak insertion) have more complex entanglements and cannot break free as easily.36

2. **Weak Rope Inhibits Species’ Recovery**

After 50 years of management, conservation and management measures to date have wholly failed to recover the species. A recently published paper summarizing the spiraling health of right whales, the increasing threats they face, and the tools that will be critical for their conservation.37 The paper concludes that the use of weak rope as a management measure is inconsistent with the recovery of the species and that “to enable species recovery, reduction in mortalities have to be accompanied by substantial reduction of sub-lethal trauma as well,” stating:

> The role of sub-lethal entanglement drag in reducing NARW health and fecundity should be a major consideration in comparing the efficacy of potential mitigation measures. Thus, while 1700 lb (~773 kg) breaking strength rope may reduce mortality and severe injury, it will continue to be a source of morbidity. Ultimately, removal of rope from the water column will better enable species recovery.38

38 *Id.*
NMFS’s Risk Reduction Analysis Uses a Flawed Baseline

NMFS estimates that 26% percent of the vertical lines in the water will be converted to weak rope in the Preferred Alternative, and 73% will be converted to full weak rope in Alternative 3 accounting for approximately significant reductions in risk. DEIS Vol. I at 1-15; DEIS Vol. I at 3-68, Table 3.4. For this analysis, the agency unreasonably assumes that inserts placed at least every 40 feet. are equivalent to full weak rope. Id. at 1-14. The analysis which compares various proposed insert intervals to a line with weak inserts every 40 feet (“lower bound”), and also recognizes the depth of the lowest insert (upper bound),\(^3\) is flawed. Weak inserts every 40 feet cannot be used as the baseline for determining the percentage of risk reduction that a “full weak rope,” would provide because that risk reduction is unknown. Any calculation of the relative risk reduction of the lesser weak insertion methods proposed, should calculate risk reduction relative to no ropes in the water (i.e., zero risk), not a line with inserts every 40 feet.

E. Improved Gear Markings Are Necessary but Will Not Reduce Risk

In our view, none of the gear marking measures analyzed or proposed in the DEIS are sufficient. We strongly urge NMFS, again, to require gear markings that are specific to the fishery and region in which it is fished, and that can be seen from a plane or boat. Appropriate gear marking requirements should also include requirements for groundlines. In addition, as gear marking is implemented solely for the conservation benefit of right whales, it should be a requirement of the Plan rather than managed by state regulations.

Insufficient gear marking requirements for fixed-gear fisheries in the U.S. have demonstrably hindered targeted management measures to reduce risk to endangered right whales. Our organizations have commented several times over the last five years on this issue, yet NMFS has failed to implement new gear marking requirements. In most cases, NMFS cannot determine the origin (to fishery or country) of the gear documented on and/or removed from right whales to the detriment of whales and the fisheries implicated. DEIS Vol. I at 1-5; 2-40. A better understanding of gear origin, particularly since 2010, is necessary to define areas of high risk to the species and is long overdue. In addition, NMFS should work with gear specialists in both the U.S. and Canada to re-analyze gear documented on, or removed from, entangled large whales in the past.

We strongly urge NMFS to require gear marking that is specific both to a fishery and to the region in which it is fished, and that supports observation of marks from platforms such as boats and planes. It is apparent that the current requirement for gear marking is too broad, enabling at least some industry members to deny potential risk from their fishery, even when the gear removed from whales is consistent with that fished in that region.\(^4\) For instance, NMFS’s right whale incident data includes several cases of retrieved gear which was marked with a red tracer.

\(^3\) “The lower bound compares the proposed insert intervals relative to insert intervals every 40 ft and provides the percentage of rope within buoy lines that would be considered weak by that metric. The upper bound recognizes that the depth of the lowest insert is important; a whale hitting the line above the lowest weak insert could break away, preventing attachment to the bottom gear and an acute drowning event, and possibly before a serious entanglement injury can be incurred. That upper bound is the estimated percent of line above the lowest weak insert.” Id.

and was attributed to the “Northern inshore/nearshore trap” fishery but in only once case was it identified as lobster gear. More specified gear marking requirements under the Plan would substantially reduce the equivocation of which fisheries do, in fact, pose demonstrable risk to the species.

There are also compelling cases in NMFS’s own data set for which gear remains categorized as unknown but for which gear determination cannot rule out U.S. fisheries. For example, right whale 4146 was documented as entangled on April 23, 2017, entangled and images indicate that the entanglement appears recent and therefore likely to have occurred in U.S. waters. Similarly, right whale 4091 is listed on a NMFS incident report on May 12, 2018 as having “Line trailing from right mouthline, with at least one pectoral wrap, and trailing 50 ft. Buoy pinned close to flipper.” As stated previously, this whale was sighted gear free in the Cape Cod Bay only six days earlier. It is most likely the whales became entangled in U.S. waters and the most likely source of line in U.S. waters is from U.S. fixed fishing gear. However, in neither case does NMFS provide any attribution of gear. We therefore suggest NMFS include a category in their assessment clarifying when U.S. fishing gear cannot be ruled out.

We continue to recommend significantly improved gear marking requirements on every 40 feet of line in all U.S. fisheries known to interact with right whales to better define the region and fishery beyond the broad regional mandates which currently exist. NMFS itself provided support for the increased frequency of gear marking in its gear marking resources, stating: “[a]lternatively, if rope were marked every 40 feet we could expect [to] get the information provided by the mark 90% of the time, because at least 40 feet of rope is likely to be recovered.” In light of the frequency with which right whales encounter the bottom while foraging, we recommend unique markings to identify sinking groundline as part of the vertical line system versus those lines used to connect traps to better inform when and where whales encounter gear.

In addition to improved gear marking in the Northeastern American trap/pot fisheries, NMFS should immediately require enhanced gear marking requirements for all permit holders in all Category I and II fisheries likely to entangle marine mammals including, but not limited to: the Northeast sink gillnet, Northeast drift gillnet, Northeast anchored float gillnet, Southeast Atlantic gillnet, Mid-Atlantic gillnet, Southeastern Atlantic U.S. shark gillnet, Atlantic mixed species trap/pot, Atlantic blue crab trap/pot, and the Mid-Atlantic American lobster trap/pot fisheries.

F. 100% Harvester Reporting, Vessel Tracking Systems, and Enhanced Enforcement Must be Prioritized

As the DEIS acknowledges, Maine still does not have 100% harvester reporting (DEIS Vol. II at 3-102), nor has NMFS finalized a rule requiring it. We urge NMFS to initiate and develop an action that would immediately require: (1) 100% harvester reporting in the entire fishery (2) all federal permit holders to obtain and use a GARFO-approved vessel tracking system; and (2) all federal permit holders to mark all traps electronically in order to provide detailed information on gear type and set location, enhance the enforcement of all regulatory measures in fixed gear fisheries, and help ascertain the ownership of lost or damaged gear.

G. Ropeless Fishing is the Only Way to Adequately Reduce Risk in the Long Term

Our organizations support and appreciate the modifications—in the Preferred Alternative and Alternative 3—that change the existing seasonal restricted areas from areas closed to harvesting lobster and crab to areas closed to persistent buoy lines. As the relative risk of sinking groundline is still uncertain, it is our view that waters within the Cape Cod Bay where the highest known concentration of right whales seasonally occurs, should remain closed to all fixed gear fishing until additional data about the efficacy of ropeless gear becomes available.

III. THE DEIS FAILS TO COMPLY WITH NEPA

NEPA, 42 U.S.C. § 4321 et seq., is the fundamental tool for ensuring that federal agencies properly vet the impacts of major federal actions on wildlife, natural resources, and communities. It requires federal agencies to consider reasonable alternatives and identify the most environmentally preferable one.

A central purpose of NEPA is to assure that federal decision-makers consider the environmental consequences of their actions before a decision to act is made and to provide for “[a]ccurate scientific analysis, expert agency comments, and public scrutiny” of agency decisions. 42 U.S.C. § 4332(C); Marsh v. Or. Natural Res. Council, 490 U.S. 360, 371 (1989) (NEPA ensures that “the agency will not act on incomplete information, only to regret its decision after it is too late to correct”). Under NEPA, federal agencies are required to take a “hard look” at environmental consequences in order to integrate environmental impacts into the decision making process. Kleppe v. Sierra Club, 427 U.S. 390, 410 n.21 (1976).

Because the proposed rule to amend the Plan is a major federal action significantly affecting the

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44 As the relative risk of sinking groundline is still uncertain, it is our view that waters within the Cape Cod Bay where the highest known concentration of right whales seasonally occurs, should remain closed to all fixed gear fishing until additional data about the efficacy of ropeless gear becomes available.

human environment, it is subject to NEPA’s “detailed statement” requirement. NMFS’s EIS must therefore evaluate: (i) the environmental impact of the proposed action, including the cumulative impacts; (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented; (iii) alternatives to the proposed action; (iv) the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity; and (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented. 42 U.S.C. § 4332(2)(C).

NMFS cannot avoid its obligation to conduct a comprehensive review of the direct, indirect, and cumulative impacts of the proposed rule by relying on the amendments to NEPA’s implementing regulations recently issued by the Council of Environmental Quality (“CEQ”). NMFS began its NEPA process on the proposed rule well before the regulatory amendments went into effect and thus NMFS should apply the old regulations. Compare 84 Fed. Reg. 37822 (Aug. 2, 2019) (NMFS’s notice of intent to prepare an environmental impact statement on proposed rule to amend the ALWTRP) with 85 Fed. Reg. 43304 (July 16, 2020) (final rule amending CEQ regulations, with an effective date of September 14, 2020). Moreover, the new regulations are unlawful and, in any event, cannot trump NMFS’s statutory obligations to fully consider the direct, indirect, and cumulative effects of its actions.46

A. The DEIS Fails to Properly Define the Purpose and Need for Action

NMFS fails to properly define the purpose and need. In preparing the DEIS, NMFS must define its purpose and need in acting. 40 C.F.R. §§ 1502.13–1502.14 (2019). This is part of the “responsibility for defining at the outset the objectives of an action” to be taken by the agency. Citizens Against Burlington, Inc. v. Busey, 938 F.2d 190, 196 (D.C. Cir. 1991). This purpose and need inquiry is crucial for a sufficient environmental analysis because “[t]he stated goal of a project necessarily dictates the range of ‘reasonable’ alternatives.” Carmel-by-the-Sea v. U.S. Dep’t of Transp., 123 F.3d 1142, 1155 (9th Cir. 1997). Thus, “an agency cannot define its objectives in unreasonably narrow terms” without violating NEPA. Id.

In crafting the purpose and need statement, the agency must incorporate the parameters set by Congress in relevant statutes. Busey, 938 F.2d at 196. Here, that means considering the overall goal of the MMPA to protect and recover imperiled marine mammals, 16 U.S.C. § 1361, the goal of section 118 to drive to M/SI of marine mammals in commercial fishing gear to below ZMRG, id. § 1387(a)(1), and Congress’s directive that “[t]he interest in maintaining healthy populations of marine mammals comes first” under the statute. Kokechik Fishermen’s Ass’n v. Sec’y of Comm., 839 F.2d 795, 800, 802 (D.C. Cir. 1988); see also Animal Welfare Inst. v. Kreps, 561 F.2d 1002, 1007 (D.C. Cir. 1977) (“the MMPA is . . . motivated by considerations of humanity toward animals, who are uniquely incapable of defending their own interests”).

NMFS must also consider the goals of the ESA, which are to protect and recover threatened and endangered species and their habitats, 16 U.S.C. § 1531, and “[t]he plain intent of Congress in enacting this statute . . . to halt and reverse the trend toward species extinction, whatever the cost.” *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 184 (1978); see also id. at 185 (agencies must “afford first priority to the declared national polity of saving endangered species”).

While NMFS correctly indicates in its purpose and need statement that the agency must take action to further reduce the risk of right whale M/SI in commercial fishing gear to comply with the MMPA, its purpose and need statement is otherwise too narrow. In particular, the purpose and need statement is too narrow because it is based on the need to reduce M/SI by 60% and ignores the urgent need to reduce the sublethal impacts of entanglement. *See* DEIS Vol. I at 2-41.

As explained above, NMFS’s 60% risk reduction target is insufficient. *Supra* Section II.A. Indeed, NMFS’s purpose and need is based on outdated information that fails to consider the best available right whale science, including a recent analysis documenting the substantial cryptic mortality right whales suffer, and that entanglements are responsible for the majority of such deaths. *See id.* New information reveals that NMFS should reduce risk by at least 90%, *see id.*, meaning the agency must adopt significantly more mitigation measures than what is currently on the table. By narrowly defining the purpose and need statement as measures that achieve a 60% reduction in the risk of right whale M/SI, NMFS arbitrarily makes the preferred alternative the only choice that will meet this goal.

And while the focus of section 118 of the MMPA may be on reducing M/SI from commercial fisheries, NMFS’s obligations under the ESA are much broader than that. NMFS must ensure that its actions in authorizing and managing the fisheries neither jeopardize the right whale’s continued existence nor adversely modify its critical habitat. *See* 16 U.S.C. § 1356(a)(2). This requires considering not only the deaths and serious injuries caused by entanglement in fishing gear, but all the other impacts such entanglements cause, including impeding the whale’s ability to reproduce, or increasing its vulnerability to death or injury from other stressors such as vessel strikes.

It is well established that right whales are negatively impacted by entanglement, not only through a reduction in the numbers of individuals through serious injuries and mortalities, but also through increasing a whale’s stress hormone levels, leading to infections; making them more vulnerable to other sources of mortality like vessel strikes; and impeding their ability to feed.47 For example, studies have concluded that “[p]rotrected entanglement in fishing gear often leads to emaciation through reduced mobility and foraging ability, and energy budget depletion from

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the added drag of towing gear for months or years.” Additionally, the “chronic effects of entanglement in free-swimming individuals include systemic infection and debilitation from extensive tissue damage . . . More common in protracted cases is severe emaciation due to the inability to cope with a negative energy budget, driven by the combined effects of reduced mobility and foraging ability, and increased energetic demand imposed by towing accessory gear for months to years.”

The best available scientific data also indicates that even a single line increases drag on a whale; extra energy demand may affect body condition to the point that individual females’ reproductive capacities could be impaired. Indeed, scientific studies have concluded that poor body condition that may result from chronic entanglement in right whales is a serious limitation to reproductive success. Studies have also found that “[r]eproductive females seen alive and carrying gear or with severe wounds from entanglement had a significantly lower chance of calving again. Females that experienced moderate or severe entanglement wounds between calvings had a significantly longer calving interval than females that experienced minor or no entanglement wounds,” that “females that have suffered a severe entanglement are significantly less likely to calve again,” and that “[h]uman impacts are reducing the reproductive success of this population.”

Other studies have concluded that entanglements contribute to poor body condition in juvenile right whales, adults, and lactating females, “which could be suppressing their growth, survival, age of sexual maturation and calving rates.” Moreover, the poor condition of lactating females, may cause a reduction in calf growth rates, “potentially lead[ing] to a reduction in calf survival or an increase in female calving intervals.” As such, “the poor body condition of individuals within the NARW population is of major concern for its future viability.” Thus, entanglement is likely one of the major determinants of reproductive failure in right whales, and probably all large whales. NMFS cannot define its purpose and need to focus solely on serious injury and mortality.

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49 Id.
53 Id.
55 Id.
56 Id.
B. The DEIS Fails to Properly Examine the Direct and Indirect Impacts to Right Whales

The DEIS fails to take a hard look at the direct and indirect impacts on right whales. The relevant regulations define “direct” effects as those that are “caused by the action and occur at the same time and place;” and “indirect” effects as those that are “caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.” 40 C.F.R. § 1508.8 (2019).

NMFS fails to properly evaluate the direct impacts of the proposed rule on right whales by failing to base its analysis on accurate scientific information, improperly narrowing the scope of the action under review, and assuming the efficacy of risk reduction measures without any discussion of how these measures will not sufficiently reduce risk. As an initial matter, because the DEIS fails to properly define the proposed rule as part of its authorization and management of operation of the fisheries in state and federal waters under the MMPA, the DEIS improperly characterizes the nature and extent of the direct effects as beneficial, rendering the agency’s analysis too narrow. Moreover, the analysis is based on outdated information that does not constitute the best available science on right whales, violating the requirement that “[t]he information must be of high quality” because [a]ccurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA.” 40 C.F.R. § 1500.1(b) (2019).

For example, the proposed rule and DEIS explain that NMFS established the 60% risk reduction target based on a PBR of 0.9. 85 Fed. Reg. at 86,880; DEIS Vol. I at 1-2. However, as NMFS is well aware, the right whale PBR is now officially 0.8 as per the final 2019 Stock Assessment Report and actually 0.7 as per the most recent data on the population estimate.57 The DEIS further explains that the assumptions underlying this risk reduction target, were based on an estimate that 40% of mortalities between 2010 and 2018 were unobserved. DEIS Vol. I at 2-39. But a newly-published paper finds that 71% of mortalities between 2010 to 2017 were unobserved.58

In addition, NMFS simply assumes that the proposed rule will adequately mitigate impacts to right whales to achieve the agency’s stated risk reduction target, without addressing the likelihood that it will not do so. As the Supreme Court has instructed, “omission of a reasonably complete discussion of possible mitigation measures would undermine the ‘action-forcing’ function of NEPA. Without such a discussion, neither the agency nor other interested groups and individuals can properly evaluate the severity of the adverse effects.” Robertson, 490 U.S. at 353. NEPA requires that FERC discuss mitigation measures with “sufficient detail to ensure that environmental consequences have been fairly evaluated.” Id. at 352. “An essential component of a reasonably complete mitigation discussion is an assessment of whether the proposed mitigation measures can be effective. . . A mitigation discussion without at least some evaluation of effectiveness is useless in making that determination.” South Fork Band Council v. U.S. Dep’t of the Interior, 588 F.3d 718, 727 (9th Cir. 2009) (citations omitted).

Moreover, many of the measures on which NMFS relies in its proposed rule are unproven and therefore not guaranteed to hit the projected risk reduction goal. As explained above, the proposed rule relies extensively on the use of weak rope or weak insertions to reduce risk of right whale M/Sl. *See supra* Section II.D. But the efficacy of this rope at reducing M/Sl is untested, assumes right whales are entangled in particular ways, and will not address the sublethal impacts impeding the recovery of the species. *Id.* Indeed, numerous scientists recently determined that “while 1700 lb (~773 kg) weak rope breaking strength rope may reduce mortality and sever injury, it will continue to be a source of morbidity.”59 As such, “removal of rope from the water column will better enable species recovery.”60

Indeed, numerous studies have demonstrated that NMFS’s long history of implementing a series of complex, inefficient gear modifications via the ALWTPR have been ineffective at reducing M/Sl to the levels the agency assumed in those rules and associated documents. For example, a 2007 scientific review panel stated that:

> In general, [NMFS] should set higher standards of protection and place greater reliance on the ability of industry to adapt to those standards, rather than continuing to depend on a complex, shifting, inefficient, and ineffective network of regulatory measures to protect the whales. The guiding principle should be to separate high-risk human activities from right whales, in both space and time, to the maximum extent feasible.61

Studies issued since then only reinforce this point. For example, a 2014 study by agency scientists concluded that incremental gear modifications under the ALWTPR from 1999 to 2009 were “generally ineffective in abating whale deaths from entanglements in fishing gear.”62 In October 2018, NMFS’s Technical Memorandum observed that, starting in 1997 when the original Plan was put in place, including the 2009 sinking groundline and 2014 vertical line rules, data from 2000 through 2017 showed that “absolute entanglements appear to be on the rise.”63 The same document noted the “unintended consequences” of the 2015 vertical line rule that required trawling up, potentially contributing to the increased severity of entanglements.64

NMFS’s NEPA evaluation therefore cannot simply assume its proposed rule will achieve its goals and must disclose potential shortcomings, particularly where available evidence indicates the proposed rule will not be sufficiently protective.

NMFS also fails to take a hard look at the indirect impacts of the proposed rule. Because the

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59 Moore et al. 2021 (emphasis added).
60 *Id.*
62 Pace, R. M. III et al. 2014.
64 *Id.; see also* Kenney, R. 2018. What if there were no fishing? North Atlantic right whale population trajectories without entanglement mortality. Endangered Spec. Res. 37:233 (“[d]espite legal requirements to reduce fishery-related mortality, little or no real progress has been made over the last 2 decades”).
The proposed rule is part of NMFS’s authorization of the fisheries under the MMPA, NMFS must consider all the impacts of the fisheries on right whales as part of its analysis. Yet NMFS failed to do so.

Specifically, NMFS failed to take a hard look at the impacts that fishing activity can have on prey availability for right whales. Right whales select foraging areas based on a relatively high threshold of copepod density. See, e.g., DEIS Vol. I at 4-86. Notably, foraging areas with suitable prey density are limited relative to the overall distribution of North Atlantic right whales, meaning that unrestricted and undisturbed access to suitable areas, when they exist, is extremely important for the species to maintain its energy budget. Scientific information on right whale functional ecology also shows that the species employs a “high-drag” foraging strategy that enables them to selectively target high-density prey patches, but is energetically expensive.

Thus, if access to prey is limited in any way, the ability of the whale to offset its energy expenditure during foraging is jeopardized. NMFS itself has elsewhere recognized that these prey disturbances should and could be minimized because it relies on the Massachusetts Restricted Area to “further minimize” such disturbances stating:

> Localized disturbance to dense copepod aggregations by these gear types is further minimized by MMPA gillnet and trap/pot closure areas that exist in temporal and spatial areas where these dense concentrations are expected to trigger foraging behavior (e.g., Massachusetts Bay Restricted Area). 50 CFR 229.23).

While NMFS’s DEIS acknowledges that reduced prey availability can negatively affect right whale health, e.g., DEIS Vol. I at 1-4, 4-88, the agency failed to consider the role the proposed action has in exacerbating those impacts.

Relatively, NMFS also failed to consider the impacts of fishing vessel operations on right whales. This is improper considering that NMFS elsewhere acknowledged that noise pollution from fishing vessels can negatively impact right whales and increase the risk of ship strikes. See e.g., Draft BiOp at 146. Indeed, there have been at least four documented right whale deaths and serious injuries due to vessel strikes in U.S. waters since January 1, 2020, all due to confirmed or suspected recreational fishing vessels less than 65 feet.

C. The DEIS Does Not Examine a Reasonable Range of Alternatives or Adequately Describe Differences Between Alternatives

The DEIS fails to analyze a reasonable range of alternatives, or adequately analyze the differences between alternatives. NEPA requires a “detailed statement” of “alternatives to the

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65 Id.
67 Draft BiOp at 87.
proposed action.” 42 U.S.C. § 4332(2)(c). In considering alternatives, an agency “should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public.” 40 C.F.R. § 1502.14 (2019).

The requirement to consider reasonable alternatives “lies at the heart of any NEPA analysis.” California ex rel. Lockyer v. U.S. Dept. of Agric., 459 F. Supp. 2d 874, 905 (N.D. Cal. 2006). The purpose of this section is “to insist that no major federal project should be undertaken without intense consideration of other more ecologically sound courses of action, including shelving the entire project, or of accomplishing the same result by entirely different means.” Envt’l Defense Fund v. Army Corps of Engr’s, 492 F.2d 1123, 1135 (5th Cir. 1974).

While an agency is not obliged to consider every alternative to every aspect of a proposed action, the agency must “consider such alternatives to the proposed action as may partially or completely meet the proposal’s goal.” Nat. Resources Defense Council v. Callaway, 524 F 2d. 79, 93 (2d Cir. 1975). In considering what constitutes a reasonable alternative, “an agency should always consider the views of Congress, expressed, to the extent that the agency can determine them, in the agency’s statutory authorization to act, as well as in other congressional directives.” Citizens Against Burlington v. Busey, 938 F.2d 190, 196 (D.C. Cir. 1991). The existence of a viable but unexamined alternative renders an EIS inadequate. Citizens for a Better Henderson v. Hodel, 768 F.2d 1051, 1057 (9th Cir. 1985).

Despite these obligations, NMFS considered only three primary alternatives: (1) Alternative 1 (not issuing the proposed rule); (2) Alternative 2 (issuing the proposed rule); and (3) Alternative 3 (similar to Alternative 2 but with some additional measures). NMFS neglected to consider a range of reasonable alternatives because none of the action alternatives meet NMFS’s protective mandates under NEPA and the MMPA (or the ESA) or provide a meaningful range of adequate mitigation measures. See supra Section II.

Indeed, there are relatively few differences among the action alternatives. Both alternatives would require a combination of trawling up, seasonal buoy line restricted areas, and weak lines or weak insertions. See DEIS Vol. I at 3-52–3-53. NMFS estimates Alternative 2 would reduce M/SI risk by 64.3% while it estimates that Alternative 3 would reduce M/SI risk by 69.6% to 72.6%. Id. at 3-68, 3-69. The lack of any meaningful difference between the alternatives considered in detail violates the requirements of NEPA. See Muckleshoot Indian Tribe v. U.S. Forest Serv., 177 F.3d 800, 813 (9th Cir. 1999) (federal agency violated NEPA where two action alternatives considered were “virtually identical”).

For example, NMFS failed to examine a truly protective alternative: no fishing. Because NMFS’S’s No Action alternative reflects continued fishing under the current ALWTRP, NMFS should have considered an additional alternative that analyzed no commercial fishing, and thus no risk to from entanglements in U.S. fishing gear. This would have provided an important basis for the public and the agency to compare the tradeoffs between continued fishing and continued risk of entanglements, serious injuries, and mortalities in fishing gear, versus an alternative under which there would be zero risk of entanglement in commercial fishing gear in U.S. waters. No fishing protects the critically endangered right whale NMFS is mandated to protect, conserve,
and recovery; while continued fishing with unattended vertical line continues to threaten the survival and recovery of this critically endangered species.⁶⁹

At the very least, NMFS must consider an alternative that would reduce serious injury and mortality of right whales in Northeast trap fisheries by 90%. NMFS’s failure to do so is especially glaring where the agency itself identified the need to reduce U.S. entanglement-related M/SI by upwards of 80% at a time when PBR for right whales was 0.9, DEIS Vol. 1 at 3-47, and the PBR for right whales is now 0.7.⁷⁰ See supra Section II.A. Additionally, NMFS should have evaluated alternatives that considered adopting the closures proposed as part of the Preferred Alternative and Alternative 3 as year-round restricted areas, particularly considering the best available science demonstrates that right whales use the waters in Southern New England in all months of the year. See supra Section II.C.2.

NMFS should also consider an alternative that considers a line cap on all gear and include an alternative that address risk from gillnet gear. The agency chose not to focus on gillnets in its current rulemaking because lobster gear makes up a significantly greater portion of the line in right whale habitat. See, e.g., DEIS Vol. 1 at 2-34, 2-40. However, while gillnets make up a small amount of the line in right whale habitat, they pose a disproportionate risk of entangling a right whale.⁷¹ The presence of one or more nets (up to 300 feet long each) strung together and held up by floats, presents a much bigger target area for whales foraging throughout the water column, as compared to vertical trap/pot buoy lines without net in between. The agency must consider an alternative that evaluates the risk reduction benefits of restricting gillnet fishing.

While not necessarily in the spirit of TRT negotiations, NMFS’s failure to examine a no-fishing alternative, or an alternative that would further reduce risk to right whales (to 80% or more), as part of its NEPA analysis is especially arbitrary considering that the status of the species has become particularly dire in the years the much-needed amendments to the ALWTRP have languished. See Nat. Res. Def. Council v. U.S. Forest Serv., 421 F.3d 797, 813–14 (9th Cir. 2005) (NEPA obliges an agency to revisit its alternatives analysis whenever there are “changed circumstances [that] affect the factors relevant to the development and evaluation of alternatives,” and “account for such change in the alternatives it considers.”).

NMFS’s failure to address a reasonable range of alternatives is due, at least in part, to its unfounded rejection of alternatives proposed during scoping or elsewhere. In particular, NMFS rejected several proposals that would have required larger closures than what NMFS has proposed—such as the closure of all of Statistical Area 529, the seasonal closure of LMA3 above

⁶⁹ That the agency purports to have addressed these impacts in an appendix to its draft biological opinion on operation of the federal fisheries is irrelevant as the agency’s obligations under NEPA and the ESA are distinct in several important respects. See, e.g., Fund for Animals v. Hall, 448 F. Supp. 2d 127, 136 (D.D.C. 2006) (describing differences). Moreover, “an agency may not circumvent its obligation to provide a clear assessment of environmental impacts simply by placing [vital] analysis in an appendix.” Or. Envt’l Council v. Kunzman, 817 F.2d 484, 494 (9th Cir. 1987).
⁷⁰ See, e.g., Colleen Coogan Presentation to the Atlantic Large Whale Take Reduction Team, Jan. 2021.
⁷¹ “Per the agency’s draft North Atlantic Right Whale Conservation Framework for Federal Fisheries in the Greater Atlantic Region, the agency is not even planning on having the ALWTRT evaluate the risk from gillnets and provide recommendations until 2023 and the agency anticipates acting on recommendations from the ALWTRP in 2025.” NARWConservationFrameworkGARFO.pdf.
40.3 degrees, or the closure of all waters from January through April—because these measures were “too large” and “unpopular with stakeholders.” DEIS Vol. I at 3-79. NEPA does not contain a “popularity” exemption to the requirement to consider a reasonable range of alternatives—indeed, neither do the ESA or MMPA contain a “popularity” exemption to their legal requirements.

NMFS’s rejection of these alternatives on this basis is particularly concerning in light of the agency’s recognition that the proposed rule will not meet its legal obligation under the MMPA to reduce M/SI to below PBR (not to mention ZMRG), see supra Section I; and its acknowledgement over two decades ago, that reducing entanglement risk for right whales would be especially difficult and that “extensive closures of large areas of the ocean to lobster and gillnet fishermen . . . would guarantee reduction of entanglements causing serious injury and mortalities.” 62 Fed. Reg. 39,157, 39,159 (July 22, 1997); cf., Citizens Against Burlington, 938 F.2d at 196.

In addition to failing to examine a reasonable range of alternatives, NMFS also failed to adequately compare the differences between the alternatives it did consider. For example, NMFS states that the no action alternative would have “high[ly] negative” consequences on right whales because “serious injury and mortality would continue to occur and impact population health,” the agency also states that Alternative 2—the preferred alternative— would have a “positive” effect on right whales because it “would reduce right whale co-occurrence by 69%.” See, e.g., DEIS Vol. I at 8-276. Similarly, it states that Alternative 3—the non-preferred alternative— would have a “highly positive” effect on right whales by “reduc[ing] right whale co-occurrence by 83–88%.” Id. These assumptions are unfounded for the reasons described above. See supra Section II. But even if true, that would not save the agency’s analysis because NMFS failed to acknowledge that even under these alternatives, right whale serious injury and mortality would continue to occur and at unsustainable levels. See, e.g., id.

**D. The DEIS Fails to Properly Examine Cumulative Impacts**

To ensure that the full effect of its decision is analyzed, NEPA requires NMFS to examine the potential cumulative impacts. See 42 U.S.C. § 4332(2)(C); 40 C.F.R. § 1508.9 (2019); Te-Moak Tribe of W. Shoshone of Nev. v. U.S. Dep’t of the Interior, 608 F.3d 592,602-03 (9th Cir. 2010) (citation omitted). A “cumulative impact” is “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.” 40 C.F.R. § 1508.7 (2019). “[I]n considering cumulative impact, an agency must provide some quantified or detailed information; . . . general statements about possible effects and some risk do not constitute a hard look absent a justification regarding why more definitive information could not be provided.” Ocean Advocates v. U.S. Army Corps of Eng’rs, 361 F.3d 1108,1128 (9th Cir. 2004) (citation omitted); see also Te-Moak Tribe of W. Shoshone v. U.S. Dep’t of the Interior, 608 F.3d 592, 603-06 (9th Cir. 2010) (rejecting the EA’s cumulative impact analysis because it failed to analyze impacts in light of other projects that would impact the same resources).
NMFS failed to comply with these requirements. Its “analysis” of cumulative impacts amounts to nothing more than general statements about activities that impact large whales and other species. As one example, NMFS states that noise can have “low negative to negative” impacts on large whales, DEIS Vol. I at 8-254, 8-259, NMFS makes no attempt to quantify take from noise pollution or otherwise take a hard look at their detrimental impacts. For example, NMFS fails to even acknowledge its rule issued under the MMPA that allows the Navy to harass right whales hundreds of times each year over the next seven years incidental to testing and training activities conducted in the Atlantic Fleet Training and Testing Study Area. See 84 Fed. Reg. 70,712, 70,763 (authorizing 471 instances of Level B harassment of right whales from December 2019 through November 2025). Nor does NMFS attempt to quantify or take a hard look at the impacts of noise from vessel traffic.

Noise from the Navy’s activities, the maritime industry, and the numerous offshore wind projects in Southern New England waters will certainly “impact” right whales, and likely significantly so. For example, scientific research reveals that chronic stress in North Atlantic right whales is associated with exposure to low frequency noise from ship traffic. Specifically, “the adverse consequences of chronic stress often include long term reductions in fertility and decreases in reproductive behavior; increased rates of miscarriages; increased vulnerability to diseases and parasites; muscle wasting; disruptions in carbohydrate metabolism; circulatory diseases; and permanent cognitive impairment.” As such, “over the long term, chronic stress itself can reduce reproduction, negatively affect health, and even kill outright.” In addition, right whales will experience temporary threshold shifts, behavioral response (including foraging displacement), and stress throughout the Atlantic from Navy sonar and other transducers, as well as offshore wind projects. All of the existing and increasing ocean noise impacts important communications, including those between mothers and calves.

In fact, NMFS lumps its analysis of the cumulative impacts on right whales together with other whales by only generally describing impacts on “large whales.” See, e.g., DEIS Vol. I at 8-250–8-251, 8-259. But this fails to constitute the hard look required by law and obfuscates the
distinct, significant cumulative impacts that will likely befall right whales in light of their critically endangered status and sensitivity to the various stressors listed, such as the fact that right whales, and female and their calves in particular, are more at risk of vessel strikes than other species.\(^{78}\)

NMFS also seems to have artificially narrowed the definition of the action area for purposes of its cumulative impacts analysis. Specifically, NMFS defines the action area as “focused primarily on the Northeast Region Trap/Pot Management Area.” DEIS Vol. I at 8-248. But this ignores the behavioral characteristics of right whales and other species who migrate hundreds or thousands of miles in the Atlantic and thus will be exposed to the risk of vessel strikes, noise pollution, and other stressors in areas outside the narrow circle NMFS has drawn for purposes of its cumulative impacts analysis. While the agency considers the impacts of entanglements and vessel strikes “in Canadian waters . . . because of the magnitude of impact this is have on the population,” id., NMFS must also analyze the combined impacts of the species’ exposure to other stressors outside New England. See, e.g., Nat. Res. Def. Council v. Hodel, 865 F.2d 288, 297–300 (D.C. Cir. 1988) (rejecting EIS where it failed to properly consider the impacts of offshore oil and gas activities on species who migrate through multiple planning areas); Utahns v. U.S. Dep’t of Transportation, 305 F.3d 1152, 1180 (10th Cir. 2002) (holding EIS inadequate where it only evaluated impacts within 1,000 feet of proposed project because it limited analysis to smaller, less mobile species and ignored impacts to migratory species). For example, it is not clear if the agency considered the impacts of vessel strikes in the mid- and south-Atlantic regions, despite this stressor having significant impacts on the population in these waters. Indeed, in the last 14 months alone numerous right whales have been killed or seriously injured by vessel strikes in U.S. waters outside New England.\(^{79}\) Additionally, it is unclear whether the agency considered other stressors right whales also face, or are reasonably likely to face in the foreseeable future, in waters outside New England and Canadian waters such as vessel noise or plastic pollution.

While NMFS may consider the impacts from the proposed rule to be minor (or beneficial), that does not absolve the agency of its duty under NEPA to consider the combined impacts of the regulations on imperiled right whales or other species, particularly because the regulations are part of NMFS’s authorization of the operation of the fisheries under the MMPA. As one appellate court has explained:

> the addition of a small amount of [pollution] to a [waterway] may have only a limited impact on [fish] survival, or perhaps no impact at all. But the addition of a small amount here, a small amount there, and still more at another point could add up to some-thing with a much greater impact, until there comes a point where even a marginal increase will mean that no [fish] survive.

\(^{78}\) See, e.g., 78 Fed. Reg. 73726, 73727 (Dec. 9, 2013) (“Right whales appear to be more vulnerable to ship strikes than other large whale species”); NMFS, North Atlantic Right Whale (Eubalaena glacialis) Vessel Speed Rule Assessment (June 2020) at 23.

*Klamath-Siskiyou Wildlands Ctr. v. Bureau of Land Mgmt.*, 387 F.3d 989, 994 (9th Cir. 2004). The same is true for impacts to right whales from entanglements in commercial fishing gear, vessel strikes, noise pollution, and other stressors—the addition of some impacts here, and some impacts there, could add up to cumulatively significant impacts, particularly where NMFS has found that protecting every individual right whale is essential to its recovery; that its extinction is almost certain in the immediate future if existing threats are not dramatically reduced; and the best available science indicates that ongoing entanglements and vessel strikes are not only impeding the species’ recovery but actively driving the species toward extinction.\(^{80}\) NMFS must carefully examine and disclose these impacts to comply with NEPA.

### E. The Economic Analysis in the DEIS Is Fundamentally Flawed

NMFS’s economic analysis of the proposed rule in the DEIS is flawed in two fundamental ways. First, it fails to properly consider that reduced effort does not equate to reduced catch. Second, it fails to consider the significant economic benefit from preventing whale entanglements. The DEIS overestimates the economic impact of the proposed rule on industry by incorrectly assuming reduced effort will lead to reduced landings. Research examining the catch of lobsters in Maine and Canada concluded that there is far more effort in the U.S. than is needed to obtain the same level of catch.\(^{81}\) Accordingly, seasonal closures and trap reductions could provide substantial benefit to endangered whales while having little economic impact on fishermen.\(^{82}\) The authors of a 2007 study stated, for example, that “if Maine restricted its fishing season to 6 months and reduced the number of traps by a factor of 10, the same amount of lobster could be landed with greatly reduced risk to right whales and other species.”\(^{83}\)

Recent studies have reached similar conclusions. For example, a 2020 study found that Canadian fishers in the Gulf of Maine caught about the same about of lobster using 7.5 times less effort than Maine fishers in U.S. waters.\(^{84}\) In particularly, the study determined that from 2007 to 2013 in Maine, lobster landings doubled as the number of traps fell 10.5% and landings per trap increased by about 125%; and that Massachusetts achieved record-high landings since the implementation of trap/pot seasonal closures, especially within those areas most affected by the closures.\(^{85}\) As such, “a negative economic impact should not be assumed with effort reduction.”\(^{86}\)

The DEIS also overestimates the economic impacts by ignoring the economic benefits of

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82 Id.
83 Id.
85 Id.
86 Id.
reducing entanglement risk. While putting a dollar figure on an individual whale is not necessarily the best way to measure its inherent value, NMFS cannot focus solely on the cost to industry while ignoring the significant benefits provided by large whales—including to the fisheries themselves—particularly where tools exist to estimate the economic benefits of whales. For example, the International Monetary Fund recently issued a “conservative estimate[]” that placed the average value of an individual large whale at more than $2 million due to the ecosystem services individual whales provide in carbon sequestration and fertilizing activity that adds significantly to phytoplankton growth in the areas whales frequent. In addition, reducing the frequency and severity of whale entanglements, will also reduce the expense associated with disentanglement efforts. But NMFS failed to consider these benefits in evaluating the economic impact of the proposed rule. This is improper.

Courts have held that it is arbitrary for an agency to focus solely on the costs to industry from enacting regulations while ignoring the economic benefits of the new standards. See, e.g., Ctr. for Biological Diversity v. Nat’l Highway Traffic Safety Admin., 538 F.3d 1172, 1203 (9th Cir. 2008) (holding that it was arbitrary for an agency to consider the economic benefits of decreased carbon emissions from tailpipes when establishing corporate average fuel economy standards for light trucks when it considered economic costs to industry from enacting stricter standards); see also High Country Conservation Advocates v. U.S. Forest Serv., 52 F. Supp. 3d 1174, 1190-93 (D. Colo. 2014) (holding that it was arbitrary for the agency to consider the economic benefits of a coal mine expansion without also assessing the climate consequences of the end use of coal using the Social Cost of Carbon protocol).

In other words, NMFS “cannot put a thumb on the scale by undervaluing the benefits and overvaluing the costs of more stringent standards.” Ctr. for Biological Diversity, 538 F.3d at 1198; see also Mont. Envtl. Info. Ctr. v. U.S. Office of Surface Mining, Case No. 15-106-M-DWM, 2017 WL 3480262, at *15 (D. Mont. Aug. 14, 2017). Yet that is just what NMFS’s DEIS does. While it contains a lengthy analysis of the economic impact to industry, it has no analysis or discussion of the economic benefit of the regulations—whether quantitative or qualitative. While there may be a range of values, the value of saving whales “is certainly not zero” as NMFS irrational treats such value in its DEIS. See Ctr. for Biological Diversity, 538 F.3d at 1200.

V. CONCLUSION

NMFS’s proposed rule and its associated DEIS are fundamentally flawed and fail to comply with the agency’s legal obligations under the MMPA, ESA, and NEPA in numerous ways. NMFS must revise its risk reduction target, proposed rule and associated documents, reissue them for public notice and comment, and implement emergency measures to significantly reduce entanglement risk in the interim. Failure to do so would be a gross dereliction of the agency’s duties and condemn the right whale to suffer yet more of the entanglements in commercial fishing that are not only impeding the species recovery, but actively driving it closer to the brink of extinction.

Sincerely,

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North Atlantic Right Whale Consortium
2020 Annual Report Card

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NORTH ATLANTIC RIGHT WHALE CONSORTIUM BACKGROUND

The North Atlantic right whale (Eubalaena glacialis) remains one of the most endangered large whales in the world. Over the past two decades, there has been increasing interest in addressing the problems hampering the recovery of North Atlantic right whales by using innovative research techniques, new technologies, analyses of existing databases, and enhanced conservation and education strategies. This increased interest demanded better coordination and collaboration among all stakeholders to ensure that there was improved access to data, research efforts were not duplicative, and that findings were shared with all interested parties. The North Atlantic Right Whale Consortium, initially formed in 1986 by five research institutions to share data among themselves, was expanded in 1997 to address these greater needs. Currently, the Consortium membership is comprised of representatives from more than 100 entities including: research, academic, and conservation organizations; shipping and fishing industries; whale watching companies; technical experts; United States (U.S.) and Canadian Government agencies; and state authorities.

The Consortium membership is committed to long-term research and management efforts, and to coordinating and integrating the wide variety of databases and research efforts related to right whales to provide the relevant management, academic, and conservation groups with the best scientific advice and recommendations on right whale conservation. The Consortium is also committed to sharing new and updated methods with its membership, providing up-to-date information on right whale biology and conservation to the public, and maintaining effective communication with U.S. and Canadian Government agencies, state authorities, the Canadian Right Whale Network, the U.S. Southeast and Northeast Right Whale Implementation Teams, the Atlantic Large Whale Take Reduction Team, the Atlantic Scientific Review Group, and members of the U.S. Congress. The Consortium membership supports the maintenance and long-term continuity of the separate research programs under its umbrella, and serves as executor for database archives that include right whale sightings and photo-identification data contributed by private institutions, government scientists and agencies, and individuals. Lastly, the Consortium is interested in maximizing the effectiveness of management measures to protect right whales, including using management models from other fields.

The Consortium is governed by an Executive Committee and Board members who are elected by the general Consortium membership at the Annual Meeting.

North Atlantic Right Whale Consortium members agreed in 2004 that an annual “report card” on the status of right whales would be useful. This report card includes updates on the status of the cataloged population, mortalities and injury events, and a summary of management and research efforts that have occurred over the previous 12 months. The Board’s goal is to make public a summary of current research and management activities, as well as provide detailed recommendations for future activities. The Board views this report as a valuable asset in assessing the effects of research and management over time.

ESSENTIAL SPECIES MONITORING AND PRIORITIES

In the 2009 Report Card to the International Whaling Commission (IWC), the Consortium Board identified key monitoring efforts that must be continued and maintained in order to identify trends in the species, as well as assess the factors behind any changes in these trends (Pettis, 2009). The key efforts are: (1) Photographic identification and cataloging of right whales in historically and emerging high-use habitats and migratory corridors, including, but not limited to, the southeast United States, Cape Cod Bay, Gulf of St. Lawrence, Great South Channel, Bay of Fundy, Scotian Shelf, and Jeffreys Ledge, (2) Monitoring of scarring and visual health assessment from photographic data, (3) Examination of all mortalities, and (4) Continue using photo-ID and genetic profiling to monitor species structure and how this changes over time.


www.narwc.org
The Consortium Board regards the Consortium databases as essential to recovery efforts for the North Atlantic right whale species. In a review of the federal recovery program for North Atlantic right whales, the Marine Mammal Commission agreed with the Board’s sentiment, stating that “both databases play critical roles in right whale conservation” and that the Identification Catalog “is the cornerstone of right whale research and monitoring” (Reeves et al. 2007). The review went on to recommend that both databases (“both” here and above refers to the Identification and Sightings databases; there are several Consortium databases available) be fully funded on a stable basis. Additionally, the Board recognizes the importance that passive acoustic monitoring has played in our understanding of right whale distribution and its potential role in mitigating anthropogenic impacts on the species. The Board strongly supports and encourages efforts to develop a comprehensive Right Whale Acoustic Detection Database that will serve as an additional resource in conservation and management efforts.

Since 2010, right whale distribution and patterns of habitat use have shifted, in some cases dramatically. These shifts have been observed throughout the range of North Atlantic right whales and have direct implications on research and management activities, and on each of the key efforts identified above. As such, the Board believes that identifying potential extralimital and new critical habitats and developing alternative survey effort strategies to respond to the distributional changes should continue to be a priority. These strategies should include efforts to not only locate, including use of passive acoustic monitoring, and identify individual right whales, but also to ensure that information critical to important monitoring and management efforts (i.e. health assessment, injury and scarring assessments) is effectively and efficiently collected. The drastic shifts in right whale distribution, both temporally and spatially, and the speed at which they occurred, should be viewed as a harbinger of the inadequacy of static mitigation efforts focused solely on past habitat use.

In 2020, two right whale mortalities were detected, a decrease over 10 mortalities in 2019. The causes of death were attributed to a vessel strike for the first and possible injury during birth or dystocia for the second. The confirmed vessel strike was the first vessel strike mortality detected in US waters since 2017. There were three additional vessel strikes detected in 2020, one of which was presumed fatal and also occurred in U.S. waters. The presumed fatal strike occurred in an active Seasonal Management Area with vessel speed restrictions in place and the confirmed mortality in an area not under vessel speed restrictions at the time of detection. The absence of detected mortalities in Canadian waters in 2020 was encouraging and likely driven by several factors, including the reduction in large vessel traffic due to COVID-19 as well as ongoing vessel strike and entanglement mitigation measures in Canadian waters.

There were no confirmed entanglement mortalities detected in 2020, however, five right whales were documented carrying gear- four of the entanglements first seen in 2020. Four of the five entanglements are considered to be life-threatening and though all five were detected in U.S. waters, the origin of the gear in all cases is currently unknown.

Ten right whale calves were born in 2020, up from seven in 2019. However, births remain significantly below what is expected and over the last four years (2017-2020) detected mortalities outnumbered births by 3:2. The species continues to be in decline and in July 2020, the International Union for Conservation of Nature (IUCN) red listed the North Atlantic right whale changing its status from endangered to critically endangered. This designation is made when a species is considered at high risk for global extinction. The North Atlantic right whale is the only large whale species on the list.

Discussions about reducing anthropogenic impacts on right whales in both Canadian and U.S. waters are ongoing and encouraging. However, despite the 2020 reduction in overall mortalities and increase in births over 2019, a one year improvement does not a trend make and the species remains in decline. Anthropogenic injuries and mortalities remain a threat to the existence of North Atlantic right whale and immediate, broad-based mitigation strategies that result in significant risk reduction throughout the right whale’s range (both realized and potential) must be a priority if this species is to survive.

**POPULATION STATUS**

The ability to monitor North Atlantic right whale vital rates is entirely dependent on the North Atlantic Right Whale Identification Database (Catalog), curated by the Anderson Cabot Center for Ocean Life at the New England Aquarium. As of September 1, 2020, the database consists of over a million slides, prints, and digital images collected during the 83,988 sightings of 761 individual right whales photographed since 1935. Each year, 2,000 to 5,000 sightings consisting of 20-30,000 images are added to the identification database. Using Catalog Pettis, H.M., Pace, R.M. III, Hamilton, P.K. 2021. North Atlantic Right Whale Consortium 2020 Annual Report Card. Report to the North Atlantic Right Whale Consortium. World www.narwc.org
data, a number of methods have been employed to estimate the number of North Atlantic right whales alive annually. Due to lag times in Catalog data submissions and data processing, only data through 2019 were available for these calculations. Here we describe four different estimate methods and present the Consortium’s best estimate for 2019. The first two methods use the calendar year; the last two methods use the “whale” year which runs from December 1 to November 30. This latter definition was created to avoid “double counting” whales seen in the southeast US in December and January.

**Presumed Alive Method**
The presumed alive method (PA) counts whales that have been seen at least once in the last six years (Knowlton et al. 1994). It is a consistently measureable and easily available value, but it assumes that whales remain alive for six years after their last sighting (which is often not the case) and the estimates for recent years may be artificially low due to delays in data processing. The PA number for 2019 is 458.

**Catalog Method**
The Catalog method (formerly referred to as the “Report Card” method) includes a low, middle and high estimate. A table with all of these estimates as well as a full description of the methodology is provided in Appendix 1 of this report card. The values are based upon the number of photographed whales only; they exclude potential unphotographed whales and therefore should not be considered a “population estimate”. This method has the weakness of utilizing the PA methodology with its assumptions, but it does incorporate whales that have been photographed but not yet added to the Catalog. The Catalog estimates for 2019 range from a low of 339 to a high of 723 with a middle estimate of 486.

**Minimum Number Alive Method**
The Minimum Number Alive (MNA) is the number that was historically used in National Marine Fisheries Service stock assessment reports and counts whales seen in a given year, plus any whale not seen that year- but seen both before and after (see Hayes et al. 2017). The MNA number is more accurate than PA for older years, but is also not accurate for recent years for the same reason as the PA method, plus the fact that there have been fewer “after” years to detect a whale. The MNA number for 2019 is 347.

**Pace Method**
The Pace Method was added to the 2016 report card and has been included ever since. This analysis comes from the Pace et al. 2017 model which “adapted a state-space formulation with Jolly-Seber assumptions about population entry (birth and immigration) to individual resighting histories and fit it using empirical Bayes methodology.” This model estimate accounts for whales that have not been photographed. The full methodology is available in the paper. It is important to note that the estimates provided by the Pace et al. 2017 methodology represent the estimated abundance at the start of the sample period plus all new entries into the population. That number for 2019 is 366. If one wanted an estimate at the end of the interval, one could subtract the number of known dead (or estimated number of dead if a detection rate for carcasses was available).

The full results for all four methods are presented in Figure 1. All numbers except the past Catalog method estimates were recalculated using data as of September 1, 2020 and therefore the numbers in this figure will differ from those in past report cards. The PA number is always artificially high as a comparison to the past year’s MNA numbers attest. The difference is largely due to whales that have not been seen since before the year in question. For example, the 30+ animals that the PA number included in 1990 but the MNA did not are all whales that have not been seen since 1990 and are thus very likely dead. From 1990 to 2010, the average difference between the PA number and the MNA number was 35 animals. If that difference remained consistent into this decade, the adjusted presumed alive number in 2019 would be 423 whales. The Pace method removes assumptions of when a whale is alive and is likely more accurate. The Catalog estimates are always higher than the other two methods for the most recent years. However, the fact that the old Catalog estimates for 2005 to 2009 were close to the eventual MNA numbers suggests that the methodology worked reasonably well through 2009. However, starting in 2010, the two numbers started to diverge. This is partially because fewer whales were seen so the MNA number may be artificially low. But it also appears that the six-year assumption for PA whales is increasingly erroneous; whales die sooner than six years after their last sighting. The Catalog estimate does however capture recent increase in calves that have not yet been cataloged. This delay in cataloging is largely due to the right whale distribution shift that has resulted in fewer calves being seen on the feeding grounds with their mothers, and fewer sightings of them as juveniles anywhere- both of which make cataloging recent calves challenging. There is some evidence this delay may be impacting the Pace model for recent years.


[www.narwc.org](http://www.narwc.org)

Figure 1. Assessments of the North Atlantic right whale population based on four available assessment methods. The Pace model shows a point “estimate” along with error bars which represent 95% of the posteriori probability. That model estimates the number of whale alive at the start of each year plus any new whales estimated to enter during that year. Data through 2019 as of September 1, 2020.

Best Right Whale Population Estimate 2019
We believe the Pace Method provides the best estimate for 2019. To get an estimate of whales alive at the end of 2019, we can take the estimate at the start of 2019 (366, Figure 1) and subtract the observed deaths during 2019 (8 cataloged whales and two unidentified). Therefore, the best estimate for the end of 2019 is 356 whales (95% confidence range +/- 11 and 13 respectively) using data as of September 1, 2020. This represents a more precipitous drop than previous years. Last year’s Pace Method number for 2018 was 85 animals more than the MNA number at that time; this year’s number is just 19 more than the MNA number (and that MNA number will increase over time as more whales are identified in 2019 and more “after” years are added). Survivorship is decreasing and that alone may account for the narrowing of the gap between MNA and the Pace Method number. The completion of 2019 data and the processing of additional 2020 data, along with further examination of the model, may help determine whether there is, in fact, a downward bias and if so, how large it is.
How Well Are We Monitoring?
Below is an annual count of sightings, unique individuals, whales presumed alive, kilometers of effort that have been submitted to the sightings database at the University of Rhode Island, and percent of the population that is identified each year from 2000 onward (Table 1). Data as of September 1, 2020.

Table 1. Annual counts of photo-ID sightings, unique individuals, presumed living whales, survey effort (in Beaufort conditions \( \leq 4 \)), and the percentage of the population seen. Survey effort from dedicated surveys only; opportunistic sightings do not record or report effort. None of the numbers for 2019 are final as not all of the data for that year have been submitted or analyzed. Data as of September 1, 2020.

<table>
<thead>
<tr>
<th>Year</th>
<th>Sightings</th>
<th>Unique IDs</th>
<th>Best Population Estimate (Pace model)*</th>
<th>Survey Effort (1,000 km)</th>
<th>% of Presumed Alive Population Seen*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>3286</td>
<td>246</td>
<td>309</td>
<td>125</td>
<td>80%</td>
</tr>
<tr>
<td>2001</td>
<td>3983</td>
<td>286</td>
<td>332</td>
<td>127</td>
<td>86%</td>
</tr>
<tr>
<td>2002</td>
<td>2725</td>
<td>315</td>
<td>345</td>
<td>252</td>
<td>91%</td>
</tr>
<tr>
<td>2003</td>
<td>2406</td>
<td>315</td>
<td>359</td>
<td>180</td>
<td>88%</td>
</tr>
<tr>
<td>2004</td>
<td>1839</td>
<td>299</td>
<td>368</td>
<td>287</td>
<td>81%</td>
</tr>
<tr>
<td>2005</td>
<td>3408</td>
<td>364</td>
<td>391</td>
<td>357</td>
<td>93%</td>
</tr>
<tr>
<td>2006</td>
<td>2803</td>
<td>348</td>
<td>402</td>
<td>316</td>
<td>87%</td>
</tr>
<tr>
<td>2007</td>
<td>3768</td>
<td>384</td>
<td>412</td>
<td>267</td>
<td>93%</td>
</tr>
<tr>
<td>2008</td>
<td>4164</td>
<td>408</td>
<td>430</td>
<td>254</td>
<td>95%</td>
</tr>
<tr>
<td>2009</td>
<td>4698</td>
<td>427</td>
<td>460</td>
<td>246</td>
<td>93%</td>
</tr>
<tr>
<td>2010</td>
<td>3236</td>
<td>432</td>
<td>476</td>
<td>271</td>
<td>93%</td>
</tr>
<tr>
<td>2011</td>
<td>3479</td>
<td>444</td>
<td>481</td>
<td>234</td>
<td>92%</td>
</tr>
<tr>
<td>2012</td>
<td>2127</td>
<td>383</td>
<td>471</td>
<td>271</td>
<td>81%</td>
</tr>
<tr>
<td>2013</td>
<td>1905</td>
<td>296</td>
<td>478</td>
<td>215</td>
<td>62%</td>
</tr>
<tr>
<td>2014</td>
<td>2404</td>
<td>379</td>
<td>473</td>
<td>200</td>
<td>80%</td>
</tr>
<tr>
<td>2015</td>
<td>1774</td>
<td>268</td>
<td>467</td>
<td>184</td>
<td>57%</td>
</tr>
<tr>
<td>2016</td>
<td>2210</td>
<td>327</td>
<td>451</td>
<td>155</td>
<td>73%</td>
</tr>
<tr>
<td>2017</td>
<td>3126</td>
<td>377</td>
<td>425</td>
<td>178</td>
<td>89%</td>
</tr>
<tr>
<td>2018</td>
<td>3833</td>
<td>358</td>
<td>383</td>
<td>190</td>
<td>93%</td>
</tr>
<tr>
<td>2019</td>
<td>4402</td>
<td>339</td>
<td>366</td>
<td>141</td>
<td>93%</td>
</tr>
</tbody>
</table>

*In previous Report Cards, the population estimate and resulting % presumed alive seen were based on the Middle Catalog number (see Population Status section above and Appendix 1). Given that the Report Card now considers the population estimate based on the Pace Method to be the most accurate estimate, we have modified Table 1 to include the Pace Model estimate as the best population estimate and as the denominator for the calculation of the % presumed alive population seen.
Reproduction
There were 10 documented calves born in 2020 (Table 2).

Table 2. Summary of calving events and associated inter-birth interval times for North Atlantic right whales from 2009-2020. The number of available cows, defined as females who have given birth to at least one previous calf, were presumed to be alive, and have not given birth in the last two years, are followed by the percentage of available cows to successfully calve. First time mothers are now included in the available to calve count.

<table>
<thead>
<tr>
<th>Year</th>
<th>Calf Count</th>
<th>Available Cows/ % to calve</th>
<th>Average Interval</th>
<th>Median Interval</th>
<th>First time Moms</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>39</td>
<td>66/59.1%</td>
<td>4.0</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>2010</td>
<td>19</td>
<td>49/38.8%</td>
<td>3.3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2011</td>
<td>22</td>
<td>51/43.1%</td>
<td>3.7</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>2012</td>
<td>7</td>
<td>66/10.7%</td>
<td>5.4</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>2013</td>
<td>20</td>
<td>90/22.2%</td>
<td>4.6</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>2014</td>
<td>11</td>
<td>86/12.8%</td>
<td>4.4</td>
<td>4.5</td>
<td>1</td>
</tr>
<tr>
<td>2015</td>
<td>17</td>
<td>84/20.2%</td>
<td>5.5</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>2016</td>
<td>14*</td>
<td>85/16.5%</td>
<td>6.6</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>2017</td>
<td>5</td>
<td>71/7.0%</td>
<td>10.2</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>2018</td>
<td>0</td>
<td>76/0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2019</td>
<td>7</td>
<td>87/8.0%</td>
<td>7</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>2020</td>
<td>10</td>
<td>77/13%</td>
<td>7.6</td>
<td>7</td>
<td>1</td>
</tr>
</tbody>
</table>

*There were 14 mothers seen with calves in the 2015/2016 season, however, due to a three-way calf switch that included the presumed loss of one calf that was never photographed, only 13 calves were photographed.

Mortalities
Between 01 January 2020 – 31 December 2020, two right whale mortalities were documented in U.S. waters (Table 3). The necropsy for the first, a calf of the year, was conducted and the cause of death was identified as vessel strike. The second mortality documented was a neonate discovered in November 2020. Initial necropsy results suggest the calf died at, or shortly after, birth. There was no evidence of anthropogenic injury found. The Consortium Board recognizes necropsies as significant data collection events that provide valuable information on which management and conservation measures can be (and have been) based. The Board views consistent necropsy response and support (both financial and personnel) as critical to monitor both right whale recovery and the efficacy of management actions.

Non-lethal Vessel Strikes, Entanglements, and Entrapments

Vessel Strikes:
There were three non-lethal vessel strike injuries documented between 01 January 2020 – 31 December 2020 (Table 4). One of these cases, the 2020Calfof2360 sighted with strike wounds in January, was considered non-lethal because it was last seen alive. However, the injuries to the whale were severe and the whale is not expected to have survived.

Entanglement and Entrapments
There were five active entanglement/entrapment cases reported between 01 January 2020 – 31 December 2020, of which four were new. Table 5 includes newly reported cases as well as pertinent updates to previously reported cases.
Table 3. Documented right whale mortalities 01 January 2020 – 31 December 2020.

<table>
<thead>
<tr>
<th>Whale #</th>
<th>Date</th>
<th>Location</th>
<th>Sex</th>
<th>Age</th>
<th>Field #</th>
<th>Necropsied?</th>
<th>Cause</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020Calf of 3560</td>
<td>06/25/2020</td>
<td>NJ - MIDA</td>
<td>M</td>
<td>calf</td>
<td></td>
<td>Yes</td>
<td>Vessel strike</td>
<td>Necropsy results indicate that the calf had evidence of at least two separate vessel collisions, the latter of which occurred shortly before the whale died and was the likely cause of death. The calf was last sighted alive on 04/06/2020 off North Carolina. The whale’s mother was resighted on 07/22/2020 in the Gulf of St. Lawrence.</td>
</tr>
<tr>
<td>11/20/2020</td>
<td>NC – MIDA</td>
<td>M</td>
<td>calf</td>
<td>CALO 20-09</td>
<td>Yes</td>
<td>Possible dystocia</td>
<td></td>
<td>Necropsy indicates no evidence of human interactions from entanglement or vessel strike. Initial results suggest the whale died during birth, or shortly thereafter. Multiple genetic samples were collected in order to identify the calf's mother.</td>
</tr>
</tbody>
</table>

Table 4. Right whale vessel strikes (non-lethal) detected between 01 January 2020 – 31 December 2020.

<table>
<thead>
<tr>
<th>Whale #</th>
<th>Date</th>
<th>Location</th>
<th>Sex</th>
<th>Age (current)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020Calf of 2360</td>
<td>01/08/2020</td>
<td>Georgia</td>
<td>Unk</td>
<td>calf</td>
<td>At first sighting of the calf of the year, at least two wounds consistent with propeller strike were observed on calf's head. The anterior most wound wraps over front of left rostrum and is deep. Aerial images do not allow for full assessment of the wounds. There is concern that the injury may impede suckling. Resighted 01/10/2020 by aerial team, noted that wounds were still bleeding. A multi-agency effort to deliver antibiotics to the calf off 01/15/2020 was successful. Neither the calf nor its mother #2360 have been sighted since 01/15/2020. Given the nature of the injuries to the calf, it is not expected to have survived the strike.</td>
</tr>
<tr>
<td>1017</td>
<td>02/29/2020</td>
<td>Cape Cod Bay</td>
<td>M</td>
<td>40+</td>
<td>Sighted with series of 25+ minor prop cuts down right flank. Orange cyamids are visible in several aft cuts. Overall condition of the whale is good. Last sighted without cuts on 07/11/2019 in the Gulf of St. Lawrence.</td>
</tr>
<tr>
<td>4539</td>
<td>04/05/2020</td>
<td>Cape Cod Bay</td>
<td>M</td>
<td>5</td>
<td>Whale observed on 04/05/2020 in Cape Cod Bay with wound to right blowhole and very faint and minor marks on right side that appear to be propeller marks. Whale appeared to be in good condition. Resighted several times in the Gulf of St. Lawrence between June and September 2020.</td>
</tr>
</tbody>
</table>
Table 5. Right whale entanglements and status updates 01 January 2020 – 31 December 2020. Newly reported entanglements (carrying gear) and updates to previously reported entanglements are in **bold**. Dead whales first sighted entangled at death are not included here. However, whales sighted alive as entangled and later dead are included.

<table>
<thead>
<tr>
<th>Whale #</th>
<th>Date of First Entanglement Sighting</th>
<th>First location</th>
<th>Sex</th>
<th>Age (in 2020)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>3466</td>
<td>12/21/2019 ~20m south Nantucket USA</td>
<td>M</td>
<td>15</td>
<td></td>
<td>At the initial entanglement sighting, the whale had multiple passes of yellow line through its mouth. The line appeared to be buoyant and trails behind the whale to a jumble and at least one bitter end. There is no evidence of tackle or buoys and the flippers do not appear to be involved. No response was mounted due to the time of day and distance from shore. The large amount of line and the jumble indicate that the whale will have difficulty shedding the gear and the configuration may become more complicated. Resighted on 01/18/2020, 01/22/2020, and 1/31/2020 southeast of Nantucket. Reporting group indicates no change in entanglement or condition. Response not possible given time of day and distance to shore.</td>
</tr>
<tr>
<td>3180</td>
<td>02/24/2020 ~45m SE of Nantucket</td>
<td>F</td>
<td>19</td>
<td></td>
<td>Whale sighted during an aerial survey, no response possible due to time of day and distance from rescue team. The full extent of the entanglement is unclear, however, a white bullet buoy was visibly lodged in the mouth and there may be a tight wrap of line around the bonnet. No trailing or suspended gear was visible. The whale was in extremely poor condition: emaciated, grey, and large cyamid aggregations on head and above both flippers.</td>
</tr>
<tr>
<td>WR-2020-02</td>
<td>03/16/2020 George’s Bank</td>
<td>Unk</td>
<td>Unk</td>
<td></td>
<td>A commercial fisher reported an entangled right whale ~130nm east of Cape Cod on Georges Bank via the USCG. No response was mounted due to the time of day and distance. Entanglement described as whale with two orange polyballs trailing ~30ft aft of the flukes. No images were taken.</td>
</tr>
<tr>
<td>4680</td>
<td>10/11/2020 ~3m east of Sea Bright , NJ</td>
<td>M</td>
<td>4</td>
<td></td>
<td>At a minimum, the whale has two passes of line around its rostrum, with line embedded in the rostrum. There is a large open lesion above the left shoulder. The whale is in extremely poor condition with significant body condition loss, lesioned and grey skin, and accumulations of orange cyamids on head and body. Survival is questionable.</td>
</tr>
<tr>
<td>3920</td>
<td>10/19/2020 South of Nantucket</td>
<td>M</td>
<td>11</td>
<td></td>
<td>During a search for entangled right whale #4680, the CCS aerial survey team found #3920 entangled south of Nantucket on 10/19/2020. The free-swimming whale had line wrapped tightly around it’s hear with line embedded in the forward part of the upper jaw. There was also trailing line. The CCS response team was able to locate the whale, affix a telemetry buoy to the entanglement, and remove ~100 feet of trailing line. Whale location and weather are being monitored for further intervention.</td>
</tr>
</tbody>
</table>
Monitoring Health of Injured Right Whales

Efforts to better track and monitor the health of anthropogenic injury of North Atlantic right whales were initiated in January 2013. These efforts aim to support annually mandated human induced serious injury and mortality determinations, to reduce the likelihood of undetected and unreported events, and to better assess both short and long-term impacts of injury on right whale health. Previously and newly injured right whales with vessel strikes, attached fixed gear, or with moderate to severe entanglement injuries in the absence of attached gear (see Knowlton et al. 2016 for review of injury types) are flagged for monitoring biannually. Each whale’s pre- and post-injury health conditions are evaluated using the visual health assessment technique (Pettis et al. 2004) and a determination of the impact of injury on health is made. Based on the available sighting and health information, whales are assigned to one of four categories: 1) Evidence of declining health coinciding with injury; 2) Inconclusive (this determination was assigned to animals when a: evidence of declining health exists but it was unclear whether or not it was linked to injury and/or b: images/information were inadequate to fully assess health condition visually; and/or c: condition has improved but remains compromised; 3) No indication of declining health caused by injury based on available images/information (these are removed from the monitoring list should subsequent sightings also show no impact of injury on health); and 4) Extended Monitor - no indication of declining health or whale’s condition has improved but whale will remain on monitoring list because of injury severity and/or is still carrying gear. This last category was created to capture whales without current health impacts related to injury, but with injuries that have the potential to negatively impact future health condition (e.g. some severe vessel strikes, whales carrying gear, etc.).

Between 01 January and 31 December 2020, thirteen new injury-of-interest events were documented for twelve whales, including four whales with attached gear, six entanglement injuries but no gear attached (including two new injuries detected for one whale), and three vessel strikes (Tables 6 and 7). Of these twelve whales, four exhibited declining condition coinciding with injury. The impact of injury on the health of four whales was inconclusive. There were no visual indicators of injury impact on health condition for the remaining four newly injured whales (Table 7). Twenty whales previously on the monitoring list were removed, including six who became presumed dead (Knowlton et al. 1994). The remaining 14 whales were removed for improved condition and/or length of time since initial injury detections. As of 31 December 2020, the Serious Injury/Human Impact list includes 62 whales with 74 injuries documented from March 2004 through 31 December 2020 (Table 8). The majority of the injuries are entanglement related (63/74, 85.1%) followed by vessel strikes (9/74, 12.2%). There are two whales on the list with injuries of unknown origin.

Table 6. Since the inception of the injured right whale monitoring protocol, the number of injured whales and newly reported injuries has varied by year. The number of whales included on the injured whale list is given for each report and is followed parenthetically by how many of those were newly detected injuries. There are currently twelve whales on the injured list with multiple injuries.

<table>
<thead>
<tr>
<th>Year</th>
<th>June</th>
<th>December</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>33*</td>
<td>32 (2)</td>
</tr>
<tr>
<td>2014</td>
<td>45 (16)</td>
<td>50 (6)</td>
</tr>
<tr>
<td>2015</td>
<td>51 (4)</td>
<td>59 (9)</td>
</tr>
<tr>
<td>2016</td>
<td>60 (4)</td>
<td>63 (8)</td>
</tr>
<tr>
<td>2017</td>
<td>61 (4)</td>
<td>70 (10)</td>
</tr>
<tr>
<td>2018</td>
<td>74 (9)</td>
<td>70 (8)</td>
</tr>
<tr>
<td>2019</td>
<td>-</td>
<td>72 (9)</td>
</tr>
<tr>
<td>2020</td>
<td>-</td>
<td>62 (13)</td>
</tr>
</tbody>
</table>

*The first injured whale monitoring report was distributed in June 2013 and therefore does not include a comparative number of newly reported injuries. In 2019, reporting moved from a biannual to an annual basis.

Table 7. Impact of anthropogenic injury on right whale visual health for newly detected injured right whales.

<table>
<thead>
<tr>
<th></th>
<th>Entanglement</th>
<th></th>
<th>Vessel Strike</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gear Present</td>
<td>No Gear Present</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decline in Condition</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Inconclusive</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>No Decline in Condition</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>12*</td>
</tr>
</tbody>
</table>

*Two new injuries were detected on whales that were already on the monitoring list. One newly injured whale had two injuries detected in 2020.

Table 8. Impact of anthropogenic injury on right whale visual health by injury type based on assessments of photographs pre- and post-injury for all North Atlantic right whales on the Serious Injury/Human Impact list as of 31 December 2020.

<table>
<thead>
<tr>
<th></th>
<th>Entanglement</th>
<th></th>
<th>Vessel Strike</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gear Present</td>
<td>No Gear Present</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decline in Condition</td>
<td>10</td>
<td>11</td>
<td>1</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td>Inconclusive</td>
<td>12</td>
<td>14</td>
<td>2</td>
<td>1</td>
<td>29</td>
</tr>
<tr>
<td>No Decline in Condition</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Extended Monitor</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>30</td>
<td>6</td>
<td>2</td>
<td>62*</td>
</tr>
</tbody>
</table>

*This represents the number of whales on the monitoring list. Twelve of these whales have each had second injuries documented since their initial injury sighting. For purposes of this report, whales are included under the category representing their most recent injury.

AERIAL AND VESSEL-BASED SIGHTING SUMMARY: 2019

Prior to the 2017 Report Card, sighting information was reported for the time period following the previous NARWC Annual Meeting. However, that reporting included the current year for which not all data has necessarily been received and/or processed. Therefore, beginning with the 2017 Report Card, sighting summaries will be presented for the previous calendar year. Cataloged sighting information for the year 2019 (analysed 01 September 2020) is summarized below (Table 9) and includes survey, research, and opportunistic sightings. Months with sightings, survey types, and major contributing organizations (>10% total sightings for region) are listed.

Major Contributing Organizations
BOS: Blue Ocean Society
CCS: Center for Coastal Studies
CMARI: Clearwater Marine Aquarium Research Institute
CWI: Canadian Whale Institute
DAL: Dalhousie University
DFO: Fisheries and Oceans Canada
FWRI: Florida Fish and Wildlife Research Institute
GDNR: Georgia Department of Natural Resources
GMWSR: Grand Manan Whale and Seabird Research Station
NEAq: New England Aquarium
NEFSC: Northeast Fisheries Science Center
QLM: Quoddy Link Marine
TC: Transport Canada
UNB: University of New Brunswick
WHOI: Woods Hole Oceanographic Institution


www.narwc.org
Table 9. Summary of 2019 right whale sightings by habitat region. Analyses for 2019 data are ongoing and therefore the data presented here should not be considered complete.

<table>
<thead>
<tr>
<th>Region</th>
<th># Sightings</th>
<th>Sighting Months</th>
<th>Survey types/activities</th>
<th>Organizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bay of Fundy</td>
<td>70</td>
<td>May, Jul - Oct</td>
<td>Vessel surveys, biopsy sampling</td>
<td>GMWSR, NEAq, QLM</td>
</tr>
<tr>
<td>East (East of Mainland US)</td>
<td>11</td>
<td>Jul, Oct</td>
<td>Aerial surveys</td>
<td>DFO</td>
</tr>
<tr>
<td>(Azores, Nova Scotian Shelf, Spain, Bermuda, Canary Islands)</td>
<td>335</td>
<td>Jan - Mar, May - Sept, Nov</td>
<td>Aerial &amp; Vessel surveys</td>
<td>NEAq, NEFSC</td>
</tr>
<tr>
<td>Gulf of Maine</td>
<td>61</td>
<td>Mar - Sep</td>
<td>Aerial &amp; Vessel surveys</td>
<td>CCS, NEFSC</td>
</tr>
<tr>
<td>Great South Channel</td>
<td>4</td>
<td>Jul, Sep - Oct</td>
<td>Aerial surveys, whale watch</td>
<td>BOS, CCS</td>
</tr>
<tr>
<td>Jeffreys Ledge</td>
<td>436</td>
<td>Jan - May, Jul - Sep, Nov - Dec</td>
<td>Aerial &amp; Vessel surveys</td>
<td>NEAq, NEFSC</td>
</tr>
<tr>
<td>Mid-Atlantic (includes south of Cape Cod)</td>
<td>1827</td>
<td>May - Oct</td>
<td>Aerial &amp; Vessel surveys, biopsy sampling, drone photogrammetry</td>
<td>CWI, DAL, DFO, NEAq, NEFSC, TC, UNB</td>
</tr>
<tr>
<td>New England (Massachusetts Bay/Cape Cod Bay)</td>
<td>1372</td>
<td>Jan - May</td>
<td>Aerial &amp; Vessel surveys, biopsy &amp; habitat sampling, drone photogrammetry</td>
<td>CCS, NEFSC, WHOI</td>
</tr>
<tr>
<td>North (North of 46° incl. Newfoundland, Gulf of St. Lawrence, Iceland)</td>
<td>146</td>
<td>Jan - Mar, Nov - Dec</td>
<td>Aerial &amp; Vessel surveys, biopsy &amp; drone sampling</td>
<td>CMARI, FWRI, GDNR</td>
</tr>
</tbody>
</table>

**MANAGEMENT AND MITIGATION ACTIVITIES**

**NMFS, United States 2020 Management and Mitigation Activities**

- **North Atlantic Right Whale Unusual Mortality Event**
  An Unusual Mortality Event (UME) was declared by the National Marine Fisheries Service (NMFS) for North Atlantic right whales (*Eubalaena glacialis*) starting in 2017 due to elevated strandings along the Northwest Atlantic Ocean coast, especially in the Gulf of St. Lawrence region of Canada. This is a transboundary event and the investigation includes whales stranding in both the United States and Canada. The event is ongoing with the 32 confirmed dead stranded whales (21 in Canada; 11 in the U.S.) to date. The breakdown by year includes 17 confirmed dead stranded whales (12 in Canada; 5 in the U.S.) in 2017, three whales in the U.S in 2018, nine whales in Canada and one in the U.S in 2019, and two dead whales in the U.S. in 2020 (through 08 December). Of the 32 dead right whales, 22 were necropsied and 18 were determined to have died as a direct result of human activities (either confirmed, probable, or suspect), from entanglements (8) or vessel strikes (10). Additionally, since 2017, 13 live free-swimming non-stranded whales have been documented with serious injuries from either entanglements (4 in Canada; 8 in the U.S.) or vessel strikes (1 in the U.S). Therefore, the preliminary cumulative total number of animals currently in the North Atlantic right whale UME is 45 individuals, including 32 confirmed mortalities and 13 seriously injured free-swimming whales. Thus, given there are less than 400 individual North Atlantic right whales remaining, these 45 individuals in the UME represent at minimum 10% of the population, which is a significant impact on such a critically endangered species.

- **North Atlantic Right Whale Monitoring Plan**
  NMFS summarized the findings of a 2019 North Atlantic Right Whale expert Working Group that considered right whale monitoring objectives related to: (1) improving our understanding of population status by identifying and tracking essential population metrics, and (2) improving our understanding of distribution and habitat use. A report of the Working Group’s recommendations was released in August.
The report presents the Working Group’s recommendations for a comprehensive monitoring strategy to guide future analyses and data collection on (1) North Atlantic right whale demographics and population status, (2) distribution shifts and habitat use range-wide, and (3) the health of individuals and the population. NMFS is currently reviewing the Working Group’s recommendations, as well as other information relevant to monitoring right whales, as it considers making any changes to its current right whale monitoring and surveillance program. In doing so, we will work closely with our partners to ensure that all North Atlantic right whale monitoring efforts are effective in helping to recover the species.

- **North Atlantic Right Whale Health Assessment Workshop:**
  NMFS convened a Workshop on North Atlantic Right Whale Health Assessment June 24-26, 2019 in Silver Spring, Maryland, under the auspices of the Working Group on Marine Mammal Unusual Mortality Events (Working Group) in response to the ongoing North Atlantic Right Whale UME and the endangered status of the species. The main goals of the workshop were: 1) to assess current health information data, including associated data gaps, and 2) identify appropriate available and needed tools and techniques for collecting standardized health data that can be used to understand health effects of environmental and human impacts (e.g., entanglement), and inform fecundity and survivorship models to ultimately guide population recovery of North Atlantic right whales.

  Over the course of the three days, the workshop participants helped NMFS summarize North Atlantic right whale population status and existing health-assessment information; identified several ways to prioritize health data collection, tools and methods; and prioritized ways to increase the use of health data to aid in monitoring individual health, informing population health, and identifying the population consequences of multiple stressors, including the connection between human activities (e.g., entanglement) and health.

  A draft report detailing the workshop proceedings and recommendations is now complete. Release of the report was previously delayed but we now anticipate it will be released in early January 2021.

- **Vessel Speed Rule Report**
  NMFS has undertaken an assessment of the right whale vessel speed rule. The assessment will include information on biological effectiveness, mariner compliance, outreach and enforcement efforts, navigational safety, and economic impacts. Additionally, the assessment will assess the voluntary Dynamic Management Area (DMA) program and examine small vessel (<65ft) traffic patterns within Seasonal Management Areas.

  NMFS continues to move forward with a suite of activities designed to 1) further investigate possible changes to the speed rule regulations, 2) assess the efficacy of other vessel strike mitigation efforts, and 3) enhance our outreach and enforcement strategies.

- **DMA and Right Whale Slow Zone info**
  NMFS began the voluntary DMA program at the same time as our mandatory speed reduction regulations. Under this program, NMFS established DMAs when visual sightings documented the presence of three or more right whales within a discrete area. Vessels 65 feet and larger were asked to avoid or slow to 10 knots or less in these areas to protect right whales from vessel strike. Early in this fiscal year, the North Atlantic right whale Northeast U.S. Implementation Team identified the opportunity for NMFS GARFO to enhance vessel strike reduction efforts by also using acoustic information to alert vessels of right whale presence.

  Based on this idea, NMFS GARFO launched the Right Whale Slow Zones campaign in August of 2020. Under this new name – Right Whale Slow Zones – NMFS GARFO is expanding voluntary speed reduction efforts in the Northeast U.S. Now, NMFS GARFO is asking vessels of all sizes to avoid or slow down to 10 knots or less in areas where right whales have been seen (i.e., DMAs) or heard (i.e., areas where acoustic detections are received).

  Over the last five years NMFS has recorded a noticeable and steady increase in the number of DMAs triggered. During 2016, five DMAs occurred and speed restrictions were requested. However, in the last three years (2018-2020), notifications have increased to 20 or more annually. Historically, DMAs were triggered and initiated due to right whale visual observations. In August of 2020, since the launch of Right
Whale Slow Zones, acoustic receivers and arrays were added as a new technology used to trigger right whale presence notifications in the Northeast U.S. To date, (12-9-2020) we have had four acoustically triggered SLOW Zone events in two locations (New York Bight, NY and Atlantic City, NJ). Two events in each location, which have led to extensions of the original trigger.

The North Atlantic right whale Northeast Implementation Team identified and outlined some of the positive opportunities for NMFS to begin using acoustic receivers and detections as another alternative trigger for establishing right whale SLOW Zones. These suggestions were researched, discussed and developed by management. Acoustic triggers were accepted and have been established in the Northeast U.S. per the NEIT recommendation related to trigger criteria, duration and size.

- **U.S. North Atlantic Right Whale Implementation Teams**
  In 2020, NMFS conducted a number of management activities under the Endangered Species Act (ESA) related to recovery plan implementation specific to Section 4(f). This included:
  - **Northeast U.S. Implementation Team (NEIT)**
    NMFS GARFO continued to liaison with the NEIT on activities to assist in the implementation of the recovery plan in the Northeast U.S. This included the NEIT’s continued discussion and furtherance of identified priorities to support right whale recovery in the Northeast. For example, the NEIT’s recommendation to NMFS GARFO to enhance vessel strike reduction efforts using acoustic information informed the acoustic portion of the new “Right Whale Slow Zones.”Specifically, the areas triggered by acoustic detections in the Northeast U.S. are established per the NEIT recommendation related to trigger criteria, duration and size.
  - **Population Evaluation Subgroup**
    The U.S. Implementation Team’s Population Evaluation Tool Subgroup continued to meet and work towards development of a population viability analysis to characterize North Atlantic right whale extinction risk. This is a coastwide collaboration including Canada.

- **Species in the Spotlight**
  North Atlantic Right Whales became a Species in the Spotlight in 2019. NMFS is working to develop a Species in the Spotlight 5-year action plan which builds upon existing recovery and conservation plans and details the focused efforts needed over the next five years to reduce threats and stabilize the North Atlantic right whale population decline. Considerations include input from the Northeast and Southeast Implementation Teams from their October 2019 joint meeting. NMFS expects the action plan to be publicly available in the spring of 2021.

- **Atlantic Large Whale Take Reduction Plan**
  NMFS is requesting comments on the proposed rule to modify the Atlantic Large Whale Take Reduction Plan (ALWTRP) and associated Draft Environmental Impact Statement (DEIS). The proposed rule and a Notice of Availability of the DEIS were published in the Federal Register on December 31, 2020. Links to both documents as well as supporting information can be found on the ALWTRP website.

  Comments on the Proposed Rule and DEIS are due by March 1, 2020. NMFS is holding informational sessions in January to give the public an opportunity to learn about the proposed rule and DEIS before providing comments. Comments can be submitted in writing or orally:
  - To submit written comments go to the regulations.gov website, search for NOAA-NMFS-2020-0031 and choose “Comment Now”.
  - Oral comments can be provided during February public hearing sessions.

  Proposed changes to the Plan would:
  - Modify gear marking to introduce state-specific colors for gear marks and increase the number of gear markings and areas requiring marked lines.
  - Modify gear configurations to reduce the number of vertical lines by requiring more traps between buoy lines and by introducing weak insertions or weak rope into buoy lines.
  - Modify existing seasonal restricted areas to allow ropeless fishing.
  - Add one or two new seasonal restricted areas that are closed to buoy lines but allow ropeless fishing.

  **Contact** Colleen.Coogan@noaa.gov or Marisa.Trego@noaa.gov with questions.
• **Offshore Wind Energy:**
  Offshore wind energy development along the U.S. East Coast continued to progress rapidly in 2020, including the first two turbines being installed in Federal waters off the coast of Virginia. Currently, there are 16 active leases on the Outer Continental Shelf of the U.S. East Coast between southern New England and North Carolina. Many of the proposed projects are simultaneously conducting site assessment activities, including geotechnical and geophysical surveys, and preparing Construction and Operating Plans. The effects of all these activities on protected species and their habitat are assessed under the ESA and the Marine Mammal Protection Act (MMPA). NMFS continued its engagement in the burgeoning industry in 2020 fulfilling multiple roles, primarily providing input and review throughout the One Federal Decision process as a cooperating agency to the Bureau of Ocean Energy Management, the lead Federal agency for authorizing the construction, operation, and eventual decommissioning of any offshore wind project and also providing data and analyses on protected species to developers and working on a number of regional coordination projects to advance our scientific understanding of the effects of offshore wind development. Additional activities in 2020 included:
  ○ Completing the ESA section 7 biological opinion for the Vineyard Wind 1 project, the Opinion can be found at: [https://repository.library.noaa.gov/view/noaa/27243](https://repository.library.noaa.gov/view/noaa/27243)
  ○ Continuing to conduct a programmatic ESA consultation on offshore wind energy survey activities to include actions from Maine-Florida and update analyses of effects to ESA-listed species and their habitats.
  ○ Processing MMPA Incidental Take Authorizations related to Vineyard Wind 1 and South Fork construction.
  ○ Coordinating with the Northeast Fisheries Science Center (NEFSC) to improve our understanding of the effects of offshore wind development on protected species.


• **Aquaculture Interactions Working Group (AIWG):**
  The NOAA Aquaculture Interactions Working Group (AIWG) coalesced in 2019 in partnership between the NMFS Office of Protected Resources and Office of Aquaculture to address the potential risk of protected species interactions with marine aquaculture gear. The objectives of this working group are to: (1) consider ways to assess the risk of adverse impacts to protected species associated with various types of aquaculture gear, (2) evaluate strategies to avoid or minimize risks to protected species and their habitats (e.g., siting, engineering design, monitoring), and (3) develop operational products such as guidance documents and best management practices that will constitute national guidance on assessing and minimizing potential risks to protected species and their habitats from aquaculture operations. Efforts by the AIWG are ongoing, with guidance and information produced by this working group expected throughout 2021.

• **Ropeless Fishing Research:**
  During FY20 the NMFS NEFSC accelerated the research and development of a ropeless fishing pilot program. Many activities have been accomplished or are being planned to aid in both testing and development of ropeless systems. The NEFSC has built relationships with fishermen, manufacturers of ropeless systems, and nongovernmental organizations (NGO) to help facilitate the development of safe and operationally feasible methods to remove the vertical lines from pot/trap and other fishing gears.

We continue to expand our capacity to work on innovative gear solutions. Activities include:
  ○ NEFSC acquisition of a total of 10 ropeless fishing systems from six vendors were added to the collaborative Gear Library which now maintains 47+ ropeless fishing systems.
  ○ Contracting with 16 collaborative fishermen to conduct both inshore and offshore trials of ropeless fishing systems.
  ○ Completion of 120 active fishing hauls using ropeless fishing systems. Dedicated training/rigging days accomplished prior to each new vessel or ropeless fishing system.
  ○ Two federal employees have been reprogrammed to work on ropeless testing and four contractors added to the team.
  ○ Economics staff are estimating anticipated cost reductions of ropeless technology over time.
  ○ NEFSC/Protected Species Branch is working with the National Aeronautics and Space Administration’s Center for Collaborative Excellence and Yet2 to crowdsource market research to
identify vendors with the expertise to develop an inexpensive geolocation system for traps and pots to be used by fishermen, managers, and enforcement.
○ Funding was provided to the National Fish and Wildlife Federation to develop a scoping project to elicit feedback from key stakeholder groups on ropeless fishing conflict issues (matched by $300,000 from private corporations).
○ NMFS staff are actively participating in newly formed ropeless fishing forums including the Ropeless Consortium and Canadian Gear Innovation Summit.
○ Worked with communications staff to develop an infographic and informational videos on ropeless systems.
○ Working with NGOs and engineers to develop a geolocation system to resolve issues of gear conflict, fishermen setting their gear over or fishing through ropeless fishing system systems set on the ocean floor.

- NOAA called for 27 Dynamic Management Area (DMA) voluntary speed reduction zones between 01 January 2020 and 31 December 2020 (Table 10).

<table>
<thead>
<tr>
<th>Trigger Date (date of RW sightings)</th>
<th>Number of Right Whales</th>
<th>Sightings Source</th>
<th>General Location</th>
<th>Boundaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/22/2020</td>
<td>58</td>
<td>NOAA aerial team</td>
<td>31 nm south of Nantucket</td>
<td>41 11 N 069 32 W 070 37 W</td>
</tr>
<tr>
<td>1/31/2020</td>
<td>50</td>
<td>NOAA aerial team</td>
<td>31 nm south of Nantucket</td>
<td>41 11 N 069 32 W 070 37 W</td>
</tr>
<tr>
<td>2/9/2020</td>
<td>14</td>
<td>NOAA aerial team</td>
<td>31 nm south of Nantucket</td>
<td>41 11 N 069 32 W 070 37 W</td>
</tr>
<tr>
<td>2/20/2020</td>
<td>8</td>
<td>NARW Sighting Survey</td>
<td>31 nm south of Nantucket</td>
<td>41 11 N 069 32 W 070 37 W</td>
</tr>
<tr>
<td>3/2/2020</td>
<td>66</td>
<td>NARW Sighting Survey</td>
<td>Extended 31 nm south of Nantucket and 47 nm SE Nantucket, MA</td>
<td>41 11 N 069 32 W 070 37 W</td>
</tr>
<tr>
<td>3/12/2020</td>
<td>13</td>
<td>NOAA Aerial team</td>
<td>31 nm south of Nantucket</td>
<td>41 11 N 069 32 W 070 37 W</td>
</tr>
<tr>
<td>3/23/2020</td>
<td>4</td>
<td>NOAA Aerial team</td>
<td>East of Boston</td>
<td>42 45 N 070 11 W 071 10 W</td>
</tr>
<tr>
<td>4/9/2020</td>
<td>5</td>
<td>Opportunistic Sighting from Shore</td>
<td>Nahant, MA</td>
<td>42 47 N 070 26 W 071 23 W</td>
</tr>
<tr>
<td>4/24/2020</td>
<td>4</td>
<td>Boston Harbor Cruise</td>
<td>NE of Boston</td>
<td>42 47 N 070 26 W 071 23 W</td>
</tr>
<tr>
<td>8/31/2020</td>
<td>8</td>
<td>NOAA Aerial Team</td>
<td>South of Nantucket</td>
<td>41 16 N 069 37 W 070 28 W</td>
</tr>
<tr>
<td>9/14/2020</td>
<td>7</td>
<td>NOAA Aerial team</td>
<td>South of Nantucket</td>
<td>41 16 N 069 37 W 070 28 W</td>
</tr>
<tr>
<td>9/24/2020</td>
<td>4</td>
<td>NEA aerial survey</td>
<td>South of Nantucket</td>
<td>41 16 N 069 37 W 070 28 W</td>
</tr>
<tr>
<td>10/4/2020</td>
<td>3</td>
<td>NEA aerial survey</td>
<td>South of Nantucket</td>
<td>41 16 N 069 37 W 070 28 W</td>
</tr>
<tr>
<td>10/19/2020</td>
<td>6</td>
<td>CCS aerial survey</td>
<td>South of Nantucket</td>
<td>41 16 N 069 37 W 070 28 W</td>
</tr>
</tbody>
</table>

Table 10. Dynamic Management Area (DMA) voluntary speed reduction zones posted by NOAA between 01 January 2020 and 31 December 2020.
Table 10 (cont’d). Dynamic Management Area (DMA) voluntary speed reduction zones posted by NOAA between 01 January 2020 and 31 December 2020.

<table>
<thead>
<tr>
<th>Trigger Date (date of RW sightings)</th>
<th>Number of Right Whales</th>
<th>Sightings Source</th>
<th>General Location</th>
<th>Boundaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/31/2020</td>
<td>4</td>
<td>NOAA aerial survey</td>
<td>South of Nantucket</td>
<td>41 16 N 069 37 W 40 32 N 070 28 W</td>
</tr>
<tr>
<td>11/15/2020</td>
<td>4</td>
<td>NOAA aerial survey</td>
<td>SE of Nantucket</td>
<td>40 59 N 069 05 W 40 23 N 069 52 W</td>
</tr>
<tr>
<td>11/17/2020</td>
<td>4</td>
<td>WHOI Acoustic Buoy</td>
<td>SE of New York City</td>
<td>40 41 N 73 03 W 40 01 N 073 55 W</td>
</tr>
<tr>
<td>11/20/2020</td>
<td>4</td>
<td>WHOI Acoustic Buoy</td>
<td>SE of Atlantic City</td>
<td>39 25 N 073 44 W 38 44 N 074 36 W</td>
</tr>
<tr>
<td>11/29/2020</td>
<td>3</td>
<td>NEA aerial survey</td>
<td>SW of Nantucket Isl.</td>
<td>41 01 N 070 07 W 40 22 N 070 59 W</td>
</tr>
<tr>
<td>11/30/2020</td>
<td>3</td>
<td>WHOI acoustic buoy</td>
<td>SE of New York City</td>
<td>40 41 N 73 03 W 40 01 N 73 55 W</td>
</tr>
<tr>
<td>12/7/2020</td>
<td>4</td>
<td>WHOI Acoustic Buoy</td>
<td>SE of Atlantic City</td>
<td>39 25 N 073 44 W 38 44 N 074 36 W</td>
</tr>
<tr>
<td>12/9/2020</td>
<td>4</td>
<td>WHOI Acoustic Buoy</td>
<td>SE of New York City</td>
<td>40 41 N 73 03 W 40 01 N 73 55 W</td>
</tr>
<tr>
<td>12/14/2020</td>
<td>4</td>
<td>NEA aerial survey</td>
<td>SE of Nantucket Isl.</td>
<td>41 26 N 069 31 W 40 44 N 070 25 W</td>
</tr>
<tr>
<td>12/20/2020</td>
<td>4</td>
<td>WHOI Acoustic Buoy</td>
<td>SE of New York City</td>
<td>40 41 N 73 03 W 40 01 N 73 55 W</td>
</tr>
<tr>
<td>12/20/2020</td>
<td>4</td>
<td>WHOI Acoustic Buoy</td>
<td>SE of Atlantic City</td>
<td>39 25 N 073 44 W 38 44 N 074 36 W</td>
</tr>
<tr>
<td>12/30/2020</td>
<td>7</td>
<td>PR Observers aboard survey vessel - VENTUS</td>
<td>S of Martha’s Vineyard</td>
<td>41 25 N 069 59 W 40 44 N 070 55 W</td>
</tr>
<tr>
<td>12/31/2020</td>
<td>4</td>
<td>WHOI Acoustic Buoy</td>
<td>W of Martha’s Vineyard</td>
<td>41 34 N 070 50 W 40 54 N 071 43 W</td>
</tr>
</tbody>
</table>

Fisheries and Oceans Canada and Transport Canada, Canadian 2020 Management and Mitigation Activities

Input from Fisheries and Oceans Canada

- 2020 is the fourth year that the Government of Canada has implemented targeted management measures to help protect and recover NARW by addressing primary threats to the population: vessel strikes (Transport Canada lead) and entanglement in fishing gear (Fisheries and Oceans lead).

- In February 2020, additional management measures to protect North Atlantic right whales were announced for 2020 and beyond. These include the expansion of temporary area closures to fisheries triggered by single whale detections in the Gulf of St. Lawrence, Roseway and Grand Manan Basins, and the entire Bay of Fundy as well as season-long area closures to protect aggregations in the Gulf of St. Lawrence. The new season-long closure protocol, an adaptive management measure, resulted in the largest area closed to fishing to date. As of November 13, 2020, 175 full grids (approximately 36,000 km2) were closed for the season. As of November 13, 2020, 36 full grids were temporarily closed (approximately 6,400 km2) within the Gulf of St. Lawrence, Bay of Fundy and Roseway Basin. In comparison, the static season long closure area to protect right whales in 2019 was 2,200 square km.

- This is also the first year where acoustic technology was used to trigger fishery area closures. This technology successfully detected the presence of whales, in turn, triggering both fishing and shipping measures.

- Canada implemented a requirement for fixed gear fisheries in Atlantic Canada and Quebec to be marked by end of 2020 and to have weak breaking points in their vertical lines as well as other gear modifications.
Canada’s on the water, in the air and acoustic whale surveillance program covers all of Atlantic Canada and Quebec, with targeted monitoring in the Gulf of St. Lawrence, the Bay of Fundy and other areas. For example, at any given time through peak NARW months in Canada (April to November), upwards of 4-5 planes from DFO and Transport Canada were monitoring different areas for right whales and potential overlap with fishing activity and vessel traffic. As of November 2020, over 2000 hours of flights were designated for NARW.

Right whales were first sighted in Canadian waters on May 3rd, 2020. As of early December, there have been over 1000 detections in Canadian waters of right whales and 128 different individuals have been identified from visual surveillance in Canadian waters this year, including five new right whale calves. Analysis of photos from 2020 is ongoing.

With less than 400 remaining, the Government of Canada continues to take action to protect the endangered North Atlantic right whale. To date, there have been no Right whale deaths or new entanglements reported in Canadian waters for 2020.

The Government of Canada has been working with industry, to identify gear solutions for alleviating injury to right whales and has provided funding for entrepreneurs and the fishing industry for gear development and pilots. Many innovative approaches to addressing gear modification were discussed during the Gear Innovation Summit hosted by the Minister of Fisheries and Oceans from February 11-12, in Halifax, N.S.

Over the past three years, ropeless gear trials have been conducted in Atlantic Canada. In 2020, the Department supported the first dedicated trials of ropeless gear for crab fishing in an area closed due to the presence of right whales, their catches were sold on the commercial market. Future gear modifications that are being considered include: requirements for maximum rope diameters of 5/8 inches, sinking rope between pots and traps, and reductions in vertical and floating rope.

Fisheries and Oceans has continued annual investment of over $1 million for marine mammal response organizations and investments in science to better understand threats to right whales, and to inform future management measures. The Department is also delivering $4.5 million over four years to build additional capacity across Canada for safe and effective marine mammal incident response. The funds for 2020-21 will further support necropsies, Indigenous community response capacity, and in particular increased large whale disentanglement response capacity in the Gulf of St. Lawrence. Meetings are held annually with Marine Mammal Response partners to discuss the operational season and needs moving forward.

Fisheries and Oceans hosted the Gear Innovation Summit in Halifax on February 11-12, 2020. The Summit provided an opportunity for harvesters, technical experts, non-government and government agencies to share information and learn about technologies and programming aimed to the prevention, reduction, and retrieval of ghost gear and industry-led whale safe gear initiatives. Attended by over 250 stakeholders as well as the Minister of Fisheries and Oceans, the event included plenary sessions, expert panel discussions and a trade show to allow for harvesters to further discuss the application of technology in their operations.

Fisheries and Oceans is committed to addressing the threat of abandoned, lost, or otherwise discarded fishing gear through various initiatives, including the Sustainable Fisheries Solutions and Retrieval Support Contributions program (Ghost Gear Fund). Projects supported by Fisheries and Oceans Canada have been responsible for the removal of almost 69 tons worth of lost or discarded fishing gear from coastal waters in Atlantic Canada this year.

On November 17-18, 2020, Fisheries and Oceans Canada held the North Atlantic Right Whale Roundtable Meeting with indigenous groups, the fishing industry, provinces, and marine mammal experts. The Roundtable and other discussions with harvesters play an important role in the preparation of Canada’s measures to protect right whales and to support sustainable fisheries for 2021 and beyond.
Essential Population Monitoring and Priorities

In the spring of 2018, Canada announced new measures to mitigate both entanglements and vessel strikes in areas in which right whales frequent, including vessel speed reductions, temporary and fixed fisheries management areas and closures, and increased reporting requirements for fishing activity, lost gear, and interactions with marine mammals. There were no detected right whale mortalities in Canadian waters in 2018, though there were three entangled whales detected that year. In 2019, similar mitigation measures were put into place in Canadian waters. Between 04 and 27 June 2019, seven right whale mortalities were detected in Canadian waters, three of which were attributed to vessel strikes. In response, vessel strike mitigation measures in the Gulf of St. Lawrence were expanded on 08 July 2019. Two additional right whale mortalities were detected in Canadian waters in July 2019 (causes of death undetermined) and a third whale who became severely entangled in the Gulf of St. Lawrence in August 2019, well after the snow crab fishery season was over, was discovered dead in waters off New York, U.S. in September 2019. In 2020, Canada further expanded on the measures introduced in July 2019. There were no known right whale mortalities in Canadian waters in 2020.

Management and Mitigation Activities

- In 2020, Transport Canada once again implemented a large mandatory static speed restriction zone covering much of the Gulf of St. Lawrence, and dynamic speed restriction zones in the shipping lanes north and south of Anticosti Island to reduce the risk of vessel collisions with the North Atlantic right whale. These measures, applicable to all vessels longer than 13m, came into force on April 28, 2020 and were in place until November 15, 2020.
- Additionally, Transport Canada instituted Seasonal Management Areas from April 28 to June 30, 2020 to expand the static speed restriction zone for part of the season and a mandatory restricted area in and near the Shediac Valley to protect aggregating North Atlantic right whales from August 2 to October 9, 2020 – the area was closed to all vessels longer than 13m with exceptions for fishing and certain other activities. Vessels permitted to transit in or through the zone were limited to speeds of no more than 8kn.
- Transport Canada also conducted a trial voluntary slowdown in Cabot Strait from April 28 to June 15, 2020, and October 1 to November 15, 2020.
- Transport Canada used two new surveillance technologies to detect North Atlantic right whales to inform active management of dynamic vessel speed measures - a Remotely Piloted Aircraft System (RPAS or drone) and an acoustic underwater glider. These two technologies complimented the surveillance flights flown by Transport Canada’s National Aerial Surveillance Program (NASP).
- Transport Canada began evaluating the 2020 measures before the conclusion of the season, and continues to engage with the marine transportation industry, fishers, scientists, and other stakeholders to refine and develop measures for 2021.
- The Government of Canada consults with fishing and shipping industry representatives, Indigenous groups and other partners, for feedback on measures and to support the development of future measures.

2020 NORTH ATLANTIC RIGHT WHALE PUBLICATIONS/REPORTS

Reports and publications that utilized NARWC databases in 2020 and/or those of general interest to the right whale community are listed and hyperlinked (when available) below.

Publications/Theses


Myers, H.J. and M.J. Moore. 2020. Reducing effort in the U.S. American lobster (Homarus americanus) fishery to prevent North Atlantic right whale (Eubalaena glacialis) entanglements may support higher profits and long-term sustainability. Marine Policy 118:104017


Reports


REFERENCES


Appendix 1

Catalog Assessment Method
We have developed standardized criteria that can be applied each year to get a low, middle (best estimate) and upper number of whales in the population as determined from Catalog data. One term needs to be explained to understand these numbers. Whales are given temporary intermatch codes if 1) two or more sightings match each other, and 2) neither have been matched to a catalog whale. Some of these whales will eventually be matched to existing cataloged whales and others will be determined to be “new” to the Catalog and assigned a number. Once an intermatch whale is given a Catalog number, or matched to another intermatch code whale, the intermatch code is made inactive. The results for 2019 are provided below in Table 1.

LOWER
To determine the lower bound, we simply count the number of unique cataloged whales identified the year before. Because of delays in processing data, this number is lower than the eventual total number of whales seen alive in that year.

MIDDLE
The middle bound is determined by summing three categories:
1. All whales presumed to be alive in that year (i.e. seen in the last six years),
2. Intermatch whales that are likely to be added to the Catalog. This is calculated by first finding all intermatch codes that span two or more years (both those that are active and those that were matched and made inactive), removing all calves and any SEUS whales whose sightings span two years only because they are seen in December and January of the same field season. Then, we determine which of those intermatch whales have Catalog numbers and what percent of those were new to the catalog (i.e. had not been matched to an existing cataloged whale). The remaining, unidentified intermatch whales are then multiplied by that fraction to determine how many are likely new to the Catalog (e.g. if only 20% of the matched intermatch whales were new, then 20% of the unmatched intermatch whales are likely new). That number is then added to the count of calves born more than two years earlier that are unmatched with active intermatch codes (indicating there is enough information to potentially match them in the future). Process changed Oct. 2009.
3. Calves from the last two years that have not been cataloged. We make an assessment of whether there is enough photographic information to likely be able to match them to future sightings and thus eventually assign them a Catalog number. We then sum those that will likely be cataloged.

UPPER
The upper bound is also the sum of three categories:
1. All Cataloged whales minus those whose carcasses were identified. Even whales missing for 30 years included.
2. All active intermatch whales minus calves from the last two years.
3. All calves from the last two years minus those known to be dead.

Table 1. The Catalog method of estimating the population represents an assessment of the number of photographed whales in the North Atlantic Right Whale Identification Database. Analysis completed 9/1/20.

<table>
<thead>
<tr>
<th>CAT</th>
<th>INDIVIDUALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low:</td>
<td>339 individuals</td>
</tr>
<tr>
<td></td>
<td>339 Cataloged whales seen in 2019</td>
</tr>
<tr>
<td>Middle:</td>
<td>486 individuals</td>
</tr>
<tr>
<td></td>
<td>458 Cataloged whales presumed alive in 2019</td>
</tr>
<tr>
<td></td>
<td>23 Intermatch whales likely to be added to Catalog</td>
</tr>
<tr>
<td></td>
<td>5 Calves from 2018 and 2019 likely to be added to Catalog</td>
</tr>
<tr>
<td>High:</td>
<td>723 individuals</td>
</tr>
<tr>
<td></td>
<td>690 All Cataloged whales in 2019 minus those known dead</td>
</tr>
<tr>
<td></td>
<td>26 All active intermatch codes without 2018 &amp; 2019 calves</td>
</tr>
<tr>
<td></td>
<td>7 All uncataloged 2018 and 2019 calves minus dead</td>
</tr>
</tbody>
</table>
Whale Release Ropes

Amy Knowlton, Tim Werner and Scott Kraus

Anderson Cabot Center for Ocean Life at the New England Aquarium

Consortium for Wildlife Bycatch Reduction
Talk overview

• Evidence that whale release ropes could benefit large whales

• Where and how could whale release ropes be effectively used based on strains placed on ropes during fishing

• Status of whale release rope manufacturing and testing
Effects of fishing rope strength on the severity of large whale entanglements

Amy R. Knowlton,* † Jooke Robbins, † Scott Landry, † Henry A. McKenna, ‡ Scott D. Kraus,* and Timothy B. Werner‡

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† Center for Coastal Studies, 5 Holway Avenue, Provincetown, MA 02657, U.S.A.
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§ Department of Biology, Boston University, 5 Campanile Mall, Boston, MA 02215, U.S.A.

Abstract: Entanglement in fixed fishing gear affects whales worldwide. In the United States, deaths of North Atlantic right (Balaena glacialis) and humpback whales (Megaptera novaeangliae) have exceeded management limits for decades. We examined live and dead whales entangled in fishing gear along the U.S. East Coast and the Caribbean Maritimes from 1994 to 2010. We recorded whale species, age, and injury severity and determined rope polymer type, breaking strength, and diameter of the fishing gear. For the 152 retrieved ropes from 70 cases, tested breaking strength range was 0.80–39.63 kN (0.18–8.83 kips) and the mean was 11.64 kN (2.62 lb), which is 26% lower than strength at manufacture (range 2.89–5.13 kN, mean = 43.70 kN [9.95%]). Median rope diameter was 9.5 mm. Right and humpback whales were found in ropes with significantly stronger breaking strengths at time of manufacture than minke whales (Balaenoptera acutorostrata) (19.30, 17.13, and 10.47 mean kN, respectively). Adult right whales were found in stronger ropes (mean 34.09 kN) than juvenile right whales (mean 15.33 kN) and than all humpback whale age classes (mean 17.37 kN). For right whales, severity of injuries increased since the mid 1980s, possibly due to changes in rope manufacturing in the mid 1990s that resulted in production of stronger ropes at the same diameter. Our results suggest that broad adoption of ropes with breaking strengths of ≤7.56 kN (≤1.70 kips) could reduce the number of life-threatening entanglements for large whales by at least 72%, and yet could provide sufficient strength to withstand the routine forces involved in many fishing operations. A reduction of this magnitude would achieve nearly all the mitigation legally required for U.S. stocks of North Atlantic right and humpback whales. Ropes with reduced breaking strength should be developed and tested to determine the feasibility of their use in a variety of fisheries.

Keywords: bycatch, humpback whales, injury severity, North Atlantic right whales, rope diameter, rope manufacturing
70 large whales with 132 retrieved ropes
Used strongest rope for each case
30 RW, 30 HW, 8 MW, 2 FW
Right whales by age

New rope breaking strength (lbs)

Rope diameter (inches)

- Adult
- Juvenile 6-8 yo
- Juvenile 3-5 yo
- Calf/juvenile 0-2 yo
- Unknown age
- Minke’s in significantly lower breaking strength than right and humpback whales
- Adult right whales in significantly stronger ropes than juvenile RW and all humpbacks
- Breaking strength trended upward with injury severity
Our findings meshed with findings of Arthur et al. which show increasing estimated force output based on musculature and total length.

Adult right whale – max force ~ 8,000 lbs
Young right whales would have much lower force output

Any explanation for these temporal changes?
Rope manufacturing changes

<table>
<thead>
<tr>
<th>Rope Diameter</th>
<th>Manila - Pre 1950's</th>
<th>Polypro - 1950's to Early 1990's</th>
<th>Copolymer - Mid 1990's to Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5/8&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/4&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
STRONG ROPE
STRONG ROPE
This could also benefit fishermen as it would be less likely that their gear would be shifted from where it was set and they could grapple for it.
What rope strength do fishermen need?

How to measure the strain placed on the endline during fishing operations?

• Load cell attached to boat davit

• Development of a formulaic approach
Maximum strain on endline before first pot is brought onboard

Main variables that might influence strain:
- Water depth
- Configuration and weight of gear set
- Rope diameter
- Speed of hauler
- Water velocity – from current and/or boat operations or whale with gear under tow
- Shock load from wave action/heaving boat
- Length of groundline between pots
Hauling 5 pot trawl in 200 ft water depth

With ~90 ft of groundline between first and second pot

With ~210 ft of groundline between first and second pot – “groundline extension”

= notable reduction in strain
TOWING A SINGLE POT AT VARIOUS SPEEDS

Figure B1: The single lobster pot system line tensions as measured by NEAq personnel
Formulaic approach

- Consulting with engineer Dr. Jud DeCew
- Using OrcaFlex software – used in oil and gas industry to understand strains placed on ropes
- Can plug in a variety of changeable parameters to build a model
- Can evaluate different water depths, gear configurations, and water velocities
- Preliminary results are available and under review
- Will continue to ground truth the model with some at-sea testing

<table>
<thead>
<tr>
<th>Component</th>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line</td>
<td>Diameter</td>
<td>0.375”</td>
</tr>
<tr>
<td></td>
<td>Material</td>
<td>Polypropylene</td>
</tr>
<tr>
<td></td>
<td>Mass (dry)</td>
<td>0.028 lb/ft</td>
</tr>
<tr>
<td></td>
<td>Mass (wet)</td>
<td>-0.004 lb/ft</td>
</tr>
<tr>
<td></td>
<td>M.B.L.</td>
<td>2161 lbf</td>
</tr>
<tr>
<td>Lobster Pot</td>
<td>Dimensions</td>
<td>48” x 22.5” x 15”</td>
</tr>
<tr>
<td></td>
<td>Mass (dry)</td>
<td>65 lb</td>
</tr>
<tr>
<td></td>
<td>Mass (wet)</td>
<td>57 lb</td>
</tr>
<tr>
<td></td>
<td>Drag coefficient</td>
<td>1.395</td>
</tr>
</tbody>
</table>
Figure 9: The baseline system subjected to a 2.9 knot (1.5 m/s) water velocity.
Simulated hauling of a 5 pot trawl with no water velocity – maximum strain 314 lbs

Figure 30: The line tension associated with a simulated recovery of a 5-lobster trap system, which initiated from the seafloor.
Sensitivity analyses of static parameters

Trap drag coefficient and # of traps on the water column had the most sensitivity as water velocity increases.
Influence of wave action and hauler speed

3 pots in the water column

3.3 ft (1 meter) wave height
Different wave periods

Hauling initiated at 50 sec mark

Hauling speed can dramatically influence rope strain especially as waves are closer together

Peak at slow hauling is ~600 lbs

Peak at fast hauling is ~1,000 lbs

Figure 26: The line tension of the baseline system in regular waves, with fast (1.463 m/s) line hauling
If a whale reacts by increasing its velocity when entangled, the greater the # of pots attached, the more quickly the whale will reach the 1700 lb breaking strength.

Trawling up may be a benefit AS LONG AS the end line is of reduced breaking strength.

Reducing the # of pots in the water column at any one time will reduce the hauling strain.

With reduced breaking strength endlines, if sinking groundlines are stronger, may help with gear retrieval.
Main findings

Operational measures can be taken to reduce the strain while fishing:

– reduce hauler speed especially in high seas
– reduce # of pots in water column (until reach stronger sinking groundline) – groundline extension
– try to keep vessel over the top of gear when hauling
Main findings

Main parameters effecting rope strain

– Drag coefficient and # of pots in the water column
– Water velocity
– Wave height and period
– Hauler speed

Parameters that will be further tested: line stiffness/stretchiness, influence of groundline extension, bigger wave heights
Status of whale release rope manufacturing and testing

Weak Rope Trials: 2006-2008

Three separate batches

Rope types: 5/16” and 3/8” diameter; 600 and 1200lb breaking strength

Rope was fished as endline and usually spliced with float rope on lower third

“Fishable” in many parts of Maine

Where rocky bottoms and with stronger tides and currents, they reported concerns about an increased likelihood that ropes would break over what they typically use

Prior studies to assess whether weak ropes are “fishable” have been done

Goal is to create and test a variety of whale release ropes that are not costly
Status of whale release rope manufacturing and testing

3 different whale release rope types

• Hollow braided sleeve to create weak links in rope
• Cut strand rope – cut a specific # of strands in regular rope to create weak links in rope
• Reformulated rope to be 1700 lb breaking strength along entire length
Status of whale release rope manufacturing and testing

• At sea testing – late spring/summer 2017
  – Will compare whale release prototypes with control ropes to evaluate gear loss, degradation, and handling concerns

• Lab testing will be done before and after at sea testing
Paradigm shift in fishing is essential

- Make **all** gear ideally “safe” or at least “safer” for whales
- Ropeless fishing techniques would eliminate entanglements
- Red/orange colored ropes may prevent many entanglements from occurring (according to studies by Kraus and others)
- Whale release rope (<1,700 lb breaking strength) would reduce severity of entanglements
- Other measures such as sinking groundlines, end line reduction and closures would reduce the frequency of entanglements by lowering the amount of rope in the water column
- Measures would need to be implemented throughout the right whale’s range in the U.S. and Canada
Acknowledgements

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- Massachusetts Executive Office of Energy and Environmental Affairs
- Island Foundation
- Volgenau Foundation
- Cross Foundation

At sea load cell testing:
- Monica Zani
- Mike Lane

Formulaic testing
- Jud DeCew

Fishing industry feedback and at-sea testing
- Mass Lobstermen’s Association
- Maine Lobstermen’s Association
- South Shore Lobster Fishermen’s Association
Recent Scientific Publications Cast Doubt on North Atlantic Right Whale Future

Scott D. Kraus 1,*, Robert D. Kenney 2, Charles A. Mayo 3, William A. McLellan 4, Michael J. Moore 5 and Douglas P. Nowacek 6

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Keywords: right whales, conservation, mortalities, entanglements, population recovery

The North Atlantic right whale, Eubalaena glacialis, was near extinction by 1935, when whaling for this species became illegal. In 1992, 295 right whales were estimated alive (Knowlton et al., 1994), and growth from 1990 to 2010 averaged 2.8% per year (Waring et al., 2016), bringing the population to about 500 individuals in 2015 (Pettis and Hamilton, 2015). However, since 2010, calving rates have dropped by nearly 40%, and the last four decades have seen increasing numbers of right whales killed by entanglements in fishing gear and collisions with ships combined (Knowlton et al., 2012; Van der Hoop et al., 2013; Pace et al., 2014). Recent U.S. and Canadian regulatory actions (slowing ships and moving shipping lanes) appear to have been successful at reducing ship kills (Laist et al., 2014; Van der Hoop et al., 2015).

However, the National Marine Fisheries Service (NMFS) draft 2015 marine mammal stock assessment for right whales reports that between 2009 and 2013 an average of 4.3 right whales were killed by human activities each year, with nearly all of these deaths attributable to entanglement in fishing gear (Waring et al., 2016). For context, from 1970 to 2009, 44% of diagnosed RW mortality cases were due to ship kills and 35% were due to entanglements (Van der Hoop et al., 2013). From 2010 to 2015, 15% of diagnosed right whale mortalities were due to ship kills and 85% were due to entanglements (Pettis and Hamilton, 2015; Waring et al., 2016). In January of 2016, an announcement on expanded critical habitat for right whales included this quote, “We’re making significant progress in reversing the population decline of the species, and are seeing signs of recovery” (NOAA, 2016). In contrast to this optimistic view of right whale recovery, our review of the recent science suggests that fishing gear entanglements are increasing in number and severity, and that this source of injury and mortalities may be overwhelming recovery efforts.

Almost four decades of research based on the ability to identify individual whales has yielded immense amounts of information about this population’s biology. The right whale catalog and sightings database provide information on the age and sex of individuals, movements and habitat use patterns, reproduction, mortality, and the impacts of human activities on the population (Hamilton et al., 2007). Multiple research programs run concurrently on genetics, endocrinology, health, feeding, stress, and acoustics in many institutions (Kraus and Rolland, 2007). From these large datasets, mathematical models that describe trends in population growth and demographics as well as the effects of human activities on health and mortality have been developed (Schick et al., 2013; Robbins et al., 2015; Rolland et al., 2016).

Since 1980, the leading causes of mortality in right whales have been collisions with ships and entanglements in fishing gear, which combined caused half of the 99 confirmed right whale deaths (Van der Hoop et al., 2013). That estimate is a minimum, since the other half includes natural
mortalities and deaths where the cause could not be determined, not all dead whales were discovered. Since U.S. NOAA regulations lowered ship speed limits in the vicinity of right whale habitats in 2008, deaths from vessel strikes have declined (Laist et al., 2014; Van der Hoop et al., 2015). In contrast, despite a nearly 20-year US federal effort to reduce accidental kills of whales in fishing gear, sub-lethal and lethal entanglement rates have increased (Van der Hoop et al., 2013; Arthur et al., 2015; Knowlton et al., 2015), and there is no evidence that current fishing regulations have been effective at reducing mortality (Pace et al., 2014). As of 2015, 83% of all right whales display scars or carry ropes indicative of past entanglements. Sub-lethal entanglements can cause reproductive failure and declining health long after the entanglement is over (Rolland et al., 2016; Van der Hoop et al., 2016).

Attempts at population viability analyses on right whales have largely failed due to the dual complications of capture heterogeneity (in tag-recapture population assessments) and small sample sizes. There are however early indicators of population well-being, including health assessments, scarring rates and frequencies, reproductive rates, and necropsy data, all of which precede changes in population size and demographics, and all of which indicate declines in this population (Knowlton et al., 2012; Pettis and Hamilton, 2015; Rolland et al., 2016).

From this extensive research, three points emerge. One, until recently, the population was growing at 2–3%/year (Waring et al., 2016), although this rate is less than one-half of the growth rate (6–7%) of all other well-studied right whale populations around the world (Best et al., 2001). Two, in recent years, population growth rates appear to be declining (Figure 1), likely due to a combination of anthropogenic mortalities and reduced calving rates (Kraus et al., 2007; Pettis and Hamilton, 2015). Three, mortalities and serious injuries from fishing gear entanglements remain far higher than the limits mandated by US Endangered Species Act and Canadian Species At Risk Act regulations, further jeopardizing recovery and leaving the population vulnerable to declines (Knowlton et al., 2015; Waring et al., 2016).

In conclusion, right whales are not yet a conservation success story. Right whales need immediate and significant management intervention to reduce mortalities and injuries from fishing gear, and managers need a better understanding about the causes of reduced calving rates before this species can be considered on the road to recovery. Failure to act on this new information will lead to further declines in this population’s number and increase its vulnerability to extinction.

AUTHOR CONTRIBUTIONS

All authors have a long history (>20 years) of research and significant contributions to right whale research in the North Atlantic. In the context of this paper, all authors have contributed data, analyses, writing, and editing, as well as conceptual development to this submission.

REFERENCES


**Conflict of Interest Statement:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Food for Thought

How we can all stop killing whales: a proposal to avoid whale entanglement in fishing gear

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Whales are federally protected by the Marine Mammal Protection Act; endangered species, such as the North Atlantic right whale, receive additional protection under the Endangered Species Act. However, their regulations have failed to satisfy conservation and animal welfare concerns. From 1990 to 2011 the North Atlantic right whale (Eubalaena glacialis, NARW) population grew at a mean of 2.8% annually. However, population trends reversed since 2011; the species is in decline, with only ~100 reproductively active females remaining. This failure is driven by vessel collisions and increasingly fatal and serious entanglement in fixed fishing gear, whose rope strength has increased substantially. Chronic entanglement, drag, and associated morbidity have been linked to poor fecundity. Genuine solutions involve designating areas to be avoided and speed restrictions for ships and removing fishing trap ropes from the water column. A trap fishing closure for NARW habitat in the Cape Cod Bay (U.S.) area has been in place seasonally since 2015. 2017 mortalities in Eastern Canada elicited substantive management changes whereby the 2018 presence of NARW in active trap fishing areas resulted in an effective closure. To avoid these costly closures, the traditional trap fishery model of rope end lines attached to surface marker buoys has to be modified so that traps are marked virtually, and retrieved with gear that does not remain in the water column except during trap retrieval. Consumer demand for genuinely whale-safe products will augment and encourage the necessary regulatory changes so that trap fisheries conserve target and nontarget species.

Keywords: end line, entanglement, large whale, rope removal, trap.

In a previous “Food for Thought” titled “How we all kill whales” (Moore, 2014), I suggested that: “western countries have, through the development and increase in fishing and shipping in continental shelf waters, essentially resumed whaling as vessel speeds and fishing gear strength have increased in recent decades.” Others have reviewed the effectiveness of whale/vessel strike mitigation (Silber et al., 2012). Here, I will consider how we can stop killing whales with our seafood harvesting habits.

Ethical consumers are keen to ask where their seafood came from and how it was caught, hoping that the provider responds that the food source was certified sustainable by an entity such as the Marine Stewardship Council (MSC). At this point, the MSC product stamp is widely available and considered a sustainability standard. There is a general sense that the sustainable seafood movement has made remarkable progress and is now an integral part of running a modern seafood business, ultimately translating into healthier oceans. The business model of sustainable fisheries is expected to be viable and effective (Walton Family Foundation, 2017). However, the sustainable seafood movement has historically failed to consider bycatch when defining certification standards (O’Connell, 2017). This is beginning to be considered and should become a routine assessment.

On the U.S. and Canadian eastern seaboard, the number of mortalities and serious injuries of the North Atlantic right (Eubalaena glacialis—NARW) whale routinely exceed the “potential biological removal” (PBR) values set by the U.S.’s National Oceanic and Atmospheric Agency (NOAA) by factors of two to four. PBR, a biological reference point, is defined as the maximum number of animals that can be killed by anthropogenic causes each year whilst allowing that stock to reach or maintain its optimal sustainable population level. It is typically used to assess whether or not measures taken to protect a population are
The current status of the NARW population is best illustrated by the reduction in estimated abundance since 2010, with a disproportionate loss of females (Figure 1). This has occurred despite a range of regulatory changes aimed at achieving PBR (Pennisi, 2017). There has been an increasing number of entanglement mortalities since 2010 (Figure 2). Whereas many whale entanglements cannot be traced to source fishery, given inadequate gear marking, the overwhelming nature of rope in the water column in whale habitat are endlines and floating groundlines from trap fisheries, especially American lobster (Boenish and Chen, 2018) and snow crab (Daoust et al., 2017; DFO, 2017). As can be clearly seen, if avoidance of whale morbidity and mortality are included in the definition of “sustainable,” fisheries that harvest using traps with line in the water column, are far from sustainable.

NARW fecundity has also dropped since 2010 (Figure 3). No new calves were observed in 2018, the first time that no calves have been counted since scientists began monitoring the population more than forty years ago (Kraus et al., 1986). These and other data were summarized by a recent review (NMFS, 2017): “In many ways, progress towards NARW recovery has regressed.” The population has been declining since 2010 and has exhibited changes in habitat use (Pace et al., 2017). During this period, NARW calving rates have remained below average (Hayes et al., 2017) and body condition of the population has worsened (Rolland et al., 2016). Important questions have developed in the scientific literature on energetic stressors on NARW, both from prey availability (Meyer-Gutbrod et al., 2015) and the energetic costs of chronic, sub lethal entanglement (Knowlton et al., 2012; van der Hoop et al., 2017). In addition, between 7 June 2017 and 15 October 2018, NARW experienced a significant mortality event of ~3% of the population (20 deaths). The diagnosed causes of death (12 in Canada and 8 in the USA) were entanglement and vessel strike (NOAA, 2018a).

In addition to its critical role in worsening the threat of extinction for the NARW, entanglement also poses a major animal welfare concern (Figure 4). Large whales that become entangled in fishing gear and are unable to break free take an average of six months to die (Moore and van der Hoop, 2012). Entanglement effects include: constriction, partial amputation, presumed chronic and severe pain, impaired feeding, drag and reduced fecundity.

Despite the negative population and calving trends described above, if anthropogenic impacts on NARW mortality and fecundity are successfully mitigated, their potential for recovery is great. The Southern right whale (Eubalaena australis), a closely related species and pertinent comparison, has recently experienced intrinsic annual growth of 7% (International Whaling Commission, 2013). Thus, despite years of U.S. and Canadian federal management effort to conserve the species, there is every reason to also seek general public engagement in the success or failure of current efforts to prevent extinction of the NARW.

The relationship between large whales feeding on high density zooplankton prey patches and fixed trap fisheries for lobster and crab and other species is not intuitive to most seafood consumers. There seems to be no obvious direct resource competition except for space. As such, whale conservationists are likely the only consumers of lobster and crab who think of entangled whales as they dine. However, where the two resources do overlap (Figure 5), the conflict can be serious; and overlap is not uncommon: 85% of NARW bear scars from being entangled in gear once in their lives, and over half bear scars of being entangled two or more times (Knowlton et al., 2012; Pettis et al., 2017). Sustainable seafood certifiers, like MSC, can use their label to inform consumers of such conflicts, especially when they are not obvious. In March

**Figure 1.** Abundance of North Atlantic right whale with recent disproportionate loss of females, many of which are never reproductively active (Pace et al., 2017).
MSC chose to do so. It suspended the Gulf of Saint Lawrence snow crab fishery certificate due to fishery involvement in the NARW mortality event that occurred in the spring and summer of 2017 in the Gulf of Saint Lawrence.

Following the 2017 mortality event, the Canadian government also closed snow crab and lobster fisheries in the Gulf of Saint Lawrence and Bay of Fundy when NARW were sighted from April to June 2018. In contrast, April 2018 sightings of NARW from the beaches of Gloucester, Massachusetts and York, Maine in the USA, did not result in comparable closures. Thus far, there have been three entanglement-related NARW mortalities in Northeast U.S. waters in 2018.

The Canadian closures and an annual closure of Cape Cod Bay and adjacent waters have elicited substantial concern from the
affected fishing industry sectors (CBC, 2018; WickedLocal.com, 2018) and spurred some willingness to trial alternative trap marking and retrieval options that are whale-safe (Ropeless Consortium, 2018), if doing so will reopen closed fishing areas. These whale-safe gear options, commonly referred to as “ropeless” or “buoyless” (no rope in water column in whale and turtle habitat, irrespective of source, except during trap retrieval if need be) would remove trap end lines from the water column, lowering the risk of entanglement substantially, leaving only risk from any ground line if traps deployed in a trawl. In this regard, the U.S. is planning an experimental fishery to harvest lobster without the use of end lines (Department of Commerce, 2018).

Previous mitigation measures such as weak links and sinking ground line (van der Hoop et al., 2013), implemented in 2007, have led to no detectable overall decrease in entanglements. On the contrary, entanglement mortality has increased since these regulations have been in place (NMFS, 2017). Rules setting a minimum number of traps per trawl, designed to reduce entanglement risk by lowering the number of vertical trap lines in the water, not only failed to ultimately reduce the number of vertical lines, but may have had the unintended consequence of encouraging fishermen to use stronger lines to haul the longer trawls (Hayes et al., 2018), resulting in an increase in the severity of injuries caused by entanglement (Knowlton et al., 2016). A short term mitigation would involve fishing with reduced strength rope (Knowlton et al., 2016). However, eliminating end lines in the water column by fishing with ropeless gear is the only long term option to end NARW entanglements. Obviously this recommendation could eventually involve a vast amount of lobster and crab habitat, in that passive acoustic surveys of NARW vocalization show their habitat to be very extensive in space and time (Davis et al., 2017). It should start by developing ropeless approaches in currently closed NARW/trap fishing conflict hotspots in time and space, such as a closed lobster fishery in the Cape Cod Bay area in Massachusetts, USA, and the snow crab fishery in the Gulf of St Lawrence, Canada, where the industry will have the greatest incentive to gain access to areas from which they are currently excluded. The resulting product could sell for a significant sustainability premium. From there, as the technology becomes more affordable it should be encouraged to spread to other areas, because as climate change and consequent prey distribution shifts continue to change the nature of optimal whale habitat, the high mobility of both the whales and the relevant fisheries will result in ongoing entanglements unless ropeless technology is adopted over wide areas.

Similarly, disentanglement of large whales by humans has been used to mitigate large whale entanglement since the 1970s. It has...
The challenges to adopt these changes are substantial. Safety issues include avoiding layovers by different strings of traps. Layovers can be common where traps are fished in close proximity. Thus, an affordable, robust, virtual trap marker will be essential. Other vessels such as fish and scallop bottom trawlers will need to receive and display the virtual trap marks on their wheelhouse plotters as well. As this technology gains acceptance, economy of scale should increase affordability. In undeveloped countries this will be especially challenging, but there are relatively affordable ropeless options. Where bottom access is zoned, traps could be deployed without an acoustic marker, and strings of traps recovered by grappling, or using galvanic timed releases (Gagnon and Boudreau, 1991).

Where fisheries are not currently closed to mitigate whale entanglement, the motivation to adopt these more complex technological solutions will be weak, especially given that capital outlays and maintenance costs will exceed traditional approaches. Regulatory systems will also have to be updated to manage ropeless fishing. However, if regulations are introduced preventing trap fisheries from using end lines, then the fisheries will adapt and develop functional solutions.

There will be additional costs, but if ethical consumers demand genuinely sustainable, whale-safe lobster and crab products, this can all happen (Moore, 2018). There needs to be a solid, enforced regulatory framework, but a “nudge” to consumers (Mackay et al., 2018) could make this happen. The time has come to seriously manage bycatch extinction risk and animal welfare concerns of whales in how we harvest seafood.

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FEATURE ARTICLE

REVIEW

Assessing North Atlantic right whale health: threats, and development of tools critical for conservation of the species


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ABSTRACT: Whaling has decimated North Atlantic right whales Eubalaena glacialis (NARW) since the 11th century and southern right whales E. australis (SRW) since the 19th century. Today, NARWs are Critically Endangered and decreasing, whereas SRWs are recovering. We review NARW health assessment literature, NARW Consortium databases, and efforts and limitations to monitor individual and species health, survival, and fecundity. Photographs are used to track individual movement and external signs of health such as evidence of vessel and entanglement trauma. Post-mortem examinations establish cause of death and determine organ pathology. Photogrammetry is used to assess growth rates and body condition. Samples of blow, skin, blubber, baleen and feces quantify hormones that provide information on stress, reproduction, and nutrition, identify microbiome changes, and assess evidence of infection. We also discuss models of the population consequences of multiple stressors, including the connection between human activities (e.g. entanglement) and health. Lethal and sublethal vessel and entanglement trauma have been identified as major threats to the species. There is a clear and immediate need for expanding trauma reduction measures. Beyond these major concerns, further study is needed to evaluate the impact of other stressors, such as pathogens, microbiome changes, and algal and industrial toxins, on NARW reproductive success and health. Current and new health assessment tools should be developed and used to monitor the effectiveness of management measures and will help determine whether they are sufficient for a substantive species recovery.

KEY WORDS: Right whale · Health · Trauma · Reproduction · Stressor · Cumulative effects

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1. INTRODUCTION

The North Atlantic right whale (NARW) *Eubalaena glacialis* species is Critically Endangered and declining. Past and current conservation measures have failed to maintain a recovery trajectory for the species. Therefore, better understanding of the current status of NARW health, and tools to evaluate health, are critical to reverse the decline and restart the recovery of this species. The challenges of studying large whales and their health include, but are not limited to, the following factors: distance-, weather- and season-dependent logistics; locating them; collecting and analyzing the data; and determining the causes of observed morbidity and mortality. A recent review of the right whale genus *Eubalaena* spp. (Harcourt et al. 2019) summarized the extensive relevant literature in the context of future directions for comparative research among the 3 extant species to inform conservation. Topics included variable recovery from historic whaling, linking individuals to population level response, adapting to shifting resources, emergent diseases and vulnerability under stress, and cumulative effects. Our review summarizes data, publications and past workshops, related to the health of NARWs as discussed at a workshop in Silver Spring, MD, USA, in June 2019 (Fauquier et al. 2020). Previous workshops are summarized in that report (Brownell et al. 1986, Best et al. 2001, Reeves et al. 2001, O’Hara et al. 2003, Rowles et al. 2006, International Whaling Commission 2010, Thomas et al. 2013, Sironi et al. 2018, Sisson & Long 2018). Additionally, we periodically refer to unpublished analyses of data by authors of this review to provide as current a perspective as possible. Most of those data are available from the NARW Consortium (NARWC) database collection (www.narwc.org/narwc-databases.html).

Implications and recommendations from the 2020 workshop, and consequent discussions, are then presented in the context of (1) furthering our overall understanding of NARW health, and (2) the use of health assessment tools to gauge the efficacy of measures designed to enhance the recovery of the NARW species. For a recent bibliography on this topic see https://repository.library.noaa.gov/view/noaa/202221.

For the purpose of this review, we define wildlife health following Stephen (2014, p. 427)

Health is the result of interacting biologic, social, and environmental determinants that combine to affect the animal’s or population’s capacity to cope with change. Health cannot be measured solely by what is absent, but rather by characteristics of the animals and their ecosystem that affect their vulnerability and resilience. Wildlife health is not a biologic state but rather a dynamic social construct based on human expectations and knowledge.

Following centuries of whaling, with the last documented event in 1967 (Maul & Sergeant 1977), the NARW species underwent a very slow recovery (~2.8% yr⁻¹) until 2010 (Fig. 1). Since then, abundance has declined by 20%, so that as of 2020 there are about 356 animals remaining (Pace et al. 2017, NOAA 2020, Pettis et al. 2020). In 2020, the IUCN changed the species listing from Endangered to Critically Endangered (Cooke 2020), the only large whale species in the world to warrant this designation. The North Pacific right whale *E. japonica* is listed by the IUCN as Endangered, with the Northeast Pacific subpopulation as Critically Endangered. In contrast, most southern right whale (SRW) *E. australis* populations have recovered remarkably from historic whaling, despite a major setback from Russian whaling in the 1960s (Yablokov 1994, Corkeron et al. 2018). The species is listed as of Least Concern by the IUCN, although in some habitats SRW sightings have plateaued in recent years (Jackson et al. 2020, Stamation et al. 2020).

Right whales are individually identified using photographs of cornified skin patterns, called callosities, on their heads (Payne et al. 1983, Kraus et al. 1986, Kraus 1990). The North Atlantic Right Whale Catalog (http://rwcatalog.neaq.org) contains all known photographed sightings of NARWs from 1935 to the present (Hamilton et al. 2007). The Catalog is used to monitor their distribution, associations, survival, reproduction, movement, and health. There is an intensive photo-identification survey effort conducted annually in many NARW habitats resulting in an average of 75% of this species being photo-documented each year (Pettis et al. 2020). The Catalog is the hub of the NARWC database collection (www.narwc.org/narwc-databases.html).

A recent broad-scale NARW distribution shift began in 2010 or 2011 (Record et al. 2019). Sightings decreased drastically on the calving ground off the southeastern USA and in 3 northern feeding habitats (Davies et al. 2019, Gowan et al. 2019): Great South Channel (southeast of Cape Cod, MA, USA), Bay of Fundy, and Roseway Basin south of Nova Scotia (Canada). As much as 50% of this species had been seen in each of these habitats in some years prior to 2010 (Fauquier et al. 2020). Recently, annual counts have decreased to only about 100 individuals on average in the Great South Channel and 35 or fewer in the other 3 habitats (except in 2014 in the Bay of...
Fundy, when over 100 whales were present for a very short time). At the same time, sightings increased in one well-studied habitat, Cape Cod Bay, MA, USA, and in 2 lesser historically known feeding habitats: one south of Nantucket, MA, USA, and one in the Gulf of St. Lawrence, Canada. Since 2010, over 250 whales have been seen annually in the first region, and 100 to 150 have been seen annually in each of the latter two. In addition to sightings, passive acoustic data show an increased occurrence of NARW calls off the mid-Atlantic, herein described as north of Cape Hatteras to south of Cape Cod, and some calls along the edge of the continental shelf (Davis et al. 2017).

These distribution shifts have impacted the collection of sightings and photos and the data derived from those observations. The average percent of whales photographed and identified annually dropped from 81% during the 8 yr before the shift (2003 to 2010) to 68% during the 8 yr after the shift (2011 to 2018) (Pettis et al. 2020). This smaller percentage of the species being observed annually impacts the precision and potential accuracy of abundance estimates. The decrease in shipboard photographs, which had been primarily collected from historical high-residency areas (e.g. the Bay of Fundy and off the southeastern USA in the 2000s) affects the ability to assess body condition and scarring from shipboard images. Finally, mothers are being seen with their calves less frequently on the northern feeding grounds, making it harder to photo-identify those calves because their callosities are generally not well developed until the latter half of their birth year, and at the very least, this has delayed our ability to catalog those calves. These impacts on the photo-identification data collection have downstream effects (e.g. the potential underestimate in abundance and calf survival) that should be considered when analyzing the data and assessing monitoring power especially when comparing pre-2010 to post-2011 derived products (Faucquier et al. 2020).

In summary, cataloging the location and identification of individual NARW, year by year, has been the cornerstone of our developing understanding of the health of individuals, their movements, and the species as a whole. Therefore, we need to regain adequate cataloging of the species, especially in light of the recent habitat shifts, by increasing photo identification effort in the mid-Atlantic, southern New England, and the Gulf of St Lawrence among other currently important habitat areas. In addition, we need to be better prepared for future...
shifts of distribution and rapidly shifting efforts to maintain adequate photo-identification of the population.

2. RESULTS

2.1. North Atlantic right whale trauma

2.1.1. North Atlantic right whale mortality

There has been little comparison of mortality patterns between SRW and NARW. Such comparisons as there are should be expanded. In Peninsula Valdés, Argentina (a well-studied SRW calving ground with low historical calf mortality) between 2003 and 2018, 20% (738/4403) of calves (mostly neonates) died (Fig. 2) (Sironi et al. 2018). Current theories as to the cause(s) include predation from kelp gull attacks (Sironi et al. 2018). There have been reports of SRW vessel strikes and entanglements (Van Waerebeek et al. 2007, Kemper et al. 2008, Zappes et al. 2013). However, these events have not precluded the species from a substantial post-whaling recovery (Fig. 1). In contrast, for NARW, human-induced trauma has been a major factor in the failure of that species to recover. Their perinatal mortalities are from natural causes, but older calves can be vessel struck, while juveniles and adults die acutely after asphyxiation in heavy fishing gear, or after severe vessel trauma, or chronically after a debilitating entanglement, or initially sublethal vessel trauma. From early Basque whaling through commercial whaling, by the 1930s NARW numbers had been reduced to possibly less than a hundred (Reeves et al. 2007). Incidental mortalities caused by commercial fishing operations and vessel strikes in the past 50 yr have kept the species numbers severely reduced, albeit with a slow recovery until 2010, but with a subsequent decline though 2020 as described above (Pettis et al. 2020). In the late 2010s, clustered mortality events occurred in the Gulf of St. Lawrence with 12 deaths in 2017 and 9 in 2019—the majority due to human activities (Daoust et al. 2018, Sharp et al. 2019, Bourque et al. 2020). This, along with mortalities in the USA, resulted in its National Marine Fisheries Service (NMFS, part of the National Oceanic and Atmospheric Administration [NOAA]) declaring an Unusual Mortality Event (www.fisheries.noaa.gov/national/marine-life-distress/2017-2020-north-atlantic-right-whale-unusual-mortality-event), a stranding that is unexpected, involves a significant die-off of any marine mammal population, and demands immediate response (16 USC § 1421h(6); see https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act).

A review of 54 NARW mortalities from 1970–2002 (Moore et al. 2004), an average of 1.7 (54/32) mortalities per year, found anthropogenic trauma in 77% (14/18) of juveniles and adults that were completely necropsied. Of these, the cause of death (COD) was determined to be vessel strike in 71% (10/14) while 29% (4/14) died of entanglement. The COD for the remaining 4 juveniles and adults could not be determined. More recently, Sharp et al. (2019) undertook a thorough review of 70 deaths between 2003 and 2018, an average of 4.7 (70/15) mortalities per year, in which 80% (56/70) of carcasses were examined externally and 63% (44/70) were necropsied. Where COD was determined, 88% (38/43) were anthropogenic in origin. The relative threat of entanglement in commercial fishing gear increased from the previous estimate, accounting for 58% (22/38) of the anthropogenic deaths, while vessel strike accounted for 42% (16/38) of these cases. Females accounted for 66% (19/29) of known-sex adult deaths. In both studies (Moore et al. 2004, Sharp et al. 2019), juvenile and adult mortalities of NARWs from known causes were all due to anthropogenic trauma. In the 1980s through the 2000s, deaths were overwhelmingly due to vessel strikes as animals transited either south to the calving grounds or back north to feeding grounds. During this time, necropsy teams documented 3 pregnant NARWs...
with evidence of vessel strikes in the mid-Atlantic and southeast USA, which motivated the development of coast-wide seasonal management areas (SMAs), where most vessels >65 ft (~20 m) are required to slow to 10 knots or less at certain times of the year (when NARWs are expected to be present) as a conservation strategy (Silber et al. 2014).

Diagnostic necropsies provide critical data, for maintaining an up-to-date understanding of how anthropogenic trauma on the species is changing in time and space. Without these data, the necessary ongoing optimization and evaluation of mitigation measures cannot occur.

2.1.2. Visual health and injury assessments

Assessment of live animals in the context of their catalogued individual identity gives a unique, sequential perspective on the status and trend of each animal and aids in identifying sublethal impacts that may affect reproductive success and therefore be targets for mitigation. The visual health assessment (VHA) method (Pettis et al. 2004, Rolland et al. 2016) allows for non-invasive assessments of NARW health using photographs taken from boats and aircraft. Data on body condition, skin condition (lesions and skin sloughing), rake marks (shallow striations in the skin) forward of the blowholes, and cyamids (whale lice) around the blowholes can be linked to the NARW Catalog (http://rwcatalog.neaq.org), allowing one to examine associations between health, individual life-history, and post-mortem information (www.narwc.org/narwc-databases.html). Analyses of these data have established connections between health, reproduction, and anthropogenic impacts (Pettis et al. 2004, Rolland et al. 2016). Two health conditions, emaciated body condition and swath skin lesions, have emerged as prognostic indicators of poor NARW survival (Pettis et al. 2004, Hamilton & Marx 2005). The incidence of these conditions has varied over time, with the highest incidence of both documented in 2011–2016 (Pettis 2019). Other types of skin lesions are regularly observed on NARW, though the etiology, and their impact on survival and reproduction are unknown (Pettis et al. 2004, Hamilton & Marx 2005, Rolland et al. 2016). Beginning in 2009, far more whales have been scored as thin, at least once annually, than the number scored with poor skin condition (Pettis et al. 2004). The VHA method has been valuable in retrospective analysis for evaluating sub-lethal anthropogenic injury impact on health, informing annual injury determinations and estimates of human impact on this species, and predicting survival (Pettis et al. 2004, Schick et al. 2013). Additionally, VHAs show promise in helping to estimate the time of death when whales are not sighted post injury (H. M. Pettis unpubl. data).

The VHA method has also enabled a broad, long-term assessment of the nature and impact of sub-lethal trauma on the species. Qualitatively, its applicability to the entire photo-ID catalog has made it a vital resource, given its sample size, and it should continue to be promulgated to adequately monitor the extent and variation in sub-lethal trauma impacts on the species. Quantitatively it has been linked to demographic outcomes (Schick et al. 2016).

2.1.3. NOAA fisheries serious injury assessments

In the USA, NMFS is responsible for management of NARWs under the Endangered Species Act and Marine Mammal Protection Act (MMPA). As mandated by the MMPA, it estimates the number of human-caused mortalities and serious injuries of NARWs. Predicting the likely outcome for animals with substantive injuries is important to estimate the overall mortality incidence. Furthermore, recent modeling (Pace et al. 2021) has shown that only 38% of total mortality was detected during 1990–2017: this cryptic mortality factor is driven at least in part by NARW lost to follow up because they are emaciated and sink due to being negatively buoyant (Moore et al. 2020). Others will likely float offshore until they decompose, without ever being observed, or at least not reported. The extent of the cryptis was modeled by comparing the number of carcasses documented to the number of animals that disappeared from the photo-ID catalog through time. A formal method to assess the status of chronically traumatized individual NARWs, linked with an ongoing estimate of cryptic mortality, is critical to understanding their prognosis and overall mortality incidence.

NMFS serious injury (SI) assessments estimate annual rates of human-caused mortality and SI for all marine mammal stocks occurring within USA waters (NOAA 2012, 2020). NMFS Northeast Fisheries Science Center (NEFSC) has made SI determinations for western North Atlantic large whale stocks since 1999 using all available relevant injury event information including sighting history, necropsy reports, and health assessments when available. NEFSC used its own criteria to assess large whale injuries until 2012, when USA National SI criteria guidelines were
established (NOAA 2012). NEFSC criteria used prior
to 2012 did not count events for which there were
insufficient data to make a lethal take determination
against potential biological removal (PBR). A take is
defined by the MMPA as ‘to harass, hunt, capture, or
kill, or attempt to harass, hunt, capture, or kill any
marine mammal’ (16 USC § 1362 (16)). PBR is de-
finite by the MMPA as the maximum number of ani-
mals, not including natural mortalities, that may be
removed from a marine mammal stock while allowing
that stock to reach or maintain its optimum sus-
tainable population. The National criteria now
address such data-poor events by providing prorated
values that count against PBR. A retrospective appli-
cation of the National criteria to all NARW injury
events from 2000 to present resulted in only 0.8%
(14/184) events between 2000 and 2011 being
changed from a 0 to a prorated value, which illus-
trates that injury determinations of this stock have
been relatively consistent across the years despite
evolving SI criteria (Fig. 3) and is likely due to the
data-rich nature of NARW injury events. As seen in
Fig. 3, and further supported by others (Knowlton et
al. 2016), the rate of entanglement related SI and
mortality has been increasing in the last decade,
whereas that of vessel strike has decreased. The
entanglement rate alone has remained above PBR
throughout the timeline (i.e. since 2000). If it were
not for disentanglement efforts, the situation would
be even worse, as in some circumstances, disentan-
glement teams are able to avert Sls. However, the
practice of not counting such cases towards PBR
does devalue such data as an index of entanglement
risk.

The SI determination process is the primary tool
used by NMFS to include an estimate of the annual
human-caused mortality and serious injury in annual
stock assessment in the USA. It provides an annual
update on the nature and extent of the different
sources of lethal trauma to the species. A major limi-
tation is the lag time from when data are available to
when they are incorporated into a publicly available
annual report. Given the current high incidence of
serious injuries and mortalities, a closer to real-time
analysis, and reporting, would facilitate equally
prompt trauma mitigation enhancement.

2.1.4. Frequency, and effects, of vessel strikes and
entanglement on North Atlantic right whale
reproduction

During times of decadal prey declines, calving out-
put is lower (Hlista et al. 2009, Meyer-Gutbrod et al.
2015). Additionally, quantifying the sublethal inci-
dences of vessel and rope trauma on NARW repro-
ductive success, in the context of their unfolding
demographic and migratory history, is a critical
aspect of understanding these sources of trauma. As
part of the recent workshop, we up-
dated earlier studies of vessel and rope
trauma.

2.1.4.1. Vessel strikes. We examined
NARW Catalog photographs of live in-
dividuals for evidence of external trauma
from vessel strikes (propeller cuts or
gashes) and necropsy reports for cause
of death information. External sharp
trauma wounds on both live and dead
whales resulting from vessel strike
were categorized as superficial, shal-
low, or deep, while blunt trauma cases
were only determined from necropsy
reports (Fig. 4). With the implementa-
tion of a USA ship-speed rule in 2008,
there appeared to be some reduction in
lethal vessel strikes for NARWs when
comparing known vessel-struck carcass
detections in or within 45 miles (74 km)
of an active SMA pre- and post-rule,
whereas for humpback whales Meg-
aptera novaengliae mortalities were
reduced both inside and outside the areas (Laist et al. 2014) (Table 1). Meanwhile, van der Hoop et al. (2014) found no detectable reduction in vessel strike mortal-
ities of all large whale species in the actual SMAs along the eastern USA, suggesting that the existing SMAs may not be large enough to provide adequate protection. Furthermore, in recent years right whales have ventured further into Canadian waters, with a shift into the Gulf of St. Lawrence, where no protection measures were in place until after at least one-third of the 12 mortalities in the region were reported as vessel strike in 2017 (Fig. 3; Daoust et al. 2018, Sharp et al. 2019). Two others of the 12 were acute entanglements, and 6 could not be diagnosed.

A recent assessment of fate by propeller wound category revealed that superficial and shallow cuts did not affect 3 yr survival, but deep cuts were lethal in the majority of cases (A. R. Knowlton & A. M. Costidis unpubl. data). A detailed, quantitative assessment of propeller cuts, carried out for 39 cases, showed that vessels >65 ft (~20 m) were involved in most of the deep cut cases, although there were 2 cases involving vessels in the 40–65 ft (12–20 m) length range that resulted in deep cuts and subsequent fatality (A. R. Knowlton & A. M. Costidis unpubl. data).

2.1.4.2. Entanglements. For entanglements, a total of 1538 interactions have been documented between 1980 and 2017 involving 86.1% (642/746) of the species; 8% (51/642) of these cases involved attached gear (Knowlton et al. 2012, A. R. Knowlton unpubl. data). Some whales have evidence of as many as 8 entanglement interactions over the course of a lifetime. Incidents of moderate and severe entanglements have become more prevalent in the last decade (Knowlton et al. 2016). These are known to cause health impacts and reduced survival, especially in reproductive females (Fauquier et al. 2020). The complexity of attached gear has also been assessed, and the majority of entanglements since the mid-1990s has been deemed high-risk, i.e. likely to be lethal without intervention, possibly because of increasing rope strengths, resulting from manufacturing changes (Knowlton et al. 2016). Based on these results, Knowlton et al. (2016) suggested maximum rope strengths of 1700 lb (~773 kg) for consideration in fixed fishing gear throughout the NARW range in order to allow more whales to break free from entanglements.

2.1.4.3. Impacts of human activities on reproductive females. An assessment of all reproductive females (i.e. females that have had a calf) since 1980 found that 42% (76/180) have either been found
dead or have disappeared, with at least one-third of those losses due to vessel strikes and entanglements. The effect of entanglement injury severity on fecundity indicates a cessation in calving for a period of time after a severe injury (van der Hoop et al. 2017a, A. R. Knowlton unpubl. data).

Both vessel strikes and entanglement continue to impact right whale reproductive success. Thus, to enable species recovery, reduction in mortalities have to be accompanied by substantial reduction of sub-lethal trauma as well.

2.1.5. Trends in growth and body condition from photogrammetry

Orthogonal aerial photogrammetry with accurate altitude data (Durban et al. 2016) can provide precise measurement of large whale length and width, enabling analysis of energy transfer during suckling (Christiansen et al. 2018). High-resolution drone images also provide information on skin condition, whale lice burdens, and the severity/incidence of entanglement wounds, notably coupled with quantitative photogrammetry measurements from the same whales.

Comparison between SRWs in Argentina, New Zealand, and Australia to NARWs in the North Atlantic revealed NARW juveniles, adults, and lactating females to be in generally poorer body condition and to be attaining shorter adult lengths than SRW (Fig. 5; Christiansen et al. 2020). Aerial photogrammetry studies to assess trends in growth and body condition of NARWs in Cape Cod Bay, MA, in March and April 2016–2020 (J. W. Durban unpubl. data) are being compared with aerial images collected by NOAA's Southwest Fisheries Science Center (SWFSC) during August 2000–2002 using manned aircraft flying over the Bay of Fundy. For both datasets, matching whales to the NARW Catalog enables body length, and width profiles, to be linked to whale age, sex, and life histories, and assessment of changes in an individual whale’s condition over time. Ongoing analysis of the NARW time series (J. W. Durban unpubl. data) revealed some whales are growing more slowly in recent years compared to those growing during the 2000–2002 sampling, as inferred from reduced length at age relationships in the more recent surveys. Whales also appeared to be in poorer body condition in recent spring surveys compared to previous sampling, although the previous study took place in summer, so that change may be due to seasonal change in body condition of this capital breeder. Ongoing longitudinal monitoring during consistent spring sampling in Cape Cod Bay is being used to assess this.

2.1.6. Energetic cost of entanglement

NARW recovery is dependent on sustained reproductive success, which requires adequate body condition. Normal energy costs include metabolism, migration, foraging, and pregnancy; additional exogenous stress adds to those costs. Chronically entangled NARWs may carry fishing gear for months to years, and often show signs of considerable loss in energy reserves over that time period, as evidenced by emaciation. Drag measured from gear that was removed from entangled NARWs (van der Hoop et al. 2013, 2016) was combined with other measured parameters, allowing estimation of drag on new entanglement cases at the time of their observation (van der Hoop et al. 2017a). Drag measurements enabled estimation of the energetic cost of entanglement using biomechanics and physical models, and blubber thickness and body condition measurements (van der Hoop et al. 2017b). Impacts of entanglements persist even after disentanglement due to time needed for recovery (van der Hoop et al. 2017a). For the cases evaluated in these studies, the median energetic recovery is 1.3–3 mo (max. 16 mo).

The role of sub-lethal entanglement drag in reducing NARW health and fecundity should be a major consideration in comparing the efficacy of potential mitigation measures. Thus, while 1700 lb (~773 kg) breaking strength rope may reduce mortality and severe injury, it will continue to be a source of morbidity. Ultimately, removal of rope from the water column will better enable species recovery.

2.1.7. Acoustic trauma

Parks et al. (2007) showed that right whales call at a higher frequency, and at a lower rate, in higher noise conditions, perhaps as a response to increased background noise. This may increase communication range under such conditions (Tennessee & Parks 2016). The resultant health impacts of acoustic stressors are unclear (Rolland et al. 2012). Better understanding of the effects of background shipping and offshore wind energy production noise and episodic noise associated with seismic survey and windfarm installation are critical in terms of focused mitigation.
2.2. Reproduction in North Atlantic right whales

2.2.1. Reproductive success

NARW had one-third the calving success of SRW between 1992 and 2016 (Corkeron et al. 2018). Nutrition is a major determinant of reproductive success. In a study of SRW calving success in southern Brazil, significant correlations were found with krill densities, Oceanic Niño Index, and Antarctic sea ice area (Seyboth et al. 2016). Similarly, calving success in Argentina was tied to global climate signals (Leaper et al. 2006). A comparison of blubber thickness in SRW and NARW suggested that marked fluctuations in North Atlantic right whale reproduction have a nutritional component (Miller et al. 2011). However, right whale feeding success is dependent on fine-scale plankton densities that do, or do not, elicit feeding (Pershing et al. 2009). Hypotheses concerning NARW migration and foraging strategies have recently been reviewed (Kenney et al. 2020). Plourde et al. (2019) describe foraging areas for NARW in Canadian waters in the context of climate change and the documented shift in NARW distribution. However, the remoteness of most SRW feeding habitats makes access challenging; thus, direct comparisons between foraging SRW and NARW in terms of the nutritional basis for calving success have not yet been undertaken.

Between 2011 and 2018 an average of 12 NARW calves were born per year (including none born in 2018), compared to 1 of 23 per year during the previous 8 yr (Pettis et al. 2020). The calving index (annual percentage of reproductive females presumed alive and available to calve that was observed to produce a calf) averaged 47% from 2003 to 2010 but has dropped to an average of 17% since 2010.

In 2019, there were 92 known reproductively active females that had been seen alive in the previous 6 yr. In addition, there were another 36 females age 10 to 19 that had not yet been observed with a calf, and 30 immature females, suggesting the pool of future reproductive recruits is low. However, those calves born after 2010 that have not yet been cataloged are not included in this analysis, so the future female pool may be slightly larger (www.narwc.org/narwc-databases.html).
The inter-birth interval, which averaged 3.9 yr from 2003–2010, increased to an average of 5.8 yr from 2011–2018, with a peak of 10.2 yr in 2017 (Petits et al. 2020). The mean age of first parturition (Knowlton et al. 1994, Hamilton et al. 1998) for all known-age females is 10.2 yr (n = 76, range 5 to 23, SD 3.3). This analysis does not account for potential missed first calving events. The tail of the distribution includes records over 19 yr of age: a first calving at 21 and 23 yr, both of which could be the result of missed calving events. However, the mean age of first parturition will likely increase in the future, as half of the known age females between 10 and 19 yr old have not yet been observed with a calf. The combination of the changes in inter-birth interval and age to first reproduction suggests that both parous and nulliparous females are experiencing delays in calving. It remains unknown how many of the current nulliparous 10 to 19 yr old females are biologically able to get pregnant and successfully reproduce. The timing of these calving delays corresponds with the recent distribution shifts described earlier, and those shifts may correlate with changing environmental conditions. Potential explanations for this reproductive cessation or delay are explored under other sections of this review, such as 2.2.2.

The low reproductive rate of NARWs is likely the result of several factors. Forty-nine females calved only once, and 53% (26/49) disappeared from the sighting record within 2 yr of that calving and very likely did not survive long enough to reproduce again. The remaining 47% (23/49) were seen 3 or more years after their first calving and thus were theoretically available to calve again. Ten percent (6/60) of females over 19 yr old have never calved. Given the age of first parturition presented above, it is unlikely these females will ever calve successfully. That percentage increases to 33.8% (46/136) if the 10 to 19 yr old nulliparous females are included, but these females may just be delaying calving and thus will likely enter the reproductive pool in the future. Another concern is evidence of low calf survival in some females. One female has been able to reproduce, but her calf survival is consistently low. She has had 6 calves, but the last 4 have not survived; at least 2 of them because they were apparently not successfully nursed (www.narwc.org/narwc-databases.html).

Other factors affecting reproductive success include changes in investment in offspring, differences in reproduction in relation to feeding habitats, and changes in NARW social interactions. Hamilton & Cooper (2010) showed that 71% (12/17) of all calves born in 2001 stayed with their mothers into the second year. They compared the fitness (age at first breeding and calving rate) of the 2001-born female calves that stayed with their mothers into the second year with those that did not and found no clear difference. In the late 1990s, some females that had a profile of being seen less frequently, which may indicate they fed in unknown habitats, continued to calve when other females stopped. All of the females that calved between 1998 and 2000 fit this profile. For the recent calving downturn, while 60% of the females in 2017 fit this profile, all of them had prolonged calving intervals equivalent to those of other females that calved during this time suggesting that, although they were calving, they were faring no better than the other females. Investigating these females that may feed elsewhere is hampered by the lack of a consistent or rigorous way to define and categorize them. Finally, the percent of sightings involved in surface-active groups appears to mirror the number of calves born (www.narwc.org/narwc-databases.html). This preliminary result could be explored by habitat to see whether the occurrence of these groups, some of which are related to mating, can be correlated with species-wide health. Reversing the trend of failed reproduction, by reducing sub-lethal trauma stands alongside reducing mortality as the 2 critical goals for enabling NARW species recovery.

2.2.2. Reproductive and stress hormones

Endocrine studies involving NARWs started in 1999 with the validation of immunoassays to measure steroid reproductive and stress hormone metabolites in fecal samples. Currently, immunoassays for a panel of 6 hormone classes including estrogen, progesterone, androgens, glucocorticoids, aldosterone, and thyroid hormones have been validated (Rolland et al. 2005, Hunt et al. 2006, Burgess et al. 2017, R. M. Rolland unpubl. data) for multiple biological matrices including the following: feces, blubber, blow (exhaled breath), and baleen (Rolland & Moore 2018). The temporal signature of hormones differs between these matrices from real-time or near-real-time (serum, blow), to days or months (feces and blubber), to years (baleen). Hormone measures from feces, and blubber integrate circulating levels of hormones over these different temporal scales and are especially valuable for assessment of chronic stress.

Over 400 fecal samples collected from 1999–2019 have been assayed for the 6 hormone classes mentioned above. Approximately one-third of the samples have been linked to identified NARWs with
known life-history data. Results show that concentrations of fecal estrogens, progesterone, and androgens are reliable predictors of sex, pregnancy, and lactation in females and sexual maturity in males (Rolland et al. 2005). Three cases of pregnancy loss or undetected perinatal or young calf death have been inferred using highly elevated fecal progesterone metabolites and sighting records on the calving ground during the following winter, without a calf (R. M. Rolland unpubl. data). Levels of adrenal stress hormone metabolites vary with reproductive status, sex, and physiological state, and reflect relative adrenal cortical activity (Rolland et al. 2017). Comparison of fecal glucocorticoids (FGCs) in healthy NARWs, to those killed acutely (vessel strike), suffering long-term entanglement, or prolonged live stranding (chronic), found extreme elevations of FGCs in cases of severe, chronic illness or injury (Rolland et al. 2017). FGCs have been used to link shipping noise exposure in NARWs to elevated FGCs indicating chronic stress (Rolland et al. 2012). Fecal aldosterone levels provide an additional measure of adrenal cortical activation (Burgess et al. 2017). Fecal thyroid hormones are a biomarker of nutritional status in NARWs, as thyroid gland hormone concentrations decrease during seasonal nutritional deficits and increases during periods of energy abundance (R. M. Rolland unpubl. data).

Studies of chemical profiles in NARW baleen have shown a valuable timeline of data ranging from very recent levels at the gum line, to up to 8 yr prior at the tip (Hunt et al. 2016). In fact, baleen progesterone profiles from 2 NARWs showed elevations 2 orders of magnitude higher than baseline in time points corresponding to known pregnancies. Baleen from a chronically entangled NARW was analyzed for steroid and thyroid hormones and stable isotopes and showed an 8 yr profile of foraging and migration behavior, stress response, and reproduction, with a 23 mo progesterone peak correlating to a single known calving event and elevated triiodothyronine (T3) and thyroxine (T4), suggesting that the entanglement event began 3 mo before it was first sighted entangled (Lysiak et al. 2018). Reproductive and stress hormone studies can usefully continue to investigate the parameters impacting pregnancy and recruitment.

2.3. Biotoxins and parasites

A 6 yr (2001–2006) analysis of fecal samples collected in the Bay of Fundy showed that some NARWs were exposed to at least 2 classes of algal biotoxins: paralytic shellfish poisoning toxins (PSP), primarily saxitoxins and amnesiac shellfish poisoning, and domoic acid (DA) (Doucette et al. 2012). In this study, 73% (96/132) of samples tested positive for PSP toxins and 25% (31/126) tested positive for DA. Both biotoxins were also detected in a small number of fecal samples collected in Cape Cod Bay, the Great South Channel and Roseway Basin. The results of this study suggest that NARWs are exposed to both algal biotoxins on an approximately annual basis in multiple habitats for periods of up to 6 mo (April through September). There were similar exposure rates for females and males (PSP: ~70–80%; DA: ~25–30%). Both pregnant and lactating females were exposed to both biotoxins, suggesting the potential for maternal toxin transfer and possible effects on fetal and suckling animals. Additionally, 22% of the fecal samples tested for PSP and DA showed concurrent exposure to both neurotoxins, leading to questions of interactive effects (Doucette et al. 2012). While exposure to these biotoxins was not significantly linked with observed health effects in NARWs (and their sensitivity to these toxins remains unknown), there is a potential for indirect effects (e.g. increased susceptibility to anthropogenic risks; Doucette et al. 2012 discuss possible effects of PSP on whales: neurotoxic effects impacting organ function, diving reflex and effects of DA on reproduction — based on California sea lion research) that will likely never be measurable. These data provide baseline levels of these 2 biotoxins for comparison to exposure levels in the future. A study of the possible role of biotoxins in the calf mortality event in Peninsula Valdés, Argentina, found a relationship between *Pseudo-nitzschia* spp. densities (but not *Alexandrium tamarense*) and calf deaths (Wilson et al. 2016).

A 5 yr study (2002–2006) assessed the prevalence of *Giardia* and *Cryptosporidium* spp. using analysis of fecal samples (Hughes-Hanks et al. 2005, Rolland et al. 2007, R. M. Rolland unpubl. data). Fecal samples were examined for the presence of cysts/oocysts using an immunofluorescent assay procedure. The overall annual prevalence of *Giardia* was 68% (78/115) (range = 38–77%), *Cryptosporidium* oocysts were detected in 14% (16/115) of samples (range = 7–38%), and all *Cryptosporidium* positive samples were co-infected with *Giardia*. Molecular characterization and phylogenetic analysis of the NARW isolates were unsuccessful, so species and genotypes remain unknown. While the effects of these organisms on NARWs are generally unknown, co-infection with both *Giardia* and *Cryptosporidium* was found to be associated with a decline in body condition using
Thus, SRW and NARW are clearly exposed to a variety of biotoxins and parasites, but their role in health determination remain unclear. Comparative biotoxin studies between SRW and NARW could be of value.

2.4. Modeling

2.4.1. Survival assessments and trends with emphasis on reproductive females

Mathematical modeling can be used to link the intermittent spatially referenced observations of individual NARWs and their visual health measurements to estimates of their movement between regions, underlying health, and survival. Such a model, based on a hierarchical Bayesian state-space modeling framework, was constructed using monthly time steps and 9 geographic regions and fitted to over 30 yr of sightings data (Schick et al. 2013, Rolland et al. 2016, Schick et al. 2016). An investigation found negative health impacts in NARWs entangled in gear. Individual health declined between the date seen without injuries and the first date of entanglement detection, and the overall average health continued to decline for those whales with attached gear. Results were further parsed by entanglement severity and category, by presence/absence of gear, by sex, and, for females, by reproductive class (A. R. Knowlton unpubl. data). These declines in health were greater among whales categorized as having severe entanglements, both with and without gear present. The average health score during entangled periods was poorer for reproductively active females, with declines in health translating to lower reproductive output. Survival analysis as a function of sex and entanglement severity showed that severe injuries resulted in steep declines in individual survival, with the decline in survival being greater for females than for males.

The above model was built and fit to data (as well as incorporating expert opinion) pre-2011, before the documented shift in distribution; the model is currently being altered to account for the changing movement patterns and VHA data. The spatial portion of the model needs to be updated to accurately depict recent movement patterns into previously understudied regions, as well as to account for the changing VHA data collection platforms. The sightings model from (Schick et al. 2013) is (1) individual specific, but not time varying, and (2) indexed to survey effort in different regions. This component of the model needs to be updated in order to better account for recent changes in effort, and distribution.

2.4.2. Population models and assessment tool

A NARW population evaluation tool is under development, with objectives that include prospective estimates of extinction risk and other demographic characterizations over various time scales. The model will consist of a baseline scenario projection and a quantitative threat assessment to examine the effects of modifying projected threat influences on demographic processes (i.e. scenarios modified from baseline). Although the lethal impacts of threats are relatively straightforward to include in a population viability model, the non-lethal influence of entanglement wounding, vessel-collision wounding, anthropogenic noise, changes in prey distribution and quality, and contaminants on body condition, growth, reproduction and survival are more difficult to parameterize. Model projections that include influences of all threats are required, even while the functional relationships between threat and health outcomes are not well-known. The more these relationships can be bounded by expert opinion, the less uncertainty will be transferred into population projections.

Modeling survival and population assessment are important activities to inform managers of NARW status and trends. Further understanding of the interactions of multiple stressors and their impacts on mortality and morbidity will enhance ongoing management.

2.5. Emerging tools

2.5.1. Baleen whale microbiomes as potential indicators of health

In humans, microbiotas (assemblages of microorganisms) are linked to many aspects of health, such as body condition, digestion and nutrition, immune function, inflammation, and behavior (Ley 2010, Cho & Blaser 2012, Ezenwa et al. 2012, McFall-Ngai et al. 2013). Although microbiotas of marine mammals are not as well studied as those of humans, there is evidence of highly diverse skin, respiratory, gut and oral microbiomes that vary with host phylogeny, diet, habitat, and health (Apprill et al. 2014, 2020, Nelson et al. 2015, Sanders et al. 2015, Bik et al. 2016). Little is known about the microbiotas of right whales, but
results from studies on the skin, blow, and gut microbiotas of other baleen whale species support a framework for using the microbiotas of these sample types to monitor baleen whale health, including that of right whales.

Blow and skin microbiotas of humpback whales from different geographical locations have been investigated by a few studies using high-throughput sequencing of the V4 region of the small subunit ribosomal RNA (16S rRNA) gene. In one study evaluating blow collected from seemingly healthy humpback whales (Apprill et al. 2017), 25 bacteria were found to be common to all samples—one of the most extensive core microbiotas found in any mammal to date. Similar results and sequences were also recovered in blow collected from southern hemisphere humpback whales (Pirotta et al. 2017). Apprill et al. (2017) also detected numerous genus-level relatives of mammalian pathogenic bacteria. Because the whales appeared healthy, these pathogen relatives likely were not acting as pathogens at the time, but such screening methods could be used to quickly identify samples that need to be examined for pathogens with finer resolution methods. Similar to the trends for core bacteria in the blow samples, 2 skin-associated bacterial taxa were common to seemingly healthy humpback whales from different oceans (Apprill et al. 2014, Bierlich et al. 2018), where abundances appeared to be affected by environmental conditions (Bierlich et al. 2018). Additionally, altered skin microbiotas were observed in a handful of humpback whales with compromised health (stranded, entangled) (Apprill et al. 2011, 2014). Taken together, these results suggest that screening for changes to the signatures of the skin and blow microbiotas, i.e. the presence of non-typical microbes, potential pathogens, and changes to the diversity of the overall microbiotas and/or the composition and abundance of core bacteria, could be used to monitor health of baleen whales (Apprill et al. 2011, 2014, 2017), including right whales.

To date, samples of blow (n = 120) have been collected from NARW and SRW (Argentina, and Auckland Islands, New Zealand) (C. A. Miller et al. unpubl. data). The microbiotas from these blow samples will be explored in the context of body condition measurements, life history traits, and other indices of health. They will also be screened at the genus level for relatives of pathogens and likely will be sequenced deeper to examine the function of the microbes, viruses, and genes involved in virulence. Given the conspicuous differences in body condition between NARW and SRW (Miller et al. 2011, Christiansen et al. 2020), the comparison of the blow-associated microbiotas between these populations has the potential to reveal information about right whale health, in addition to their different habitats and diets.

The gut microbiotas of mammals play an important role in digestion, nutrition, and health. Right whales depend on a diet rich in the high-energy lipids for achieving and sustaining the body fat reserves necessary for reproduction and survival, but little is known about how they digest these lipids because fresh samples of gut contents from right whales are rare. Native Alaskans harvest bowhead Balaena mysticetus whales for subsistence, and in the past, have generously allowed limited access to harvested whales for scientific purposes. Bowhead whales are a close taxonomic relative of right whales and consume prey rich in the same high-energy lipids. Hence, studies of lipid digestion and microbiotas in bowhead whales could provide important information for understanding right whale nutrition. In harvested bowhead whales, lipid digestion and microbial communities were mapped along the gastrointestinal tract (GI, forestomach through colon) by characterizing the lipid compositions (lipidomes) using HPLC-MS/MS and the microbiotas using high-throughput sequencing of the V4 region of the 16S rRNA gene (Miller et al. 2020). The lipidomes and microbiotas were tightly correlated as their compositions changed throughout the GI tract, with lipidomes and microbiotas being variable in the small intestine (the area of lipid digestion in mammals). The results suggested that wax esters, the primary prey lipids that are also prominent in right whale prey, were digested in the mid to distal small intestine and that specific bacteria appeared to play a role in their digestion. Despite differences in analytical methods, the bowhead whale gut microbiota consisted of bacteria from many of the same phyla as Sanders et al. (2015) found in fecal samples from 7 right whales, but direct comparisons of lower level taxonomy are needed. However, because of the similarity in the diets and GI tract anatomy of right and bowhead whales and because they are phylogenetically closely related, these data from (Miller et al. 2020) may provide a model for right whale gut microbiome and lipid digestion, thereby potentially adding to the understanding of right whale nutrition, body condition and overall health.

Additionally, recent analysis of how host phylogeny and life history stage modify the gut microbiome in dwarf Kogia sima and pygmy Kogia breviceps sperm whales (Erwin et al. 2017, Denison et al. 2020) may also have relevance to study of right whale health.
Overall, skin, blow and gut-associated microbiomes show potential for usefulness in monitoring health of baleen whales—especially blow, which can be collected non-invasively. Paired gut microbiome and lipidome studies have the potential to provide insights into nutrition and body condition and may be useful for evaluating the mechanisms involved in balaenid whale nutrition. Many laboratories are now implementing portable sequencing techniques that could be used to rapidly screen for, and identify, altered microbiomes in field settings (Hu et al. 2018, 2019). This technology has the potential to provide diagnostic-type details about how baleen whale microbiomes change due to animal health and environmental or ecosystem-related alterations.

2.5.2. Small cetacean health assessments

Recent advances in small cetacean health assessments are important to review when considering new approaches for evaluating NARW health. In particular, the Deepwater Horizon (DWH) oil spill provided a major opportunity to develop a new synthesis of wild dolphin health assessment tools to better understand the response to a major stressor (Fauquier et al. 2020). These tools allowed for the diagnosis of reproductive failure, lung injury, impaired stress response, and poor body condition in common bottlenose dolphins *Tursiops truncatus* in the aftermath of the DWH disaster (Schwacke et al. 2014, Lane et al. 2015, Kellar et al. 2017, Smith et al. 2017). Although many of the tools utilized in small cetacean exams would need to be substantially modified for large whales, their potential application to NARW health assessment should be considered (Schwacke et al. 2014, NOAA 2015, Venn-Watson et al. 2015, Smith et al. 2017, Fauquier et al. 2020).

2.5.3. Predicting *Tursiops* survival and reproduction from health assessment data

An expert system developed for predicting survival and reproduction in dolphins based on health assessments could inform approaches for linking current NARW health measures to demography and suggest efficacious future measurements (L. Thomas pers. obs.). The ‘Veterinary Expert System for Outcome Prediction’ (VESOP) model in dolphins uses statistical models linking measurements of wild bottlenose dolphin health made during hands-on sampling of inshore dolphins with 2-yr-ahead survival and successful reproduction for pregnant females observed by follow-up surveys. Data from 8 populations were included. The numerous measurements of blood and other parameters taken during health assessments have been organized into panels of organ status or specified disease condition to identify abnormal cases for each panel using previously established reference ranges. One future component of the project is to assess how the models and methods developed may be applied to other species for which such comprehensive hands-on health assessments are not available. In particular, if a remote blood sampling device could be developed for large whales, this approach would substantially enhance our understanding of right whale health.

3. DISCUSSION

3.1. NARW health threats

Understanding NARW health has resulted from decades of research throughout the primary range of this species from Florida to Canada. The sharing and analysis of photographs, samples, and data from both live NARWs and carcasses, has been undertaken by a growing, evolving and integrated community of conservation biologists, modelers, and veterinarians. There is a collaborative ethic, in large part driven by the NARWC being focused on recovery of this endangered species. There is a strong level of collaboration between the USA and Canada at the federal, research and non-governmental organizational levels. There is a substantial body of information that points to a major impact of lethal and sub-lethal anthropogenic trauma and stressors. However, establishing clear cause and effect linkages can be challenging, especially for the sublethal impacts given that multi-factorial processes are involved.

The key identified species-level concerns are low fecundity resulting in extended inter-birth intervals for some females, and others never calving at all, and poor survival (especially females) from high mortality and chronic morbidity. Together, these are the symptoms of the species downward trajectory. These species-level findings are in stark contrast to the high fecundity and good survival of SRWs. Although SRWs were similarly harvested down to a few hundred animals, in the post-whaling era, the relative lack of anthropogenic threats has allowed the SRW to rebound dramatically. Critical for NARWs is that they
are exposed to substantially greater human activity than SRW, given that 90% of the human species lives north of the equator (W. Rankin, The World’s Population in 2000, by Latitude; www.radicalcartography.net/index.html?histpop). This is the fundamental basis for far greater risk of anthropogenic trauma to NARWs.

The primary known stressors for NARWs include food quantity and quality, entanglement, vessel strike, and noise. Climate change-driven distribution shifts of food, followed by the change in distribution of NARWs (Record et al. 2019) have complicated efforts to monitor and manage NARW health by decreasing the ability to document individuals on an annual basis. This requires management measures that are flexible and effective in the face of changing distributions and the uncertainty predicted by climate change. Of these stressors, vessel trauma and entanglement are potentially the most tractable to reduce, in terms of beneficial management actions. Vessel noise is also a serious concern. Fig. 6 summarizes stressors and tools that are important for NARW health studies.

This review identified that the primary tools for assessing individual health include visual health indicators, body condition (an integrated energetic index), presence of vessel strike and entanglement wounds and scars, and detection of biota (biotoxins, parasites, and most recently, microbiome status).

Stress hormones sampled from blow, blubber and feces provide excellent shorter-term indicators of stress. The above tools are primarily collected using boat-based methods. Baleen samples collected at necropsy have provided data on health and nutrition over up to the last 8 yr of an animal’s life.

Given the precarious status of the species, the primary roles of existing and potential new health assessment tools are (1) evaluation of the efficacy of management changes designed to enhance species recovery; (2) expansion of our understanding of NARW health and reproductive success; and (3) increased perspective of the relative significance and trends of anthropogenic versus food limitation/other impacts on population health. Central to these goals are models designed to recognize important stressors, responses to them, and to management changes. Table 2 summarizes the available tools for NARW health assessment in the context of each major stressor and their use in assessment of their health and efficacy of mitigation efforts. New and recent tools (Section 2.5 above) may include adaptions for NARW assessments based on those used in the evaluation of the impacts of the DWH spill on small odontocetes (e.g. photo identification, diagnostic pathology and modeling), further development of microbiome studies, possible systems to collect blood samples from large whales at sea, and infra-red thermography from vessels and manned or unmanned aircraft. In
light of the above review, we recommend implementing the following critical measures. Recommendations from the review are collated in Table 3.

### 3.2. Population

#### (1) Increased Shipboard Surveys in the Recently Recognized Important NARW Habitats

- Increased shipboard surveys in the recently recognized important NARW habitats are needed to improve our ability to track changes in species status, health, and entanglement or vessel strike wounding/scarring, as well as to collect biological samples.
- Survey efforts need to be flexible to detect future habitat shifts, and survey areas need to be updated. Satellite detection techniques should be employed in this regard as they mature (Bamford et al. 2020) to find new aggregations as possible.
- Increased aerial and vessel photographic capture of a larger portion of the species annually is necessary to track individual health and overall species health, as well as allow for continued modeling of vital rates.
- Further comparisons between SRW and NARW populations and individuals would potentially add understanding for the failure of the NARW recovery post-whaling.

#### (2) Increased Aerial and Vessel Photographic Capture

- Further comparisons between SRW and NARW populations and individuals would potentially add understanding for the failure of the NARW recovery post-whaling.

#### (3) Increased Effort to Collect Appropriate Samples

- Increased effort to collect appropriate samples (e.g., biopsy, feces, blow) from adult females without a calf present are needed to allow assessment of pregnancy status, pregnancy loss, and perinatal loss in the reproductive, pregnancy, and perinatal populations. This will inform the reproductively viable female population size and to develop potential remediation actions. Specifically, the causes for the observed nulliparous females that are old enough to be sexually mature but have not calved.

#### (4) Further Investigations Are Needed to Detect Scarring

- Further investigations are needed to detect scarring and growth rates. Essential perspectives on changing body condition and growth rates are needed to provide an improved understanding for the failure of the NARW recovery post-whaling.

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**Table 2. Application of Health Assessment Tools.** COD: cause of death; VHA: visual health assessment; PCOD: population consequences of disturbance

<table>
<thead>
<tr>
<th>Stressor</th>
<th>How to Measure Occurrence</th>
<th>How to Assess Health Impacts</th>
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<tr>
<td>Vessel strikes</td>
<td>Visual Surveys</td>
<td>VHA, photogrammetry, microbiome, hormones</td>
<td>High capture rate of living species; reduction in observed external injuries; improved VHA health scores; improved calving rates</td>
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<tr>
<td>Entanglements</td>
<td>Visual Surveys</td>
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<td>VHA, photogrammetry, microbiome, hormones</td>
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<td>Cryptic Mortality</td>
<td>Visual Surveys</td>
<td>VHA, photogrammetry, microbiome, hormones</td>
<td>Reduction in carcass detections and COD of vessel strike</td>
</tr>
<tr>
<td>Food limitation</td>
<td>Visual Surveys</td>
<td>VHA, photogrammetry</td>
<td>Not manageable in relevant timescale</td>
</tr>
<tr>
<td>Ocean noise</td>
<td>Passive acoustic monitoring</td>
<td>Stress hormones</td>
<td>Change in ambient and episodic noise</td>
</tr>
<tr>
<td>Harmful biota &amp; pollution</td>
<td>Sampling of live or dead whales</td>
<td>Sample collection: food, blow, feces, blubber</td>
<td>Change in levels of observed effects: immune function, microbiome change, disease</td>
</tr>
</tbody>
</table>

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(1) Increased shipboard surveys in the recently recognized important NARW habitats are needed to improve our ability to track changes in species status, health, and entanglement or vessel strike wounding/scarring, as well as to collect biological samples.
(2) Survey efforts need to be flexible to detect future habitat shifts, and survey areas need to be updated. Satellite detection techniques should be employed in this regard as they mature (Bamford et al. 2020) to find new aggregations as possible.
(3) Increased aerial and vessel photographic capture of a larger portion of the species annually is necessary to track individual health and overall species vital rates.
(4) Further comparisons between SRW and NARW populations and individuals would potentially add understanding for the failure of the NARW recovery post-whaling.

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(1) Consistent long-term collection of well-calibrated photographic data are needed to provide essential perspectives on changing body condition and growth rates. Further investigations are needed to detect scarring and growth rates.
(2) Further investigations are needed to detect scarring and growth rates.
(3) Increased shipboard surveys in the recently recognized important NARW habitats are needed to improve our ability to track changes in species status, health, and entanglement or vessel strike wounding/scarring, as well as to collect biological samples.
(4) Survey efforts need to be flexible to detect future habitat shifts, and survey areas need to be updated. Satellite detection techniques should be employed in this regard as they mature (Bamford et al. 2020) to find new aggregations as possible.
(4) Analysis of fecal, blow, and biopsy samples for microbiome and other biota are needed to enhance our understanding of overall health in this species.

(5) Greater capacity to retrieve and examine floating carcasses from substantial offshore distances to enhance evaluation of mitigation efforts.

3.4. Modeling

(1) An assessment of the interaction of multiple stressors in each major habitat is needed to enable more spatially precise management measures and to improve modeling efforts to determine how broad scale management measures may influence health and reproduction (Fig. 7).

(2) Population consequence of multiple stressor (PCOMS) and other models are needed to test the conservation and species recovery benefit of undertaking specific health assessment options.

3.5. Management

(1) Shifting mortality locations indicate the need for effective broad-scale management measures that allow healthy female NARWs to forage, conceive, deliver, and wean calves.

(2) Management needs are summarized in Table 3.

4. CONCLUSIONS

In contrast to SRW, the NARW species has failed to maintain a positive trajectory towards recovery from the impacts of historic whaling. The reasons for this are complex but center on the far greater pressure from human activities in the northern versus southern hemispheres.

The major known anthropogenic sources of lethal and sublethal NARW trauma are from collisions with vessels and fishing gear entanglement. These have
increased in recent decades. Vessels have got larger and faster, increasing the lethality and frequency of collisions. Fishing gear strength has increased, with resultant increased morbidity and mortality from entanglement.

The already poor fecundity and survival of NARWs has devolved into a recent decline. The species peaked at 500 individuals in 2010. The best estimate for 2019 is approximately 360 animals.

Climate-driven changes in NARW habitat features (biological, physical, chemical) resulting in changes in migration and foraging patterns that have correlated with a further reduction in already poor reproductive success. Extreme recent warming of the Gulf of Maine, a major feeding habitat, has led to an increase in the use of the Gulf of St Lawrence, when ice free.

The interaction of sub-lethal stressors such as decreased energy intake and entanglement trauma must be better quantified in order to identify critical management strategies to enhance NARW body condition and reproductive success. While foraging success is the most critical determinant of health, little can be done to enhance it, whereas anthropogenic trauma is also a major factor and is avoidable, given adequate and effective management changes.

Tools critical to assessing the efficacy of measures to mitigate failed recovery include visual surveys, photo-ID catalog-based species analyses, annual scarring assessments, visual and photogrammetric health assessments, and necropsies. These efforts are ongoing but need to be continually optimized as environmental changes drive shifts in NARW distribution and behavior.

Investigation of individual health, analyzing blow, blubber, fecal, and other samples in addition to conducting complete necropsy examinations is critical to better understanding the health, reproductive status, and disease states of the NARW population. While we understand the fundamental role of trauma in NARW status, a more nuanced understanding of other aspects of their health would be hugely valuable.

Modeling is critical to our understanding of the status and trends of NARW health, and in particular for understanding the interactions of multiple stressors on both individuals and the species as a whole. Given the fragmented and changing nature of routine sighting and health assessment opportunities, models are critical to translate available data into best estimates of NARW status and trends.

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LITERATURE CITED


Schick RS, Kraus SD, Rolland RM, Knowlton AR and others (2013) Using hierarchical Bayes to understand movement, health, and survival in the endangered North Atlantic right whale. PLOS ONE 8:e64166


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Reducing effort in the U.S. American lobster (*Homarus americanus*) fishery to prevent North Atlantic right whale (*Eubalaena glacialis*) entanglements may support higher profits and long-term sustainability

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Abstract

North Atlantic right whales (*Eubalaena glacialis*) feed and migrate in areas of the inshore and offshore trap fishery for American lobster (*Homarus americanus*) in the Northeast U.S. In addition to a recent increase in lethal and sub-lethal interactions with Canadian snow crab gear, entanglement in both Canadian and U.S. lobster trap gear threatens the continued existence of this endangered species. The U.S. National Marine Fisheries Service is considering a number of measures to prevent right whale entanglement bycatch that could impact lobster fishing effort. The U.S. lobster fishery in Maine expends approximately 7.5 times as much effort as the Canadian fishery in Lobster Fishing Area 34, where fishers catch about 3.7 times more lobster per trap than Maine fishers. From 2007 to 2013 in Maine, lobster landings doubled as the number of traps fell 10.5 percent and landings per trap increased by about 125 percent. The state of Massachusetts has achieved record high landings since trap/pot seasonal closures have been implemented to protect right whales, especially within the Statistical Reporting Areas most affected by the closures. Therefore, a negative economic impact should not be assumed with effort reduction. In fact, reducing effort may serve to increase fishing profits while supporting the protection of endangered North Atlantic right whales and the long-term sustainability of the lobster fishery.

Keywords: bycatch, fisheries management, North Atlantic right whales, overfishing, fishing technology, ropeless fishing

1. Background

The United States’ National Marine Fisheries Service (NMFS) is preparing significant new regulations designed to reduce bycatch of endangered North Atlantic right whales (*Eubalaena glacialis*) in the American lobster (*Homarus americanus*) fishery. Entanglement in fixed fishing gear, which, in U.S. waters, is dominated by gear from the American lobster fishery, is the leading cause of mortality among North Atlantic right whales (Pettis et al. 2018; Sharp et al. 2019) and has important sublethal impacts on the species’ ability to recover (van der Hoop et al. 2017). Many of the measures NMFS is considering could lead to a reduction in fishing effort. Myers et al. (2007) showed how reducing effort would benefit both the U.S. lobster industry and the North Atlantic right whale. Here we extend that concept by exploring how overcapacity and effort reduction are connected to American lobster landings and revenue in the U.S. fishery.

1A. The U.S. American lobster fishery
The American lobster fishery is the United States’ most valuable fishery, bringing in over US $670 million in landings revenue in 2016 (NMFS Annual Commercial Landings Statistics). It is based in the Northeast, especially the states of Maine, Massachusetts, New Hampshire, and Rhode Island, and is fished using fixed trap/pot fishing gear. Trap/pot fishing gear consists of a baited trap or string of traps (referred to as a trawl) on the seafloor connected to a surface buoy with a vertical buoyline or “endline.” The surface buoy and endline serve to mark the location of the trap or trawl for the owner and other fixed and mobile fishing gear (i.e. scallop dredge and bottom trawl) operators operating in the area, as well as to allow the traps to be hauled up through the water column. The rope connecting traps in a trawl is referred to as “groundline.” Since 2007, NMFS has required fishers in most areas to use sinking or neutrally buoyant groundline due to the potential for floating groundline to entangle North Atlantic right whales (NMFS 2007).

However, North Atlantic right whales and other protected species—including humpback, fin, sei, and minke whales and loggerhead and leatherback sea turtles—are known to become entangled in trap/pot endlines (Hayes et al. 2018b; NMFS 2014) [Figure 1]. The U.S. American lobster fishery employs an estimated 912,300 vertical endlines during peak fishing months—many of which are within the North Atlantic right whale’s designated Critical Habitat Area (NMFS 2016; NMFS co-occurrence model 2019) [Figures 2, 3]. The rope used for endlines has become significantly stronger over recent decades as manufacturing techniques have evolved, likely contributing to an increase in right whale entanglement severity and mortality as whales are less able to break free of entangling line and gear (Knowlton et al. 2016).

![Figure 1: Illustration of a North Atlantic right whale entangled in vertical endline, showing the surface buoy, endline, and string of traps or “trawl” connected by sinking groundline. Credit: Natalie Renier, Woods Hole Oceanographic Institution](image-url)
The Atlantic States Marine Fisheries Commission (ASMFC) has divided the U.S. lobster stock into three biological areas: the Gulf of Maine, Georges Bank, and southern New England. According to the most recent stock assessment from 2015, the Gulf of Maine and Georges Bank stocks are not depleted and overfishing is not occurring, but the southern New England stock is severely depleted (ASMFC 2015). Climate change and associated disease and poor recruitment may be at least partly responsible for the collapse of the southern New England stock (ASMFC 2015). The Gulf of Maine stock accounts for more than 90 percent of U.S. landings (ASMFC 2015). The Gulf of Maine and Georges Banks stocks are heavily fished, especially in the fall, but stock abundance is also high (ASMFC 2015). However, in the most recent stock assessment from 2015, three of the five young of year indicators—which help indicate future sustainability of the stock—were low, which may suggest potential declines in recruitment in future years (ASMFC 2015). Using an annual larval settlement index and local bottom temperature and disease prevalence indicators, Oppenheim et al. (2019) predict that Gulf of Maine lobster landings will decline to near-historical levels within the next decade as the lobster population continues to recede poleward in a warming ocean.

The U.S. American lobster fishery has experienced robust growth in recent decades, with peak landings in 2016 of over 72,000 metric tons (nearly 160 million pounds) valued at more than $670 million (NMFS Annual Commercial Landings Statistics). Landings value has also shown consistent growth. Total U.S. American lobster landings weight increased by 2.78 times from 1992 to 2016, while landings value increased by 2.24 times when adjusted for inflation (4.03 times nominal value) [Figure 4].
This growth in landings has not been driven by a rise in the number of individuals fishing; the total number of participants in the fishery has fallen from an estimated 13,000 in 1997 to 8,485 in 2019 (NMFS 1997; NMFS 2019b). There are currently about 2,000 fishers actively operating with a federal commercial trap/pot license (GARFO American Lobster 2019); states issue the majority of licenses. NMFS issued a moratorium on new federal licenses in 1999 (NMFS 1999). Fewer fishers are bringing in significantly more revenue, although costs (especially fuel and bait) have not remained stagnant. The fishery is dominated by small owner-operated businesses.

1B. North Atlantic right whales

Once numbering in the tens of thousands (Monsarrat et al. 2015), as of 2018 there were an estimated 411 North Atlantic right whales remaining (Pace et al. 2017; Pettis et al. 2018). The population grew slowly from a low of approximately 270 animals in 1990 to 482 in 2010, but has since declined rapidly (Pace et al. 2017) [Figure 5]. Only approximately 90 reproductive-aged females remain in the population (Pace et al. 2017; Hayes et al. 2018a). With continued high rates of anthropogenic mortality, the population could be functionally extinct within several decades (Meyer-Gutbrod and Greene 2018). North Atlantic right whales are protected under the U.S.’s Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA) and Canada’s Species at Risk Act.

Figure 5: Estimated North Atlantic right whale population, number of calves, observed mortalities and serious injuries, and diagnosed cause of death or serious injury. Diagnosed entanglements have increased significantly since the population has been in decline. Data from Waring et al. 1997, Kraus et al. 2001, Waring et al. 2002, Moore et al. 2004, Waring et al. 2015, Pace et al. 2017, Pettis et al. 2018, Hayes et al. 2018b, and NOAA Northeast Fisheries Science Center (unpublished).

In addition to the legal imperative to conserve this species, large whales such as right whales are increasingly recognized for their important role in sequestering carbon from the atmosphere into the deep sea and in mixing and transporting nutrients to support primary productivity in marine ecosystems (Lavery et al. 2010; Pershing et al. 2010; Roman et al. 2014). A recent estimate placed the value of an average individual large whale at over US $2 million in terms of carbon sequestration, fisheries productivity enhancement, and ecotourism (Chami et al. 2019).

Entanglement in fishing gear and vessel strikes are responsible for all diagnosed adult North Atlantic right whale mortalities since 1970; no adults are known to have died of natural causes in almost fifty years (though many mortalities are not observed or diagnosed) (Moore et al. 2004; Sharp et al. 2019). Entanglement was the cause of death in 72 percent of diagnosed adult mortalities since the population has been in decline (from 2010 to 2018), but only 35 percent from 2000 to 2009 (Moore et al. 2004; Sharp et al. 2019).

North Atlantic right whales can be found off the coast of New England and Canada in areas likely to overlap with trap/pot fisheries throughout the year (Davis et al. 2017) [Figure 6]. Rope taken off entangled whales has been tracked to fisheries throughout these areas (Hayes et al. 2018a) [Figure 7].
NMFS has calculated Potential Biological Removal (PBR) for North Atlantic right whales at 0.9, meaning that less than one animal can be killed each year due to human activity while still allowing the population to recover (Hayes et al. 2018b). Right whale serious injuries and mortalities in U.S. waters from entanglement alone—excluding entanglements known to be caused by Canadian gear—have exceeded PBR every year except for two since 2000 (Morin et al. 2018b). In their most recent ESA Section 7 consultation on the impacts of the American lobster fishery, NMFS stated that U.S. lobster fishing gear is likely to kill 3.25 animals annually (NMFS 2014). Entanglement is very common among North Atlantic right whales: in a 2012 study, 83 percent of right whales showed scars from entanglements and an estimated 26 percent—or approximately 100 animals—are entangled each year (Knowlton et al. 2012).

In addition to mortalities, entanglement has serious sublethal impacts on North Atlantic right whales that likely inhibit the species’ ability to recover (van der Hoop et al. 2017). Right whales can produce up to an estimated 8,000lbs of force with a single stroke of their flukes (Arthur et al. 2015), so they will often continue to swim while entangled in rope and/or associated traps and buoys. Entangling gear creates substantial drag for a swimming animal, and the energetic demands of an entanglement are comparable to or exceed those of other major life history events such as migration and pregnancy (van der Hoop et al. 2016; van der Hoop et al. 2017).

For reproductive females, the energetic costs of entanglement can extend the amount of time needed to recover fat stores following pregnancy, calving and lactation, potentially delaying the female’s ability to become pregnant (van der Hoop et al. 2017). In recent years, the average calving interval for reproductive females has stretched from three to ten years (Pettis et al. 2018). Females have about a five percent chance of not becoming entangled during that ten-year period (Hayes et al. 2018a).
Entanglement also poses a serious animal welfare concern. Beyond preventing the take of marine mammals, including North Atlantic right whales, at unsustainable levels, the MMPA also specifies that takes must be humane—wherein the term “humane” means “that method of taking which involves the least possible degree of pain and suffering practicable to the mammal involved” (MMPA 1972). When a right whale becomes entangled, the line and gear can wrap around the animal’s body, flukes, flippers and mouth [Figure 8]—impeding swimming and feeding, causing chronic infection, emaciation, and damage to blubber, muscle, and bone (Moore et al. 2006; Moore and van der Hoop 2012; Moore 2013; Dolman and Moore 2017; Sharp et al. 2019) [Figure 9]. It can take months to years for a North Atlantic right whale to die of entanglement, during which time it experiences extreme pain and debilitation (Moore et al. 2006; Moore and van der Hoop 2012; Moore 2013; Moore 2014; Dolman and Moore 2017). For example, entanglement is known to have caused fatal scoliosis in a juvenile whale due to the strain of dragging fishing gear as a young animal [Figure 10] and nearly severed flippers on multiple animals swimming in up to 30 to 50 wraps of constricting rope [Figure 11] (Sharp et al. 2019).

**Figure 8**: A live entangled North Atlantic right whale showing fishing line wraps over the blowhole and through the mouth, damaging baleen plates. Credit: Nick Hawkins
**Figure 9**: Fishing rope furrowed into the lip of Bayla, North Atlantic right whale #3911. Credit: Michael Moore, NMFS Permit 932-1905-00/MA-009526

**Figure 10**: North Atlantic right whale (CALO00901, 3710) with debilitating abnormal curvature of the spine (scoliosis) caused by an entanglement. This injury caused chronic damage to the spine, which ultimately led to the young animal’s death. Image credit: University of North Carolina Wilmington; NMFS Permit No. 932-1489.
1C. Regulatory processes concerning the U.S. American lobster fishery and North Atlantic right whales

The U.S. American lobster fishery is cooperatively managed by the states (0-3 miles from shore) and NMFS (3+ miles from shore) under the framework of the ASMFC. State waters regulations are promulgated by the respective government agencies, i.e. the Maine Department of Marine Resources and Massachusetts Division of Marine Fisheries, while complementary federal water
regulations are promulgated by NMFS. The ASMFC assesses the fishery according to seven Lobster Management Areas (LMAs) [Figure 12], of which LMA 1 is the most productive, with 92.5 percent of total catch in 2012 (the most recent year for which landings by LMA are available) (ASMFC 2018b). Many fishers are licensed to operate in both state and federal waters; for example, 27 percent of fishers with Massachusetts state licenses also have federal licenses (Massachusetts DMF unpublished data). In cases where state and federal regulations differ, the most restrictive rule applies.

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The Atlantic Large Whale Take Reduction Team (ALWTRT), a group of fishers, scientists, conservationists, and state and federal officials, was created in 1996 as mandated by the Marine Mammal Protection Act to advise NMFS on steps to reduce incidental take (or killing) of large whales in Atlantic fixed gear (trap/pot and gillnet) fisheries to a level below PBR (NMFS 1997). Although the ALWTRT is mandated to reduce take of all large whale species affected by the fisheries, in recent years the ALWTRT has focused on North Atlantic right whales due to the urgency of the right whale entanglement crisis and the potential for this species to become extinct in the near future.

Since 1997, NMFS has taken a series of management actions, some of which were recommended by the ALWTRT, to identify and reduce North Atlantic right whale bycatch (Hayes 2018a). These include gear marking requirements, surface weak links, sinking groundlines, trap limits, minimum numbers of traps per endline, and seasonal fishery closures (Hayes et al. 2018a). However, right whale entanglement mortalities and serious injuries have increased substantially over the same period and the population trajectory has reversed from modest growth to rapid decline. Though a number of factors have likely contributed to the rising entanglement mortality rate, including stronger fishing rope (Knowlton et al. 2016) and climate change-related shifts in right whale distribution (Record et al. 2019), protective measures to date have failed to demonstrably reduce total right whale entanglement risk and mortalities.

Between June 2017 and September 2019, 30 North Atlantic right whales were found dead in U.S. and Canadian waters in an Unusual Mortality Event (UME) (NOAA 2019). This UME has brought renewed urgency to the ALWTRT and NMFS rulemaking processes.
At the April 2019 ALWTRT meeting, NMFS indicated an intent to develop and implement new rules to reduce North Atlantic right whale bycatch by 60 to 80 percent and asked Team members to generate proposals to meet that risk reduction target (NMFS correspondence 2019). At the end of the meeting, the Team reached near-consensus agreement on a suite of measures implemented by state and federal management area (NMFS Key Outcomes Memorandum 2019). The primary risk reduction measures agreed upon were:

1. Reductions in the number of endlines fished by 18 to 50 percent
2. Use of reduced breaking strength (less than 1,700lbs force) endlines

There were notable differences in the recommendations from different caucus groups within the ALWTRT. The fishing industry and state management representatives focused on endline reductions and reduced breaking strength rope, while the conservation non-governmental organization (NGOs) members also recommended:

3. Additional time/area fishery closures in North Atlantic right whale aggregation areas
4. Rapid research using and steps toward implementation of ropeless fishing gear (defined as gear that does not use endlines prior to gear retrieval)

Additional seasonal closures and ropeless gear testing and/or implementation were not included in the near-consensus recommendations (NMFS Key Outcomes Memorandum 2019), but are likely to be continually considered as part of ongoing efforts to reduce large whale bycatch in the fishery.

The ALWTRT’s near-consensus subsequently withered on August 20th, 2019 when the Maine Lobstermen’s Association withdrew their support (Maine Lobstermen’s Association 2019). However, the purpose of the ALWTRT is to make consensus-based recommendations to NMFS, and under the MMPA NMFS is responsible for implementing measures to reduce serious injuries and mortalities to below PBR regardless of whether the Team reaches consensus (MMPA 1972). NMFS therefore subsequently indicated their intent to move forward with regulations (Oliver 2019). In August 2019, NMFS published a notice of intent to prepare an environmental impact statement and a request for public comments on proposed modifications to the Atlantic Large Whale Take Reduction Plan, which was based on the ALWTRT’s risk reduction framework (NMFS 2019a). NMFS is tentatively expected to release a proposed rule including the ALWTRT’s recommendations by early 2020, with a final rule expected thereafter.

2. Potential impacts of proposed regulations on fishing effort

Each of the major management measures NMFS is considering to reduce right whale bycatch could have an impact on fishing effort, described here by the number of traps or trap days used, as explained below. If the lobster fishery is operating efficiently, then a reduction in effort would likely lead to reduced landings and potentially lower revenue (depending on the extent to which price rises in response to a contraction of supply). In contrast, if the exploitation rate in the lobster fishery is above optimum efficiency, reducing effort would likely allow lobster biomass to build up so that catch rates remain high with substantially reduced operating costs (Myers et al. 2007; Worm et al. 2009). Understanding how effort reduction could impact the fishery is important for federal and state regulators, the fishing industry, and conservation interests.

1. Reductions in the number of endlines fished
There are multiple ways in which an endline reduction can be implemented: (1) directly, such as through a vertical endline cap that could be administered similar to trap tags, and (2) indirectly, such as through a trap limit reduction combined with a set minimum number of traps per trawl. In either case, it is imperative that a vertical endline reduction be implemented as a reduction from the actual number of endlines fished, not from the amount currently allowed under regulations, for such a measure to have the expected entanglement risk reduction benefit for right whales. This is because in many areas of the fishery actual effort is lower than regulations allow. If, for example, the trap limit was reduced from 800 to 600 traps in an area where fishers use 550 traps on average, the measure would have significantly less than a 25 percent entanglement risk reduction benefit.

If a direct endline cap were to be pursued, the endline reduction would not necessarily lead to an equivalent reduction in the number of traps fished, because many fishers can add traps to trawls in order to continue fishing their standard number of traps. However, vessel and other equipment constraints would likely limit some individuals from fishing their full trap allocation. For example, fishers operating offshore in LMA3 often already fish long trawls of 20 or more traps and may have a limited ability to add more traps per endline. Fishers who operate on small vessels inshore may not have sufficient mechanical hauling strength to fish longer trawls. Therefore, we expect an endline cap to lead to a reduction in effort that is greater than zero but less than the amount of the endline reduction (for example, a 50 percent endline reduction will lead to a trap reduction between 0 and 50 percent). In contrast, an indirect endline reduction implemented through a trap reduction and minimum number of traps per trawl would have a direct impact on effort, provided that the reduction is from actual number of traps fished.

2. Use of reduced breaking strength (less than 1,700lb force) endlines
Of the proposed measures, the use of reduced breaking strength endlines has the least clear impact on effort, and may not lead to an appreciable reduction in the number of traps fished. If fishers find that 1,700lb breaking strength rope cannot adequately handle their trawls as currently configured, they may consider reducing the number of traps per trawl so as to reduce the load on the endline when hauling (although there are also requirements on the minimum number of trap per trawl). However, other reconfigurations, such as lengthening the groundline between the first and second traps in a trawl, may similarly reduce the load on the endline without reducing the number of traps per trawl.

3. Additional time/area fishery closures in North Atlantic right whale aggregation areas
Seasonal closures would have a direct impact on fishing effort by requiring complete removal of fishing gear from an area for a period of time. The extent to which seasonal closures will impact fishing effort depends on the duration of the closure, season, and area fished. Although fishers are currently allowed to harvest American lobster year-round other than within specific seasonal closures, there are significant differences in effort and landings by season. For example, in many areas landings are highest in the fall, while late winter and early spring bring in a significantly lower harvest (ASMFC 2015). However, some fishers keep their gear in the water even when

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1 Most fishers in the U.S. lobster fishery are licensed to use up to 800 traps, though there are important differences by area, especially in LMA3 where fishers may use up to 1,945 traps (GARFO American Lobster Commercial Fishing Regulations 2019).
harvest is minimal, and endlines pose the same whale bycatch threat regardless of how much lobster is being harvested.

Neither fishing effort nor right whales are evenly distributed across the fishery; seasonal closures aim to identify areas and periods of highest risk. One particular area of concern discussed at the April 2019 ALWTRT meeting is south of Martha’s Vineyard and Nantucket in NMFS Statistical Reporting Area 537 (NMFS Key Outcomes Memorandum 2019). Right whales have maintained a near-constant presence in Area 537 over the last three years and have frequently been observed aggregating in large numbers—sometimes more than 100 individuals (NOAA Right Whale Sightings Advisory System, NMFS Key Outcomes Memorandum 2019). Their presence has triggered NMFS to implement a number of successive Dynamic Management Areas, where mariners are asked (but not required) to avoid the area or reduce vessel speed to 10 knots or less (NMFS Office of Protected Resources 2019). Effort in this area is relatively low, but the offshore lobster industry operating there uses heavy fishing gear (NMFS co-occurrence model 2019; NMFS Key Outcomes Memorandum 2019).

4. Use of ropeless fishing gear

Instead of leaving an endline in the water continuously, ropeless fishing gear releases a buoy and endline or inflates a lift bag to come to the surface when a fisher sends an acoustic command to retrieve their trawl (Myers et al. 2019) [Figure 13]. Alternatively, many fishers already use a customized hook to catch the groundline between traps and haul their gear to the surface—called grappling—when the permanent buoy or endline go missing (Myers et al. 2019). Both acoustic-release ropeless fishing and grappling have the potential to substantially reduce or eliminate entanglement in endlines. Entanglement involvement with endlines is the most commonly identified interaction since the sinking groundline rule went into effect (D. Morin personal communication); since 2007, line consistent with endlines has been recovered from entangled whales about ten times more often than line consistent with groundline (Morin et al. 2018a).

Figure 13: Illustration of acoustic-release ropeless fishing gear. Upon receiving an acoustic trigger, a buoy and

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2 Marine mammal regulations require that lobster traps be hauled back only once every 30 days (GARFO American Lobster Commercial Fishing Regulations 2019).
endline attached to a trap at the end of a trawl deploys for retrieval or a lift bag inflates and brings the attached trap and trawl to the surface. Endlines are only used during gear retrieval, or not at all if a lift bag is used. A virtual trap marker visible on a screen in the vessel would replace the marker buoy. Credit: Natalie Renier, Woods Hole Oceanographic Institution

Ropeless fishing gear may take longer to retrieve than traditional methods due to the added time needed to triangulate on gear position using acoustic signals and/or the time needed to grapple (Myers et al. 2019). This may be particularly relevant for early adopters of ropeless gear; time costs may go down as fishers become accustomed to different retrieval methods and technologies are iteratively improved. If fishers are not able to haul as many trawls per day when fishing ropeless, ropeless fishing could effectively cause a reduction in effort. Additionally, the upfront costs of transitioning to ropeless fishing gear may be too high for fishers to replace all of their endlines at once. Combining a transition to ropeless fishing gear with an endline or trap reduction could make the upfront investment more feasible.

On the other hand, ropeless fishing could offer a solution for fishers facing an endline reduction: if allowed by federal and/or state regulations, fishers could replace some of their endlines with ropeless retrieval units to meet endline reduction requirements. Therefore, the overall impact of ropeless fishing on effort depends on implementation.

3. Overcapacity and effort reduction in the U.S. lobster fishery

We examined three case studies to describe how fishing effort has correlated with landings in the U.S. lobster fishery:

A. Comparison of lobster fishing effort on the U.S. (Maine) and Canadian (Lobster Fishing Area 34) sides of the Gulf of Maine in terms of number of traps and season days
B. State of Maine landings and number of traps over time
C. Landings within the Massachusetts Restricted Area seasonal trap/pot closure and Massachusetts statewide landings since the closure was implemented

We used publicly available landings data, price indices, and trap and license counts and the longest available time series up to 1986 in order to show decadal trends.

3A. Effort and landings in the Gulf of Maine: Maine compared to Lobster Fishing Area 34

We employ a comparison of the lobster fishery on the U.S. and Canadian sides of the Hague Line, the North Atlantic boundary between U.S. and Canadian fishing waters, in 2016 and 2017.5

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3 Current federal and state regulations require the use of surface marking systems that use endlines in the American lobster fishery (GARFO American Lobster Commercial Fishing Regulations 2019). However, NMFS and some state agencies have demonstrated interest in supporting ropeless gear development and use.
4 Some data sets used are not publicly published but are available upon request to the relevant state or federal agency.
5 Myers et al. (2007) also employed a comparison of the U.S. and Canadian lobster fisheries across the Hague Line and found that U.S. effort was about 13 times higher than Canadian. However, Myers et al. (2007) compared landings and traps in the U.S.’s Lobster Management Area 1 and Canada’s Lobster Fishing Area 34 and calculated effort using different assumptions. We chose to compare the state of Maine and LFA 34 because more recent and complete landings and effort data were available. Therefore, these two studies should not be directly compared,
U.S. landings are from Maine state- and federally licensed landings from the Gulf of Maine; Canadian landings are from Lobster Fishing Area (LFA) 34 [Figure 14]. These two areas share similar biological characteristics and have both experienced record landings in recent years following four decades of landings growth (Myers et al. 2007; DFO Seafisheries Landings; NMFS Annual Commercial Landings Statistics). However, the Maine lobster fishery has a much higher trap limit and is allowed to fish year round, whereas LFA 34 is restricted to about one half of the trap limit for most Maine fishers and fishing is restricted to a winter season from the last Monday in November to May 31st (GARFO American Lobster Commercial Fishing Regulations; DFO Integrated Fisheries Management Plan 2019).

Figure 14: Map of U.S. Lobster Management Areas (LMAs) and Canadian Lobster Fishing Areas (LFAs) in the Gulf of Maine divided by the Hague Line. Maine landings and effort (primarily from LMA1 and LMA3) are compared to landings and effort in LFA 34. This map shows the U.S. definition of the Hague Line. Map created in QGIS using shapefiles from NMFS Greater Atlantic Regional Fisheries Office (Lobster Management Areas) and Free 2017 (Atlantic Coast: Lobster Fishing Areas).

To compare effort in Maine and LFA 34, we compared lobster landings, number of traps, and season days in each area in 2016 and 2017, the two most recent years for which data are available [Table 1]. LFA 34 data are provided by fishing season; in this analysis 2016 refers to the 2015/2016 fishing season and 2017 refers to the 2016/2017 fishing season. For the state of Maine, the number of traps is the number of trap tags sold, as published by the state of Maine Department of Marine Resources (Maine DMR 2019). For LFA 34, we calculated the number of...
traps as the trap limit (383⁶) multiplied by the number of licenses (979) (DFO 2019). We calculate overcapacity in Maine compared to LFA 34 as:

\[
\text{Overcapacity in Maine versus LFA 34 = (number of traps x season days) / landings}
\]

<table>
<thead>
<tr>
<th>Lobster Fishing Effort in Maine versus Lobster Fishing Area 34, 2016</th>
<th>Maine</th>
<th>LFA 34</th>
<th>Maine/LFA 34</th>
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</thead>
<tbody>
<tr>
<td>Landings (metric tons)</td>
<td>60,175</td>
<td>29,151</td>
<td>2.06</td>
</tr>
<tr>
<td>Number of traps</td>
<td>2,946,000</td>
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<tr>
<td>Season days</td>
<td>365</td>
<td>184</td>
<td>1.98</td>
</tr>
<tr>
<td><strong>Overcapacity in Maine versus LFA 34</strong></td>
<td></td>
<td></td>
<td>7.55</td>
</tr>
</tbody>
</table>

**Table 1A:** Landings, number of traps, and season days in Maine versus Lobster Fishing Area (LFA) 34 in 2016 (LFA 34’s 2015/2016 fishing season). Maine fishers used approximately 7.55 times as much effort as fishers in LFA 34 to harvest the same amount of lobster. Maine landings data from National Marine Fisheries Service Annual Commercial Landings Statistics and number of traps from Maine Department of Marine Resources Historical Maine Lobster Landings. LFA 34 landings, number of licenses, trap limits, and season days from Fisheries and Oceans Canada March 2019 update to the Integrated Fisheries Management Plan for LFAs 27-38.

<table>
<thead>
<tr>
<th>Lobster Fishing Effort in Maine versus Lobster Fishing Area 34, 2017</th>
<th>Maine</th>
<th>LFA 34</th>
<th>Maine/LFA 34</th>
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</thead>
<tbody>
<tr>
<td>Landings (metric tons)</td>
<td>48,983</td>
<td>22,679</td>
<td>2.16</td>
</tr>
<tr>
<td>Number of traps</td>
<td>2,954,000</td>
<td>375,000</td>
<td>7.88</td>
</tr>
<tr>
<td>Season days</td>
<td>365</td>
<td>185</td>
<td>1.97</td>
</tr>
<tr>
<td><strong>Overcapacity in Maine versus LFA 34</strong></td>
<td></td>
<td></td>
<td>7.20</td>
</tr>
</tbody>
</table>

**Table 1B:** Landings, number of traps, and season days in Maine versus Lobster Fishing Area (LFA) 34 in 2017 (LFA 34’s 2016/2017 fishing season). Maine fishers used approximately 7.20 times as much effort as fishers in LFA 34 to harvest the same amount of lobster. Maine landings data from National Marine Fisheries Service Annual Commercial Landings Statistics and number of traps from Maine Department of Marine Resources Historical Maine Lobster Landings. LFA 34 landings, number of licenses, trap limits, and season days from Fisheries and Oceans Canada March 2019 update to the Integrated Fisheries Management Plan for LFAs 27-38.

In Maine, fishers use nearly eight times as many traps to catch about twice as much lobster as fishers in LFA 34 [Table 1]. Since the lobster fishing season in Maine is almost twice as long as that in LFA 34, we calculate that effort in Maine is approximately 7.5 times higher than that in

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⁶ The trap limit in LFA 34 is 375 for approximately two thirds of the season and 400 for one third of the season (DFO 2019). We therefore used a scaled trap multiplier of 383.
LFA 34 to harvest the same amount of landings. Results were comparable from 2016 to 2017, as both areas experienced a drop in landings of about 20 percent.

It is important to note that many Maine fishers do not actively fish during the full 365-day season, and commonly remove gear for part of the year. However, even if we estimate that Maine fishers use 75 percent of available fishing days (292 days), capacity in Maine is still about 5.5 times that in LFA 34. Additionally, the number of trap tags sold in Maine does not fully account for latent effort; some fishers likely do not use all of the trap tags they purchase. However, the number of trap tags sold is markedly lower than the full trap limit. In 2016 and 2017, the number of trap tags sold averaged 490 and 493 per fisher, respectively (Maine DMR 2019), whereas the trap limit is 800 in most areas. This indicates that the number of trap tags sold is a better indicator for actual effort than the number of licenses multiplied by the trap limit in Maine. In contrast, the number of traps for LFA 34 calculated here represents the upper bound for this area and assumes all license holders fish the full trap limit.\(^7\)

Even if latent effort in Maine is approximately 20 percent of the number of trap tags sold and Maine fishers actively fish 75 percent of the year, overcapacity in Maine compared to LFA 34 is 4.5 times.\(^8\) Even a much lower overcapacity estimate would indicate that effort reduction measures currently under consideration by NMFS (i.e. an endline and possible trap reduction of up to 50 percent) would likely benefit the fishery.

Next, we calculated landings per trap in Maine compared to LFA 34 [Table 2]. Total landings indicate a fisher’s revenue (when multiplied by ex-vessel price), and does not account for cost. In contrast, landings per trap is a stronger proxy for profit than total landings because it partially accounts for costs by standardizing to effort. Bait and fuel are frequently the most significant input costs to harvest lobster, and are closely related to the number of traps used (i.e. each trap is baited, and fishers likely travel farther and use more fuel to haul more traps). To calculate landings per trap, we divided total annual landings by the number of traps from Table 1.

<table>
<thead>
<tr>
<th>Landings per trap in Maine versus Lobster Fishing Area 34</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maine landings per trap (lbs)</td>
</tr>
<tr>
<td>2016</td>
</tr>
<tr>
<td>2017</td>
</tr>
</tbody>
</table>

Table 2: Landings per trap in Maine compared to Lobster Fishing Area (LFA) 34 in 2016 and 2017 (LFA 34’s 2015/2016 and 2016/2017 fishing seasons, respectively). LFA 34 fishers harvested about 3.7 times as much lobster per trap as Maine fishers. Maine landings data from National Marine Fisheries Service Annual Commercial Landings Statistics and number of traps from Maine Department of Marine Resources Historical Maine Lobster Landings. LFA 34 landings, number of licenses, trap limits, and season days from Fisheries and Oceans Canada March 2019 update to the Integrated Fisheries Management Plan for LFAs 27-38.

In 2016 and 2017, LFA 34 fishers brought in about 3.7 times as much lobster per trap than Maine fishers (3.8 times in 2016 and 3.6 times in 2017). This calculation of landings per trap does not take season days into account. Again, if latent effort in Maine is approximately 20 percent of the

\(^7\) LFA 34 license holders are issued a yearly set of trap tags which matches the trap limit, they do not select a number of trap tags to purchase each year (Fisheries and Oceans Canada March 2019 update to the Integrated Fisheries Management Plan for LFAs 27-38).

\(^8\) 7.5 x .80 x .75 = 4.5 times overcapacity in Maine compared to Lobster Fishing Area 34
number of trap tags sold, LFA 34 landings per trap are still three times higher than in Maine, assuming all LFA 34 fishers use the full trap limit.

LFA 34 did not achieve high landings in recent years by increasing effort; the number of lobster licenses and trap limit has remained consistent over time [Figure 14] (Myers et al. 2007; DFO 2011; DFO Atlantic Region Licenses). Therefore, landings per trap (a proxy for profit) in LFA 34 mirrored growth in total landings [Figure 15]. In contrast, the number of traps in Maine increased for much of the last three decades [Figure 14] (Maine DMR 2019), likely indicating comparably higher costs and lower profits during a similar period of landings growth [Figure 15]. We compared the number of lobster traps in Nova Scotia Maritimes and Maine from 1990 to 2017 to illustrate this concept. Here we switch to Nova Scotia Maritimes because a more consistent time series of the number of licenses is available (DFO Atlantic Region Licenses). LFA 34 is the most significant contributor to total Nova Scotia Maritimes landings. The number of traps in Nova Scotia Maritimes was calculated by multiplying the annual number of licenses by the proportion of licenses per LFA, category, and LFA restrictions from the most recent Integrated Fisheries Management Plan from 2011 (DFO 2011).

**Figure 14:** Estimated number of lobster traps in Maine versus Nova Scotia (NS) Maritimes from 1990 to 2017. Maine number of traps showed uneven growth until reaching a peak of 3.283 million traps in 2006 and has since tapered off slightly, while NS Maritimes number of traps has remained relatively consistent at approximately 900,000 traps. Data from Maine Department of Marine Resources Historical Maine Lobster Landings, DFO Integrated Fisheries Management Plan for LFAs 27-38 (2011), and DFO Atlantic Region Licenses.
Landings per trap is especially relevant as per trap harvesting costs, especially bait, are expected to rise in the near future. For example, from 2018 to 2019 the U.S. Atlantic herring quota was cut by 80 percent and is expected to remain low in coming years (NMFS 2019c). Because herring has been the most important American lobster bait, the reduced quota could cause bait shortages and higher prices in the near-term, increasing per trap lobster harvesting costs (though other bait alternatives may mitigate higher costs) (NMFS 2019c).

3B. Maine landings and number of traps over time

Maine is the largest contributor to the American lobster fishery, with fishers in the state bringing in 83.3 percent of total U.S. catch in 2016 (NMFS Annual Commercial Landings Statistics). The Maine Department of Marine Resources maintains a database of historical Maine lobster landings that details the number of traps in the fishery (Maine DMR 2019). The number of traps used by Maine lobster fishers grew through the late 1980s and 90s to reach a high in 2006 of 3.283 million traps, and has since tapered off [Figure 16]. Landings have shown strong growth throughout, driving the overall growth in the U.S. lobster fishery despite the collapse of the southern New England stock since the late 1990s [Figure 16] (ASMFC 2015).

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Figure 15: Maine and Nova Scotia (NS) Maritimes lobster landings and landings per trap from 1990 to 2017. While NS Maritimes landings per trap mirrored landings growth, Maine landings per trap remained relatively stagnant for the majority of this period. Data from DFO Seafisheries Landings, DFO Atlantic Region Licences, DFO Integrated Fisheries Management Plan for LFAs 27-38 (2011), NMFS Annual Commercial Landings Statistics, and Maine Department of Marine Resources Historical Maine Lobster Landings.

From 1981 to 1995, DMR calculated the number of traps used by estimating the number of active boats and mean traps per harvester. From 1996 to 2016 the number of traps was taken from the number of trap tags sold.
Figure 16: Maine lobster landings per trap, number of traps (an upper bound indicated by the number of trap tags sold), and total landings weight from 1986 to 2017. Landings per trap were relatively stagnant except from 2007 to 2013, when landings per trap increased substantially year on year, correlating with a decrease in the number of traps and faster rate of growth in total landings. Data from National Marine Fisheries Service Annual Commercial Landings and Maine Department of Marine Resources Historical Maine Lobster Landings.

Although many factors impact landings, historically a reduction in number of traps has not been connected to reduced landings in Maine. Landings per trap have been relatively stagnant in Maine for most of the last three decades, except for a period from 2007 to 2013 when landings per trap grew rapidly year on year. During this period, landings per trap grew 124 percent from 19.6lbs to 43.8lbs. This growth in landings per trap correlates with a 10.5 percent decrease in number of traps and a doubling in landings (100.2 percent increase). As discussed above (section 3A), landings per trap is a better proxy for fishing profit than landings alone. The rate of growth of total landings weight was also faster after trap numbers began to fall: from 2007 to 2016 Maine landings grew by 207 percent, whereas from 1997 to 2006 landings grew by 160 percent, and landings grew by 183 percent in the decade prior. Such a correlation between reduced effort and increased landings is characteristic of an overexploited fishery.

3C. Massachusetts landings before and after implementation of the Massachusetts Restricted Area trap/pot seasonal closure

In 2015, NMFS expanded trap/pot seasonal closures in the Massachusetts Restricted Area and the Great South Channel to protect significant aggregations of North Atlantic right whales known to feed in these areas each year [Figure 17] (NMFS 2014b). The Massachusetts Restricted Area is closed to trap/pot fishing from February 1st to April 30th and the Great South Channel is closed to trap/pot fishing from April 1st to June 30th (NMFS 2014b). In 2017, 2018, and 2019, the Massachusetts Division of Marine Fisheries extended the closure in Cape Cod Bay by up to 14 days due to the continued presence of endangered right whales (Massachusetts DMF 2017; 2018; 2019). We focus on the Massachusetts Restricted Area closure in this study because it fully covers multiple Statistical Reporting Areas, making it more feasible to discern the change
in landings since the closure was implemented, and because the Massachusetts Restricted Area contributes a greater portion of total statewide landings.

These Massachusetts Restricted Area closure primarily impacts Massachusetts-based fishers, especially those fishing Massachusetts’ south shore, Cape Cod Bay, and the outer Cape, though the exact number of fishers affected is unclear. In an amendment to the final rule establishing the trap/pot fishery closure published in 2014, NMFS estimated that “slightly more than” 125 fishers would be affected by the Massachusetts Restricted Area closure (NMFS 2014b). The Massachusetts Division of Marine Fisheries (DMF) has identified 172 individuals who previously fished in Statistical Reporting Areas that fall within the Massachusetts Restricted Area during February, March, and April who can no longer do so (Massachusetts DMF unpublished data). Representatives of the fishing industry have recently estimated that 250 fishers are affected (Casoni 2018). In 2017, there were 1,018 commercial lobster permits licensed in Massachusetts, of which approximately 780 are actively fished (Massachusetts DMF unpublished data). Therefore, according to these estimates the Massachusetts Restricted Area closure affects between 16 and 32 percent of Massachusetts’ active lobster fishers.

Since the seasonal closures last at least three months, fishers who are impacted often publicly state that they lose at least one quarter of their income each year due to the closures (Abel 2019a; Abel 2019b). Some fishers claim that the three-month closure effectively becomes five months, causing them to lose closer to 40 percent of their annual income because it takes about one month to remove their traps before the February 1st start date and another month to replace them once the fishery reopens (Abel 2019a; Abel 2019b; Casoni 2019). However, in the three years
for which Vessel Trip Report data are available since the closure was implemented (2015, 2016, and 2017), lobster landings in the Statistical Reporting Areas (SRAs) covered by the closures have continued to grow to record highs [Figure 18] (Massachusetts DMF unpublished data). Vessel Trip Reports are collected for all commercial vessels fishing in Massachusetts waters (ASMFC 2018a).

Figure 18: Annual lobster landings weight, in millions of pounds, for Massachusetts Statistical Reporting Areas (SRAs) 5, 6, 7, 8, and 9 from 1990 to 2017. Vertical line indicates the start of the Massachusetts Restricted Area Trap/Pot Closure in 2015. The Massachusetts Restricted Area Trap/Pot Closure includes all of SRAs 6, 7, 8, and 9, as well as most of SRA 5 and small portions of SRAs 18 and 19. Data from the Massachusetts Division of Marine Fisheries (unpublished).

The growth in landings in the Massachusetts Restricted Area is consistent with statewide trends: Massachusetts state landings value reached record highs for all three years for which data are available since the closure was implemented (2015, 2016, and 2017) [Figure 19] (NMFS Annual Commercial Landings Statistics). Massachusetts’ landings weight also reached an all-time high in 2016, and 2015 and 2017 were the fifth and third highest years on record, respectively [Figure 19] (NMFS Annual Commercial Landings Statistics).
Figure 19: Massachusetts state landings by weight and value from 1986 to 2017. The Massachusetts Restricted Area and Great South Channel seasonal trap/pot closures took effect in 2015. Data from National Marine Fisheries Service Annual Commercial Landings Statistics.

Standardizing landings weight to 1990 in the primary SRAs covered by the Massachusetts Restricted Area and the rest of Massachusetts shows that commercial lobster fishers in SRAs 5 to 9 have experienced stronger growth than those in the rest of the state since the closure was implemented. Landings growth in SRAs 5 to 9 continued consistently since the seasonal closure was implemented on February 1st, 2015, but was inconsistent elsewhere [Figure 20]. Notably, landings weight in SRAs 5 to 9 did not drop from 2016 to 2017, in contrast to the rest of Massachusetts and most of the Northeast U.S. When compared to neighboring areas (SRAs 1 to 4 to the north of the Massachusetts Restricted Area and SRAs 10 to 14 to the south), the SRAs covered by the closure have also shown stronger relative growth [Figure 21].
Figure 20: American lobster commercial landings weight standardized to 1990 landings in the primary Statistical Reporting Areas (SRAs) covered by the Massachusetts Restricted Area closure and the rest of the state of Massachusetts. The Massachusetts Restricted Area seasonal trap/pot fishery closure took place on February 1st, 2015. Data from Massachusetts Division of Marine Fisheries (unpublished) and National Marine Fisheries Service Annual Commercial Landings Statistics.

Figure 21: Lobster landings weight in the Statistical Reporting Areas (SRAs) covered by the Massachusetts Restricted Area (5-9) and to the north (1-4) and south (10-14) from 1990 to 2017. Relative growth in landings in SRAs 5 to 9 was stronger than in neighboring areas since the closure was implemented. Vertical line indicates the start of the three-month closure in 2015. Data from Massachusetts Division of Marine Fisheries (unpublished).
Lobster is not harvested evenly throughout the year, but rather landings are typically low in February, March, and April. This was a significant part of the rationale for amending the Massachusetts Restricted Area closure start date from January 1\textsuperscript{st} to February 1\textsuperscript{st}, which NMFS did before the closure was enacted in 2015 (NMFS 2014b). Although landings during the closure period have historically been very low across the state, low weight is in part compensated for by higher price per pound [Figure 22] (Atlantic Coastal Cooperative Statistics Program). Fishers who previously may have harvested during the closure months could have experienced a negative economic impact even if they were able to harvest more weight later on, since they would be selling it for a lower price.

![Massachusetts monthly lobster landings weight and ex-vessel price](image)

**Figure 22:** Massachusetts monthly lobster landings weight and ex-vessel price per pound, January 2007 to December 2018. Price is nominal and not adjusted for inflation. Data from Atlantic Coastal Cooperative Statistics Program.

However, average lobster landings from February, March, and April in SRAs 5 to 9 changed by only 19,450 pounds from the four-year period immediately before the Massachusetts Restricted Area closure was implemented (2011 to 2014) to the four-year period immediately after (2015 to 2018) (Massachusetts DMF unpublished data). When monthly landings weight is multiplied by the average price per pound in Massachusetts for each month, we find that this 19,450 pound difference is equivalent to a change in revenue of about $94,000 for all of SRAs 5 to 9 (Massachusetts DMF unpublished data) [Figure 23]. Since the closure was implemented, SRAs 5 to 9 have landed an average of 4.16 million pounds of lobster worth about $19.41 million annually\textsuperscript{10} (Massachusetts DMF unpublished data; NMFS Annual Commercial Landings Statistics). The change in landings during the closure months is therefore worth only about 0.5 percent of annual landings from these areas. On the other hand, annual landings from SRAs 5 to 9 have gone up about 587,800 pounds since the closure was implemented (Massachusetts DMF unpublished data), an overall increase approximately 30 times greater than the amount lost

\textsuperscript{10} This value was calculated by multiplying the average annual portion of statewide landings from SRAs 5 to 9 (0.2396) by the average landings value for the state of Massachusetts ($80,991,600) from 2015 to 2017.
during the closure months. Overall, the loss in landings during the high-price closure period has therefore been more than compensated for by growth in total landings.

![Graph showing lobster landings value from Massachusetts Statistical Reporting Areas 5 to 9 in February, March, and April from 2005 to 2018.](image-url)

**Figure 23:** Lobster landings value in February, March, and April from Massachusetts Statistical Reporting Areas 5 to 9, 2005 to 2018. Landings value from these areas dropped approximately $94,000 from the period immediately before to the period immediately after the closure was implemented. Vertical line indicates the start of the Massachusetts Restricted Area trap/pot closure in 2015. Landings value calculated by multiplying landings weight for each area by average price for Massachusetts for that month and year. Value is nominal and not adjusted for inflation. Data from Massachusetts Division of Marine Fisheries (unpublished).

It is important to note that landings by SRA and by state mask individual differences among fishers, some of whom may have lost income due to the closures. This analysis also does not address potential changes in the portions of SRAs 18 and 19 that are covered by the Massachusetts Restricted Area, since finer scale data would be needed to separate landings from the closure portions and the rest of those areas. Additionally, changing local oceanographic conditions affect how much lobster biomass is available to harvest (Goode et al. 2019, Oppenheim et al. 2019), making it difficult to isolate the impact of the closures. However, the available evidence does not demonstrate that the Massachusetts Restricted Area closure has had an overall negative economic impact. Instead, landings have reached record highs, and landings from the primary SRAs covered by the Massachusetts Restricted Area showed stronger and more consistent growth than from the rest of the state. The closure may allow for a buildup in lobster biomass that is brought in later in the season, as can occur with effort reduction (Myers et al. 2007). Lobsters that otherwise would have been caught during the closure period increase in size (leading to higher landings weight if they are caught later on) and contribute to the reproductive cycle to grow the total stock.

Massachusetts’ recent experience with the Massachusetts Restricted Area trap/pot closure suggests that seasonal closures will not necessarily cause landings to drop. The reduction in effort that occurred with the closure did not correlate with a drop in landings. In contrast, landings have continued to rise since the closure was implemented.
4. Discussion

Available evidence does not show that landings in the U.S. lobster fishery will necessarily fall with effort reduction. In contrast, in both Maine and Massachusetts an actual or presumed drop in effort has correlated with record high landings, and the significant overcapacity in the Maine fishery compared to Lobster Fishing Area 34 suggests that effort could be substantially reduced and allow fishers to harvest the same landings with lower costs. Therefore, a negative economic impact should not be presumed with right whale bycatch mitigation measures that include or could cause a reduction in fishing effort; the economic impact of effort reduction could in fact be positive.

Although many factors influence total landings, the potential capacity to harvest the same landings with approximately 7.5 times less effort and the correlation between reduced effort and higher landings in the U.S. lobster fishery is typical of an overexploited resource (Worm et al. 2009). It is also in line with international fishing trends: effective catch per unit effort—a standard measure of fishing efficiency calibrated to technological advancement—has decreased by approximately 80 percent in North America from 1950 to 2015, as fishing exploitation has expanded faster than fish stocks can support (Rousseau et al. 2019). Precaution regarding overexploitation is especially important as multiple indicators show that the Gulf of Maine American lobster stock is unlikely to sustain current high abundance levels in the near future (ASMFC 2015; Oppenheim et al. 2019) and as the Gulf of Maine continues to warm at a rapid rate (Pershing et al. 2015; Record et al. 2019).

For the U.S. American lobster fishery to continue to be successful for generations, it is in the best interest of fishers to scale back effort in advance of an ecological or economic crisis (Steneck et al. 2011). As available evidence indicates that the U.S. lobster fishery is currently operating with significant overcapacity, doing so may also support higher profits in the near-term. If fishing effort is scaled back in a manner that reduces the number and strength of vertical endlines, it will simultaneously serve to reduce entanglement risk for North Atlantic right whales. This study provides particular support for a trap reduction implemented in concert with a set minimum number of traps per trawl or an endline cap, as well as seasonal closures. Additional closures in areas of high right whale aggregation could provide significant conservation benefit and may not have a net negative economic impact if overall landings gains exceed losses during the closure period. Other right whale protection measures that may indirectly lead to a reduction in effort, such as ropeless fishing, could also serve to reduce overexploitation in the lobster fishery. Implementing ropeless fishing together with a trap reduction could strengthen this benefit while reducing the upfront cost of technological transition.

After decades of insufficient protections, the U.S. American lobster fishery is facing potentially significant new regulations to protect North Atlantic right whales from entanglement. However, a negative economic impact should not be presumed with such measures; right whale bycatch mitigation measures that include or could cause a reduction in lobster fishing effort may support higher profits and the long-term sustainability of the fishery.
Acknowledgments

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When it comes to saving the planet, one whale is worth thousands of trees. Scientific research now indicates more clearly than ever that our carbon footprint—the release of carbon dioxide (CO₂) into the atmosphere, where it contributes to global warming through the so-called greenhouse effect—now threatens our ecosystems and our way of life. But efforts to mitigate climate change face two significant challenges. The first is to find effective ways to reduce the amount of CO₂ in the atmosphere or its impact on average global temperature. The second is to raise sufficient funds to put these technologies into practice.

Many proposed solutions to global warming, such as capturing carbon directly from the air and burying it deep in the earth, are complex, untested, and expensive. What if there were a low-tech solution to this problem that not only was effective and economical, but also had a successful funding model?

An example of such an opportunity comes from a surprisingly simple and essentially “no-tech” strategy to capture more carbon from the atmosphere: increase global whale populations. Marine biologists have recently discovered that whales—especially the great whales—play a significant role in capturing carbon from the atmosphere (Roman and others 2014). And international organizations have implemented programs such as Reducing Emissions from Degradation and Deforestation
(REDD) that fund the preservation of carbon-capturing ecosystems.

Adapting these initiatives to support international efforts to restore whale populations could lead to a breakthrough in the fight against climate change. The carbon capture potential of whales is truly startling. Whales accumulate carbon in their bodies during their long lives. When they die, they sink to the bottom of the ocean; each great whale sequesters 33 tons of CO₂ on average, taking that carbon out of the atmosphere for centuries. A tree, meanwhile, absorbs only up to 48 pounds of CO₂ a year.

Protecting whales could add significantly to carbon capture because the current population of the largest great whales is only a small fraction of what it once was. Sadly, after decades of industrialized whaling, biologists estimate that overall whale populations are now less than one-fourth what they once were. Some species, like the blue whales, have been reduced to only 3 percent of their previous abundance. Thus, the benefits from whales’ ecosystem services to us and to our survival are much less than they could be. But this is only the beginning of the story.

**The whale pump**

Wherever whales, the largest living things on earth, are found, so are populations of some of the smallest, phytoplankton. Not only do these microscopic creatures contribute at least 50 percent of all oxygen to our atmosphere, they do so by capturing about 37 billion metric tons of CO₂, an estimated 40 percent of all CO₂ produced. To put things in perspective, we calculate that this is equivalent to the amount of CO₂ captured by 1.70 trillion trees—four Amazon forests’ worth—or 70 times the amount absorbed by all the trees in the US Redwood National and State Parks each year. More phytoplankton means more carbon capture.

In recent years, scientists have discovered that whales have a multiplier effect of increasing
phytoplankton production wherever they go. How? It turns out that whales’ waste products contain exactly the substances—notably iron and nitrogen—phytoplankton need to grow. Whales bring minerals up to the ocean surface through their vertical movement, called the “whale pump,” and through their migration across oceans, called the “whale conveyor belt” (see Chart 1). Preliminary modeling and estimates indicate that this fertilizing activity adds significantly to phytoplankton growth in the areas whales frequent.

Despite the fact that nutrients are carried into the ocean through dust storms, river sediments, and upwelling from wind and waves, nitrogen and phosphorus remain scarce and limit the amount of phytoplankton that can bloom in warmer parts of the oceans. In colder regions, such as in the Southern Ocean, the limiting mineral tends to be iron. If more of these missing minerals became available in parts of the ocean where they are scarce, more phytoplankton could grow, potentially absorbing much more carbon than otherwise possible.

**Letting whales live**

This is where the whales come in. If whales were allowed to return to their prewhaling number of 4 to 5 million—from slightly more than 1.3 million today—it could add significantly to the amount of phytoplankton in the oceans and to the carbon they capture each year. At a minimum, even a 1 percent increase in phytoplankton productivity thanks to whale activity would capture hundreds of millions of tons of additional CO₂ a year, equivalent to the sudden appearance of 2 billion mature trees. Imagine the impact over the average lifespan of a whale, more than 60 years.

Despite the drastic reduction in commercial whaling, whales still face significant life-threatening hazards, including ship strikes, entanglement in fishing nets, waterborne plastic waste, and noise pollution. While some species of whales are recovering—slowly—many are not.

Enhancing protection of whales from human-made dangers would deliver benefits to humans, the planet, and of course, the whales themselves. This “earth-tech” approach to carbon sequestration also avoids the risk of unanticipated harm from suggested untested high-tech fixes. Nature has had millions of years to perfect her whale-based carbon sink technology. All we need to do is let the whales live.

Now we turn to the economic side of the solution. Protecting whales has a cost. Mitigating the many threats to whales involves compensating those causing the threats, a group that includes countries, businesses, and individuals. Ensuring that this approach is practical involves determining whales’ monetary value.

**International public good**

Whales produce climate benefits that are dispersed all over the globe. And because people’s benefits from the existence of whales do not diminish the benefits that others receive from them, they are a textbook public good (see Chart 2). This means that whales are affected by the classic “tragedy of the commons” that afflicts public goods: no individual who benefits from them is sufficiently motivated to pay his or her fair share to support them. Just think of the importance of earth’s atmosphere to humans’ survival. Even though all nations acknowledge that everyone has an interest in preserving this common resource for the future, global coordination remains a problem.

To solve this international public goods problem, we must first ask, What is the monetary value of a whale? Proper valuation is warranted if businesses and other stakeholders are to be galvanized to save the whales by showing that the benefits of protecting them far exceed the cost. We estimate the value of an average great whale by determining today’s value of the carbon sequestered by a whale over its lifetime, using scientific estimates of the amount whales contribute to carbon sequestration, the market price of carbon dioxide, and the financial technique of discounting. To this, we also add today’s value of the whale’s other economic contributions, such as fishery enhancement and ecotourism, over its lifetime. Our conservative estimates put the value of the average great whale, based on its various activities, at more than $2 million, and easily over $1 trillion for the current stock of great whales.

But there is still the question of how to reduce the myriad dangers to whales, such as ship strikes and other hazards. Luckily, economists know how these types of problems can be solved. In fact, a potential model for such solutions is the United Nations (UN) REDD program. Recognizing that deforestation accounts for 17 percent of carbon emissions, REDD provides incentives for countries to preserve their forests as a means of keeping CO₂ out of the atmosphere. In a similar way, we can create financial mechanisms to promote the restoration
of the world’s whale populations. Incentives in the form of subsidies or other compensation could help those who incur significant costs as a result of whale protection. For example, shipping companies could be compensated for the cost of altered shipping routes to reduce the risk of collisions.

This solution, however, raises questions that are tricky to answer. To begin with, a financial facility for protecting whales and other natural assets must be set up and funded. Exactly how much should we be willing to spend on protecting the whales? We estimate that, if whales were allowed to return to their prewhaling numbers—capturing 1.7 billion tons of CO$_2$ annually—it would be worth about $13 a person a year to subsidize these whales’ CO$_2$ sequestration efforts. If we agree to pay this cost, how should it be allocated across countries, individuals, and businesses? How much should each individual, company, and country that must bear some of the cost of protecting whales be compensated? And who will oversee the compensation and monitor compliance with the new rules?

International financial institutions, in partnership with other UN and multilateral organizations, are ideally suited to advise, monitor, and coordinate the actions of countries in protecting whales. Whales are commonly found in the waters around low-income and fragile states, countries that may be unable to deal with the needed mitigation measures. Support for these countries could come, for example, from the Global Environment Facility, which typically provides support to such countries to meet international environmental agreements. The IMF is also well placed to help governments integrate the macroeconomic benefit that whales provide in mitigating climate change, as well as the cost of measures to protect the whales, into their macro-fiscal frameworks. The World Bank has the expertise to design and implement specific programs to compensate private sector actors for their efforts to protect whales. Other UN and multilateral organizations can oversee compliance and collect data to measure the progress of these efforts.

**A new mindset**

Coordinating the economics of whale protection must rise to the top of the global community’s climate agenda. Since the role of whales is irreplaceable in mitigating and building resilience to climate change, their survival should be integrated into the objectives of the 190 countries that in 2015 signed the Paris Agreement for combating climate risk.
International institutions and governments, however, must also exert their influence to bring about a new mindset—an approach that recognizes and implements a holistic approach toward human survival, which involves living within the bounds of the natural world. Whales are not a human solution—these great creatures having inherent value of their own and the right to live—but this new mindset recognizes and values their integral place in a sustainable ocean and planet. Healthy whale populations imply healthy marine life including fish, seabirds, and an overall vibrant system that recycles nutrients between oceans and land, improving life in both places. The “earth-tech” strategy of supporting whales’ return to their previous abundance in the oceans would significantly benefit not only life in the oceans, but also life on land, including our own.

With the consequences of climate change here and now, there is no time to lose in identifying and implementing new methods to prevent or reverse harm to the global ecosystem. This is especially true when it comes to improving the protection of whales so that their populations can grow more quickly. Unless new steps are taken, we estimate it would take over 30 years just to double the number of current whales and several generations to return them to their prewhaling numbers. Society and our own survival can’t afford to wait this long. 

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References:
Incremental fishing gear modifications fail to significantly reduce large whale serious injury rates

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Incremental fishing gear modifications fail to significantly reduce large whale serious injury rates

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ABSTRACT: A major and immediate goal of the US Marine Mammal Protection Act is the reduction of marine mammal mortality incidental with commercial fishing operations. Under articles of the Act, the Atlantic Large Whale Take Reduction Plan (ALWTRP) was developed and implemented to reduce entanglement mortality of North Atlantic right whales *Eubalaena glacialis*, Gulf of Maine humpback whales *Megaptera novaeangliae*, and western North Atlantic fin whales *Balaenoptera physalus* by requiring modifications to commercial fishing gear (i.e. pots and sink gillnets). Although they undercount the number of entanglements, counts of detected incidents of entanglements and entanglement-related mortality are the primary index to entanglement mortality. We analyzed the annual counts of large whale entanglements including serious injuries and mortalities attributed to entanglements to evaluate the effectiveness of the ALWTRP from 1999 to 2009. The annual number of mortality events (including serious injuries) related to fishing gear entanglements averaged 2.5 for right whales, 6.5 for humpbacks, 0.6 for fin whales, and 2.4 for minke whales *B. acutorostrata*. Annual entanglement rates increased during the study period, but evidence for increased rates of entanglement-related mortality was equivocal. No significant changes occurred in waiting time (the number of days between entanglement events) in response to any management measures implemented to reduce large whale mortalities between 1998 and 2009, implying that these measures were generally ineffective in abating whale deaths from entanglements in fishing gear.

KEY WORDS: By-catch · Human-caused mortality · Large whales · Efficacy tests

INTRODUCTION

Cetaceans, including large whales, frequently become entangled in commercial fishing gear, and some entanglements result in injuries that may lead to the whale’s death (Moore et al. 2005). In the USA, all entanglements, regardless of their lethality, constitute ‘a take’ or form of harassment that the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA) are intended to restrict. When human-caused mortality exceeds a prescribed threshold value, the MMPA compels the US government, in this case the National Marine Fisheries Service (NMFS; US Department of Commerce), to convene a take reduction team to develop rules to reduce human-caused mortality related to commercial fishing within the exclusive economic zone (EEZ) of the USA. In developing take reduction plans, NMFS convenes meetings of stakeholders, primarily state government representatives, fishing industry participants, conservation advocates, and academic scientists, in an attempt to negotiate practical mitigation measures through consensus agreements. Regulations may target both lethal and non-lethal takes, and it is important that NMFS can demonstrate that a reduction in entanglements results from these rules. The set of rules described in the Atlantic Large Whale Take Reduction Plan (ALWTRP) (National Marine Fisheries Service 2007) attempts to reduce entanglement mortality of North Atlantic right

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Ideally, the best indicator of the biological effectiveness of ALWTRP rules would be to compare measures of the incidence of entanglement or mortality rate due to entanglement both before and after regulations are in place. If we could estimate the cause-specific mortality due to entanglement at different times, we could gauge the effectiveness of regulations and measure the influence of entanglement on demographic patterns. However, the logistics of studying wild cetaceans renders estimates of cause-specific mortality unlikely in the near future. Most whales die far from shore, and few carcasses are discovered for which the cause of mortality can be reasonably assured. Finally, detectability rates may vary significantly among causes of mortality so that observed proportions of detected causes may be unreliable estimates (Williams et al. 2011). This detection issue influences any measure of incidence rates, such that records of entanglement or mortality due to entanglement likely represent a small subset of actual entanglements. Using counts of incidents to judge effectiveness requires an assumption that the fraction of detected entanglements is not greatly influenced by the rate of occurrence and has a constant expectation throughout the time series being examined. Because unbiased estimates of annual numbers of entanglements, mortality due to entanglement, or even population sizes are not available, the basic data of raw counts of detected entanglements and deaths are the only direct measure of fisheries interactions with large whales.

We evaluated the ALWTRP’s (National Marine Fisheries Service 2007) effectiveness in meeting the stated management goals directed at stocks of several baleen whales that spend significant time in US waters off the northeastern US coast. These rules attempt to reduce entanglement mortality of North Atlantic right whales, Gulf of Maine humpback whales, and western North Atlantic fin whales by regulating both commercial pot and sink gillnet fisheries. We note that with the exception of right whales, we are referencing stocks which are subpopulations recognized in US regulations as spending significant time in US waters. We were particularly interested in entanglement data prior to the enactment of a relatively contentious regulation referred to as the ‘ground line rule’, which requires fishers to use sinking lines in their gear configurations (National Marine Fisheries Service 2008). We believed that if the ALWTRP rules were effective, there would be a reduction in entanglement-related deaths and concomitantly in the detection of such deaths for these whale stocks, as well as for the Canadian east coast minke whale (*Balaenoptera acutorostrata*) stock, which is common in the same US waters. Specifically, we examined entanglement event data to determine the basic character of the event time series from 1999 through 2009. We also used simulation to examine the power of these methods, including an assessment of the influence of population change on the discovery of decreased incidence rates.

**METHODS**

Large whale entanglements were detected opportunistically by a wide range of observers, including biologists, commercial fishermen, commercial whale watchers, recreational boaters, and others. They were reported to the NMFS primarily through the Atlantic Large Whale Disentanglement Network and formal marine mammal stranding networks along the east coast of the USA and Canada. Those reports were evaluated by the Northeast Fisheries Science Center as part of a federal process to quantify serious injuries and mortalities (e.g. Henry et al. 2011). Here, those data were used to examine temporal patterns in reported entanglements of right, humpback, fin, and minke whales from 1 January 1999 through 31 December 2009. We removed all entanglements with strong evidence that they occurred outside the US EEZ (first seen entangled east of Halifax, Nova Scotia, or entangled in Canadian gear) and those entangled in gear from fisheries not regulated by the ALWTRP (principally fish weirs). We evaluated 2 data sets: all entanglements, and the subset of entanglements judged to result in mortality or serious injury. Hereafter, the term mortality will refer to any known dead animals or those judged to have received serious injuries caused by fishery interactions that, according to NMFS guidelines, would likely result in death.

We examined these data in 2 different forms: the annual counts and the waiting times between detected events. Counts per unit time and waiting times are 2 measures associated with the same process, and either type of data may be used to evaluate rates of events through time. Annual counts of entanglement and mortality events for each species should resemble a Poisson process, each with its own
inherent rate, and can be summarized with generalized linear models for Poisson data. Waiting times, which we defined as the numbers of days elapsed between the discovery dates of 2 subsequent events, are a continuous analog to the count data and may offer advantages when analyzing relatively rare events. In particular, they have a cumulative distribution along a time axis that may inform our examinations. Based on a simulation experiment, Pace (2011) concluded that waiting times were more sensitive than counts per unit time for detecting modest changes (e.g. 50% reduction) when annual detections averaged fewer than 10. Because rates of entanglement detections are low, we focused our analysis on waiting times.

**Statistical analysis**

We conducted pair-wise comparisons of annual rates of entanglements between stocks, and calculated generalized linear models of annual counts and 'waiting times' to judge competing hypotheses about changes in entanglement rates through time. For each of the 4 stocks, we first examined the waiting time data relative to fits of models of exponential waiting times assuming a constant mean annual rate of entanglement. We estimated the mean exponential waiting time over the entire period and plotted the empirical cumulative distribution against a theoretical one with the estimated mean as its sole parameter. Second, we examined pair-wise plots of counts of entanglements between stocks to look for common patterns and evaluated Poisson regressions for pairs that appeared correlated. We combined all event data in the same model allowing 'species' as a possible predictor, and we fit a series of generalized linear models (McCullagh & Nelder 1989) to counts and their associated waiting times between events. Competing models were, in ascending order of complexity with regard to time:

1. a single constant rate (null model);
2. species-specific intercepts and a constant rate through time;
3. species-specific intercepts plus 2 different rates representing the time frames of the initial ALWTRP and the subsequent expanded gear modifications beginning in 2002 (a breakdown of regulation changes over time appears in the supplemental material in van der Hoop et al. 2013);
4. species-specific intercepts and a linearly (in the link) changing rate through time;
5. species-specific intercepts plus a quadratic model of continuous time to accommodate possible multiple reductions in entanglements or entanglement-related mortalities over time;
6. species-specific intercepts plus variable rates among years (i.e. 11 rates, 1 per year 1999–2009); and
7. species-specific rates (i.e. species by continuous time interaction).

To count data, we fit analogous logistic regression models to examine evidence for changes in the proportions of mortalities observed per detected entanglement. All models were developed using the generalized linear model (‘glm’) procedure in R (ver. 2.14) (R Development Core Team 2011). Model comparisons were based on corrected Akaike’s information criterion (AICc) and associated weight of evidence calculations for likelihood models (Anderson 2008). When there was no clear best model, we used model-averaged predictions calculated using the R package ‘AICcmodavg’ (ver. 1.24) to summarize relationships.

Evaluations of similar data suggested that a relatively powerful approach for detecting changes may be to develop regressions of event times against order of occurrence (cumulative waiting time for an event versus its occurrence), and to compare models with and without change points (Pace 2011). The approach is attractive in that one can visualize and test for divergence (change point) occurring when a specific conservation measure is enacted or becomes effective. However, arranging the data thusly likely imputes an auto-correlated error structure which bears consideration, and because the predictor is now order of occurrence, the method is most suitable for one species at a time or pooled events. The ALWTRP rules have been amended in ways that presumably would have increased protection to whales during the study period, so we fit generalized least squares models (Pinheiro & Bates 2000) to event times allowing for auto-correlated errors to examine the evidence for a change in the rate of entanglement and entanglement mortality detections in the period 1999 to 2009. Specifically, competing models were (Fig. 1):

8. a single slope (a constant rate, not shown in Fig. 1);
9. a fixed change point having 2 slopes coinciding with initial ALWTRP and expanded gear modifications in 2002;
10. a fixed change point having 2 slopes on either side of the implementation date for another set of expanded gear modifications (starting with an entanglement prior to 5 October 2008); and
11. a linear model with a quadratic term to test for curvilinear change over the study period.
To examine whether population growth might act to obscure substantial conservation benefits, we replicated the above experimental conditions assuming annual 2% growth (Fig. 1). We used the 'gls' procedure in R for calculations. Model comparisons were based on AICc and associated weight of evidence calculations for likelihood models (Anderson 2008).

**Simulation experiments**

We were interested in the general sensitivity of the above analyses to these kinds of moderately low observed rates of occurrence over similar short time frames. So, in addition to evaluating the available records of detected entanglements and the subset leading to mortalities, we examined the potential to detect a change in rates of events using a set of simulation trials. Specifically, we simulated sets (1000 each) of randomly generated exponential waiting times that could occur over an 11 yr period if the rates of occurrence of events were generated under the following set of experimental conditions:

1. Base rates of 3, 5, 10, or 15 events per year; and
2. Changes to the base rate (effects) within a time series diminished at 8 or 10% per year, or alternatively, after the first event occurring in Year 5, base rates would decrease by 0, 33, or 50%

This yielded 20 experimental settings with known mean rates of event occurrence (see Table 1). For each simulated data set, we fit the following models using either a glm or generalized least squares (gls):

1. Constant count of events each year (Poisson, glm)
2. Two mean rates, one for Years 1–5 and the other for Years 6–11 (Poisson, glm)
3. Graduated rate change (Poisson, glm)
4. Constant waiting times across years (Gamma, glm)
5. Different mean waiting times for Years 1–5 and Years 6–11 (Gamma, glm)
6. Gradually changing mean waiting time over the study period (Gamma, glm)
(7) Event time series with a constant slope (gls, auto-correlated errors)

(8) Segmented regression allowing the slope of the event time series to change at the start of Year 6 (gls, auto-correlated errors)

(9) Linear regression including a quadratic term to allow for continuous change over the event time series (gls, auto-correlated errors).

For each trial, we used deviance tests to make the following model comparisons: 2 vs. 1, 3 vs. 1, 5 vs. 4, 6 vs. 4, 8 vs. 7, and 9 vs. 7. The percent rejections (alpha = 0.05) were taken as Type I errors under no change, or as measure of power to detect a true change for the 20 combinations of 4 base levels and 5 effects.

RESULTS

Whale events evaluated by the Northeast Fisheries Science Center for the 11 yr period prior to enactment of the ground-line rule (1999−2009) included 167, 59, 62, and 22 records of entanglements of humpback, right, minke, and fin whales, respectively, of which 72, 28, 26, and 7 were classified as serious injuries or mortalities. Comparisons of counts of entanglements and mortalities between species showed little agreement, except that annual right whale entanglements were correlated with those of humpback whales (Poisson regression with log link: slope = 0.082 ± 0.30 SE [Pr > |Z| = 0.0058] probability of a greater absolute Z-statistic). Empirical distributions of species-specific waiting times had the same general appearance of exponential random variables generated by theoretical distributions derived using the calculated means as the theoretical mean. Close inspection of these comparisons gave the impression of a slight lack-of-fit due to excessive clustering of shorter waiting times (Fig. 2), but there was no substantive statistical evidence that single species models of waiting times were different from a constant Poisson process through time.

Generalized linear models provided substantial evidence that counts of entanglements and mortalities due to entanglement and their associated waiting times were not consistent during the study period (Table 1). Substantial differences in base rates were exhibited among species, with humpback entanglements and mortalities reported more than twice as frequently as those of right and minke whales, which were much more common than those of fin whales. Annual counts of detected entanglements increased, and waiting times slightly decreased during the study period (Fig. 3A,B), but results from entanglement-related mortalities were less clear. Counts of detected mortalities were relatively constant, with a small increase occurring after 2002, whereas model-averaged predictions of waiting times between mortalities slightly increased (Fig. 3C,D). Our logistic model provided

Table 1. Results of generalized linear models of waiting times between entanglements or mortalities due to entanglement for 4 species of baleen whales (*Balaenoptera acutorostrata*, *B. physalus*, *Eubalaena glacialis*, *Megaptera novaeangliae*) in the Atlantic exclusive economic zone (EEZ) from 1999 to 2009. K: no. of parameters in the model; AICc: corrected Akaike’s information criterion

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evidence for a declining trend in the probability that a detected entanglement would be classified as a mortality or serious injury, and that the species being monitored had little influence on proportions (Table 2, Fig. 4). In the case of minke whale mortalities due to entanglement, a model that predicted decreased death rates per detected entanglement over time (quadratic fit; Table 3) had about twice the supporting evidence than the model fitting only a constant rate.

Our tests of the cumulative waiting times for entanglements and their related mortalities varied somewhat among species (Fig. 5). In general, there was modest to little evidence to support deviation in either the entanglement rate or the lethal entanglement rate from a constant rate during the study.
period because there was no clear winner among competing models (AICc difference of >8; Tables 3 & 4). In nearly all instances of evidence supporting change elements, the estimated parameters led to models predicting that events were more frequent toward the end of the study period. Increasing event rates through time was most evident for humpback and fin whale entanglements, for which there was no evidence to support a constant event rate.

Not surprisingly, results from our simulation experiments showed the marked influence that sample size (number of events tallied) and effect sizes (overall reductions in event rates) have on the chances of detecting a true change in event rates (Fig. 6). A 20% reduction in entanglement rate had little chance of being detected in the simulations even when the base rate was 15 entanglements per year. More substantial effect sizes stood a fair chance of being detected when initial rates were 10 or more per year, and models of waiting times (glm, gamma with inverse link) were slightly more powerful at detecting true change than those relying on count data. Models of event times were substantially more powerful than those for counts or waiting times but, surprisingly, the Type I error rates for this approach were also substantially higher (~40%) than normally accepted in the classical statistical paradigm. Including 2% annual population growth with a concomi-

Fig. 3. Annual values plotted against resulting generalized linear model fits to (A) counts of entanglements, (B) waiting times between entanglements, (C) counts of mortalities due to entanglement, and (D) waiting times between detected entanglement mortalities for (A,B) 4 species and (C,D) 3 species of large whales (Balaenoptera acutorostrata, B. physalus, Eubalaena glacialis, Megaptera novaeangliae) in the Atlantic US exclusive economic zone (EEZ) from 1999 to 2009. AICc: corrected Akaike’s information criterion

Table 2. Results of logistic regression models of probability that a detected entanglement was a mortality or serious injury for 4 species of baleen whales (Balaenoptera acutorostrata, B. physalus, Eubalaena glacialis, Megaptera novaeangliae) in the Atlantic EEZ from 1999 to 2009. See Table 1 for abbreviations.
DISCUSSION

The data available for measuring fisheries interactions with large whales, as with many situations in conservation biology, are often too sparse to support strong conclusions about the efficacy of attempts to mitigate those interactions. As our simulations showed, rates of detected entanglement-related mortality must be reduced substantially (on the order of 50% or more) to have much of a guarantee of a change over short time frames (10 yr) being detected. A solution to this dilemma may exist if multiple rare events can be linked in a common analysis or concomitant predictors can be incorporated (Dixon et al. 2005). Analyzing a similar time series of events, Pace (2011) recognized that sums of Poisson processes remain Poisson, and thus he pooled detected ship strikes of large whales to achieve greater power in his evaluations. In our analysis of the efficacy of rules to mitigate fisheries interactions with large whales, we used the idea that modifications to gear may affect interaction rates with multiple species, and combined 4 species into a common set of analyses to increase the power of our analyses.

Through our examination of detection times of entanglements and entanglement-related deaths, we found no evidence to suggest that the frequency of entanglements or entanglement-related mortality substantially abated during 1999–2009. The lack of evidence to support declining frequencies of entanglement or serious injury due to entanglement remains disappointing, given that considerable time and expense have
been spent involving stakeholders in a process to develop measures (gear modifications) specifically designed to mitigate such interactions. Most of the evidence from evaluating the event data suggests that events became more frequent through the study period. Our results indicate a clear need for different or additional mitigation measures.

At least 2 indirect lines of evidence support our conclusion that mitigation measures deployed during our study period were insufficient to reduce large whale and fisheries interactions to acceptable levels. Robbins (2011, 2012) analyzed entanglement rates of humpback whales in the Gulf of Maine and concluded that new entanglements were either constant or increasing during a time frame largely overlapping ours. Similarly, Knowlton et al. (2012) evaluated rates of entanglement scar acquisition by North Atlantic right whales and estimated a nearly constant rate of new scarring from 1999 to 2006. Knowlton et al. (2012) also detected an increase in the rate of right whales carrying gear and an increase in the number of whales that they determined as seriously injured. (Their definition varies somewhat from NMFS definition.) More directly, van der Hoop et al. (2013) evaluated stranding records and found significant increases in entanglement and vessel strike mortality probabilities for large whales from 1990 through 2009. In addition, they found no significant change in the local intensity of mortalities before and after 2003, which implies that much of the detected increase in our first model was due to increased lethal fisheries interactions.

It is possible that entanglements and related mortalities declined during the period but that the detectability of events increased, or growing whale populations produced increased numbers of events despite a declining prevalence. Based on studies of acquisition rates of non-lethal entanglement scars on humpback whales, only a small fraction of entanglements are detected (Robbins 2011). Thus, variable detection rates could significantly alter waiting times inherent in our records. However, we are aware of no evidence to suggest that detectability of events has

<table>
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<th>K</th>
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<th>ΔAICc</th>
<th>AICc weight</th>
<th>Cumulative weight</th>
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Table 3. Model comparisons of generalized least squares fits (auto-correlated error structure) to detected mortalities and serious injuries from gear entanglement predicted by competing models on their order of occurrence, for *Megaptera novaeangliae*, *Eubalaena glacialis*, and *Balaenoptera acutorostrata*. See Table 1 for abbreviations.

<table>
<thead>
<tr>
<th>Model</th>
<th>K</th>
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Table 4. Model comparisons of generalized least squares (auto-correlated error structure) fits to entanglement detections predicted by competing models on their order of occurrence, for *Megaptera novaeangliae*, *Eubalaena glacialis*, *Balaenoptera acutorostrata*, and *B. physalus*. See Table 1 for abbreviations.
changed. As noted earlier, detections come from a wide range of observers, including biologists, commercial fishermen, commercial whale watchers, recreational boaters, and others. No large changes in large whale research and management occurred during our study, thus there was relatively constant effort exerted in detecting entanglements. Many detections came from naturalists on whale watch boats operating in the Gulf of Maine, a multi-vendor enterprise that has been operating at about the same level for >20 yr. Anecdotally, we note that this haphazard collection process was able to detect a significant mortality event of humpbacks that occurred during 2003 in the Gulf of Maine and not associated with entanglement (Gulland 2006). The entanglement rates of right whales and humpback whales were correlated. This relationship was likely evident because events are frequent enough for both of these 2 species to detect a similarly increasing pattern through time, whereas fin whales showed no correlation with either because the detections are less frequent. Many humpback and right whales frequent the Gulf of Maine during late spring and summer. While not completely overlapping in time and space, they likely show enough co-occurrence with fixed fishing gear, especially pot gear, to show a similar pattern. North Atlantic right whale population growth has been estimated at 2.6% per year (Waring et al. 2011). Although precise population growth rates were not available for Gulf of Maine humpback whales for the period in question (Robbins 2007, Waring et al. 2011), we assumed a 2% per year increase for the purpose of simulation. Based on these simulations, small improvements resulting from gear modifications could be obscured by opposing effects of population growth, but the substantial true decreases hoped for by the ALTWRT and required to meet the mandates of the MMPA would not be masked.

Fig. 6. Results of simulations examining the power of 6 different deviance tests to detect differences from constant event rates \((H_0)\) when rates increase linearly with populations and concomitant event rate growth of 2% (●) and no growth (▲). Plot groupings portray different base event rates modified with 5 different rate-reducing effects (see ‘Methods’ for a description of experimental conditions and specific tests 1–6). Note that a difference in a trial occurs when the appropriate statistical test statistic is rejected at \(\alpha = 0.05\), and rejecting when \(H_0\) is true (no difference exists = Constant) is a Type I error.
NMFS is mandated to reduce human-caused mortality of marine mammals to levels not compromising stock viability. In agreement with other studies, our analysis causes us to strongly reject the notion that significant conservation gains resulted from the first 10 yr of ALWTRT negotiated incremental mitigation measures. The key word here is significant reductions which would not likely be masked by small amounts of population growth or shifts in whale and gear distribution. Further, our findings support decisions by NMFS to impose further conservation measures such as the recently instituted ‘ground line rule’, and to seek other means of reducing whale–gear interactions. However, the lack of progress during the first 10 yr is cause for concern. That the development of measures to reduce large whale entanglements has been incremental may have been predicted, given the lack of fundamental knowledge of how entanglements occur (Johnson et al. 2007) and the economic value of the fisheries responsible for entanglements (Myers et al. 2007). Measured approaches seem warranted when knowledge is lacking and economic costs are potentially high. What seems to have received little weight in the evolution of rules was that, in the early stages, an analysis of right whale demographics concluded that the species, one of the most critically endangered cetaceans in the world, was headed for extinction if human-caused mortality was not reduced (Fujiwara & Caswell 2001). We believed that, to be effective, mitigation measures would produce substantial direct reductions in mortality (biological response). However, we may be experiencing a common problem in conservation: we are attempting to evaluate a process without any explicitly measurable goals or trade-offs (Lonergan 2011). Although the MMPA does provide an explicit goal to reduce takes below a stock’s potential biological removal (PBR) in 6 mo, that goal was not achieved for most large whale stocks found off the northeast USA. PBR is typically exceeded even when using confirmed human-caused mortalities as a measure, which is likely a biased low accounting of takes. Moreover, it has not proven useful to compare observed takes to the PBR threshold as an ‘on-off’ switch approach to evaluating effectiveness of management actions, where observed takes which are below PBR indicate effective actions, and takes which exceed PBR indicate ineffective measures. Observed entanglements and entanglement-related mortalities have frequently exceeded PBR (van der Hoop et al. 2013) for more than a decade for western North Atlantic baleen whales with no apparent catastrophic consequences for these stocks (Waring et al. 2011). Without more sensitive effectiveness measures, the lack of definitive positive results such as ours will be a frequent result of effectiveness evaluations. In this paper, we have produced an evaluation of management action effectiveness despite the meager data available for that evaluation.

Acknowledgements. We are especially grateful to the US and the Canadian Maritime Provinces and Newfoundland stranding and entanglement networks, and the Atlantic Large Whale Disentanglement Network, whose members searched for and examined whales both live and dead. It is a difficult, dirty, and ceaseless job that deserves special recognition. The United States Coast Guard was instrumental in conveying sightings reported by mariners, investigating carcasses at sea, and assisting in disentanglement efforts. We are also grateful to the staff of the Provincetown Center for Coastal Studies (PCCS), New England Aquarium, Whale Center of New England (WCNE), NOAA aerial survey teams, Wildlife Trust, the states of Florida and Georgia, Northeast Fisheries Observer Program, Marine Animal Response Society, New Brunswick Museum, Atlantic Veterinary College, Grand Manan Whale and Seabird Research Station, Whale Release and Stranding, and many others for providing the sightings that have allowed this work to be conducted.

LITERATURE CITED


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Cryptic mortality of North Atlantic right whales

Richard M. Pace III | Rob Williams | Scott D. Kraus
Amy R. Knowlton | Heather M. Pettis

Abstract
Evaluations of the conservation status of the endangered North Atlantic right whale as well as many other wildlife species often rely extensively on counts and cause-of-death determinations of carcasses found accidentally or during dedicated surveys. Even when survey effort dedicated to a population is extensive, many deaths may go unseen. We used an abundance estimation model to derive estimates of cryptic mortality for North Atlantic right whales and found that observed carcasses accounted for only 36% of all estimated death during 1990–2017. We found strong evidence that total mortality varied over time, and that observed carcass counts were poor predictors of estimated annual numbers of whales dying. Importantly, there were substantial differences between fractions of deaths determined to be entanglement related during necropsy (49%) and the fraction of cryptic deaths suffering serious injuries related to entanglement (87%). Although we concluded that a single year’s observations produced poor estimates of carcass detection rates due to the volatility of ratios of small counts, ratio estimates of data pooled over periods of consistent survey may offer better information on detection rates. Additionally, it appears unwise to consider cause of death determinations from detected carcasses as representative of cause-specific mortality rates in right whales given the large number of seriously injured whales from entanglement that are likely part of the unseen mortality.

Key words
carcass detection, cryptic mortality, detection bias, right whale, total mortality

1 INTRODUCTION

The North Atlantic right whale, Eubalaena glacialis, is among the world’s most endangered large whale populations (Reynolds, Marsh, & Ragen, 2009). The population at its recent peak numbered ~500 individuals in 2010 (Pace, Corkeron, & Kraus, 2017) but has been declining since and at the start of 2018 numbers ~400 (Pettis, Pace III, & Hamilton, 2020). The deaths of at least 17 individuals in 2017 (Davies & Brillant, 2019) and 10 more in 2019 has renewed concerns about recovery potential of this population (Kraus et al., 2016). Between 2003 and 2018, conclusions drawn from 38 of 44 (88%) necropsies conducted on right whales attributed death to human causes, namely collisions with vessels and entanglement...

The known deaths suggest that recovery of North Atlantic right whales is in serious jeopardy (Corkeron et al., 2018) unless substantial mitigation measures that reduce mortality and serious injury from human activities are instituted immediately (Kenney, 2018; Moore, 2014). But, these known deaths represent only a fraction of the true death toll, because counts of carcasses do not agree with the numbers of whales that disappear from long term sighting records. In the fisheries management literature, postrelease mortality of fish has been termed “cryptic mortality” (Coggins Jr, Catalano, Allen, Pine III, & Walters, 2007), and this term has been applied to human activities that kill marine mammals without resulting in an observed carcass. Several reference points have been developed that estimate the number of animals that can be removed from a marine mammal population each year while still achieving conservation objectives (e.g., Chilvers, 2008; Hammill & Stenson, 2007; Wade, 1998; Williams, Thomas, Ashe, Clark, & Hammond, 2016), but these all rely on unbiased calculations of mortality rates. For many smaller cetacean species, a bycatch mortality rate can be estimated from observers placed on a representative sample of fishing boats to document takes, which can then be scaled up to the fleet as a whole (Wade, 1998). The kinds of human activity resulting in major sources of mortality for many larger cetaceans do not lend themselves to estimation from dedicated observer coverage. Examples include bycatch in fixed gear and unattended fisheries, such as lobster or crab pots (Johnson et al., 2005), oil spills, or collisions with ships (Laist et al., 2001). Although these causes are readily detected in recovered carcasses, no sampling frameworks exist to infer their incidence rates.

Several factors interact to cause undercounting of human-caused mortalities of cetaceans. Generally speaking, in order for anthropogenic mortality to be detected, a whale carcass must float or strand, be detected by human observers before decomposition or scavenging occurs, be subject to an evaluation by a qualified veterinary pathologist to determine cause of death, and then have that result reported in the primary literature or in publicly accessible databases (Faerber & Baird, 2010). At any point along the time line from death to disintegration, information about the cause of mortality can be lost including even its occurrence. Herein, we distinguish between carcass “detection” (i.e., identifying an observed carcass to be a right whale and therefore a known death in the population regardless of whether it can be identified as a known individual), and carcass “recovery” (a term often used in studies of known individuals implying that the carcass has been identified to the list of known population members). Unless otherwise noted, we focus on carcass detection rates in this study.

Some studies have attempted to estimate carcass detection rates in a number of cetacean populations, and these studies reveal that the potential for underestimation of human-caused mortality is considerable. Two populations of resident, fish-eating killer whales (Orcinus Orca) are found in the coastal waters of British Columbia (Canada) and Washington State (USA). The population is studied through an annual census. Between 1974 and 2008, only 3 and 20%, respectively, of the presumed deaths of northern and southern resident killer whales resulted in detected carcasses (Barbieri et al., 2013). In a relatively closed area, Wells et al. (2015) estimated dolphin carcass recovery rates as 33% in Sarasota Bay, FL. In a retrospective analysis inspired by the Deepwater Horizon oil spill, historic carcass detection rates in the northern Gulf of Mexico averaged 2% among 14 cetacean species (Williams, Gero, Bejder, et al., 2011). Some rare species had a carcass detection rate of 0%, and the sperm whale (Physeter Macrocephalus, the largest whale in the study) had a detection rate of 3.4% (Williams et al., 2011).

A particularly data-rich study on a coastal population of bottlenose dolphins (Tursiops Truncatus) revealed a carcass detection rate of 25% (95% CI = 20, 33%), and made the argument that observed (minimum) numbers of anthropogenic mortality of dolphins derived from strandings should be corrected to account for unobserved mortality (Carretta et al., 2016). This careful analysis led to a policy change for management of human activities affecting US Pacific coast dolphins. Now, US marine mammal stock assessment reports1 for coastal bottlenose dolphins in California that report anthropogenic mortalities detected from beach-cast carcasses are multiplied by a factor of 4 to account explicitly for cryptic mortality.

A management focus merely on the number of detected carcasses will underestimate the severity of anthropogenic mortality, and consequently, the management response will fail to take into account the severity of the threats. Methods are needed to scale up the known mortality to estimate the total amount of human-caused mortality that must be mitigated to save endangered whales. An initial assessment of natural and human-caused mortality in North Atlantic right whales for the period 1980–1999 suggested a 17% carcass detection rate (Kraus, Brown, Caswell, et al., 2005), but increased search effort and stranding response funding in recent years would suggest a higher rate may apply now. Because the sighting rates of live right whales has varied over time (Pace et al., 2017), it stands to reason that carcass detection rate varies over time. Additionally, detectability of carcasses could be influenced by cause of death. For example, healthy whales struck by vessels likely float for
longer periods and therefore may be detected at higher rates than chronically entangled animals that burn their fat stores for months as they slowly starve to death (Moore, Mitchell, Rowles, & Early, 2020). Additional analyses are needed to generate a robust multiplier that can be used in management (e.g., Carretta et al., 2016). Without a statistically robust multiplier, correction factors to account for imperfect carcass detection can result in estimates of mortality that exceed the size of the entire population (Parrish & Boersma, 1995).

Our study had three main objectives:

1. To estimate average carcass detection rates of North Atlantic right whales, and explore how this may have changed over time. Estimating this parameter will not affect our understanding of population dynamics, because detected and undetected mortality are already subsumed within the survival estimates (Pace et al., 2017). However, understanding the extent to which anthropogenic mortality is undercounted may alter our perspective of the potential scope for population recovery if precautionary mitigation measures were implemented broadly. We briefly explore two alternative estimators for detection rate over a specified time interval.

2. Explore the hypothesis that carcass detection may vary with cause of death. Evidence for differential carcass detection rates could change our understanding of the relative importance of the two main risk factors (i.e., collision with vessels and entanglement), and more accurate information could change the emphasis placed on various mitigation measures.

3. Our long-term objective is to stimulate a discussion at the science-policy interface on the need to improve the way that cryptic mortality is handled in management. Using the extremely data-rich case study of the North Atlantic right whale, we advocate developing multipliers to better account for cryptic mortality when assessing conservation status of marine mammal stocks (Carretta et al., 2016).

2 | METHODS

Three lines of inquiry were used to explore factors influencing carcass detection rates in North Atlantic right whales.

2.1 | The ratio of observed to estimated mortalities

Observed mortalities of right whales exist in two categories: (1) a discovered carcass that can be identified as a whale known to the North Atlantic Right Whale Catalog (Hamilton, Knowlton, & Marx, 2007) and (2) a discovered carcass that is not identifiable to individual either by photograph (position of carcass obscuring matching features or state of decomposition) or genetic fingerprint (no sample gathered or no match found).

Annual estimates of the total number of right whale deaths from 1990 to 2017 were generated from a previously published hierarchical state-space model of right whale abundance (Pace et al., 2017). The model to estimate abundance is parameterized to yield posterior distributions of $N_t$ and $B_t$, which are respectively, the abundance and numbers of new entrants (Births) to the population in year $t$. For each of 20,000 realizations in the Markov chain Monte Carlo run after initial burn-in, we calculated the estimated number of deaths according to the following formula:

$$D_t = N_t - N_{t+1} + B_t$$

where $D_t$ is the number of deaths occurring in the interval $[t, t+1]$. We assumed that the derived values represented a posterior distribution for each $D_t$ and calculated 95% highly credible regions for each estimate. We further assume that the population is closed to permanent emigration, which seems well supported by the long study period and the lack of evidence of right whale being resident in other parts of the North Atlantic. We calculated an additional total mortality estimate from abundance estimates from the aforementioned model and detected calf counts according to:

$$D_{total} = N_{1990} - N_{2018} + C_{(1990-2017)}$$

where $C_{(1990-2017)} = 407$ was the total calf count during 1990–2017.

We fitted generalized linear models (GLMs) to examine whether or not the observed number of carcasses were predictive of estimated median number of deaths each year. Candidate models included: constant estimated death rate over time; a linear predictive relationship between annual carcass counts and annual estimated death count; a simple periodic variation in the estimated death count over three “eras” (1990–1991; 1992–2009; and 2010–2017); and a model with both era effect and observed carcass counts as predictors. The choice of eras was based on time frames of significant changes in search effort patterns and/or animal distributions, where the predictive value of carcass counts might vary with these changes. In particular, we believed that variable periods evident in the recapture rates of individuals was indicative of three eras that might have differing carcass detection rates. We estimated the relative effective detection effort as the mean adult female capture probability for the era.
2.2 | Cause of serious injuries and cause of death

Additionally, mortalities can be inferred for whales seen alive but declared seriously injured by the National Marine Fisheries Service (NMFS; Henry et al., 2017). These injured whales are often in poor health condition or suffering from complex entanglements that will interfere with foraging. Many are eventually presumed to have died as they commonly disappear from the sighting records within 1–2 years following their injury. We only counted whales as seriously injured the first year of their determined status and removed from the counts two whales that were determined to be seriously injured but appeared to recover. From first principles, it seems plausible that whales that become entangled and lose fat during the months it takes them to die may be less likely to be detected as carcasses if they sink soon after death, although Moore et al. (2020) show that carcasses that sink in shallower water are more likely to bloat and refloat. Conversely, healthy whales killed immediately by ship strikes would be more likely to float. It is impossible to test directly for differences in detection rate based on cause of death, precisely because one never sees the unobserved mortality. We explored the plausibility of this scenario using a subset of whales that were observed with serious injuries just prior to their disappearance (Henry et al., 2017; Knowlton, Hamilton, Marx, Pettis, & Kraus, 2012). Using data from New England Aquarium (NEAQ) and NMFS, we examined the fate of animals last seen with serious injuries arising from either fisheries gear entanglement or “other” (i.e., mostly consistent with blunt force trauma or fresh propeller wounds). We compared the frequency of occurrence of serious injuries from entanglement and other anthropogenic sources with sources of mortality determined from examined carcasses of noncalf animals. Causes of mortality for examined carcasses have been documented in Moore, Knowlton, Krauss, McLellan, and Bonde (2004) and Sharp et al. (2019). We note that a few animals may have been observed as serious injuries and later found dead but no link clearly establishing that it was the same individual. Because we are comparing the distributions of death causes, double counting in this instance would only act to reduce differences in distributions.

2.3 | Body condition and subsequent carcass recovery of known individuals

Each individual in the North Atlantic right whale catalog has a suite of health records over its sighting history, each of which includes a visual estimate of body fat stores (Pettis et al., 2004). For 159 whales that were known (28) or presumed (131) to have died and had an assessment of body condition within 6 months of its last sighting, we modeled the probability that a carcass would be recovered as a function of visual body condition. The rationale was that whales observed to be skinny just before death could act as a proxy for entangled whales that took several months to die (Pettis et al., 2017), whereas whales with healthy fat stores just before their death could act as a proxy for whales that were struck by a ship and died immediately with fat reserves intact (Moore et al., 2020).

We fitted a binomial GLM to the fate of each individual whale, whose carcass was either recovered (1) or not recovered (0), using body fat condition as a candidate covariate. Statistical support for including the covariate was estimated by comparing AIC of this model to an intercept-only model.

3 | RESULTS

3.1 | Magnitude of cryptic mortality

When compared with the derived estimates of total mortality from the abundance model (Pace et al., 2017) extended to produce estimates for 1990–2017, counts of carcasses seriously underrepresented total right whale mortality (Figure 1). During this period, the number of deaths derived from the abundance model was 2.8 times the carcass count.

![Figure 1](https://via.placeholder.com/150)

FIGURE 1 Counts (black dots) of right whale carcasses and total number of right whale deaths estimated from an abundance model (diamonds) together with their 95% credible intervals. Overall detection rate was the sum of carcass counts across the entire time frame divided by the sum of estimated deaths.
The predictive ability of observed carcass counts

Comparison of four models used to evaluate the predictive value of annual carcass counts revealed that very little information about the number of right whales dying in a given year could be derived from carcass counts (Table 1). The model with the most support validated the higher undetected death tolls during 2010–2017 shown in Figure 1. The overall estimate of carcass detection rate was 36%. Our GLM produced little support that annual counts of carcasses were predictive of annual mortality estimates (Table 1). However, when we pooled data from eras of more similar survey effort and whale distribution, a pattern of detection emerged that fit with our prior suspicions (Figure 2). When survey effort was lower for important whale use areas during 1990–1991, the ratio of detected carcasses was only 17% (2 s.e. = 5.5%). Detection increased significantly to 43% (2 s.e. = 0.6%) during a lengthy period of high whale recapture rate (1992–2009) and declined to 29% (2 s.e. = 2.8%) from 2010 to 2017 as whales changed their area use patterns and recapture rates declined.

3.3 | Cause of serious injuries and cause of death

From 1990 to 2017, a total of 62 North Atlantic right whales were reported by NMFS as having “serious injuries” that were defined as life-threatening, and subsequently disappeared. Entanglement accounted for the vast majority (54 of 62, or 87%) of serious injuries (Table 2). Because these whales were never seen again, one would also expect to see 87% of deaths to be caused by entanglement. Among 41 examined carcasses, only 49% of deaths were determined to be entanglement related. Assuming all of the “other” sources of serious injury or mortality of noncalf whales can be attributed to vessel collisions, there is a large disparity between the sets of observations ($X^2 = 16$, $p < .001$). This disparity suggests that it may be unreasonable to use the distribution of causes of death from examined carcasses to characterize the cryptic deaths.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Information criteria generated from GLMs fit to estimated annual mortality of North Atlantic right whales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Parameters count</td>
</tr>
<tr>
<td>Era</td>
<td>3</td>
</tr>
<tr>
<td>Era + Carcass count</td>
<td>4</td>
</tr>
<tr>
<td>Carcass count</td>
<td>2</td>
</tr>
<tr>
<td>Constant</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: Prior choice of models included (1) constant death count over time, (2) linear correspondence between observed carcasses estimates, (3) varying by different eras of survey effort or whale distribution a model, and (4) an additive model including 2 and 3. Models assumed data were Poisson and the three Eras were 1990–1991, 1992–2009, and 2010–2017.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Likely cause of death distribution for noncalf North Atlantic right whales during 1990–2017 (excluding undetermined, $n = 3$) from examined carcasses versus live animals declared as seriously injured by NMFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data source</td>
<td>Entanglement</td>
</tr>
<tr>
<td>Carcass</td>
<td>20 (49%)</td>
</tr>
<tr>
<td>Serious injury</td>
<td>54 (87%)</td>
</tr>
</tbody>
</table>

Note: Chi-sq. test for similar distributions between data sources $X^2 = 16.1$, $p < .001$. 

3.2 | The predictive ability of observed carcass counts

Comparison of four models used to evaluate the predictive value of annual carcass counts revealed that very little information about the number of right whales dying in a given year could be derived from carcass counts (Table 1). The model with the most support validated the higher undetected death tolls during 2010–2017 shown in Figure 1. The overall estimate of carcass detection rate was 36%. Our GLM produced little support that annual counts of carcasses were predictive of annual mortality estimates (Table 1). However, when we pooled data from eras of
3.4 | Body condition and subsequent carcass recovery of known individuals

The model with the highest information content based on AIC was one not relying on body condition to predict the probability of detection \((AIC = 150.0)\). Using body fat condition at the time of the last sighting had little support from the data \((AIC = 151.9; \Delta AIC = 1.9\) over an intercept-only model).

4 | DISCUSSION

Recent results from a hierarchical state-space model of North Atlantic right whale population dynamics (Pace et al., 2017) were integrated with data on animal health, encounters, necropsies, and serious injuries held by the North Atlantic Right Whale Consortium at the New England Aquarium (Hamilton et al., 2007; Pettis et al., 2004) or published literature (Moore et al., 2004; Sharp et al., 2019) with the serious injury and mortality database held by NMFS (Henry et al., 2017). Taken together, these data suggest that 36% of right whale deaths resulted in a carcass detection. Experts who have led the data collection efforts believe that changes in whale distribution and search effort by agencies on both sides of the Canada-US border may have changed carcass detection rates over time. By pooling data across relatively homogeneous periods of survey effort and whale distribution, we found modest deviations in carcass detection rates over time. The period of much lower effective searching (lower capture rates of live whales) produced a low estimated detection rate consistent with that reported by Kraus et al. (2005) using different methods to estimate total mortality. They estimated that the carcass detection rate was 17% based on data from 1980 to 1999 (Kraus et al., 2005). There appears to have been a large increase in detection rate to 43% during a period coincident with the highest estimated recapture rates of live whales reported by Pace et al. (2017), but the estimated value is still below half. In the most recent era, carcass detection rates have fallen off as whales spend less time in previously well surveyed areas.

Our analysis allows us to caution strongly against relying on a single year’s count of carcasses to infer differing amounts of total mortality. These counts are usually small (<10) and hence widely varying relative to their mean. Despite our own cautionary note, we found it of interest that during 2017, a year of an unusually high carcass count coupled with a dramatic increase in Canadian survey effort to find carcasses, the number of dead found may have accounted for nearly every whale estimated to have died that year. This finding is clearly not indicative of the recent past, given that the overall detection rate during 2010–2017 was only 29%.

There is a striking mismatch between the causes of serious injuries observed in living whales and the causes of mortality revealed in necropsies of dead whales. Entanglement accounted for the vast majority (54 of 62, or 87%) of serious injuries, but only 20 of 41 (49%) of mortality in examined carcasses. Collisions with vessels and “other” causes represent 8 of 62 (13%) of serious injury cases, but represent 21 of 42 (51%) of mortalities in examined carcasses. We caution, however, that blunt force trauma incurred by whales that are seriously injured by a vessel collision may be difficult to detect from photographs of free swimming whale that may ultimately die as a result of the collision. Despite the possibility of missing some vessel collisions that produced serious injuries, the disparity in observed rates of serious injury by cause suggests that cryptic deaths due to entanglements significantly outnumbers cryptic deaths from vessel collisions or other causes. Although this dissonance could not be explained by a model of carcass detection as a function of visual body condition, the topic warrants continued research. If attempts are made to expand detected causes of mortality to total counts, detection rates should be calculated over a rolling time block to reduce the influence of any 1 year’s values. Alternatively, estimated mortality values should be calculated over periods of homogeneous live right whale capture probabilities. Regardless, entanglement-related mortality is widely underestimated, which has important implications for management actions to promote recovery.

5 | CONCLUSION

The amount of cryptic mortality occurring over longer time intervals seem to vary with effective survey effort to finding live whales. The evidence surrounding whales not recovered following their likely deaths, suggests that cryptic deaths are more likely entanglement related than the record of examined carcasses indicates. As monitoring and managing the conservation status of North Atlantic right whales requires robust quantitative data, this study showed that total mortality was 2.8 times the number of detected carcasses during 1990–2017. Annual counts of right whale carcasses do a poor job of indicating the total mortality for that year, and carcass detection rates seem to vary with effective survey effort. The incidence rates among causes of mortality differs significantly between those examined carcasses from which a cause of death was determined, and those animals whose likely death followed a serious injury. The evidence surrounding whales not recovered following their likely
deaths, suggests that cryptic deaths are almost twice as likely to be due to entanglements than the records from examined carcasses whales indicate.

ACKNOWLEDGMENTS
The authors gratefully acknowledge support to New England Aquarium's right whale research program from the Volgenau Foundation, and to Oceans Initiative from Fisheries and Oceans Canada and Save Our Coasts Foundation. The authors also thank A. Henry for verifying accounting of right whale serious injury and mortality data from NEFSC archives. The capacity to develop precise estimates of North Atlantic right whale demographic parameters is due to the thousands of photographic captures of whales contributed by hundreds of collaborators working through the North Atlantic Right Whale Consortium for over nearly 40 years.

CONFLICT OF INTEREST
The authors have no conflicts of interests to declare.

AUTHOR CONTRIBUTIONS
Richard M. Pace and Rob Williams contributed equally to the analysis and writing of this paper and should be regarded as joint first authors. Scott D. Kraus helped focus the content, provided extensive edits, and access to data. Amy R. Knowlton and Heather M. Pettis compiled and extracted data and provided text and edits.

DATA AVAILABILITY STATEMENT
Data used to calculate total mortality and a table of known deaths by cause are available from RMP.

ETHICS STATEMENT
Data used in this manuscript were all collected using guidelines and permits provided by federal (US and Canadian) agencies which govern the ethical treatment of animals.

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ENDNOTE

REFERENCES


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Tools to identify and minimize risks to marine mammals

Jessica Redfern, Dan Pendleton, Orla O’Brien, Laura Ganley, Brooke Hodge, Katherine McKenna

EcoMap
Spatial Ecology, Mapping, and Assessment Program
Weekly predictions of North Atlantic right whale *Eubalaena glacialis* habitat reveal influence of prey abundance and seasonality of habitat preferences

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Right Whales

Little survey effort in this area and time period (2002-2006)!


Photo on the left
Photographer: Melissa Patrician
Credit: Anderson Cabot Center
New England Aquarium
Collected under Canadian SARA permit
Massachusetts and Rhode Island Wind Energy Areas
Right Whales and Wind Energy

Wind Energy Areas

New England Aquarium
Aerial surveys
2011-present
Approximately monthly

2011-2020 surveys funded by MassCEC and BOEM

2020-2021 surveys funded by Equinor Wind U.S., Mayflower Wind Energy LLC, Ørsted North America, and Vineyard Wind
Right Whales and Wind Energy

New England Aquarium Aerial surveys
2011-2015

North Atlantic right whale *Eubalaena glacialis* occurrence in offshore wind energy areas near Massachusetts and Rhode Island, USA

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Distribution and abundance of cetaceans in a wind energy development area offshore of Massachusetts and Rhode Island

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Received 12 December 2016 / Revised: 2 June 2017 / Accepted: 7 June 2017 / Published online: 19 June 2017

© Springer Science+Business Media B.V. 2017
Aerial Surveys 2018-2019

• 40 surveys flown over 185.8 hours
• Documented marine fauna, human activity, and debris
  • Observer sightings and photos taken directly below the plane
• 1,436 detections of marine fauna
  • 10,940 individuals
  • 17 species
    • Large whales
    • Small cetaceans
    • Birds
    • Sharks/fish
    • Sea turtles
Aerial Surveys 2018-2019
Right Whales

Seen in every season and 9 of 11 months surveyed
Temporal Changes

Right whale temporal occurrence
- 2011-2015: Dec. – April
- 2018-2019: All year

Leiter et al. 2017
Endangered Species Research
Aerial Surveys 2018-2019
Right Whale Seasonal Abundance Estimates

- Single abundance estimate for the entire survey area
- Captures temporal trends in abundance
- Does not capture spatial trends within the study area

Photographs taken under NOAA permit 19674
Aerial Surveys 2018-2019
Right Whale Seasonal Abundance Estimates

Progress!

- 2011 – 2015: detection function for all large whales
- 2017 – 2019: detection function for right whales
Aerial Surveys 2018-2019
Right Whale Seasonal Abundance Estimates

Confidence intervals are large
• Confidence intervals are large
• Density appears to be increasing
  • Need to recalculate abundance from the earlier surveys to standardize methodology
  • For example: change in detection function
• Explore Bayesian trend assessment (e.g., Moore and Barlow 2011, 2013)
Aerial Surveys 2018-2019

Right Whales

Eastern side of study area
Some seasonal distributions shifts
Spatial Changes

2018-2019
Eastern side of study area

Leiter et al. 2017
Endangered Species Research
Seasonal abundance estimates and sightings rates tell us the number of animals in whole study area.

Sightings per unit effort provides estimates only in sampled areas.
Habitat Modeling

What if we want to know the impact of an activity within one of these lease areas?
Habitat Modeling

What if we want to know the impact of an activity within one of these lease areas?

Habitat models can be used to estimate distribution patterns at smaller spatial scales.
Density Surface Modeling

- Data from 2017 and 2018
- Transect lines divided into ~4.6 km segments

- Oceanographic data extracted at segment midpoints
  - Log transformed chlorophyll-a (mg/m3) concentration
    - NASA MODIS-Aqua, 4.6 x 4.6 km resolution
  - Sea surface temperature
    - NASA MODIS-Aqua sensor, 4.6 x 4.6 km resolution
  - Depth
Density Surface Modeling
Density Surface Modeling

- Captures spatial and temporal trends in distributions
- Estimates density
  - Rather than probability of occurrence
- Requires line-transect data
- We need to improve our oceanographic variables to better capture spatial patterns
Occupancy Modeling

- Probability that a site is occupied
- Addresses imperfect detection
  - Observer bias
  - Availability bias
- Uses presence/absence data
  - Option to use a wider range of data sets

![Graph showing probability of habitat use for Right Whales across multi-year seasons (2012 – 2018).]
Seasonal Occupancy Predictions

Right Whale Predicted Occupancy

<table>
<thead>
<tr>
<th>Year</th>
<th>Jan - Apr</th>
<th>May - Aug</th>
<th>Sep - Dec</th>
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<td><img src="image14.png" alt="Map" /></td>
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<tr>
<td>2018</td>
<td><img src="image16.png" alt="Map" /></td>
<td><img src="image17.png" alt="Map" /></td>
<td><img src="image18.png" alt="Map" /></td>
</tr>
</tbody>
</table>
Moving Forward

- Manuscript documenting temporal and spatial changes among surveys
  - Standardizing methodology
- Demographic analyses to understand when males and females, adults and juveniles are in the study area
- Habitat modeling
- Analyzing data for other species

December 2018
Acknowledgements

• Aerial surveys of offshore wind energy areas sponsored by MassCEC and the Bureau of Ocean Energy Management
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• New England Aquarium Right Whale Catalog and Photo ID team
• EcoMap team:

  Orla O’Brien

  Laura Ganley

  Katherine McKenna

  Dan Pendleton

  Brooke Hodge

Questions?
Jessica Redfern
jredfern@neaq.org
REPORT OF THE
NORTH ATLANTIC RIGHT WHALE
PROGRAM REVIEW

13–17 March 2006, Woods Hole, Massachusetts

Report prepared for the
Marine Mammal Commission by

Randall R. Reeves
Andrew J. Read
Lloyd Lowry
Steven K. Katona
Daryl J. Boness

2007

This is one of five reports prepared in response to a directive from Congress
to the Marine Mammal Commission to assess the effectiveness of protection programs
for the most endangered marine mammals in U.S. waters.
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I. Overview Statement by the Review Panel

The approximately 350 North Atlantic right whales alive today constitute a biologically viable population with potential for recovery. Although calf production has been variable and appears to be lower than in some populations of southern right whales, we believe that reproduction and recruitment in the North Atlantic population are adequate to support a recovery but only if the number of whales killed by ship strikes and entanglement in fishing gear is significantly reduced. In fact, much of the potential recruitment to the population is being lost to such removals, seriously inhibiting population growth. With such a small population, any progress toward recovery could be offset by random processes and events (e.g., inbreeding, a natural catastrophe, or a disease outbreak). The longer the population remains mired in its present state of low numbers because of regularly occurring ship strikes and entanglement, the greater is the danger that such processes and events will drive the population to a level from which it cannot recover.

The last 100 years have seen an unbroken chain of human impact on right whales, marked by a shift in the mid-1930s (when international legal protection, albeit incomplete, was conferred on the whales) from deliberate to non-deliberate “whaling.” From a demographic and biological standpoint, “whaling” on this population has continued uninterrupted and may have intensified in recent decades as its habitat has become increasingly hazardous.

In terms of public investment to remedy this situation, the most cost-effective approach to protection and recovery of North Atlantic right whales would be to eliminate high-speed (>10 knots) vessel traffic and risk-conferring fishing gear (e.g., traps with vertical lines and set or drift gillnets) from the whales’ environment, or at least from areas where the whales occur most frequently. In fact, one way to assess the cost-effectiveness of these measures would be to calculate the public expenditures that would have been saved (i.e., available for reallocation to other priorities) if the mortality from ship strikes and entanglement had been significantly reduced in the 1970s or 1980s when the whale population apparently was increasing. To the best of our knowledge, no such calculation has previously been contemplated, much less undertaken.

From a cost-effectiveness standpoint, comprehensive, science-based management actions that can be scaled back as conditions improve would be greatly preferable to the piecemeal and prolonged process of incremental regulatory expansion that has been pursued over the past 15 years. In effect, many of the accumulated program costs (to say nothing of the costs of legal actions brought against the National Oceanic and Atmospheric Administration [NOAA] and other agencies) can be properly viewed as the costs of past inaction. Protection of right whales has been subjugated to the social and economic expectations of an ever-expanding, increasingly urban human society with which the whale population must co-exist. The compatibility of the two—a healthy, recovered right whale population on one hand and expansive coastal development on the other—cannot be taken for granted.
II. INTRODUCTION AND PROJECT BACKGROUND

As part of the 2004 Omnibus Appropriations Bill, the Senate Appropriations Committee directed the Marine Mammal Commission to “review the biological viability of the most endangered marine mammal populations and make recommendations regarding the cost-effectiveness of current protection programs.” One of the Commission’s activities in response to that directive was to organize and conduct, in close consultation with the National Marine Fisheries Service (NMFS), a review of the federal recovery program for the endangered North Atlantic right whale and the federal and non-federal research in support of it. This species was chosen for a case study because of its degree of endangerment, the large scale of research and recovery efforts related to it, and Congress’s particular awareness of and interest in the species. It was understood from the outset that the review would need to include a workshop where a panel would have opportunities to engage in discussions with relevant experts.

The present report, together with other background papers and the report of a workshop on population viability analysis, was prepared for use by the Commission in developing a report that it will submit to Congress as a response to the congressional directive. The workshop on population viability analysis was held in September 2005 and, among other things, considered natural factors affecting the population dynamics and recovery of very small populations of marine mammals. Workshop participants noted that small populations are particularly vulnerable to demographic and environmental stochasticity and to the loss of genetic variability. As population size is reduced, populations become increasingly vulnerable to such chance factors and, as a result, can be driven to smaller and smaller size in what conservation biologists refer to as an “extinction vortex.” It was also noted, however, that population viability is a vague term that is best stated in terms of the probability of extinction within a specified time frame. The September 2005 workshop concluded that, with possibly one or two exceptions, all marine mammal populations in U.S. waters, including North Atlantic right whales, are viable. In other words, with effective management, even populations that are greatly reduced should be capable of recovery.

The right whale review involved the following steps:

- A steering group, including members of the review panel (Attachment 1), the Commission staff, and SRA International (a consulting firm contracted by the Commission to help organize meetings and draft reports in response to the congressional directive), prepared a draft workshop agenda and a series of questions to be directed at agency representatives, contractors, and others involved in right whale research and management.
- After considering the draft agenda and list of questions, NMFS representatives offered to help organize the workshop and requested that the scope of the review be modified somewhat to meet the agency’s own need for external (independent) review of its right whale science program.
• In January and February 2006 the steering group met several times with NMFS representatives to develop the workshop format and logistics.

• In advance of the workshop, and with assistance from NMFS and Commission staff, SRA International prepared extensive background reading materials for the panel. These included explicit written responses to the steering group’s list of questions.

• The workshop was held at the Marine Biological Laboratory, Woods Hole, Massachusetts, on 14–17 March. The agenda and list of participants are provided in Attachments 2 and 3.

The panel prepared this report after the workshop. It consists of two main parts: a review and evaluation of the federal government’s North Atlantic right whale research and monitoring program (including university and nongovernmental organization-sponsored research) and a review and evaluation of the federal government’s North Atlantic right whale protection and recovery program.

A. Evaluating Effectiveness

Any evaluation of cost-effectiveness implicitly assumes that information is available to assess effectiveness, preferably quantitatively but at least qualitatively. To judge effectiveness throughout its report, the panel sought to use the downlisting criteria (i.e., from endangered to threatened status) specified in the 2005 version of the Recovery Plan for the North Atlantic Right Whale (National Marine Fisheries Service 2005). The criteria, paraphrased from the plan, are—

(1) “Population ecology” (range, distribution, age structure, sex ratios, etc.) and vital rates (age-specific survival, age-specific reproduction, and lifetime reproductive success) indicate an increasing population.

(2) The population has increased at an annual rate of 2 percent or greater for 35 years.

(3) None of the five listing factors—habitat degradation, deliberate use, disease or predation, inadequate regulations, and mortality/serious injury from ship strikes and fishery interactions—is known to be limiting the population’s growth rate.

(4) The estimated probability of quasi-extinction in 100 years is no more than 1 percent.

The panel attempted to evaluate the relevance and importance of research and monitoring efforts according to the extent to which they either had addressed these criteria or could be expected to address them in the future. Similarly, it tried to evaluate protection and recovery programs according to whether they had brought the population closer to meeting the downlisting criteria or could reasonably be expected to do so in the future.

Judging effectiveness with reference to the criteria in the recovery plan was complicated by the following:

• Unless it is known whether the population is increasing, decreasing, or at an equilibrium, it is difficult to know whether any particular intervention, or for that matter the entire package of interventions as a whole, is having any positive effect. Because the
population’s rate of increase is not estimated on a regular basis, and indeed because we cannot even assess whether the population is currently increasing or decreasing, there is little or no basis for confirming effectiveness.

- For effectiveness to be assessed in relation to specific management measures, causal connections need to be established between such measures and the desired outcome or outcomes. In other words, it has to be shown, for example, that a reduction in the rate of serious injuries or deaths of right whales (and its concomitant effect on status) was due to a particular fishery management measure or change in shipping traffic. Without a means of associating cause and effect in this way, any judgment about the effectiveness of individual protective measures is highly speculative.

- Compliance with management measures needs to be verified. It has to be shown that prescribed changes in human activities or behavior (e.g., in the types of fishing gear deployed or the speeds and routes of vessel traffic in specified areas or seasons) are actually being made. Otherwise, there is danger that apparent correlations between regulatory actions and trends in the whale population will be misleading.

- Data on the whale population’s “performance” in response to management measures, as well as data on compliance by regulated parties, need to be gathered at very large spatial and temporal scales (tens of thousands of square miles and decades). Given the expense and logistics involved, this means that datasets are often incomplete or have low statistical power.

In the view of some NMFS representatives, the effectiveness of the right whale program cannot be judged solely on the basis of the delisting criteria because the agency is bound to adhere to several other relevant mandates. Specifically, Endangered Species Act (ESA) section 7 consultations require that any alternatives to a proposed activity be “reasonable and prudent,” and section 118(f) of the Marine Mammal Protection Act (MMPA) specifies that NMFS must take into account the economics of the fishery and the availability of existing technology when seeking to reduce incidental mortality or serious injury of marine mammals. The inadequacy of specific information concerning the dynamics of entanglement, right whale foraging ecology, and right whale behavior, in general, makes it difficult for NMFS to develop measures that are not only effective in protecting right whales but that also meet the “reasonable and prudent alternative” requirement of the ESA and give due consideration to fishery economics and technology as required under the MMPA. The panel acknowledges that these competing components of the ESA and MMPA further complicate the agency’s position and hinder progress toward achieving some of the downlisting criteria. Nonetheless, when evaluating the effectiveness of past actions and identifying future actions that might be more effective, the panel did not feel constrained to consider those other mandates. Its conclusions and recommendations are based solely on judgments about what actions are most likely to be effective in achieving the recovery of North Atlantic right whales.

B. Evaluating Cost-Effectiveness

To aid it in evaluating cost-effectiveness, the panel benefited from a detailed compilation of expenditures on right whale recovery and research by federal and state government agencies and
nongovernmental organizations over the past three fiscal years (FY2003/04 to FY2005/06). That information was compiled by Jeff Benoit of SRA International, who contacted agencies and organizations directly. It was supplemented by workshop presentations in which representatives of federal agencies and certain major contractors attempted to place the expenditures in context.

Determining how to measure and assess cost-effectiveness proved a major challenge for several reasons, including the following:

- Assessing cost-effectiveness depends on the ability to assess effectiveness. As discussed above, that can be very difficult.
- Reliable information on the actual costs of implementing management measures is needed, but such information is seldom available for individual program components. Moreover, because some program components (e.g., aerial surveys) simultaneously serve multiple research and management functions, it can be difficult to partition costs for specific activities or purposes within the overall recovery program.
- A metric of cost-effectiveness is needed that is conceptually coherent and feasible to apply. For example, cost-effectiveness might be measured in terms of right whale deaths prevented per unit of federal funds invested in a given type of intervention. Thus, if a 50 percent reduction in adult female mortality could be achieved with a $1 million investment in a certain management action, while a $10 million investment would be required to achieve a similar reduction in mortality with a different management action, the relative cost-effectiveness of the two measures could easily be assessed and compared. However, uncertainty regarding the magnitude and causes of right whale deaths, together with frequent changes in regulations, makes it virtually impossible to devise a practical and appropriate metric for cost-effectiveness in the present context.

Systemic constraints also exist and deserve mention. Among these are the following:

- Inadequacy and uncertainty of funding for critical activities make it difficult for agencies to develop cost-effective programs, which require the ability to plan, introduce measures in a stepwise fashion, monitor and evaluate outcomes, and adapt if necessary.
- The conflicting mandates within and between government agencies inevitably reduce effectiveness of many kinds—biological, economic, and political. For example, the Coast Guard must respond, first and foremost, to demands related to human safety and homeland security, even if in the process it means putting right whales at greater risk of ship strikes. Similarly, the Department of Commerce is responsible for protecting and enhancing the economic interests of U.S. business, industry, and individuals, yet it also is expected to protect right whales from shipping and fishing gear.

Such constraints are to be expected in a modern nation with a large bureaucracy and frequently changing government administrations. What is important here, however, is to acknowledge that cost-effectiveness alone may not be an appropriate guide to the public interest.
The panel was at once mindful of the intrinsic difficulties and limitations summarized above and the desire expressed by Congress for information concerning the effectiveness and cost-effectiveness of the right whale protection program. In the complete absence of rigorous, conclusive studies evaluating the effectiveness of specific measures, the best that the panel can offer is a series of judgments based on the information provided to it. Given their subjective nature, some of these judgments are bound to be controversial. Where doubt has been expressed concerning the effectiveness or cost-effectiveness of a given aspect of the program, the panel would like nothing better than to be proven wrong by an appropriate study.
III. FINDINGS OF THE PANEL:

RESEARCH ON NORTH ATLANTIC RIGHT WHALES AND MONITORING THE WHALE POPULATION

As noted above, the downlisting criteria are framed around the demography of the North Atlantic right whale population. Any assessment of status must provide basic information on the rate of population increase or decrease, parameters controlling that rate (births and deaths), and the ecological factors affecting those parameters. This section of the report reviews the NMFS right whale science program. Research and monitoring efforts related to recovery management are discussed in sections IV and V.

A. RANGE AND DISTRIBUTION

A great deal has been learned over the past 25 years about the distribution of right whales in the western North Atlantic, yet surprisingly large gaps in knowledge remain. The winter distribution of a significant portion of the population is unknown. The routes taken by whales moving between the southeastern U.S. calving grounds and northern feeding areas have been only partially documented. In particular, the extent to which migrating whales remain in coastal waters or travel offshore as they pass the mid-Atlantic states (between the Carolinas and New England) is uncertain. A significant fraction of adult females take their dependent calves somewhere other than to the main summer nursery area in the Bay of Fundy. Paternity analyses of DNA from biopsy samples suggest that the number of males in the population is 16 to 21 percent greater than the number documented through photo-identification and genotyping. Opportunistic sightings of right whales in the Gulf of St. Lawrence, south of Greenland, around Iceland, and in northern Norway show that some individuals occur far beyond the well-known high-use areas in the Gulf of Maine, Bay of Fundy, and Scotian Shelf regions during summer. The boundaries of designated critical habitat do not appear to define all of the areas used intensively by right whales. Improved understanding of right whale distribution and movement patterns should, therefore, remain a research priority, both for better assessing the status of the population and for designing a comprehensive protection regime.

Seasonal (winter and spring) aerial surveys in the Southeast, Cape Cod Bay, and Great South Channel and year-round surveys in the Gulf of Maine have provided some useful information on distribution patterns, although these surveys are not designed solely for that purpose. Instead, the surveys are conducted, in part, to provide information necessary for management (e.g., providing warnings to mariners) and are therefore flown more frequently than would be necessary for population monitoring purposes alone (e.g., annual calf counts). Since 2001 federally funded studies of right whale distribution also have been expanded to include broadscale aerial surveys beyond the well-described habitats in New England, Bay of Fundy, and the calving grounds. For example, these expanded surveys were expected to cover the entire coasts of North and South Carolina in winter/spring of 2005/2006 and 2006/2007.
There is a clear desire on the part of NMFS to reduce the frequency of aerial survey flights in critical habitats and to phase out broadscale aerial surveys for detecting locations where whales occur and to replace them with another method, such as passive acoustic monitoring. The impetus for such a shift is rooted in at least three factors: (1) the emergence of the requisite technology to conduct real-time acoustic monitoring, (2) concerns about human safety in offshore aerial surveys, and (3) the high and rising costs of aircraft use (due, in part, to measures to address safety). The review panel regards all three factors as worthy of consideration and agrees that the Service should continue to support efforts to develop and refine alternative monitoring capabilities. However, any shift away from aerial surveys needs to proceed with due recognition of the potential benefits and drawbacks of new approaches. The panel’s thoughts in regard to passive acoustic monitoring are presented here.

**Benefits:** Once an acoustic monitoring system has been deployed and a system for processing data from it has been set up, this approach offers the potential for continuous, long-term monitoring of an area to detect vocalizing right whales—regardless of visibility, sea conditions, or time of day—at relatively low cost and with little risk to human safety. Preliminary results of studies in Cape Cod Bay, as reported to the workshop by Chris Clark of Cornell University, indicate that when whale densities are low, acoustic detection is more efficient than visual detection. It should be possible to establish acoustic monitoring stations at remote locations where right whales are known or suspected to have occurred in the past but have yet to be adequately surveyed (e.g., the Gulf of St. Lawrence and the eastern margins of the Grand Bank). The availability of real-time acoustic data also offers the possibility of improving the cost-effectiveness of certain aerial (and shipboard) survey efforts by allowing flights (or cruises) to go directly to areas where at least some right whales are known to be present. Finally, the recent inclusion of passive acoustics as part of NOAA’s Integrated Ocean Observing System is a welcome development that can be expected to contribute new information on right whale range and distribution.

**Drawbacks:** Although listening can establish the presence of calling right whales (within a radius of about 5 to 10 nautical miles [nmi] of a buoy in optimal listening conditions using current technology), a lack of detections cannot establish their absence from an area. A failure to detect calls may occur because the whales are not vocalizing or because of acoustic masking by noise from ship traffic or other sources. Further work is required before we understand the factors responsible for variation in calling rates, such as behavioral and reproductive state, time of day, and location, and the effect of this variation on detection probabilities using passive acoustic methods. Call characteristics and rates cannot be used to determine numbers of right whales present or to detect and assess entangled or injured whales, and it is not yet possible to identify individual right whales acoustically. Further development is needed to improve techniques for transmitting detections in real time and for analyzing and interpreting the acoustic data. Another drawback is that reduction or cessation of large-scale aerial surveys will lead to a loss of information critical to population assessment and monitoring. For example, calf counts are obtained from aerial surveys, and many of the detections of whales entangled in fishing gear are made during aerial surveys. Also, a reduction in aerial survey effort will mean fewer photographic records and therefore a loss of data for use in population analyses that involve
photo-identification (e.g., abundance estimation and assessments of individual health). For this reason, aerial surveys cannot be eliminated, but rather the current broadscale surveys should be replaced by a system of focused surveys designed to provide information necessary for demographic assessment. Such focused surveys could be conducted at much less cost (and risk to human life) than the current broadscale system of surveys. The utility of such surveys could be improved by incorporating knowledge gained from predictive modeling based on environmental correlates of right whale presence and absence. There will also be a continuing need for follow-up visual documentation of at least some of the acoustic detections (e.g., for periodic ground-truthing), which can be accomplished from aircraft or boats.

A balance is needed to ensure that, during the transition from aerial surveys to passive acoustic monitoring (or some other monitoring method), data critical to population monitoring continue to be collected and well-justified aerial survey programs are not terminated prematurely. Moreover, there continues to be a need for other tools that will improve knowledge of distribution patterns, perhaps including analyses of isotopic signatures from tissue samples and the deployment of satellite tags on a carefully selected sample of right whales. The panel was not able to reach consensus on the important question of whether satellite-tagging technology has been adequately developed and field-tested to ensure that it can be safely and effectively used on North Atlantic right whales. It does agree, however, that if any such program is initiated, it should include a follow-up monitoring component to assess the health and condition of tagged animals. Development of less invasive, long-term tags also should be encouraged and supported, and close consideration given to the potential of shipboard surveys to provide additional information on range and distribution.

The value of shipboard surveys deserves special consideration. Although not generally as cost-effective as aerial surveys for obtaining large-scale, synoptic views, shipboard surveys have fewer safety issues and provide a much wider array of opportunities for data collection (e.g., photography, biopsy sampling, fecal sampling, visual health assessments, observations of behavior, group size determination, acoustic recording, and measurements of environmental conditions). The photographs from shipboard surveys are the only ones that provide sufficient detail and are of high enough quality to support visual health assessment and, importantly, analyses of wounds and scars from interactions with fisheries. These latter analyses are, at present, the only means available for assessing the effectiveness of management actions to reduce entanglement risk. In part because of those advantages, shipboard surveys can be highly cost-effective in comparison to aerial surveys in some circumstances. For example, the designated right whale critical habitat in Cape Cod Bay was undetected as such during the broadscale aerial surveys conducted by the University of Rhode Island in 1979–1981. The significance of the area as habitat for right whales was, however, recognized from shipboard observations during the late 1970s and 1980s. In Cape Cod Bay, as in some other parts of their range, right whales in scattered groups or individuals making prolonged dives (18 to 25 minutes) are much more likely to be detected by shipboard surveys than by broadscale aerial surveys.

Some of the data on right whale distribution have come from aerial surveys in support of management programs. There has not always been a clear and consistent distinction between
research/monitoring and management functions of the surveys. Although integration can enhance cost-effectiveness, it also can create the potential for data collection and analyses that serve management but are not optimal for addressing key research questions. Therefore, the types of data needed for research and for management (mitigation) should be distinguished when designing and implementing aerial survey programs.

Table 1: Costs of actions to study range and distribution, FY2003/FY2005

<table>
<thead>
<tr>
<th>Activity/Source</th>
<th>FY 03</th>
<th>FY 04</th>
<th>FY 05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerial Surveys</td>
<td>$2,017,000</td>
<td>$2,906,544</td>
<td>$2,984,470</td>
</tr>
<tr>
<td>NMFS</td>
<td>1,484,000</td>
<td>1,854,000</td>
<td>2,345,000</td>
</tr>
<tr>
<td>Navy</td>
<td>155,000</td>
<td>155,000</td>
<td>155,000</td>
</tr>
<tr>
<td>U.S. Coast Guard</td>
<td>237,000</td>
<td>370,544</td>
<td>299,470</td>
</tr>
<tr>
<td>U.S. Army Corps of Engineers</td>
<td>141,000</td>
<td>174,000</td>
<td>185,000</td>
</tr>
<tr>
<td>National Fish and Wildlife Foundation</td>
<td>0</td>
<td>353,000</td>
<td>0</td>
</tr>
<tr>
<td>Massachusetts Environmental Trust</td>
<td>0</td>
<td>0</td>
<td>36,475</td>
</tr>
<tr>
<td>Shipboard Surveys</td>
<td>66,815</td>
<td>39,048</td>
<td>32,500</td>
</tr>
<tr>
<td>NMFS *</td>
<td>N/A*</td>
<td>N/A*</td>
<td>N/A*</td>
</tr>
<tr>
<td>New England Aquarium</td>
<td>64,315</td>
<td>36,548</td>
<td>31,000</td>
</tr>
<tr>
<td>Provincetown Center for Coastal Studies</td>
<td>2,500</td>
<td>2,500</td>
<td>2,500</td>
</tr>
<tr>
<td>Acoustic Monitoring</td>
<td>642,552</td>
<td>416,170</td>
<td>345,324</td>
</tr>
<tr>
<td>NMFS</td>
<td>627,552</td>
<td>416,170</td>
<td>285,324</td>
</tr>
<tr>
<td>International Fund for Animal Welfare</td>
<td>0</td>
<td>0</td>
<td>60,000</td>
</tr>
<tr>
<td>Stellwagen Bank National Marine Sanctuary</td>
<td>15,000</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$2,726,367</td>
<td>$3,361,762</td>
<td>$3,362,294</td>
</tr>
</tbody>
</table>

* Costs of ship time provided in-kind by NMFS (i.e., by making NMFS vessels available for dedicated right whale work) were not provided to the panel but were significant in all three years.

Note: The costs for aerial surveys and acoustic monitoring summarized in the table represent investments in both management and research, i.e., in both ship strike mitigation (early warning and avoidance systems; see section IV.A) and investigations of right whale range and distribution.

**Contribution to recovery program**

Reliable information on range and distribution is needed to identify critical habitat, facilitate the monitoring of right whales within high-use areas, plan research activities, and trigger or tune management actions. Knowing the entire range and distribution is important to ensure that animals have adequate protection throughout the year and that no large groups of individuals are unaccounted for.
Cost-effectiveness of actions

During FY03/05, a total of $9.45 million was spent on activities that contributed relevant data. Of that total, $7.91 million was spent on aerial surveys. The challenge of obtaining detailed information on the range, distribution, and movements of this whale population is formidable. There is no quick, simple, or inexpensive way to do it. The current state of knowledge represents an accumulation of data over many decades and from many different sources, some of it from activities carried out for other purposes. These factors make it impossible to quantify the true cost of studying the species’ range and distribution. Clearly, aerial surveys have absorbed a large proportion of the total funding for studying this topic, and the fraction has increased steadily from 74 percent in FY03 to 89 percent in FY05. Although the majority of the funds (72 percent) expended on surveys came from NMFS, other agencies and organizations provided $2.23 million over the three years.

The review panel accepts the judgment of NMFS scientists that alternative methods (passive acoustic monitoring, satellite tracking, shipboard surveys in unstudied areas, etc.) will ultimately prove more cost-effective and safer than aerial surveys. At the same time, the panel recognizes that some recent aerial surveys have fulfilled multiple, and important, research and management purposes. For example, photo-identification data have been obtained, and many of the detections of entangled right whales have been made during aerial surveys.

Shipboard surveys, in addition to providing data on range and distribution, offer opportunities to collect samples and data of many kinds. Actual expenditures for shipboard surveys during FY03/05 are greatly underrepresented in the foregoing table of costs, which includes only the amounts raised from non-NMFS sources to supplement the support provided in-kind by NMFS. More realistic estimates of the total amounts invested in shipboard surveys are approximately $300,000 in FY03, $286,000 in FY04, and $281,000 in FY05 (S. Kraus, pers. comm., October 2006).

Passive acoustic monitoring is a promising but still not fully developed tool and therefore is at present only potentially cost-effective for improving knowledge of range and distribution. Moreover, its eventual effectiveness might be restricted to areas that are readily accessible and known to be used by right whales. A significant investment has been made in development of passive acoustics methods, with $1.4 million spent on this topic during FY03/05, the vast majority by NMFS. Although controversial and not without some risk to the health of right whales, satellite tracking is a potentially cost-effective means of completing the inventory of habitat used by North Atlantic right whales. No expenditures to support satellite-tracking studies during FY03/05 were identified.

Recommendations

The apparent intent of NMFS to move away from aerial surveys and toward passive acoustic methods for assessing right whale range and distribution is both prudent and desirable. It is important, however, that the transition occurs gradually and with due regard to the need for
continuity in collecting photo-identification data, especially in the southeast region and in Great South Channel. In the short term, the panel recommends that aerial surveys be continued as needed to supply critical management information, while development, testing, and deployment of passive acoustic technology proceeds. A combined program of focused aerial surveys in areas where small survey vessels are unable to work easily (e.g., offshore in the Great South Channel or on the Northeast Peak of Georges Bank) and dedicated shipboard surveys in predictably used seasonal habitat of right whales would likely be the most cost-effective approach. It would address multiple management and science needs while allowing flexibility to respond to changes in whale distribution as well as the emergence of enhanced acoustic monitoring capabilities. Other approaches, including satellite tagging and isotope analyses, should be explored to determine what role they might play in refining our understanding of right whale range and distribution. In the medium to long term, aerial surveys explicitly for determining range and distribution should be used only in a carefully focused manner as needed to complement alternative methods. A major purpose of range and distribution studies should be to provide data needed to reassess the current designation of critical habitat under the Endangered Species Act.

B. Abundance and Trends

Databases

Two separate but related databases are supported by NMFS: the North Atlantic Right Whale Identification Catalog (hereafter, the Catalog), maintained at the New England Aquarium and the Right Whale Sightings Database (hereafter, the Sightings Database), maintained at the University of Rhode Island (URI). Both databases play critical roles in right whale conservation.

The Catalog is the cornerstone of right whale research and monitoring. It provides records of individual whale sightings that are used to estimate reproductive parameters, mortality rates, and other input to demographic models. In addition, the Catalog serves to link many other types of samples (e.g., biopsies) and information (e.g., health assessments) to individual whales. Among other services provided by the Catalog team are the provision of real-time data on individual whale identities for researchers engaged in biopsy darting or tagging; information on identity and health assessment of stranded, injured, or entangled right whales; and responses to requests for data to be used in many types of scientific and management analyses.

Ongoing maintenance of the Catalog has two essential aspects: (1) field collection of photographic images and associated data, and (2) photographic analysis, matching, confirmation, integration, and cataloguing previously unidentified individuals. Each year, approximately 3,000 sighting records are added to the Catalog. Somewhat paradoxically, the advent of digital photography has increased the workload of the New England Aquarium team as field researchers now contribute many more images every year, creating a backlog in processing andarchiving the information. In addition, the rich database of genetic information obtained from biopsy sampling has not yet been fully integrated into the Catalog. Ongoing curation and maintenance of the Catalog requires 4.7 person-years annually. The panel notes that the cost of the Catalog would rise substantially if there were a need to train new personnel for its curation and maintenance.
Maintenance of the Sightings Database involves processing, validating, and integrating survey and sightings datasets. This database, which includes records of species other than right whales (e.g., sea turtles and other marine mammals), serves NMFS and individual researchers by providing tailored subsets of data—e.g., for analyses used in stock assessment reports, environmental impact assessments, plans and designs of protected areas, and analyses of habitat. Like the Catalog, it has experienced rapid growth, doubling in the past three years to more than two million records. Much of the increase is due to expanded aerial survey effort.

The manager of the Sightings Database at URI (R. D. Kenney) has prepared a detailed manual explaining the procedures involved in its upkeep, but the panel is concerned about the extent to which the continuity and function of this database depend on Kenney’s continued availability.

*Trends in Abundance*

Despite the fact that the four primary criteria for downlisting this population pertain directly to its demography, there is no current or recent statistically derived estimate of the number of North Atlantic right whales. The most recent (2005) NMFS Stock Assessment Report notes “…no estimate of abundance with an associated coefficient of variation has been calculated for this population.” The primary factor responsible for this situation is not lack of data, as the Catalog provides a rich source of information on individual histories. Instead, the limiting factor is variation in the probability of sighting individual whales. That is, not all whales occur in specific study areas (and are thus available to be photographed) each year.

Mark-recapture and matrix population models applied to the Catalog data by Caswell et al. (1999) and Fujiwara and Caswell (2001) suggest that the population began to decline around 1992 after a period of modest growth. The models incorporated variation in sighting probabilities because estimates of survival and population growth that do not take into account such variation may give spurious and misleading results. The published model results incorporate sightings data only up to 1996.

NMFS scientists suggested at the workshop that the “minimum number of individuals known to be alive” is a potentially useful metric for tracking the population’s status, but the panel disagrees. Instead, the panel believes that, as called for in the Recovery Plan, a true estimate of population growth rate, or a reasonable proxy, should be generated on a regular basis, perhaps as part of the NMFS Stock Assessment Report process. Such estimates will become particularly important as specific management measures are implemented to reduce anthropogenic sources of mortality. Without a statistically appropriate demographic metric, it will be difficult or impossible to gauge the success or failure of management measures, let alone their cost-effectiveness.

Demographic metrics other than population growth rate may prove effective for monitoring population status. For example, this population’s growth rate is particularly sensitive to changes in the survival rate of adult females. Furthermore, adult females have consistently higher sighting probabilities than other age and sex classes. It might be possible, therefore, to monitor the status
of the North Atlantic right whale population by tracking changes in the survival rate of adult females. Further effort should be put toward the development of such a metric that would allow authoritative assessment on a regular and timely basis (e.g., annually). This would require identifying the data requirements and ensuring that they are met in a timely fashion. To achieve this, maintenance and more frequent updating of the Catalog will be necessary to ensure availability of the data for modeling purposes in a reasonable time frame.

Table 2: Costs of actions to study abundance and trends, FY2003/FY2005

<table>
<thead>
<tr>
<th>Activity/Source</th>
<th>FY 03</th>
<th>FY 04</th>
<th>FY 05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Whale Identification Catalog</td>
<td>$219,000</td>
<td></td>
<td>$363,000</td>
</tr>
<tr>
<td>NMFS</td>
<td>207,000</td>
<td>215,000</td>
<td>223,848</td>
</tr>
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<td>New England Aquarium</td>
<td>7,000</td>
<td></td>
<td>139,152</td>
</tr>
<tr>
<td>National Science Foundation</td>
<td>0</td>
<td>359,206</td>
<td></td>
</tr>
<tr>
<td>International Fund for Animal Welfare</td>
<td>5,000</td>
<td>5,000</td>
<td></td>
</tr>
<tr>
<td>Right Whale Sightings Database</td>
<td>98,962</td>
<td>117,815</td>
<td>124,949</td>
</tr>
<tr>
<td>NMFS</td>
<td>98,962</td>
<td>117,815</td>
<td>124,949</td>
</tr>
<tr>
<td>Population Modeling/Abundance Estimates</td>
<td>238,300</td>
<td>256,919</td>
<td>317,035</td>
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<tr>
<td>NMFS</td>
<td>228,300</td>
<td>229,483</td>
<td>296,128</td>
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<td>Woods Hole Oceanographic Institution</td>
<td>0</td>
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<td>International Fund for Animal Welfare</td>
<td>10,000</td>
<td>10,000</td>
<td>10,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$556,262</td>
<td>$953,940</td>
<td>$804,984</td>
</tr>
</tbody>
</table>

Note: Also see cost table on page 11; survey and monitoring work carried out for multiple purposes has contributed much of the data used in analyses of abundance and trends.

Contribution to recovery program

(a) Databases. Both principal databases—the Catalog and the Sightings Database—are essential to right whale recovery efforts. Many aspects of both research and management depend directly on access to up-to-date information that they contain. This information can be and often is provided very quickly (e.g., in the case of identifying an entangled whale).

(b) Trends in Abundance. Demographic analyses of the right whale population should be a high priority for NMFS. Any future assessment of the effectiveness of right whale recovery efforts will depend on an ability to determine whether the population is growing and, if it is, which specific actions are responsible. Also, given continued uncertainty regarding the effectiveness of various management actions, further investigations are warranted into the contribution of demographic processes (e.g., survival of the different age and sex classes, and birth rates) to
population growth rates. Some may argue that the current situation is so dire that detailed
demographic analyses are superfluous. The panel rejects such an argument and believes that,
given the significant investment of public funds in efforts to promote the recovery of this
population, it is essential for managers, stakeholders, and the public to know whether the North
Atlantic right whale population is increasing, decreasing, or stable.

**Cost-effectiveness of actions**

(a) *Databases.* During FY03/05, a total of $1.5 million was spent on maintenance of the two
primary right whale databases ($1.16 million on the Catalog and $0.34 million on the Sightings
Database). Both databases are essential for right whale recovery and have been diligently
maintained in a cost-effective manner. Furthermore, the Sightings Database includes important
information on other protected species that is being curated and made available to NMFS and
others at no cost to those programs.

(b) *Trends in Abundance.* During FY03/05 a total of $0.81 million was spent on population
monitoring and abundance estimates. The current lack of statistically derived estimates of either
abundance or trend means that further investment in this task will be necessary to provide
fundamental information needed for effective management.

**Recommendations**

(a) *Databases.* The Catalog and the Sightings Database are both essential elements of the right
whale recovery program and, as such, they should be fully funded on a stable basis. Each
database has particular needs that must be met during the next few years to place data processing
and analyses in support of the recovery program on a sound footing over the medium to long
term. Therefore, in addition to continuation of base support for the Catalog at a level of
approximately $360,000 (actual operating costs in FY 2005), the panel recommends that NMFS
provide a one-time funding supplement to the New England Aquarium to cover the costs of
clearing the data backlog and integrating genotype information with the photo-identifications.

The panel further recommends that NMFS continue to support the Sightings Database at a level
adequate to cope with the growing rate of data input. Because much of the effort being expended
on the database is due to sightings of sea turtles and other marine mammals, it would be
appropriate for some support to come from programs focused on those species.

The panel also recommends that NMFS consider the need to broaden administrative support, and
thus increase funding, for both databases to ensure the long-term continuity of these invaluable
resources.

(b) *Trends in Abundance.* The panel recommends that NMFS develop a system for regular
assessment of right whale numbers so that trends in abundance can be determined. As noted
above, such a system could either estimate a rate of increase directly, or use a surrogate
parameter, such as adult female survival, to determine the likely trend of the population. The
panel further recommends that NMFS take advantage of the considerable expertise in
demographic modeling in academic institutions to develop the methods for this assessment.

C. MORTALITY

Estimating mortality rates and determining causes of death are both critical components of the
going whale research program. Estimates of mortality (or survival) rates are required to
understand the demography of the population, as noted earlier. It is essential to know the causes
of death in order to understand which, and to what extent, anthropogenic factors are affecting the
population.

Estimating mortality rates is not straightforward because perhaps only half, or less than half, of
all deaths are discovered and reported (Knowlton and Kraus 2001, Kraus et al. 2005). To account
for deaths that are not observed, the Catalog assumes that any whale not resighted within six
years has died. Sighting records suggest that this assumption is reasonable in most but not all
cases. For example, right whale #1035 was seen 10 times between 1978 and 1986 in waters off
New England but was not resighted again until 2002, an interval of 16 years. Conversely, right
whale #1102 was the subject of an intensive disentanglement operation in 2001 before
disappearing in very poor condition. Although this whale almost certainly died, it is still
considered a living animal in the Catalog because no carcass has been found. With a longer time
series of observations, it may be possible to reevaluate the probability of mortality having
occurred after a given period of absence from the Catalog.

The necropsy program ranks alongside the Catalog and the Sightings Database as an
indispensable aspect of right whale recovery efforts. Evaluation of the effectiveness of mitigation
and protection measures will depend ultimately on an ability to demonstrate a reduction in
mortality from ship strikes and entanglements. Therefore, the capability to determine cause of
death, which begins with carcass detection and ends only with a definitive necropsy diagnosis,
needs to be maintained and enhanced.

During the period from 2000 to 2005, causes of death were determined for about half of the right
whales known to have died (12 of 23). Concerted efforts by NMFS, the Coast Guard, and the
Navy have been responsible for substantial improvements in the detection, reporting, and
recovery of carcasses. Likewise, NMFS, the U.S. Geological Survey, and a few exceptionally
committed researchers have greatly improved the quality and standardization of necropsy
protocols so that more information is obtained from each carcass. In particular, there have been
improvements in the diagnosis of blunt trauma associated with ship strikes. All of these efforts,
however, require sustained funding. Appropriate levels of support (salaries and adequate funds
for logistical expenses) are needed to keep necropsy team leaders engaged (only three teams are
currently in place). Arrangements for sites to perform necropsies are essential, so agreements
with the relevant state agencies for access to necropsy sites should be updated and expanded. In
addition, further standardization of necropsy protocols and the training of a broader pool of
necropsy team leaders are necessary.
The difficulty and complexity of obtaining conclusive results from necropsies and associated pathology and forensic investigations should not be underestimated. Difficult, uncomfortable, and stressful work by a small but dedicated cadre of individuals has provided the critical data presently available on causes of death for right whales. Although the panel recognizes and appreciates that work, it also believes that more effort is needed to investigate causes of death and, importantly, to trace those causes to precise times, localities, and circumstances. As explained by representatives of NMFS, determination of the exact type of fishing gear that was responsible for a given entanglement, and where the entanglement occurred, requires painstaking, careful documentation and can involve substantial logistical and legal complications. Nevertheless, the current long delays between carcass discovery and reporting with regard to the type of entangling gear (many months and, sometimes, years) are unacceptable. Mandatory gear marking (not only buoys, but also line and net material) as a condition for permission to fish with high-risk gear and methods (e.g., lobster traps and gillnets) is certainly desirable, and its feasibility should be evaluated. (For more discussion, see section IV.B. Also, note that much of the gear removed from right whales is obtained during attempts at disentanglement of live animals rather than during necropsies.)

The panel is well aware of how difficult it often is to determine, even approximately, where an entanglement took place or a ship strike occurred without observing the event. Nevertheless, knowing something about the proportions of lethal events that occur inside or outside areas designated as critical habitat, in shipping lanes, or on known migratory routes is essential for assessing effectiveness and improving management measures. This will require continued support for efforts to detect and examine carcasses, investigate the etiology of wounding and scarring on live animals, and determine where whales were killed, injured, or entangled.

Table 3: Costs of actions to study mortality, FY2003/FY2005

<table>
<thead>
<tr>
<th>Activity/Source</th>
<th>FY 03</th>
<th>FY 04</th>
<th>FY 05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Necropsy Teams</td>
<td>$0</td>
<td>$65,000</td>
<td>$65,000</td>
</tr>
<tr>
<td>NMFS</td>
<td>0</td>
<td>65,000</td>
<td>65,000</td>
</tr>
<tr>
<td>Logistics</td>
<td>91,596</td>
<td>150,169</td>
<td>231,259</td>
</tr>
<tr>
<td>NMFS</td>
<td>70,000</td>
<td>70,000</td>
<td>70,000</td>
</tr>
<tr>
<td>U.S. Coast Guard</td>
<td>21,596</td>
<td>80,169</td>
<td>161,259</td>
</tr>
<tr>
<td>Diagnostics</td>
<td>11,000</td>
<td>11,000</td>
<td>11,000</td>
</tr>
<tr>
<td>NMFS</td>
<td>11,000</td>
<td>11,000</td>
<td>11,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$102,596</td>
<td>$226,169</td>
<td>$307,259</td>
</tr>
</tbody>
</table>

Contribution to recovery program

Increased efficiency in detecting dead right whales at sea, better coordination among cooperating agencies in responding to carcasses, more consistent necropsy protocols, and new postmortem techniques have allowed the stranding program to play an increasingly important role over the
past decade. The response to stranding events is now an integral part of the right whale recovery program, contributing information on the rates and causes of death that is vital to understanding the population’s status and the anthropogenic threats affecting it.

**Cost-effectiveness of actions**

About $636,000 was spent during FY03/05 to secure right whale carcasses and examine them. Although NMFS expenditures over that three-year period remained relatively stable, Coast Guard assistance with logistics (principally retrieving floating carcasses) increased substantially. Coast Guard expenditures for logistics accounted for 38 percent of the total amount spent on mortality studies.

The investments by NMFS and the Coast Guard, together with the many hours of volunteer labor contributed by necropsy teams, have yielded significant information on the causes of right whale deaths. Such information is essential to the development of management and conservation actions that will assist in right whale recovery. Considering travel expenses, equipment needs (including rental of heavy construction equipment for moving carcasses), costs for laboratory analyses, volunteer help, and the difficulty of retrieving floating carcasses, this component of the recovery program is judged to have been very cost-effective.

**Recommendations**

Stranding response is a core responsibility of the recovery program and requires an adequate, ongoing funding base. This funding should be used principally to cover the recurrent but unpredictable costs of travel for necropsy teams. Funds should be made available each year to ensure that these teams are adequately equipped, stranded animals are moved to suitable sites for necropsy, heavy equipment is available for moving carcasses at necropsy sites, and essential laboratory analyses are conducted in a timely manner. The process of establishing cooperative agreements with the Navy, Coast Guard, and others for assistance in towing carcasses and securing shore areas to conduct necropsies appears well under way. Existing agreements should be maintained and others pursued to completion as needed. Finally, although recognizing the need for thoroughness and quality control, the panel believes that the analyses of gear removed from right whale carcasses (and entangled live animals) can and should be completed in a more timely and efficient manner.

**D. Assessment of Health and Reproduction**

Fecundity rates in the North Atlantic right whale population have shown significantly more inter-annual variation than expected by chance alone, and there have been two multi-year periods of very low calf production in the past two decades. In addition, there have been increases in the inter-birth intervals of individual females during the past two decades, suggesting that reproductive output has declined. Multiple hypotheses have been proposed to explain this variation and the possible decline in births, including long-term fluctuations in ocean conditions that affect copepod production, exposure to toxins and pathogens, and genetic factors. Whether
The observed variation is intrinsic to the species, caused by fluctuations in the environment, a result of human activities, or an artifact of sampling heterogeneity (e.g., caused by annual differences in behavior and habitat choices by individual whales) remains uncertain. It is possible that multiple factors are responsible, acting either additively or synergistically.

The above hypotheses have been examined to some extent, but, regardless of what is causing the variability, it is difficult to conceive of ways to substantially improve the health status of right whales and, in turn, increase their fecundity, by modifying human activities. It is possible that exposure to pathogens would be reduced through elimination (or at least improved management) of sources of contamination (e.g., sewage). Also, to the extent that human activities are responsible for the increased frequency and geographic expansion of harmful algal blooms, and if these are a health threat to right whales, it may be possible to take some kind of preventive action. Removal of entangling debris from adult females could improve their health and increase the likelihood that they will produce a calf. Otherwise, the health of right whales, and therefore their reproductive output, appears largely beyond human influence.

Investigations of right whale health nevertheless may be useful for understanding why this population is not recovering. Poor health of individual right whales could help explain why fecundity in this population is lower than the rates observed in some Southern Hemisphere right whale populations. Refinement of techniques that improve knowledge of animal health can play an important role in risk identification and assessment.

An impressive array of methods for assessing right whale health has been developed, including a visual health assessment protocol (Pettis et al. 2004) and an analysis of skin lesions (Hamilton and Marx 2005) using photographic images; fecal sampling and analyses of reproductive and stress hormones, lipid metabolism, parasites, etc. (e.g., Rolland et al. 2005); measuring blubber thickness with ultrasound (Moore et al. 2001); and efforts to carry out standard necropsies and associated histopathology on dead right whales (Moore et al. 2004). Application of such tools, and the development of new tools for health assessment, will continue through integration with (and at least limited support from) programs other than the NMFS right whale recovery program. It is important to recognize that health assessment, like many other parts of the overall right whale research and monitoring program, is subsidized by these other programs and that, conversely, core elements of the NMFS right whale program (photographic and genetic sampling, database management and maintenance, stranding response, surveys, etc.) provide the foundation that facilitates, and provides a necessary context for, such assessment. Further, the interest, initiative, and inventiveness of individual researchers are what drive much of this work.

Table 4: Costs of actions to assess health and reproduction, FY2003/FY2005

<table>
<thead>
<tr>
<th>Source</th>
<th>FY 03</th>
<th>FY 04</th>
<th>FY 05</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMFS</td>
<td>$561,000</td>
<td>$425,000</td>
<td>$321,000</td>
</tr>
<tr>
<td>Woods Hole Oceanographic Institution/Ocean Life Institute</td>
<td>0</td>
<td>88,044</td>
<td>92,444</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$561,000</td>
<td>$513,044</td>
<td>$413,444</td>
</tr>
</tbody>
</table>

21
Contribution to recovery program

Although various hypotheses have been formulated to explain the observed inter-annual variation in calf production of this population, there is no evidence that the variation is due to any human action. Nor is there evidence that the population’s failure to recover is due to poor health or reproductive impairment. More knowledge about individual animal health and reproductive condition will contribute to interpretations of observed trends and inform management planning, but it may not be possible to apply this knowledge directly to improve the population’s fecundity or status. Understanding how right whale reproduction might be coupled with broad ocean trends or cycles in productivity would provide an important context for evaluating the effectiveness of actions under human control.

Compromises to health and reproduction can, in some instances, be the result of injuries sustained from ship strikes or encounters with fishing gear. Therefore, in that sense, assessment of health and reproduction is, like the necropsy program, an integral part of the recovery program’s effort to improve understanding of threat factors.

Cost-effectiveness of actions

During FY03/05, a total of $1.49 million was spent on reproduction and health studies, with a steady decline in the level of support over that period. With the exception of support from the Woods Hole Oceanographic Institution’s Ocean Life Institute in FY04 and 05, all of the identified funding has been provided by NMFS. However, research on right whale health and reproduction has been funded in diverse and creative ways, making it difficult to assess its true costs. Moreover, some of the most important insights have come from efforts by individual scientists who have, by their own initiative and resources, pursued studies with relatively modest levels of federal funding. Much of what is known about right whale health and reproduction is a direct or indirect product of the Catalog, costs of which were included in Section III.B above. Overall, excellent scientific value has been realized from the federal funds invested in studies of right whale health and reproduction in recent years.

Recommendations

It is important that investigations of health and reproduction continue at some scale and that particular attention (and funding) be directed toward determining how serious injuries from ship strikes and entanglement are affecting the health and reproductive capabilities of individual right whales. Therefore, the panel encourages individual scientists to maintain their investigations in these areas ancillary to other programs and also encourages NMFS to provide them both direct and in-kind support. The panel recommends specifically that NMFS continue to support visual health assessment, which is relatively inexpensive and provides information potentially useful for predicting and explaining inter-annual variation in calf production and for monitoring injuries caused by ship collisions and entanglements.
E. Habitat

Major advances have been made over the past decade toward understanding habitat features that are important to right whales, especially in the calving and feeding areas off eastern North America. Management can benefit directly from improved understanding of (a) why right whales go where they go, (b) the cues that prompt them to move into or leave a given area, and (c) how they use the different types of habitat that they occupy.

In the southeastern United States, time series of right whale sightings from aerial surveys have been used to develop predictive models and characterize calving habitat for right whales. Among the more significant findings are that warm Gulf Stream waters represent a thermal limit and help define right whale offshore distribution within the calving grounds and that most sightings are in water depths of 10 to 20 m. This work, as well as analyses of sightings per unit of effort and predictive modeling, has led NMFS scientists to conclude that right whale habitat may extend outside the area designated as critical habitat for right whales in the Southeast. The aerial surveys discussed earlier (section III.A), designed to sample all nearshore waters off North and South Carolina, are expected to provide relevant data for further habitat analyses, including reevaluation of critical habitat designations.

In the Northeast, studies of right whale habitat in Cape Cod Bay have been ongoing for the past two decades, led by the Provincetown Center for Coastal Studies and supported by NMFS through contracts with the Massachusetts Department of Marine Fisheries. The studies have shown a tight coupling between high zooplankton abundance at the surface and relatively high-density occurrences of right whales. Right whales apparently come into the bay following an ecological signal of some kind that leads them to encounter large zooplankton concentrations. Why they leave the bay when they do is less clear and may have to do with memory of large copepod concentrations in other feeding areas to the north and east of Cape Cod Bay.

In the lower Bay of Fundy, a major summer feeding area, right whales appear to be closely associated spatially and temporally with dense patches of the copepod *Calanus finmarchicus* that often form just above the bottom-mixed layer in response to tidal movements. Evidence from digital archival tags (D-tags) indicates that the whales typically change their orientation while diving to feed near the bottom so that the dorsal surface of the head sometimes comes into contact with the seafloor. This research seems well justified because of its scientific value and clear relevance in addressing conservation concerns, particularly with regard to why and how right whales become entangled in fishing gear set over sandy bottom habitat. Similar D-tag studies in other types of habitat (e.g., rocky bottom) would likely provide information useful to management.

Major existing gaps in knowledge include (1) factors that determine the timing and routing of right whale movements between the Southeast and the Northeast (essentially as they go from North Carolina to Cape Cod); (2) factors that influence the presence of individuals other than reproductive females on the calving ground (e.g., is there a social component driving habitat selection in winter?); and (3) the large-scale physical processes that determine where and when
concentrations of right whale prey (especially *C. finmarchicus*) will become available. The work mentioned in III.A should provide data to address these knowledge gaps through modeling and other types of analysis.

**Table 5: Costs of actions to study habitat, FY2003/FY2005**

<table>
<thead>
<tr>
<th>Activity/Source</th>
<th>FY 03</th>
<th>FY 04</th>
<th>FY 05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat Studies in the Northeast</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NMFS</td>
<td>$0</td>
<td>$161,200</td>
<td>$100,100</td>
</tr>
<tr>
<td>Predictive Modeling in the Northeast</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NMFS</td>
<td>119,100</td>
<td>198,100</td>
<td>196,100</td>
</tr>
<tr>
<td>Modeling in the Southeast</td>
<td>56,000</td>
<td>56,000</td>
<td>56,000</td>
</tr>
<tr>
<td>Florida Wildlife Research Institute GIS Analysis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NMFS</td>
<td>125,000</td>
<td>125,000</td>
<td>125,000</td>
</tr>
<tr>
<td>D-TAG Studies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Fish and Wildlife Foundation</td>
<td>0</td>
<td>123,924</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$300,100</td>
<td>$664,224</td>
<td>$477,200</td>
</tr>
</tbody>
</table>

**Contribution to recovery program**

Understanding the habitat requirements of right whales and the ecological factors driving those requirements is vital for effective management. Such information is necessary for informed decision-making concerning critical habitat designations and to allow prediction of where and when concentrations of whales will occur (e.g., by linking them to prey concentrations) and therefore where and when protective measures should be applied.

**Cost-effectiveness of actions**

During FY03/05, a total of $1.44 million was spent on habitat studies. A large portion of the funding for aircraft surveys came directly from NMFS, was directed toward states for the purpose of flying surveys, or, in some instances, was provided through the National Fish and Wildlife Foundation on the advice of NMFS. In addition, many of the analyses of this population’s habitat have relied on data from the multi-purpose field and data management activities, costs of which are discussed in sections III.A and III.B. There was no straightforward way for the panel to determine what portion of the costs of multi-purpose data collection and data management should be apportioned to habitat studies. Therefore, the panel was unable to determine the true costs, or the cost-effectiveness, of recent habitat assessment work.

The finescale studies of right whale diving and habitat use (e.g., using D-tags) have delivered high value in relation to the scale of funding (a one-time grant of $123,924). Importantly, such fine-scale studies often have numerous applications, only one of which is to improve
understanding of habitat requirements and habitat use. Understanding the population’s habitat requirements can help focus survey and other research efforts and thereby minimize cost and maximize effectiveness.

**Recommendations**

Most activities proposed in areas designated as critical habitat are automatically subject to increased scrutiny by ESA section 7 requirements. Also, the boundaries of critical habitat may be used as a basis for various regulatory actions (e.g., some of those currently in place under the Atlantic Large Whale Take Reduction Plan). Longstanding designations of right whale critical habitat have proven well justified, but the panel believes that a reanalysis is needed. It should include reconsideration of the boundaries of currently designated critical habitat areas and evaluation of new areas for possible designation.

The panel also recommends the continuation of localized studies of factors determining habitat use (e.g., triggers for arrival and departure of whales in a given area, threshold plankton concentrations to support right whale feeding, and multivariate predictive modeling of habitat).

**F. GENETICS**

Genetic analyses of North Atlantic right whales provide important information on the identity, sex, and relatedness of individual whales, the current and historic genetic diversity of this population, the relationship of these right whales to other populations and species, and insight into the potential effects of small population size on vital parameters and health. NMFS has not funded any genetics research on North Atlantic right whales during the last three years. However, genetic analyses have been conducted during this period using biopsy material obtained through NMFS-supported field programs and with the support of sighting histories documented in the Catalog. One of the important findings of this research is that the photo-identification procedures are extremely robust with a very low (less than 1 percent) error rate.

Another important finding from genetic studies is that a significant portion (16 to –21 percent) of the reproductively active males in this population has not been sampled; their existence is known only indirectly by excluding all other males in a paternity analysis. This finding suggests that the population is larger than currently believed, particularly if an equivalent number of females also have not been sampled (although there is no *a priori* reason to believe that this would hold for females).

About 40 percent of the calves born each year are not taken by their mothers to the Bay of Fundy feeding ground. Since callosity patterns on neonates are not sufficiently developed for reliable photo-identification, genetic sampling of calves produced by “non-Fundy” females on the southeastern U.S. calving ground is an important component of population monitoring. This work requires real-time coordination with the New England Aquarium staff to direct biopsy sampling toward new calves that have not yet been sampled. The resulting information helps to refine understanding of the total number of calves produced each year.
The research by scientists at Trent University on mating incompatibility and fetal loss due to genetic characteristics ("inbreeding") may prove relevant in helping to explain this population’s apparently low fecundity compared to that of some southern right whale populations.

**Table 6: Costs of actions to study genetics, FY2003/FY2005**

<table>
<thead>
<tr>
<th>Source</th>
<th>FY 03</th>
<th>FY 04</th>
<th>FY 05</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMFS</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>National Fish and Wildlife Foundation</td>
<td>0</td>
<td>0</td>
<td>45,135</td>
</tr>
<tr>
<td>Woods Hole Oceanographic Institution</td>
<td>0</td>
<td>21,233</td>
<td>78,766</td>
</tr>
<tr>
<td>New England Aquarium</td>
<td>3,007</td>
<td>3,869</td>
<td>12,911</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$3,007</td>
<td>$25,002</td>
<td>$136,812</td>
</tr>
</tbody>
</table>

*Note:* The costs involved in collecting tissue samples for genetic analyses (e.g., costs of shipboard surveys, necropsies, and disentanglement attempts) are not reflected in this table. (For such costs, see sections III.A, III.C, and IV.B, respectively.)

**Contribution to recovery program**

Genetic research adds to understanding of the demography of this population and is interesting scientifically. Like the research on reproduction and health assessment, however, it should not detract from support for surveys of right whales, maintenance of the key databases, studies to document causes of mortality, and habitat assessment.

**Cost-effectiveness of actions**

During FY03/05 a total of $164,821, all of it from sources other than federal agencies, was invested in studies of genetics. The panel did not consider it appropriate to make a judgment about cost-effectiveness. Nevertheless, the finding that up to one-fifth of the males in this population has never been sampled is certainly a high-value result.

**Recommendations**

Further genetics studies should be supported according to the merits of individual proposals (in terms of both conservation relevance and scientific quality) and the availability of funds. This research component is a core element of the recovery program that, from a budgetary and practical standpoint, should be incorporated largely into the activities described in Section III.B.

**H. PERMITS**

The panel’s review of the right whale research program did not address research permits as a separate issue or in detail. However, this issue was raised by some of the involved scientists during the course of the workshop. It was clear that, as a strategy for litigation avoidance, NMFS has been seeking to comply fully with the requirements of the National Environmental Policy
Act (NEPA) with respect to issuance of research permits. Because North Atlantic right whales are endangered, concerns about the potentially negative effects of research on them (e.g., disturbance from repeated close approaches and physical harm or health impairment associated with tagging) go beyond animal welfare and humane treatment alone; they extend to the potential for effects at the population level that would run counter to the goals of conservation. Without discussing individual cases, the panel is convinced that extremely long delays in permit issuance have sometimes seriously impeded progress on both population monitoring (e.g., biopsy sampling of calves in the Southeast) and the development of effective mitigation (e.g., field experiments with new types of rope to reduce entanglement risks and D-tagging to improve understanding of whale behavior). The process has created serious inefficiencies, increased costs, and delayed research that could guide recovery actions. NMFS has prepared an environmental impact statement to address NEPA-related issues specifically with regard to scientific research. The environmental assessment was intended, in part, to speed up the permit issuance process while at the same time ensuring that NMFS would be in full compliance with its NEPA obligations. The panel nevertheless concludes that the problem of having critical monitoring and mitigation work delayed by the permitting process needs to be addressed as a matter of urgency and not folded into a prolonged, comprehensive process of systemic reform.
IV. FINDINGS OF THE PANEL:

PROTECTION AND RECOVERY

The vast majority of the federal government’s effort with regard to protection and recovery has revolved around the twin goals of reducing deaths or serious injury from ship strikes and entanglement in fishing gear (bycatch). That emphasis is entirely appropriate.

A. SHIP STRIKE REDUCTION

On average, one or two ship strike deaths of right whales are documented annually along the East Coast of North America. Given that not all events are reported and not all right whale carcasses are recovered and subjected to a definitive necropsy, these numbers almost certainly underestimate the true mortality caused by ship strikes. The potential biological removal (PBR) level (the number of deaths and serious injuries that the population can withstand in addition to natural mortality as defined in the Marine Mammal Protection Act) has been set at zero for this population, meaning that any ship strike-related mortality or serious injury is unsustainable and should not be permitted.

To date, measures to reduce collision risks have consisted primarily of providing advice to vessel operators and urging them to exercise caution and seek to avoid hitting right whales. The main elements of NOAA’s ship strike reduction strategy can be summarized as follows:

- The use of aerial surveys, known as Early Warning System (EWS) flights in the Southeast and Sighting Advisory System (SAS) flights in the Northeast. The surveys have been conducted annually in the Southeast during winter (1 December to 31 March) since 1993 and year-round in New England since 1997. Once right whales have been detected, mariners are alerted via NAVTEX, Notices to Mariners, the Mandatory Ship Reporting (MSR) outgoing message, NOAA weather radio, and other routes, and advised (at least through the “NOAA-mediated” outlets) to reduce speeds (to no more than 10 knots) and increase vigilance in the area(s) of the sighting(s).
- Since 1997 enforcement of a “500-yard no-approach” regulation for all vessels (including whale-watching boats) and aircraft in the vicinity of any right whale.
- MSR systems, jointly funded by NOAA and the Coast Guard, in place since 1999, to provide information, including that obtained from the early warning and advisory system surveys, to mariners entering areas where right whales occur in New England and Florida/Georgia. These systems apply to vessels larger than 300 gross tons.
- Since mid-2005 NOAA advisories specifying that speeds of 10 to 12 knots or less should be maintained in areas of known or expected right whale presence, communicated to mariners via NOAA weather radio and other NOAA outreach mechanisms.
- Consultations under Section 7 of the Endangered Species Act that have led the Army Corps of Engineers, the Coast Guard, and the Navy to modify their operating procedures
in areas where, or at times when, the risks of ship strikes on right whales are considered especially high.

- Interagency collaboration, especially with the Coast Guard, Navy, and Canada’s Department of Fisheries and Oceans, on right whale conservation measures.
- Extensive outreach and mariner education efforts.

These measures have not brought an end to ship strikes, nor is there any evidence that they have reduced the incidence of such events. Between September 2001 and February 2006 at least seven right whales, including four adult females, a juvenile female, and a female calf, have died from ship strikes. Those losses to the reproductive potential of the population are alarming by any standard, and even more so considering the likely negative bias in the number of deaths observed. It must be concluded, therefore, that although the ship strike reduction strategy may have prevented some collisions, it has not been successful in addressing this threat to North Atlantic right whales.

Recognizing the need for stronger measures, NMFS has been developing and evaluating a number of initiatives since the late 1990s. The options being considered consist primarily of (a) regulating vessel speeds, (b) changing vessel routing, (c) expanding mariner awareness and education efforts, and (d) developing and testing collision avoidance technology. The primary approach is to separate whales and vessels to the maximum extent feasible. Where such separation cannot be assured, a secondary approach is to reduce vessel speeds. This order of priority is well justified given what is known and not known about ship/whale interactions.

Regulation of vessel speeds

A proposed rule that would establish speed limits of 10 or 12 knots for large vessels (>65 ft) in specified areas is currently working its way through the rulemaking process, with the expectation that final regulations could take effect by mid-2007. Two types of areas would be designated: seasonal management areas (SMAs), where right whales are regularly expected to occur in relatively high densities, and dynamic management areas (DMAs), where right whales occur unpredictably. The first would impose speed restrictions during specified periods each year; the latter would involve temporary (15-day) imposition of speed restrictions.

Although this was not made explicit during the review, DMAs presumably would involve triggering criteria similar, if not identical, to those used for dynamic area management of fisheries (see IV.B). In other words, some threshold density (e.g., 0.4 whales per nmi²) documented by direct observation (aerial or shipboard, but possibly in the future by passive listening devices) would trigger the DMA designation process.

Information presented by NMFS representatives at the workshop indicated that the cost implications of reducing vessel speeds as suggested in the proposed rule are small relative to the total value of East Coast shipping ($325.1 billion). The direct costs of a 10-knot limit are estimated at $66.4 million and the overall costs at $116.1 million (including direct and secondary costs). Corresponding costs of a 12-knot limit are estimated to be $44.1 million and $62.4
million. Difficulties of monitoring and enforcing speeds of vessels at sea need to be addressed, bearing in mind evidence that suggests relatively small differences (a few knots) in vessel speed can make a crucial difference in whether a lethal strike on a whale does or does not occur.

NMFS can expect to be challenged to demonstrate quantitatively the conservation benefits of vessel speed regulation. For example, how many fewer ship strike deaths of right whales can be expected if the limit is set at 10 knots rather than 12? There should be no illusions about the feasibility of producing robust calculations of that kind, given the many uncertainties and biases in the data on numbers, locations, and causes of ship strikes, as well as the small sample sizes in the available database (ship strikes on right whales are rare events in absolute terms). Nevertheless, the panel shares the opinion of many other scientists, based on the best data available, that a significant reduction in lethal ship strikes would be achieved if vessel traffic were limited to 10 knots or slower within areas of high right whale density.

The Automated Identification System (AIS) currently used on vessels larger than 300 gross tons provides mariners with information on the location of other similarly equipped vessels within a range of about 60 nmi. Although not intended for such a purpose, AIS transmissions have the potential to monitor point-to-point ship speeds and could be used for enforcement of ship speed limits. To do so, however, would require a shore-based receiving system, which the system is apparently designed to accommodate. The review panel believes that such a system offers considerable promise for future monitoring and enforcement systems.

Regulation of vessel routing

Frequently when a right whale carcass is initially sighted near a shipping lane off a major port, the death proves to have been the result of a collision. (It must be borne in mind, however, that the precise locations of most ship strikes are unknown, and strikes may happen anywhere within the species’ range.) Therefore, steps have been taken to adjust some shipping lanes in both Canada and the United States to reduce the risks to right whales.

According to a Canadian official at the workshop, an analysis of data on whale distribution and shipping traffic indicated that shifting the western boundary of the traffic lanes in the Bay of Fundy westward by 3.9 nmi would reduce the probability of ship strikes by 80 to 90 percent. As a result, the traffic separation scheme (or shipping lanes) in the Bay of Fundy was altered in 2003 specifically to achieve such a reduction in risk. This required a formal procedure in which Canadian officials prepared a proposal for submission to, and acceptance by, the International Maritime Organization (IMO).

In the United States, NMFS submitted a proposed change to the port of Boston’s shipping lanes to the IMO in April 2006. If approved, this change could be implemented by mid-2007. The proposal includes a 12-degree shift in orientation of the northern leg and a narrowing of the two traffic lanes by approximately one-half mile each. These changes are expected to result in a 58 percent reduction in the risk of ship strikes on right whales and an 81 percent reduction in the risk of strikes on other large whales. Although it is not mandatory that vessels entering and
leaving Boston follow identified traffic lanes, most vessels do adhere to them. The panel commends the Service and the staff of the Stellwagen Bank National Marine Sanctuary for the painstaking work involved in bringing this measure to its present stage.

NMFS also is considering non-regulatory measures to establish recommended routes for ships in Cape Cod Bay and the Southeast, developed collaboratively with the Coast Guard (e.g., using Port Access Route Studies). Such recommended routes would be communicated via navigation charts and other means. The intention of the measures would be to reduce the overlap between whales and ships by minimizing ship transit distances through the highest-use whale habitat and encouraging ships to avoid specific whale aggregation areas. NMFS has indicated that it will monitor adherence to the designated shipping lanes and assess the need for making them mandatory.

The panel was advised by a representative of the Coast Guard that, although shipping lanes are generally non-mandatory, IMO rules do allow them to be made mandatory. Moreover, it was noted that the main purpose of a traffic separation scheme normally is to reduce the risks of collisions between ships or with fixed objects, and of groundings. The panel welcomes and commends the evident willingness of both NOAA and the Coast Guard to proceed with measures involving traffic separation schemes for the unorthodox purpose of reducing risks to right whales.

Finally, NMFS is considering establishment of an Area To Be Avoided in the Great South Channel where right whales congregate to feed in the spring. Such a designation would require IMO approval, and it is anticipated that a formal proposal will be ready for submission by April 2007. There is adequate evidence of this area’s importance to right whales to justify at least seasonal regulation of vessel traffic there. In the panel’s view, serious consideration should be given to the possibility of complete closure to large vessel traffic during part or all of May and June each year. Regardless of how the area is configured or managed, it will be important to anticipate and allow for unintended consequences, such as the displacement of high-speed traffic and exposure of whales to greater risks in another part of their range (e.g., while they are moving into or out of the restricted area). Although approximately 90 percent of existing Areas To Be Avoided are voluntary, the panel strongly encourages a mandatory approach in this instance for two reasons: (1) the fact that such a high proportion of the population uses the area on a regular basis, and (2) the whales’ intensive use of the area is strongly seasonal, so closure could be confined to a relatively small part of the year.

Awareness, outreach, and education

The Service has invested significantly in a campaign to make mariners aware of the ship strike problem and to encourage steps on their part to prevent collisions with right whales. Brochures, pamphlets, placards, magazine articles, and videos have been distributed widely; navigational and regulatory charts pertaining to U.S. East Coast shipping are annotated with cautionary notices; and information on right whale collision risks and advice on how to avoid them is posted on relevant Web sites. The campaign has wisely extended beyond the shipping industry to
include enforcement agencies (maritime police, Coast Guard, etc.), the military, the cruise ship industry, and the recreational boating community.

Research and development

Representatives of NMFS expressed their intention to continue the search for technologies that would either allow vessel operators to detect whales in advance so that they could steer to avoid collisions or that would alert whales to oncoming vessels and allow them to take evasive action. They regard passive acoustics as a particularly attractive avenue of investigation, hoping that improvements in detecting right whales (in real time) will allow regulations to be fine-tuned with minimal economic impacts. Also, as indicated earlier, it is hoped that passive acoustics will, in time, reduce the need for costly aerial surveys.

There is also a strong impetus within NMFS to improve understanding of the physical dynamics of vessel/whale interactions. Some of this work involves tests in flow tanks using right whale models. Although such tests are potentially informative, the panel was skeptical whether static models and laboratory conditions would provide useful insights justifying the relatively high costs of such studies. That said, it is important to acknowledge the insights gained in the past from laboratory studies of hydrodynamic effects of large vessels (Knowlton et al. 1995) and field studies of right whale behavior and responsiveness (e.g., Nowacek et al. 2001, 2004), both supported by NMFS funding. Both types of studies have revealed specific problems that need to be taken into consideration for a ship strike reduction strategy to be successful.

A pilot project currently underway in the Stellwagen Bank National Marine Sanctuary (with active involvement by NMFS in its design and implementation and with partial funding from NMFS) holds promise for combining data from passive acoustic monitoring with vessel traffic data from AIS transmissions to manage ship/whale interactions on a real-time basis. Ideally, such an approach could facilitate the designation of dynamic management areas (see earlier discussion and section IV.B) and provide a means of monitoring vessel responses to advisories concerning the locations of right whale sightings. Although the panel recognizes the potential value of this approach, it is concerned about possible limitations, both practical and fiscal. For example, a large amount of computing capacity will be required to manage, process, and integrate the massive flow of data coming from both passive acoustic monitoring and the AIS. There also will always be a risk that right whales are present but not heard in a given area, whether because they are not vocalizing or because their sounds are being masked by ship or ambient noise. Although it was pointed out that buoys are already in place for the pilot acoustic monitoring project and therefore the costs of deployment on Stellwagen Bank should be modest, extending the buoy network to cover known or suspected high-use areas throughout the entire range of right whales along the U.S. East Coast will require a huge amount of infrastructure with significant associated cost implications.
Compliance with advisories

Studies of the extent to which vessel operators use EWS/SAS advisories and recommendations are notably lacking, as are studies of how information provided through other awareness and education programs has been used to reduce the risk of ship strikes. Results of a pilot project using AIS to assess voluntary compliance with speed and routing advice in the Great South Channel were not encouraging. Only 2 of 40 monitored ships changed course to avoid right whale aggregations and only 1 reduced its speed measurably (Moller et al. 2005).

Representatives of the Navy and Coast Guard offered the panel assurances that they have protocols onboard their vessels for observing and avoiding right whales. However, no data were provided on, for example, when and where observations had led to avoidance maneuvers or near misses had been noted by the onboard observers. Without such data, it is difficult to judge effectiveness and impossible to generate ideas on how to improve effectiveness. Although data on near misses have been collected opportunistically in a standardized manner since 2001 as part of the EWS aerial survey program in the Southeast, it was unclear if those data had been analyzed and used to refine mitigation measures. Moreover, the panel questioned how meaningful such reports would be, given that they come from surveys that provide no coverage at night or during inclement weather. For enforcement as well as scientific purposes, a priority should be placed on obtaining high-quality photographs or video of vessel interactions with right whales.

NMFS and the Coast Guard appear to be assessing compliance with the MSR systems with rigor and transparency, noting increased compliance rates over time following the initiation of steps to issue citations for non-compliance. Ongoing problems are recognized and efforts are being made to address them. With regard to the EWS program’s effectiveness, however, the panel was puzzled to learn that mariners are advised of right whale sightings only as they approach ports and not as they leave. The reason for this asymmetry was said to be that, under the existing IMO-approved arrangement, the Coast Guard is empowered to board vessels and enforce measures as a condition of port entry but not necessarily once a vessel leaves port.

NMFS representatives stated their belief that outgoing mariners almost certainly would receive information about right whales in the normal course of checking NOAA radio and other sources before or as they leave port, although that apparently has not been verified. In the Southeast, harbor pilots are issued pagers that receive real-time information on sightings for their use as they pilot vessels both into and out of port. A NOAA e-mail address is also available for vessel operators to send messages and to receive automated responses giving information on whale locations. In the panel’s view, it is important to verify that mariners are aware of right whale locations both when entering and leaving port. If that is not occurring, steps should be taken to correct this deficiency. It is equally important to ensure that individuals who receive right whale advisories respond appropriately. In other words, more studies of the kind mentioned earlier for Great South Channel are needed to assess the extent to which such advisories are heeded by mariners.
The panel also notes that MSR messages sent to vessels by the Coast Guard do not include speed advisories because the Coast Guard considers specification of a speed that is “safe” for whales to be premature. This is despite the fact that NOAA-mediated outlets have begun advising vessels to reduce speeds to 10 to 12 knots or slower in high-risk areas or circumstances. The panel believes that it is very important for specific ship speed advisory information to be included in the MSR and other Coast Guard-generated messages.

### Table 7: Costs of actions to reduce ship strikes, FY2003/FY2005

<table>
<thead>
<tr>
<th>Activity/Source</th>
<th>FY 03</th>
<th>FY 04</th>
<th>FY 05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of speed regulations</td>
<td>$100,000</td>
<td>$450,000</td>
<td>$450,000</td>
</tr>
<tr>
<td>NMFS</td>
<td>$100,000</td>
<td>$450,000</td>
<td>$450,000</td>
</tr>
<tr>
<td>Development of routing measures</td>
<td>269,400</td>
<td>264,400</td>
<td>291,000</td>
</tr>
<tr>
<td>NMFS</td>
<td>149,700</td>
<td>204,700</td>
<td>219,000</td>
</tr>
<tr>
<td>U.S. Coast Guard</td>
<td>35,000</td>
<td>35,000</td>
<td>35,000</td>
</tr>
<tr>
<td>International Fund for Animal Welfare</td>
<td>60,000</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Stellwagen Bank National Marine Sanctuary</td>
<td>24,700</td>
<td>24,700</td>
<td>37,000</td>
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<tr>
<td>Public outreach</td>
<td>9,000</td>
<td>80,000</td>
<td>97,000</td>
</tr>
<tr>
<td>NMFS</td>
<td>0</td>
<td>71,000</td>
<td>71,000</td>
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<tr>
<td>International Fund for Animal Welfare</td>
<td>9,000</td>
<td>9,000</td>
<td>26,000</td>
</tr>
<tr>
<td>Research on whale avoidance technologies</td>
<td>1,897,800</td>
<td>2,657,713</td>
<td>1,753,825</td>
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<td>NMFS</td>
<td>1,874,047</td>
<td>2,611,699</td>
<td>1,685,332</td>
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<td>New England Aquarium</td>
<td>23,753</td>
<td>46,014</td>
<td>68,493</td>
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<td>Compliance studies</td>
<td>0</td>
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<td>0</td>
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<tr>
<td>Enforcement</td>
<td>64,668</td>
<td>67,512</td>
<td>87,592</td>
</tr>
<tr>
<td>NMFS</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>U.S. Coast Guard</td>
<td>64,668</td>
<td>67,512</td>
<td>87,592</td>
</tr>
<tr>
<td>Whale sighting/advisory systems (i.e., EWS/SAS aerial surveys)</td>
<td>1,114,649</td>
<td>1,124,788</td>
<td>1,607,200</td>
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<tr>
<td>NMFS</td>
<td>617,000</td>
<td>558,000</td>
<td>988,000</td>
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<tr>
<td>U.S. Coast Guard</td>
<td>201,649</td>
<td>237,788</td>
<td>279,200</td>
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<tr>
<td>U.S. Navy</td>
<td>155,000</td>
<td>155,000</td>
<td>155,000</td>
</tr>
<tr>
<td>U.S. Army Corps of Engineers</td>
<td>141,000</td>
<td>174,000</td>
<td>185,000</td>
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<tr>
<td>Mandatory ship reporting systems</td>
<td>266,876</td>
<td>284,379</td>
<td>296,353</td>
</tr>
<tr>
<td>NMFS</td>
<td>110,000</td>
<td>110,000</td>
<td>110,000</td>
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<tr>
<td>U.S. Coast Guard</td>
<td>156,876</td>
<td>174,379</td>
<td>186,353</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$3,722,393</td>
<td>$4,928,792</td>
<td>$4,582,970</td>
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</table>

*Note: The values shown for “whale sighting/advisory systems” are redundant with (for Navy and Army Corps of Engineers) or subsumed within (for NOAA and Coast Guard) those given for aerial surveys in section III.A.*
Contribution to recovery program

Rulemaking

Management of vessel traffic to reduce the frequency and severity of ship strikes is vital to the recovery of North Atlantic right whales. The panel questions the effectiveness of the mitigation program currently in place, which consists primarily of encouraging voluntary action on the part of vessel operators to avoid collisions with whales. Ship strikes have continued to occur with no evidence of a reduction in their frequency or severity. The recent strategy proposed by NMFS, which includes mandatory speed restrictions and new routing measures, however, offers considerable promise.

Awareness, Outreach, and Education

The belief that these efforts will contribute to recovery qualifies as common sense, but there is no evidence that complete reliance on them to encourage voluntary action has made a significant difference with regard to reducing ship collisions thus far. Little information was provided to the panel that could be used to evaluate whether the work carried out to date has contributed to recovery or has been well directed. Further, there is little basis for determining the relative value of the different types of awareness, outreach, and education products.

Research and Development

Valuable insights have been gained from studies of ship hydrodynamics and the behavior and responsiveness of right whales when approached by ships. Overall, the results point to two major conclusions: (1) it is unrealistic to expect a technological solution to this problem in the near term, and probably even the medium term; and (2) the only available solution is to separate ships from right whales in space and time. Although data are limited, the best evidence available confirms that ship speed affects the risk of collisions with whales and therefore that the imposition of speed limits is an appropriate measure.

Cost-effectiveness of actions

During FY03/05 a total of $13.23 million was spent on actions to reduce ship strikes on right whales. Of that total, NMFS provided $10.38 million.

Rulemaking

The total cost during FY03/05 to develop speed regulations and routing measures as part of ship strike reduction strategies was $1.82 million. The large investment in this aspect of the recovery program is consistent with its importance. Although the new ship strike reduction strategy currently being proposed appears carefully developed and sensible, the biological costs of the slow pace of development, in terms of dead right whales, have been substantial. Such high financial costs and the long development time must be evaluated in the context of procedural
rulemaking requirements—environmental impact statement preparation, economic impact analyses, scoping processes, port access route studies, etc. Assuming that the various elements of the strategy are implemented during the coming months as anticipated, the program may well be judged cost-effective. However, this will depend on the specific provisions of the various elements, particularly those related to speed limits and routing measures, and the extent to which vessel operators comply with them.

The slowness of rulemaking is largely systemic and therefore not necessarily a reflection of inattention on the part of NMFS. Although not rapid, the work of NMFS scientists and managers in this regard appears to have been thorough and conscientious.

The present early warning system consists of detection of right whales via dedicated aerial surveys and platforms of opportunity (e.g., Coast Guard aircraft and vessels, research vessels, and whale-watching vessels), followed by notification of vessel operators, with the expectation that they will respond appropriately to avoid collisions with right whales. During FY03/05 a total of $4.7 million was spent to gather data and operate the system. The effectiveness (and thus cost-effectiveness) of the system, in terms of preventing ship strikes, is difficult to evaluate with the information available. The panel acknowledges that useful data on whale distribution, entanglements, and individual identification have been gathered by the aerial surveys.

Studies of ship traffic volume and routing have been accomplished in a rigorous, thorough manner and have been effective in providing support for rulemaking. A great deal of valuable information on traffic volumes and patterns has been obtained and is being analyzed through the MSR system. The continued collection and analysis of such data are warranted, particularly for assessing compliance with, and cost-effectiveness of, new vessel routing measures.

Awareness, Outreach, and Education

During FY03/05, $187,000 was spent specifically on public awareness, outreach, and education, with $142,000 allocated by NMFS and the remainder by the International Fund for Animal Welfare. Without an empirical analysis of some kind to evaluate the effectiveness of different mechanisms or media (e.g., brochures, posters, radio broadcasts, training films, etc.) for bringing about changes in vessel operations in right whale high-use habitat (e.g., posting watches, adjusting speeds, or changing routes), it is impossible to determine whether this program has been cost-effective.

Research and Development

During FY03/05, $6.31 million was spent on research related to whale avoidance technology (e.g., whale detection devices, acoustic alarms, ship hydrodynamics, and the behavior and responsiveness of right whales when approached by ships). This accounted for 48 percent of the total amount spent during that period for ship strike reduction. As indicated earlier, those expenditures have failed to produce a technological solution that would allow ship traffic to operate without restraint (e.g., a vessel-mounted acoustic device that would detect whales or
cause them to move away as the vessel approached). Further investment of federal funds in efforts to develop or test such devices is not likely to be cost-effective.

Recommendations

Rulemaking

The situation with ship strikes of right whales is well past the point at which precautionary action became justified; such action is long overdue. Therefore, regulatory action should be taken with all possible haste. If further delays arise in the rulemaking schedule presented at the workshop (i.e., final action by early 2007), the panel recommends that emergency rulemaking authority be used. Ongoing research will improve our understanding of whale behavior, ship hydrodynamics, the role of speed, and other factors potentially relevant to incidence and severity of ship strikes, and it may be possible to revise or scale back regulations accordingly. The panel recommends that NMFS proceed as rapidly as possible to implement a speed limit of 10 knots for seasonal and dynamic management areas, with the understanding that this precautionary approach (i.e., 10 knots rather than some faster speed) is appropriate for addressing one of the two most serious threats to North Atlantic right whales. In addition, the panel recommends that the proposed changes in the Boston shipping lanes and in the recommended routes for Cape Cod Bay and ports in the Southeast, as outlined during the review, be implemented without delay, accompanied in each case by rigorous monitoring to assess the extent to which the new routes are being used. Finally, in view of the Great South Channel’s clear, consistent importance as a seasonal feeding ground for right whales, the panel urges establishing this area as a mandatory Area To Be Avoided for periods when right whales are present.

The panel urges NMFS to consider using the presence of a single mother/calf pair as a sufficient basis for triggering the dynamic management process because of (a) their exceptional vulnerability as they spend more time at the surface than other whales, (b) the mother’s relatively high reproductive value to the population, and (c) the fact that six of the seven right whales known to have been killed by ship strikes between 2001 and 2006 were females. Depending on expert judgment with regard to the animals’ likely mobility in a given context (e.g., whether they are likely to be passing through or instead remain for a long period), dynamic management areas triggered by this criterion may be designated for a shorter or longer period than is usual.

The panel also recommends that MSR messages be sent to vessels on their reported departure dates so that right whale advisories are available to ships when leaving port, as well as when entering.

Awareness, Outreach, and Education

It may be true that more public awareness, outreach, and education will always be useful. However, the panel has two specific recommendations in this regard. First, there needs to be a sharper focus on mechanisms to ensure that accurate, relevant messages reach specific target audiences (e.g., the people responsible for bridge operations of ships). The effectiveness of
measures taken, whether they are mandatory or voluntary, ultimately depends on their comprehension and acceptance by vessel operators. Therefore, it is important that NMFS solicit the views of vessel operators, harbor pilots, and ship captains concerning the types of information they would find useful and how that information would be most effectively communicated. Second, evaluation is needed of the effectiveness of the awareness, outreach, and education efforts to justify continuation, much less expansion, of this program. To date, there appears to have been no effort to evaluate effectiveness, despite the availability of simple techniques for doing so (e.g., interviews with harbor pilots and ship captains).

There will always be a need to educate new generations of vessel operators and reinforce messages with seasoned mariners, which means that ship strike avoidance procedures and awareness of right whales and their plight must be institutionalized as part of ongoing training and certification processes. Although doing so may be straightforward in the North American context, there is an increasing need to extend such awareness and training to foreign operators. Therefore, more attention should be given to the non-U.S. component of the shipping industry, i.e., mariners from foreign countries who operate in the international maritime trade and regularly call at U.S. East Coast ports. The panel believes that NMFS should increase its work with other agencies and organizations (e.g., the Department of State and the IMO) to make foreign mariners aware of the ship strike problem and of the applicable U.S. guidelines and regulations. This will become even more important as new rules are adopted and implemented.

The panel recognizes and accepts that the contents of brochures and other materials might need to include certain types of information that are somewhat peripheral to mitigation, *per se*. For example, providing basic information on how to identify right whales and on their natural history and conservation status is justified simply because of the inherent value of raising awareness of the animals’ existence and basic traits. However, the panel is concerned that certain other key messages that are directly relevant to mitigation may not be being communicated effectively at present. For example, advice on specific speeds that are “safe” for whales generally have not been included in outreach materials in the past, although some steps have been taken recently to correct this deficiency. In particular, given the responses received from representatives of the various agencies at the workshop, it is unclear what, if any, penalties would apply for deviations from designated ship channels. If there are consequences, it is essential that these be clearly stated and that the relevant mariners be made aware of them. Similarly, if there are incentives for voluntary compliance with guidelines or advisories, these should be explained clearly and disseminated widely.

**Research and Development**

The panel reiterates its recommendation to continue development of passive acoustic monitoring as an alternative or supplement to other types of monitoring, especially aerial surveys.

Further studies of compliance should be conducted to evaluate the effectiveness of voluntary approaches to mitigation. Such studies must remain a high priority even as new measures are taken, whether they are voluntary or mandatory (recognizing that, in the latter case, evaluation
may be tantamount to enforcement). AIS seems to offer an excellent tool for these kinds of studies as well as for monitoring and research. Therefore, infrastructure needed to make AIS useful for these purposes should be developed.

The panel recommends that carefully planned field studies to investigate right whale behavior in relation to vessel approaches should be accorded higher priority for funding than work in flow tanks with right whale models. Both types of studies should be considered for funding on their merits and as discretionary funds become available.

All available information on ship strikes of right whales along the East Coast of North America needs to be compiled and analyzed in the context of proposed ship routing changes. For example, it would be useful to know what proportion of the strikes occurred, or might have occurred, within the 30 nmi radii of the nine U.S. ports planned for speed restrictions under the current ship strike reduction strategy. Also, further analyses to compare ship traffic to right whale distribution, including predictive modeling, should continue as needed to support refinement and reevaluation of the ship strike avoidance strategy.

A major data gap is knowing where, when, and under what circumstances (e.g., vessel speed, visibility conditions) ship strikes occur. The most obvious source of such data is the vessel operators themselves. The panel therefore recommends that a regulatory mechanism be devised that would require operators of vessels that strike whales to report the incident and describe the circumstances. Only by increasing the size and quality of the ship strike database will it become feasible to design cost-effective measures that both reduce whale mortality and minimize disruption to shipping.

B. **Fishery Bycatch Reduction**

Entanglement in fishing gear (bycatch) is the second primary anthropogenic source of mortality for North Atlantic right whales. There have been 61 confirmed cases of right whales carrying fishing gear since 1986 (Kraus et al. 2005). It is often difficult to determine which fishery is responsible for an entanglement, but when the entangling gear on right and humpback whales in the western North Atlantic has been identified, it has usually (89 percent of the time) been either sink gillnet gear or trap (pot) gear set for lobsters (Johnson et al. 2005). Both types of gear are set on the sea bottom, with vertical lines that extend to floats at the surface to mark the location of the gear. Right whales can become entangled in any part of the gear, but most entanglements in which the part of the gear could be identified involved the buoy lines or the ground lines used to connect adjacent traps or nets (Johnson et al. 2005). At least five recent right whale entanglements have been linked to Canadian lobster or gillnet gear.

Entanglement is seldom immediately lethal to right whales. Instead, entangled whales usually swim off with part or all of the gear, which they may carry for periods of months or years. It can take some time before a whale is sighted and reported as carrying gear, a factor that frustrates most efforts to determine exactly where the entanglement occurred. Depending on the severity of the entanglement, the animal may become emaciated and weakened as a result of an inability to
feed, or it may succumb to infections or other trauma. Death may occur months or even years after the initial entanglement. Entanglements also may reduce the reproductive success of affected animals, which may, in turn, have an effect on the population’s recruitment rate.

The NMFS strategy to reduce and eliminate entanglement is two-tiered: a long-term program to develop gear modifications that will reduce the risk of entanglement in these fisheries, and, in the meantime, restricting the use of potentially dangerous fishing gear in times and areas where right whales occur. The ultimate goal is to design “whale-safe” fishing gear that will not entangle right whales and to require that this gear be used throughout areas where right whales occur. This goal is to be achieved by working cooperatively with the fishing industry and other stakeholders to design and test gear modifications that will reduce the risk of entanglement at reasonable cost to the fishing industry. In the meantime, while whale-safe gear is being developed (implicitly recognizing that this may take considerable time), NMFS is identifying times and areas where whales co-occur with high-risk fisheries and restricting the use of potentially risky gears through the dynamic area management (DAM) and seasonal area management (SAM) programs as well as in designated critical habitat. In most cases, conservation actions within DAM and SAM areas require, or encourage, the use of fishing gear that has been modified to reduce the likelihood of life-threatening entanglement.

While working toward the eventual reduction or elimination of entanglements, NMFS also is supporting efforts to disentangle whales observed carrying fishing gear. As explained below, those efforts do not contribute to a solution of the entanglement problem, and they carry a unique set of inherent risks, but they do at least prevent the deaths of a few entangled whales. The disentanglement program is reviewed in this section of the report.

As noted earlier, the PBR level for this whale population has been set at zero, meaning that any fishing-related mortality or serious injury is unsustainable and should not be permitted. Nevertheless, it will be extremely difficult to eliminate entanglement as a source of mortality for right whales without significant changes (and economic costs) to affected fisheries. These fisheries are important to the economies of coastal states. For example, the panel was informed that, under the Atlantic Large Whale Take Reduction Plan (ALWTRP), NMFS currently manages about 6,000 lobster fishermen who set more than 2 million traps.

Complicating efforts to resolve the entanglement issue is the fact that NMFS has a dual charge—on one hand to promote and manage fisheries and on the other to protect right whales and encourage their recovery. These often-conflicting mandates are administered by separate programs within the agency. The role of the federal regional fishery management councils and the various state fishery management agencies in developing management plans complicates matters further. To overcome these complications, the entanglement problem needs to be recognized as a fishery management crisis that requires decisive action at the highest levels of government. The extinction of North Atlantic right whales would represent a fundamental failure in both fishery management and the conservation of protected resources in the United States.
Modifications to fishing gear and practices

Since its establishment in 1996 the ALWTRT has been working with NMFS to reduce mortality and serious injury of right whales in commercial fishing gear through the large whale plan. The major focus has been to develop modifications to existing fishing gear and practices to make it less likely that right whales will become entangled. The plan has been amended several times to reflect new modifications or to extend modifications to new times, areas, or fisheries. It also includes seasonal and temporal restrictions under the SAM and DAM programs.

The following provisions currently apply to lobster trap and anchored gillnet fisheries managed under the ALWTRP throughout the U.S. Exclusive Economic Zone (out to 200 nmi from shore):

- No buoy lines floating at the surface;
- All gear must be hauled from the water at least once every 30 days; and
- Fishermen are encouraged, but not required, to maintain knot-free buoy lines.

Specific requirements for lobster trap and gillnet fisheries (e.g. sinking groundlines, net panel and buoy line weak links, gear marking) vary by management area. In addition, a number of specific modifications are required for lobster trap and anchored gillnet fisheries in areas managed under the SAM and DAM programs, including the following:

- Prohibition on the use of floating ground lines and/or buoy lines;
- Weak links required at buoys and net panels; and
- Limits on the number of buoy lines per trap (pot) trawl or net string.

Despite a decade-long period of development, the suite of regulations implemented to date has not been successful in reducing the observed entanglement rate of right whales in commercial fishing gear. There is good evidence that in some circumstances (e.g., when the line is wrapped around the tail stock) weak links do not work. For example, two lines with intact weak links have been recovered from entangled right whales since 2002. Knowlton et al. (2005) noted that “Entanglements are frequent and the annual rate has remained high and is increasing.” Thus, it is clear that the management program to date has failed to eliminate entanglements. The situation is dire, and more effective actions are urgently required.

In June 2003 NMFS published a Notice of Intent to prepare an environmental impact statement (EIS) to analyze alternatives for further amending the ALWTRP to increase its effectiveness in reducing the entanglement rates of right and other large whales. The draft EIS was issued in February 2005, followed by a proposed rule and request for comment in June of that year. The two preferred alternatives (and all other alternatives) in the amended plan focus on further modification and extension of current techniques, including, but not limited to, the following:

- Expansion of the use of weak links;
- Requirement to use neutrally buoyant or sinking ground line; and
- Inclusion of several other fisheries under the plan.
It is difficult to imagine any scenario in which the limited suite of modifications described in the
draft EIS will significantly reduce the frequency with which right whales become entangled in
fixed fishing gear. For example, a large proportion of well-documented entanglements have
involved buoy and surface lines (although in many cases, just pieces of line are found on whales,
and these cannot be attributed to a particular part of the gear), which would not be changed by
the proposed regulations. The panel learned that some individuals within the fishing industry
oppose efforts to address the problem of buoy lines, citing technical, economic, and safety issues
associated with any modification of end lines. Further, according to NMFS, it has proven
extremely difficult to modify vertical lines in a way that makes them less risky for whales but
still feasible for use by the fishermen. This is plainly evident from the detailed information
provided in the NMFS Working Draft of a Strategy to Reduce Large Whale Entanglement Risk
Associated with Vertical Line. Nevertheless, without addressing the risk of entanglement in
vertical lines, it will not be possible to solve the entanglement problem. It is critical to remember
that the goal of this program is not simply to reduce current rates of entanglement but to
eliminate serious injury and mortality due to entanglement altogether.

The panel acknowledges that some modifications to fishing practices are currently in place under
the ALWTRP, and others are being considered. Nevertheless, the panel concludes that the
measures implemented to date, as well as those in the proposed modifications to the ALWTRP,
are inadequate. They also may prove more costly than necessary in the long run. The provisions
may result in greater long-term economic costs to the fisheries involved than would be the case if
effective regulations were implemented immediately to eliminate the risk of entanglement. In
particular, regulations should be put into place as quickly as possible to prohibit the use of
vertical lines in all areas where right whale aggregations may be expected (i.e., critical habitat
and DAM and SAM areas). This prohibition should remain in place until gear modifications are
developed that can provide reasonable assurance that entanglement will not occur. Such a
prohibition would do two things: (1) place the burden of proof on the fishing industry to
demonstrate that it has developed whale-safe gear, and (2) harness the vast creative energy of
fishermen to develop ways to catch lobsters and finfish without using gear that has the potential
to entangle whales.

Finally, there is a pressing need for improvement in the processes for developing, evaluating, and
testing potential gear modifications. NMFS has implemented a competitive grants program,
administered through a cooperative agreement with the National Fish and Wildlife Foundation
(NFWF) and designed to provide funding opportunities to fishermen, academic researchers, and
other interested parties. Once a gear research project has been completed, the researcher may
request that NMFS consider the gear modification as a potential management tool for
incorporation into the ALWTRP. The panel is concerned that this arrangement has not delivered
innovative, effective gear modifications in a timely manner. As noted by participants at the 2004
Workshop on Modification of Fishing Gear to Reduce Large Whale Entanglements, there is an
urgent need for a dedicated, coordinated research program that combines gear research with
research on whale behavior. For such a program to be effective, there also needs to be a change
in the process of issuing scientific research permits to make it easier to evaluate and field-test
promising approaches.
Area management

Since 2002 NMFS has employed spatially explicit SAM and DAM approaches to reduce right whale interactions with commercial fishing gear. The SAM program was intended to protect right whales in two areas where predictable seasonal aggregations occur in and adjacent to the currently designated critical habitat areas of Cape Cod Bay and the Great South Channel. The DAM program allows NMFS to impose temporary gear specifications or restrictions on the deployment of lobster trap and anchored gillnet fishing gear in areas north of 40° N where aggregations of right whales are reported. A DAM action is triggered by a reliable report of right whales that meets a certain density threshold (0.04 whales per nm²). Once a DAM action has been triggered, NMFS may temporarily restrict or request the use of certain types of gear within an area buffered around the original sighting location.

As is the case with the other components of the NMFS fishery interactions strategy, no evidence is available to evaluate effectiveness of the area management approach in reducing right whale entanglements. The panel recognizes the rationale behind the SAM and DAM measures (i.e., to encourage wider use of gear thought to be safer for whales) but concludes that area management, as conceived and implemented to date, is unlikely to enhance right whale conservation unless more stringent restrictions are placed on fisheries operating within prescribed areas.

NMFS has been unwilling to implement conservation actions in either DAM or SAM areas that would eliminate the risk of entanglement. Currently, a series of regulatory measures (e.g., required use of weak links, limits on the number of buoy lines) apply to each SAM area, but these have not eliminated entanglements. NMFS can take several actions in DAM zones, including the following:

- require removal of gear for a 15-day period;
- request voluntary removal of gear in the area for a 15-day period; and/or
- require gear modifications for a 15-day period.

Before implementing a DAM zone, NMFS is required to follow certain steps, including intra-agency documentation and public notification through the Federal Register. DAM zones can be extended beyond 15 days if warranted.

With very few exceptions, NMFS has not required the removal of fishing gear in DAM areas. Instead, DAM designations have consistently recommended or required that fishermen incorporate certain modifications in their gear. In addition, internal processing, approval, and publication procedures result in a two-week (or longer) delay in implementing DAM measures after the initial sighting triggers for management action have been met. Obviously, some whales may become entangled and many or all of them may leave the area during this delay interval.

Until truly whale-safe fishing gear is developed, the DAM approach likely will be effective only if fishermen are required to remove lobster and gillnet gear quickly from areas with aggregations of right whales. This poses a potential safety problem for fishermen, who could be required to
remove large quantities of fixed gear on short notice in poor weather. This, together with the frequency and unpredictability of DAM events, hampers the approach’s effectiveness.

The DAM approach also requires ongoing aerial surveys to ensure that aggregations of whales are detected outside SAM and critical habitat areas. As noted elsewhere in this report, those surveys are useful for analysis of habitat use, provide important sighting information to the Catalog and Sightings Database and give valuable support to the disentanglement program. However, there are questions about their cost-effectiveness as a management measure, particularly given the delays in implementation, and concerns about their safety.

In addition to the problems outlined earlier, effective implementation of DAM and SAM programs requires enforcement. (Note that if the measures were voluntary, as they sometimes have been, the issue of enforcement would be moot.) Enforcement of fishery management regulations in these areas is primarily the responsibility of the Coast Guard working with the NMFS Office for Law Enforcement. The cost of this enforcement is difficult to estimate due to the multiple tasks addressed in most Coast Guard missions. Relatively few patrols are dedicated to enforcing provisions of the ALWTRP or other right whale conservation measures although such work may be performed while addressing other primary tasks. The panel was advised that enforcement patrols do not remove gear from the water for inspection, which means that an assessment of compliance with gear modification rules or recommendations is possible only if fishermen are encountered while actively hauling their gear.

NOAA holds joint enforcement agreements with the states of Maine, Massachusetts, Rhode Island, and Virginia. The panel was informed that 22 cases of alleged violations of ALWTRP gear requirements had been investigated, resulting in five cases being forwarded for further action to the NOAA Office of General Counsel. Overall, however, no information was readily available on the level of enforcement effort or the proportion of the total deployed gear that had been inspected.

Finally, the panel is concerned about the evident inability of NMFS to prevent the continuation and even proliferation of fisheries that pose risks to right whales within existing management areas. For example, a right whale calf was entangled and killed in a gillnet set in the Southeast Restricted Area in January 2006. The use of gillnets in this Restricted Area is managed under provisions of the ALWTRP. A new gillnet fishery for whiting (southern kingfish) recently emerged inside the Restricted Area, evidently without having been preceded by a determination that it was “safe” for right whales. The panel notes that failures to anticipate and mitigate the potential impact of allowing new fisheries to develop in right whale habitat can worsen the problem of entanglement, as happened in this case.

**Disentanglement**

The disentanglement program involves dangerous, costly work that is only marginally effective. People involved in the program risk their lives to help compensate for the fact that the entanglement problem has not been solved. Demographic models suggest that preventing the
deaths of even a few females could shift the population trend from a slow decline to a slow increase, which makes abandonment of the disentanglement program unthinkable. From another perspective, a response of some kind to alleviate the suffering imposed on entangled animals is also an important consideration. Almost three-quarters of living right whales in the western North Atlantic show evidence of past entanglements (e.g., scars, wounds, or bits of gear still attached), and perhaps 10 to 30 percent of the population interacts with fishing gear each year. During the period from January 2000 through the end of 2005 the disentanglement network received 25 reports of entangled North Atlantic right whales (Marine Mammal Commission 2006). Network responders were able to remove some of the gear from seven of those animals and all or most of the gear from four others. A few of those 11 animals likely died or were seriously injured. For the other 14 animals, either there was no opportunity to remove the gear or attempts to do so were unsuccessful. The panel commends the people involved in the disentanglement effort for their dedication and commitment.

The following elements of the disentanglement effort are germane to this review:

- At present, only three individuals on the U.S. East Coast are authorized by NMFS (based on training and experience levels) to lead disentanglement attempts on right whales; two others are authorized to lead attempts involving other whale species.
- Aerial surveys have been responsible for many of the detections of entangled right whales, and aircraft have also been used to direct the disentanglement teams to whale locations and provide images helpful for planning disentanglement strategies.
- The success rate for disentangling right whales is much lower than for other species because right whales are comparatively difficult to deal with. For example, it typically takes one attempt to disentangle a humpback whale whereas it can take as many as six or eight attempts to remove the gear from a right whale.
- Outcomes of disentanglement attempts are difficult to predict. Some whales that experts believed would survive after disentanglement have not while others with a poor prognosis have survived and reproduced.
- A major frustration for the disentanglement teams is that entanglements posing the greatest danger to the animal, such as those involving line wrapped around the head, mouth, or flipper, are the most difficult to resolve successfully.
- To date, no attempt to disentangle a right whale has been stopped on the basis of poor survival prospects, nor has any attempt been made to euthanize a right whale because of its condition. It is not clear how humane euthanasia could be accomplished with this species.
- The disentanglement program responds to events involving humpback and minke whales as well as right whales, although the entire federal contribution to funding comes directly out of the right whale program’s budget.

Further investment in the disentanglement program is clearly needed to make it safer and more effective. Among the immediate priorities are the following:
• development of a method to chemically sedate or restrain entangled whales;
• development of a more effective telemetry system that can be securely attached to trailing gear and provide real-time monitoring data; and
• establishment of reliable, long-term cooperative agreements with state agencies and the Coast Guard, especially in the Southeast, to ensure that vessels and aircraft are available when and as needed to support disentanglement efforts.

Consideration also should be given to novel approaches that would facilitate disentanglement and reduce the risks to human health and safety. These might include some unusual ideas, for example, the employment of remotely operated robotic devices or trained marine mammals (e.g., sea lions).

Finally, the panel stresses that the costs of disentanglement, including the personal risks faced by members of the disentanglement network, should be incorporated explicitly into fishery management decisions and cost-benefit assessments. In other words, rather than these costs being accounted against the right whale recovery program and borne quietly by a few dedicated individuals, they should be considered a responsibility and a funding obligation of fishery management. Requirements to modify fishing methods or equipment are matters of concern not only for the purpose of right whale conservation but also for the purpose of human safety. The highest priority should be given to methods, such as those described earlier, that will eliminate entanglement and thus eliminate the need for the disentanglement program.

Take reduction process

The ALWTRT has been ineffective as a mechanism for developing mitigation strategies to deal with right whale entanglement. A number of presenters at the workshop described the ALWTRT as unique in several respects. It is the longest serving take reduction team, having existed for more than a decade. The team is very large, with 58 members (including three from NMFS) divided into two regional sub-teams. It is by far the largest take reduction team to date. Not surprisingly, the ALWTRT has been unable to reach consensus on most important issues and, instead, has usually delivered majority and minority opinions to NMFS. Management options leading to the proposed rule currently under consideration were discussed by the ALWTRT in 2003. In the panel’s view, the take reduction team process was never intended to operate in such a prolonged, open-ended fashion. In fact, it appears that those who crafted the 1994 amendments to the Marine Mammal Protection Act intended exactly the opposite.

The panel believes that other mechanisms would be more effective for developing mitigation strategies and for combining those strategies with other conservation approaches. For example, a small recovery team, consisting of individuals with direct experience in addressing right whale biology and whale bycatch issues, itself advised on technical aspects of gear modification by a group of gear specialists and fishing industry experts, might be much more effective than the current take reduction team approach (see section V later in this report). Such a team also might be able to interact in a more efficient manner with regional fishery management councils and other bodies.
Table 8: Costs of actions to reduce fishery bycatch, FY2003/FY2005

<table>
<thead>
<tr>
<th>Activity</th>
<th>FY 03</th>
<th>FY 04</th>
<th>FY 05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration (e.g., public hearings, convening TRTs, preparing EIS, labor, etc)</td>
<td>$168,000</td>
<td>$1,057,000</td>
<td>$729,000</td>
</tr>
<tr>
<td>NMFS</td>
<td>168,000</td>
<td>1,057,000</td>
<td>729,000</td>
</tr>
<tr>
<td>Development of gear modifications and buyback</td>
<td>1,129,400</td>
<td>1,713,605</td>
<td>1,839,405</td>
</tr>
<tr>
<td>NMFS</td>
<td>1,129,400</td>
<td>1,713,605</td>
<td>1,614,405</td>
</tr>
<tr>
<td>New England Aquarium</td>
<td>0</td>
<td>0</td>
<td>200,000</td>
</tr>
<tr>
<td>Provincetown Center for Coastal Studies</td>
<td>0</td>
<td>0</td>
<td>25,000</td>
</tr>
<tr>
<td>Atlantic Large Whale Take Reduction Plan</td>
<td>2,101,714</td>
<td>2,648,400</td>
<td>2,216,586</td>
</tr>
<tr>
<td>NMFS</td>
<td>2,101,714</td>
<td>2,648,400</td>
<td>2,216,586</td>
</tr>
<tr>
<td>Disentanglement</td>
<td>1,175,933</td>
<td>808,691</td>
<td>836,438</td>
</tr>
<tr>
<td>NMFS</td>
<td>1,088,000</td>
<td>613,400</td>
<td>608,000</td>
</tr>
<tr>
<td>U.S. Coast Guard</td>
<td>37,933</td>
<td>95,291</td>
<td>153,438</td>
</tr>
<tr>
<td>Provincetown Center for Coastal Studies</td>
<td>50,000</td>
<td>100,000</td>
<td>75,000</td>
</tr>
<tr>
<td>Enforcement</td>
<td>394,034</td>
<td>1,456,770</td>
<td>595,966</td>
</tr>
<tr>
<td>NMFS (Joint Enforcement Agreements with Maine, Massachusetts, Rhode Island, and Virginia)</td>
<td>60,000</td>
<td>162,000</td>
<td>200,000</td>
</tr>
<tr>
<td>U.S. Coast Guard</td>
<td>334,034</td>
<td>1,294,770</td>
<td>395,966</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$4,969,078</td>
<td>$7,684,466</td>
<td>$6,217,395</td>
</tr>
</tbody>
</table>

*Note: Coast Guard costs do not include staff time dedicated to policy development, drafting regulations, training, and providing enforcement guidance to personnel in the field.*

**Contribution to Recovery**

Modifications to fishing gear and practices

The current suite of gear modifications has not succeeded in eliminating entanglements, nor is there any evidence that it has reduced the frequency with which right whales become entangled in fixed gear. Further, the panel was given no reason to believe that the gear modifications in recently proposed amendments to the ALWTRP will meet take reduction goals, given the insufficiency of attention to resolving entanglement risks from vertical (i.e., buoy) lines. In some areas of Massachusetts, NMFS has funded a buyback program to encourage fishermen to switch from sinking to neutrally buoyant ground lines. However, participation has been voluntary and limited in geographic scope. The panel commends the agency’s efforts to reduce the profile of ground lines and to include some measures addressing vertical line, as described and discussed in the Working Draft of a Strategy to Reduce Large Whale Entanglement Risk Associated with Vertical Line, and included in the currently proposed rulemaking. Nonetheless, it concludes that past and planned efforts at gear modification are unlikely to be adequate for solving the right whale entanglement problem.
Area Management

No evidence was presented during the review to indicate that the DAM and SAM programs have been effective in reducing serious injury and mortality of right whales in fixed fishing gear. A fundamental problem with both approaches is that critical aspects of the fishing gear (especially vertical lines) have not been addressed adequately in either past or currently proposed regulations. In addition, the DAM approach takes too long to implement due to the bureaucratic requirements of the current regulatory process. The panel concludes, therefore, that neither program, in its present form, is likely to contribute significantly to population recovery.

Disentanglement

With numbers so low, even a few successful disentanglements of right whales are potentially significant. The panel emphasizes, however, that the same could be said of other measures (e.g., gear modifications, fishery closures) where it is likely that one or more whales have been “saved” even though there is no direct evidence to prove it. The important point is that disentanglement and the other measures, taken together, have not solved the bycatch problem.

Also, it is necessary to acknowledge the possibility that the very existence of the disentanglement program makes the prevention of entanglement seem less urgent. Such a perception could deflect resources away from necessary restrictions on fisheries and allow public officials to delay difficult but necessary measures to eliminate the use of fishing gear that entangles whales. In other words, there is a danger that the program could function as an indirect subsidy to fisheries by compensating (or attempting to compensate) for a major flaw in how they operate. At the same time, the panel recognizes that removal of gear from entangled right whales has been a primary source of information for the identification of gear types and fisheries that pose a risk to right whales; this information is critical to the development of appropriate mitigation measures.

Take reduction process

The take reduction process has been ineffective at providing solutions to the entanglement problem. The process is slow, cumbersome, and often divisive. Even when incremental steps have been agreed to by the ALWRTT, very long delays have ensued in the rulemaking process required for implementation. This slow pace of change has resulted in frequent and costly litigation and rulemaking actions. As noted earlier with regard to ship strike reduction (section IV.A), much of the slow pace of rulemaking is systemic and unavoidable. Despite the agency’s continuing failure to resolve this critical issue, many individual NMFS scientists and managers have been working diligently and conscientiously to do so. Many members of the ALWRTT have expressed skepticism that the take reduction process will be able to deliver meaningful conservation recommendations. Decisive actions are required to conserve right whales, and the take reduction process is not the vehicle to deliver them.


Cost-effectiveness of actions

Expenditures to develop and implement actions that address the entanglement problem totaled $18.87 million during FY03/05. Of that amount, NMFS provided $16.10 million.

Modifications to fishing gear and practices

During FY03/05 a total of $4.67 million was spent on gear modifications and buybacks. Much of the funding for gear development has focused on gear modifications with questionable prospects for reducing entanglement risks (e.g., weak links, line cutters, and new buoy designs) although some investment has been made in more promising approaches involving the elimination of line from the water column (e.g., pop-up buoys). Funding to reimburse fishermen willing to switch from floating to sinking or neutrally buoyant ground lines (buyback programs) may have been helpful. According to NMFS, state and industry representatives report that the buyback programs funded by NMFS and administered through various state agencies, together with the DAM program, have raised awareness and encouraged fishermen to switch over their lines prior to any implementation of requirements mandating such change. The panel is concerned, however, that the use of presumably safer types of line has not yet become sufficiently widespread. The current suite of modifications in the ALWTRP apparently has not succeeded in significantly reducing or eliminating entanglement of right whales in fishing gear. Those proposed in the latest amendments to the plan appear to have the potential to reduce entanglement, but on present evidence it is difficult to assess how significant such a reduction might be. The panel contends that more stringent measures, such as the elimination of all fixed gear with vertical lines in areas of right whale aggregations, would be more cost-effective in the long term. Such measures would have immediate economic consequences for affected fisheries, but the panel believes that those costs would be overcome by the ingenuity of fishermen if they had the needed incentive to develop whale-safe gear rapidly. Furthermore, the longer the delay in implementing such effective measures, the greater will the need become for even more draconian action.

Area Management

It is difficult to estimate the total cost of the area management approach. Cost accounting is confounded by the fact that aerial surveys have multiple purposes, only one of which is to detect concentrations of right whales for establishing DAMs (see section III.A). Much has been learned about the distribution of right whales, and the surveys have been important to the disentanglement program. However, the primary goal of reducing or eliminating the entanglement of right whales in fishing gear has not been achieved. As noted, protection measures in the DAM and SAM areas, as implemented to date, have not been adequate.

Disentanglement

During FY03/05 the investment in disentanglement efforts totaled $2.82 million, not including some expenditure by the Coast Guard. As a protection measure, per se, disentanglement is not cost-effective. Moreover, it entails considerable risks to human safety for the small returns in
terms of numbers of right whales saved from serious injury or death. In assessing cost-effectiveness, it is necessary to recognize that a substantial part of the disentanglement effort, and therefore its cost, has been devoted to species other than right whales. This confounds any analysis of the cost-effectiveness of right whale disentanglement efforts. Although disentangling other whales may provide training opportunities and lead to improved techniques, such efforts do not contribute directly to right whale conservation. The panel did not attempt to evaluate cost-effectiveness from the perspective of all disentanglement efforts for all whale species.

**Take reduction process**

During FY03/05 expenditures by NMFS related to the ALWTRP totaled $6.96 million, which represents 37 percent of all funds spent on the bycatch issue. (The ALWTRP and ALWTRT address humpback and fin whales, as well as right whales.) The take reduction process has been neither efficient nor cost-effective in reducing or eliminating the entanglement of right whales in fishing gear. Costs specifically for support of ALWTRT meetings were not provided for this review, but considering travel by members, the number of members, meeting facilitation, printing of background documents, etc., the total cost of each meeting of the full team likely exceeds $200,000. The funds used to convene the current TRT and its regional subteams to discuss and develop management advice that has proven to be ineffective could have been, and should have been, invested in better means of dealing with this pressing problem.

**Recommendations**

**Modifications to fishing gear and practices**

The panel recommends that all fisheries using fixed gear in areas where right whale aggregations occur be required to demonstrate that the gear is whale-safe before its use is approved. At present, this would require a prohibition on the use of vertical lines, in addition to the measures currently required or being contemplated as part of the ALWTRP. Such restrictive measures could be relaxed once gear modifications are developed, tested, and shown to be whale-safe. The panel is confident that the East Coast fishing community could meet the challenge posed by such a restriction. Without such measures, right whales will continue to die in lobster and gillnet gear, leading to more lawsuits, additional costs to fishermen, and expensive rulemaking and administrative expenses. The panel also recommends modification to the scientific research permit system to allow more expeditious testing of whale-safe fishing gear and associated concepts.

**Area management**

The current approach to area management has not reduced the frequency of right whale entanglements. In its stead, the panel recommends a reevaluation of right whale critical habitat, guided by a recovery team (see section V). Critical habitat should include all areas in which right whales occur frequently in both the feeding and breeding grounds. In those areas, management measures should include elimination of the use of fishing gear that could entangle
right whales. To be clear, the panel recommends that all designated critical habitat should be closed to the use of fishing gear that poses a risk to right whales. Trap fisheries should be limited to gear with no fixed vertical lines and no floating ground lines. It should be possible to implement such measures within critical habitat through a combination of ESA section 7 provisions and the take reduction and recovery mandates that apply to right whales under both the ESA and MMPA.

At present, the panel cannot envision a whale-safe gillnet. No new fisheries should be authorized in right whale critical habitat until the gear to be used has been demonstrated to be whale-safe.

Disentanglement

The occasional success of disentanglement in saving a right whale justifies continuation of this program until actions are taken to reduce entanglements to close to zero or eliminate them entirely. The panel recommends that the right whale recovery program’s budget not be used to support efforts to disentangle other species or to expand such efforts outside eastern North America, even though it agrees that such expansion may be desirable for conservation generally. The panel also recommends that an independent review be conducted to assess the risks and benefits of the disentanglement program. The review should explicitly consider (1) the probability of serious injury or death to humans involved; (2) the record of success and failure in attempts to disentangle right whales; (3) the merits of, and alternatives to, disentangling some right whales, particularly those individuals in such poor condition that they are likely to die and whales that are entangled in such a way that the probability of safe or successful disentanglement is very low; and (4) the indirect benefits of disentanglement, including knowledge gained concerning which fisheries are involved, increased public awareness, and research opportunities to sample, track, and study the behavior and movements of entangled (and disentangled) individuals.

Take reduction process

The panel recommends that the current ALWTRT, including the two regional sub-teams, be disbanded. The take reduction team should be replaced by a recovery team (see section V) that would guide NMFS in the development and implementation of management strategies to eliminate the entanglement of right whales in fishing gear. Such a team would be able to act in a more efficient, cost-effective manner, without the constraints and dysfunctional history of the ALWTRT. A group of gear specialists and fishing industry experts could advise the team in technical aspects of gear modification. The current approach simply will not result in effective conservation and represents a waste of limited resources that should be invested in more productive ways. In reaching this conclusion, the panel was mindful of the fact that disbanding the ALWTRT would have implications for humpback whales and fin whales as well as right whales. However, reducing the mortality of right whales is of transcendent importance as a conservation priority, and therefore the panel considers the implications for the other two species to be far less critical. Furthermore, it is not clear that the efforts of the ALWTRT are reducing the frequency or severity of entanglements for these other two species.
V. FINDINGS OF THE PANEL: CROSS-CUTTING AND GENERAL

Coordination

The panel recommends that NMFS create a North Atlantic right whale recovery team as provided for in the Endangered Species Act. The team should be constituted for the purpose of helping NMFS promote recovery of this whale population to the point where it satisfies the downlisting criteria in the current recovery plan. Two immediate functions of the team would be to assist with a reevaluation of critical habitat designations and an evaluation of management options for eliminating right whale entanglement.

In addition, there is a need to bring regional fisheries management councils into the take-reduction process to a much greater extent than has been the case to date. This may require amendment of the Marine Mammal Protection Act and/or the Magnuson-Stevens Fisheries Conservation and Management Act to mandate a direct link between right whale bycatch reduction measures and the fishery management process. It may also require an additional oversight mechanism to ensure that councils do not veto, alter, or override essential protection measures.

Implications of mitigation measures

Two important aspects of mitigation need to be considered at all stages. First, some of the measures may offer ancillary benefits in addition to preventing harm to right whales. For example, slowing ship traffic may reduce the risks of collisions with other whales or between vessels. Restrictions on the use of gillnets and traps could be part of management plans designed to reduce fishing pressure on target and other non-target species, leading to better overall fishery management. Also, the process of developing whale-safe measures to harvest lobsters and finfish could lead to the development of safer or more efficient methods for capturing the target species. Second, proposed measures should be evaluated for unintended negative consequences, whether direct or indirect. For example, a fishery closure in a right whale feeding area could lead to a shift of fishing effort into a migration path. Similarly, a change in traffic routing could lead to a higher incidence of collisions with another valued species (e.g., humpback whales). Even though such a change might be tolerable from a conservation standpoint, it would be important to anticipate it and be prepared to respond.

Feasibility of enforcement

A great deal of momentum has developed in the direction of using passive acoustic monitoring to track the presence of right whales in different areas. The scientific approach is appealing, and the idea of dependence on remote sensing is attractive because it promises to be more cost-effective and safer. A premise of investing in and pursuing such an approach is that it will facilitate real-time measures to reduce risks to right whales (principally via dynamic management). Although
the panel is not opposed to the concept, it is concerned about the ability of enforcement agencies to deliver such protective measures in a timely and effective way. The poor record to date in this regard must be considered the best guide to what can be expected in the future. Total closures of sensitive areas to high-speed ship traffic, risk-prone fishing gear, or both, on a seasonal or permanent basis, may be the only truly enforceable (and thus effective) approach to protecting right whales from the two most important risk factors impeding their recovery.

Fundamental importance of certain core program elements

A commitment to predictable, long-term funding for core recovery-related work, including development and implementation of take reduction and threat mitigation measures, maintaining and updating key databases, and investigating causes of right whale deaths and serious injuries, is of paramount importance. In particular, the Catalog is indispensable. Any major change in how the photo-identification data are collected and managed could have serious implications for population monitoring and, in turn, the ability to assess the effectiveness of recovery efforts. For example, if funding cuts were to limit field efforts and allow sampling at only two- or three-year intervals instead of annually, this would affect the ability to monitor critical demographic parameters, such as survival and fecundity. Given the present state of North Atlantic right whales, it is essential to continue collecting the field data needed to monitor the population with maximum possible resolution.

Where and with whom does responsibility for right whale recovery lie?

The Secretary of Commerce has ultimate responsibility to ensure that the goals of the Recovery Plan for the North Atlantic Right Whale are met. Pursuit of those goals can be driven by one of three approaches: (1) develop and implement ineffective measures that will likely result in lawsuits and judicial decisions to direct actions by federal agencies; (2) rely on public awareness and education efforts to motivate and guide voluntary actions by fishermen, vessel operators, etc.; or (3) take the initiative to restrict activities known to be harmful to right whales and cope with the negative response from some stakeholders. All three options promise to be costly. However, from the standpoint of meeting recovery plan goals, the third is most likely to be effective on an acceptable time scale.

The language in the recovery plan does not adequately reflect that human-caused mortality for this whale population should be reduced to zero. Rather, the plan refers to significant reductions as the most that can be expected. The panel believes that NMFS should be pursuing the goal of zero human-caused mortality and serious injury of right whales, as clearly expressed by the setting of a PBR level of zero and as stated in the required goals of take reduction plans. The same goal appears not to have been carried forward with regard to ship strikes and general recovery planning. Obviously, working toward such a goal will require a number of different steps that are not likely to be taken simultaneously. Nevertheless, recovery planning needs to be geared toward elimination, not just reduction, of anthropogenic mortality and serious injury. With regard to reducing the number of right whales killed by fishing gear, the panel believes that responsibility for addressing this issue has been misplaced and a major change is needed. The
little progress that has been made to date has been due to efforts of conservationists, scientists, and Office of Protected Species staff in NMFS who have tried to use legislation, such as the Endangered Species Act and the Marine Mammal Protection Act, to force fishery managers to take action to reduce whale entanglements. Unlike some other interactions between marine mammals and fisheries, right whales are not attempting to depredate catches or competing with fishermen for resources. Rather, they are simply using their habitat as they have for hundreds of thousands of years. From the whales’ perspective, fisheries have developed in some of the same areas very recently, and some of those fisheries are now taking whales as a bycatch. The Department of Commerce, acting through NMFS, is required by law to regulate bycatch as part of fishery management plans developed under the Magnuson-Stevens Fishery Conservation and Management Act. They do this routinely for non-target species of shellfish, finfish, sea birds, sea turtles, and other taxa. NMFS has clearly recognized that there should be no fishery bycatch of North Atlantic right whales as it has set the PBR level for this population at zero. Therefore, fishery managers have the responsibility to modify management plans as necessary to eliminate right whale bycatch, and the panel strongly recommends that they be instructed to recognize and meet this responsibility.

Relations with Canada

A significant proportion of the known present-day feeding habitat of North Atlantic right whales lies in Canadian waters. Also, some of the deaths from ship strikes and entanglements occur in Canada. Therefore, bilateral efforts are essential to achieve coordination and consistency in measures to protect right whales and their critical habitat. Also, conducting research and monitoring to assess the population’s status, investigating factors limiting population recovery, and developing and testing mitigation methods cannot be carried out efficiently without the cooperation of Canadian authorities.

The panel was pleased to learn that cabinet-level discussions are underway to negotiate a bilateral right whale conservation agreement between Canada and the United States. Although Canada’s reconfiguration of the Bay of Fundy shipping lanes is deservedly regarded as a signal achievement, the Canadian government’s approach to right whale conservation has been otherwise passive in comparison to that of the U.S. government. The whale-watching industry in Canada is unregulated, there is no Canadian equivalent to the critical habitat designations for right whales under the U.S. Endangered Species Act, and no substantive measures have been taken in Canada to address the right whale entanglement problem. Entanglement is one area where bilateral dialogue is essential, but it is important to avoid letting U.S. fishing interests transfer responsibility for the entanglement problem to Canadian fisheries. Fisheries in both countries need to be managed to address this problem.

Another issue that should be high on the bilateral agenda concerns U.S. plans to construct a liquid natural gas (LNG) tanker terminal in Maine. Such a development will create a major new threat to the right whale population. A proposal for an oil tanker terminal at Eastport in the late 1970s provided the impetus for surveys of right whales in the lower Bay of Fundy and Quoddy region. Those surveys led directly to the right whale research and monitoring program in this
area by the New England Aquarium. Impact assessment and site selection for the LNG tanker terminal need to be addressed immediately by authorities in both countries. Also, the high-speed ferry that operates between Yarmouth, N.S., and Bar Harbor, ME, making two trips per day (including one at night), represents a potentially serious hazard for right whales. Its operations are currently not regulated to avoid whale collisions and it is exempt from the traffic separation scheme in the Bay of Fundy. Moreover, plans are underway for the ferry to serve additional sites in Maine, which would almost certainly imply additional risks to right whales.

**Funding**

Although the data available for this review are not comprehensive, they indicate that a total of $45.6 million was spent by all U.S. agencies and groups involved in implementing the right whale recovery program during the three fiscal years 2003/04 through 2005/06. Of that amount, 95.5 percent came from federal agencies, 3.8 percent from nongovernmental organizations, and less than 1 percent from state agencies. The National Marine Fisheries Service was the greatest single source of funding ($35.3 million).

**Table 9:** Costs of all actions to promote recovery of western North Atlantic right whales, FY2003/FY2005

<table>
<thead>
<tr>
<th>Source</th>
<th>FY 03</th>
<th>FY 04</th>
<th>FY 05</th>
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<tr>
<td>Federal Agencies</td>
<td>$12,639,287</td>
<td>$16,200,810</td>
<td>$14,707,144</td>
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<td>NMFS</td>
<td>10,127,897</td>
<td>12,798,559</td>
<td>12,353,725</td>
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<td>NOS (National Marine Sanctuaries)</td>
<td>67,000</td>
<td>89,900</td>
<td>124,300</td>
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<td>Navy</td>
<td>165,267</td>
<td>218,427</td>
<td>399,216</td>
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<tr>
<td>Coast Guard</td>
<td>809,525</td>
<td>2,075,569</td>
<td>1,208,268</td>
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<td>Army Corps of Engineers</td>
<td>147,000</td>
<td>180,000</td>
<td>191,000</td>
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<td>National Fish and Wildlife Foundation</td>
<td>1,322,598</td>
<td>497,149</td>
<td>192,953</td>
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<td>State Agencies</td>
<td>102,600</td>
<td>72,800</td>
<td>134,442</td>
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<tr>
<td>Florida</td>
<td>76,000</td>
<td>72,800</td>
<td>73,250</td>
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<td>Massachusetts</td>
<td>21,600</td>
<td>0</td>
<td>61,292</td>
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<td>Rhode Island</td>
<td>5,000</td>
<td>0</td>
<td>0</td>
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<td>Nongovernmental Organizations</td>
<td>379,678</td>
<td>456,227</td>
<td>907,926</td>
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<td>International Fund for Animal Welfare</td>
<td>140,000</td>
<td>104,000</td>
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<td>New England Aquarium</td>
<td>98,075</td>
<td>86,431</td>
<td>312,404</td>
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<td>Provincetown Center for Coastal Studies</td>
<td>62,500</td>
<td>112,500</td>
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<td>54,103</td>
<td>127,296</td>
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<td>Whale Center of New England</td>
<td>25,000</td>
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<td><strong>TOTAL ALL SOURCES</strong></td>
<td>$13,121,565</td>
<td>$16,729,837</td>
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The objective of this review was not simply to document how much money had been invested in right whale recovery efforts or to project how much should be spent in the future. Rather, the objective was to evaluate whether the funds invested had been used in a cost-effective manner. The panel’s conclusions in that regard are explained in sections III and IV of this report. After a surge in federal funding for right whale research and conservation beginning in 2000, the trend of financial support has reversed direction and is now on a downward trajectory. Overall funding peaked in FY04 at more than $16.7 million but declined by almost $1 million in FY05, due largely to a reduction of support from NMFS. During the review, the panel was advised that NMFS funding for FY06 was expected to decline to $7.8 million, a reduction of 53 percent from the FY2004 level.

The panel has concluded that some parts of the recovery program do not appear to have been cost-effective and that significant improvements in cost-effectiveness may be possible in some areas (e.g., aerial surveys, bycatch reduction). However, the panel also has identified a number of essential tasks that are currently underfunded or that should be expanded (e.g., catalog and database management, passive acoustic monitoring, studies of effectiveness of management actions, compliance assessment). Overall, the needs for additional funding appear much greater than any savings that might be realized by paring down program elements that currently are not considered cost-effective. Therefore, any reduction in the overall federal commitment to right whale protection will mean that some high-priority work is not carried out. This, in turn, is likely to increase the risk that recovery of this population will never be achieved.

**Overall strategy and implementation**

Although the objectives of the North Atlantic right whale recovery program are appropriate, overall strategy and implementation are not adequately accountable. Federal actions have not reflected a sense of urgency about reducing right whale mortality that is consistent with the gravity of the species’ peril. The current approach is not precautionary but rather is one of waiting for conclusive evidence and/or industry acceptance before moving ahead with protective actions. This is particularly true of attempts to reduce interactions between right whales and fishing gear. Therefore, the panel recommends that NMFS and other agencies act more aggressively to prevent right whale mortality. In general, they should set higher standards of protection and place greater reliance on the ability of industry to adapt to those standards, rather than continuing to depend on a complex, shifting, inefficient, and ineffective network of regulatory measures to protect the whales. The guiding principle should be to separate high-risk human activities from right whales, in both space and time, to the maximum extent feasible.
VI. Acknowledgments

The panel acknowledges the support and cooperation of everyone who contributed to the planning and execution of the review. This includes staff at SRA International, the Marine Mammal Commission, and the National Marine Fisheries Service (headquarters and regional offices). Two individuals deserve special mention. Wilhelmina Innes at the Commission provided a remarkably clear, detailed set of meeting minutes that facilitated report preparation. David Laist, also at the Commission, contributed in many ways. Most importantly, the panel benefited from his longstanding involvement with right whale conservation and his attention to details that otherwise would have escaped notice. Finally, the panel acknowledges the constructive, detailed reviews of a draft of this report provided by NMFS staff at its headquarters office, the Northeast and Southeast Fisheries Science Centers, and the Northeast and Southeast Regional Offices. The collegial spirit they maintained while watching their programs undergo detailed scrutiny was exemplary. Also, the panel appreciates the helpful review received from Scott Kraus of the New England Aquarium.
VII. References


APPENDIX I

PANEL MEMBERS

North Atlantic Right Whale Program Review

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APPENDIX II

AGENDA

NORTH ATLANTIC RIGHT WHALE PROGRAM REVIEW

Marine Biological Laboratory
Woods Hole, MA
14–17 March 2006

TUESDAY, 14 MARCH

8:00 – 8:30  COFFEE AND DANISH

8:30 – 8:45  OPENING REMARKS
David Laist, Marine Mammal Commission
Linda Manning, SRA International
Lloyd Lowry, Marine Mammal Commission

8:45 – 9:45  OVERVIEW OF RECOVERY PROGRAM
Michael Payne, NOAA
Richard Merrick, NOAA
Jerry Conway, Department of Fisheries and Oceans, Canada

9:45 – 10:45  MONITOR STATUS AND TRENDS OF ABUNDANCE
Richard Pace, NOAA

10:45 – 11:00  BREAK

11:00 – 12:00  RIGHT WHALE DISTRIBUTIONAL STUDIES
Lance Garrison, NOAA

12:00 – 1:15  LUNCH

1:15 – 2:15  MAJOR RIGHT WHALE DATABASES
Philip Hamilton, New England Aquarium
Robert Kenney, University of Rhode Island

2:15 – 3:15  STOCK STRUCTURE AND INDIVIDUAL IDENTIFICATION – GENETICS
Richard Pace, NOAA

3:15 – 3:30  BREAK

3:30 – 4:30  REPRODUCTION AND HEALTH ASSESSMENTS
Teri Rowles, NOAA

4:30 – 5:30  RESPONSE TO STRANDINGS
Teri Rowles, NOAA
WEDNESDAY, 15 MARCH

8:30 – 9:15  HABITAT STUDIES AND ASSESSMENTS  
Lance Garrison, NOAA

9:15 – 10:30  OVERVIEW OF FISHERY INTERACTIONS  
David Gouveia, NOAA

10:30 – 10:45  BREAK

10:45 – 11:45  OVERVIEW OF TAKE REDUCTION EFFORT  
David Gouveia, NOAA

11:45 – 1:00  LUNCH

1:00 – 3:00  IMPLEMENTATION OF SPECIAL MANAGEMENT AREAS  
David Gouveia, NOAA

3:00 – 3:15  BREAK

3:15 – 5:15  IMPLEMENTATION OF GEAR MODIFICATIONS AND GEAR RESEARCH  
Diane Borggaard, NOAA  
Glen Salvador, NOAA

THURSDAY, 16 MARCH

8:30 – 9:00  FISHERIES OUTREACH AND EDUCATION  
Diane Borggaard, NOAA

9:00 – 9:45  DISENTANGLEMENT EFFORTS  
Teri Rowles

9:45 – 10:00  BREAK

10:00 – 10:30  OVERVIEW ON VESSEL INTERACTIONS  
Gregory Silber, NOAA  
Jerry Conway, Department of Fisheries and Oceans, Canada

10:30 – 12:00  INTRODUCITON TO SHIP STRIKE MITIGATION PROGRAM  
Gregory Silber  
Barbara Zoodsma, NOAA

12:00 – 1:15  LUNCH

1:15 – 2:15  VESSEL TRAFFIC MANAGEMENT  
Gregory Silber, NOAA  
Jerry Conway, Department of Fisheries and Oceans, Canada
2:15 – 3:15  MANDATORY SHIP REPORTING SYSTEM
Gregory Silber, NOAA

3:15 – 3:30  BREAK

3:30 – 4:15  NORTHEAST AND SOUTHEAST RIGHT WHALE SIGHTING AND
REPORTING SYSTEMS
Tim Cole, NOAA
Barbara Zoodsma, NOAA

4:15 – 5:15  MARINER OUTREACH, EDUCATION AND TRAINING
Barbara Zoodsma, NOAA
Kristen Koyama, NOAA

FRIDAY, 17 MARCH

8:30 – 9:30  RESEARCH TO IMPROVE UNDERSTANDING OF HOW WHALES AND
VESSELS INTERACT
Gregory Silber, NOAA

9:30 – 10:30  RESEARCH TO IMPROVE MITIGATION TOOLS FOR REDUCING
VESSEL INTERACTIONS
Gregory Silber, NOAA
Richard Merrick, NOAA

10:30 – 10:45  BREAK

10:45 – 11:45  REVIEW AND DISCUSSION OF INFORMATION PRESENTED

12:00  ADJOURN
## APPENDIX III

**RIGHT WHALE PROGRAM REVIEW PARTICIPANT LIST**

<table>
<thead>
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<th>Contact Information</th>
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</thead>
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<tr>
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North Atlantic Right Whale Monitoring and Surveillance: Report and Recommendations of the National Marine Fisheries Service’s Expert Working Group

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North Atlantic Right Whale Monitoring and Surveillance: Report and Recommendations of the National Marine Fisheries Service’s Expert Working Group

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LIST OF ACRONYMS

BOEM – Bureau of Ocean Energy Management
CCB – Cape Cod Bay (CCB)
CCS – Provincetown Center for Coastal Studies (CCS),
DFO – Department of Fisheries and Oceans Canada
GOM – Gulf of Maine
GoSL – Gulf of St. Lawrence
GSC – Great South Channel
LIMPET – Low Impact Minimally Percutaneous Electronic Transmitter
NARW – North Atlantic right whale
NEAq – the New England Aquarium
NEFSC – Northeast Fisheries Science Center
NMFS – National Marine Fisheries Service
NOAA – National Oceanic and Atmospheric Administration
PAM – Passive Acoustic Monitoring
RNA – Ribonucleic Acid
SEFSC – Southeast Fisheries Science Center
SERO – Southeast Regional Office
SEUS – Southeastern United States
U.S. – United States
UAS – Unmanned Aerial Systems
VHR – Very High Resolution
EXECUTIVE SUMMARY

The National Marine Fisheries Service (NMFS) North Atlantic right whale (NARW) Steering Committee convened an expert Working Group to address two objectives related to monitoring NARWs: (1) improving our understanding of population status by identifying and tracking essential population metrics, and (2) improving our understanding of distribution and habitat use. The Working Group consisted of five NMFS researchers (the authors of this report) with expertise in marine mammal monitoring, but not directly involved in current NARW monitoring efforts. The Working Group was convened during a three-day workshop (held at NMFS Southwest Fisheries Science Center in La Jolla, California, from October 22-24, 2019, with remote participants on Day 1), and on a series of follow up conference calls. This report provides a brief summary of the information provided to the Working Group, including historic and current NARW monitoring efforts conducted by NMFS and partner institutions, information on the status and trends of NARWs, and analyses conducted during the workshop or at the Working Group’s request. Moreover, the report primarily presents the Working Group’s recommendations for a comprehensive monitoring strategy to guide future analyses and data collection on (1) NARW demographics and population status, (2) distribution shifts and habitat use range-wide, and (3) the health of individuals and the population. The Working Group’s recommendations are intended to improve NMFS’ overall monitoring strategy for NARW, with recognition of the significant contribution to NARW research and monitoring carried out by NMFS and partner institutions and agencies.

The Working Group’s recommendations address several overarching themes. These include (1) identifying the essential population and individual metrics to be monitored, (2) characterizing analyses that may be conducted with existing data that are critical to fine-tuning and efficiently executing an effective monitoring plan, (3) expanding the NARW species distribution model through data standardization and coordination, (4) establishing an integrated visual and passive acoustic monitoring (PAM) scheme, and (5) evaluating the utility of other research tools including satellite imagery and telemetry tagging for NARWs.

The Working Group agreed that the most important population and individual metrics to be monitored include adult survival, calf to subadult survival, abundance, calf production, population age-sex structure, number or reproductive females, and the visual health index. At present, adult survival, abundance, and calf survival are estimated with high precision and low bias through the intensive aerial photo-identification efforts of NMFS and its partners. In contrast, calf to subadult survival is estimated with low precision owing to small sample size, and the number of reproductive females is not estimated annually. The age-sex structure of NARWs has not been estimated, though given the extensive data available on individual whales, could be generated and would provide valuable insight into the current demographics of the population and its future trajectory. Finally, a visual health assessment has been developed that provides information on individual health and body condition. A 2019 workshop on NARW
health assessment provided insights into expanding and improving this assessment. The Working Group recommends that once the utility of those metrics has been established, their estimation should be considered for integration in the monitoring program.

The NARW data that have been amassed to date are an invaluable resource that could be further analyzed to inform a future, more optimized monitoring plan. The Working Group identified and described 11 retrospective analyses within four overarching objectives: (1) optimizing aerial and vessel-based survey effort to ensure high precision and low bias in the estimation of population and individual metrics identified above, (2) maintaining sufficient effort to detect entangled, injured, and dead NARWs, (3) improving characterization of the overall risk seascape, and (4) improving understanding of the relative detection by visual versus passive acoustic platforms. Many of the analyses identified will be critically important to designing and executing an efficient monitoring plan.

The current NARW habitat model is a valuable resource for examining habitat hotspots and historical distribution shifts. A robust quantitative habitat-based density model requires specific data inputs, and the variability in data collection approaches across all NARW partners has slowed progress toward the next generation model. Increased standardization in the collection of a small subset of survey effort metrics and sighting parameters would facilitate much broader integration of the vast network of spatial data collected on NARWs and, together with cooperation with Canadian modeling efforts, provide a more robust model for future predictions of habitat shifts and risk assessments.

Based on review of past and current NMFS and partner survey efforts, the relative contribution of unique photographic identifications from various regions and contributors, and the ongoing PAM work along the U.S. and Canadian east coasts, the Working Group provides specific recommendations for developing an integrated visual (aerial and vessel-based) and PAM plan that attempts to maintain appropriate survey effort to estimate essential population demographic metrics, track individual health status, and capture habitat hotspots and shifts, in an efficient and cost-effective manner while reducing cost and risk to humans of significant and sustained use of survey aircraft. This plan envisions:

- Establishing a network of 16 long-term passive acoustic listening stations to monitor distribution and habitat use
- Conducting targeted aerial surveys (i.e., at aggregations of whales) to collect photo-identifications of ~90% of the population within a given year
- Coordinating efficient, and timely identification of individuals across all data collectors within a survey year
- Conducting periodic broad-scale systematic aerial surveys of the entire Gulf of Maine and Southern New England area, alternating with a systematic rotation through all historical NARW hotspots
• Maintaining or increasing vessel survey effort to collect individual health data and replace aerial surveys for collecting individual identification photos whenever possible

The Working Group puts forward these recommendations acknowledging the significant efforts of NMFS and its partners over several decades. The recommendations in this report are intended to capture the best and most effective elements of those past and ongoing efforts and provide a roadmap for a systematic, efficient, and effective monitoring strategy for the future.
I. WORKSHOP OBJECTIVES

The National Marine Fisheries Service (NMFS) North Atlantic right whale (NARW) Steering Committee convened an expert Working Group to address two broad objectives related to monitoring NARWs: (1) improving our understanding of population status by identifying and tracking essential population metrics, and (2) improving our understanding of distribution and habitat use. The expert Working Group consisted of five staff with expertise in marine mammal monitoring and quantitative assessments, but not directly involved with current NARW monitoring efforts, who were asked to develop options for a comprehensive strategy to:

1. Monitor population status, including estimates of abundance, trends, survival and birth rates, and other demographic metrics
2. Monitor distribution shifts and habitat use range-wide
3. Assess health of individuals and the population (e.g., identify causation/threats, assess sublethal effects) through biological sampling

The Working Group’s specific tasks were to provide expert guidance to the Steering Committee on how best to achieve the following more specific objectives:

Population Status

- Identify the essential population demographic metrics (e.g., survival rate, birth rate, age at calving, calving rate, age structure, life span) the agency should use to track recovery of this species, including a description of why each metric is essential for monitoring the population status.
- Develop a monitoring/surveillance plan for each essential population metric identified above, including options for:
  - Sampling methods
  - Data types
  - Sampling locations (e.g., region and/or range-wide)
  - Monitoring/survey frequencies

Distribution and Habitat

- Determine approach for identifying:
  - Distribution, occurrence, and habitat use in the mid-Atlantic region (i.e., west of 72° 30’ West, south of 40° 00’ North through 35° 30’ North (North Carolina))
  - Migratory corridor and associated physical and biological features in the mid-Atlantic
  - The unobserved portion of the population in time/space (i.e., “missing whales” not detected during aerial surveys in northeast and southeast)
  - Where animals die
- Determine best methods for quantifying changes in occurrence and distribution (e.g., relative to a changing climate)
- Determine whether, and if so how, historic and current visual sightings data can be combined with passive acoustic detection data to assess past and current occurrence and distribution, and decadal-scale changes in distribution

### Health Status

- Determine approach for identifying cause(s) or contributing factors for dead, injured, entangled animals and poor reproduction and poor health
- Determine approach for collecting:
  - Health assessment data, such as body condition and skin condition including scarring
  - Hormones for assessing reproductive state, stress, metabolism/energetics, nutritional state
  - Injury state (e.g., wounds, entanglements, skin lesions, etc.)

The Working Group met October 22-24, 2019 at the NMFS Southwest Fisheries Science Center in La Jolla, California (see Appendix II). The group received presentations on management needs for monitoring data, using mark-recapture analysis to estimate abundance and evaluate trends, current monitoring efforts in the U.S. and Canada using planes, vessels, and passive acoustics, and current funding levels (see Appendix III). The following report describes recommended options for comprehensively monitoring the NARW population throughout its range using various platforms and the rationale associated with each element.
II. DESCRIPTION OF CURRENT EFFORTS

Primary Data Collection Efforts in Support of Population Assessment

The primary data collected for monitoring population status (population size, trends in abundance, survival rates, and recruitment) come from the photo-identification studies in known NARW habitats (Figure 1) conducted from multiple platforms (aircraft and surface vessels) by multiple governmental and non-governmental programs. Most of the current data are provided by the Provincetown Center for Coastal Studies (CCS), NMFS Northeast Fisheries Science Center (NEFSC), Department of Fisheries and Oceans (DFO) Canada and Transport Canada, the
New England Aquarium (NEAq), and combined efforts of the NMFS Southeast Fisheries Science Center (SEFSC), NMFS Southeast Regional Office (SERO), and the states of Florida and Georgia, as well as a variety of other contributors. Major funders of this data collection include NMFS, the Bureau of Ocean Energy Management (BOEM), U.S. Navy, Transport Canada, DFO and the State of Massachusetts. All sighting and survey effort records are submitted to the NARW Consortium Database maintained by the University of Rhode Island for inclusion in the sightings database and those with photographs are also submitted to the NEAq for integration into a unified photo-identification catalog. Most field research teams match their photographs to this catalog during their field efforts.

The number of NARW identifications collected by each cooperating institution and platform (aerial or vessel) has varied from 2001 to 2017 (Appendix I, Tables 1 and 2), with contributions from Canada increasing dramatically in recent years as the distribution of NARWs has shifted and the efforts of Canadian Government agencies have increased. Similarly, the number of NARW identifications has varied by region from 2001 to 2017 (Appendix I, Tables 3 and 4), most notably with recent increases in sampling in the Gulf of St. Lawrence. Many individual NARWs are seen by multiple institutions and in multiple areas within a single year, such that the number of NARWs seen uniquely by a single institution/platform (Appendix I, Table 2) or in a single area (Appendix I, Table 4) is typically less than ⅓ of the total number of NARWs seen in a year. Each year, surface vessels provide a few identifications that are not obtained from any other source (Appendix I, Table 2), but the majority of identifications now come from aircraft (Appendix I, Table 1).

Photo-Identification Data Contributed by Partners

1. Provincetown Center for Coastal Studies aerial surveys in Cape Cod Bay

CCS flies a fixed survey grid over the entirety of Cape Cod Bay and the eastern Cape several days per month during winter and early spring until NARWs leave this foraging ground for other regions. These surveys provide a large number of photo identifications (Appendix I, Tables 1 and 3), including a large proportion of the unique identifications provided to the catalog each year (Appendix I, Tables 2 and 4). CCS also conducts small boat habitat surveys along predetermined tracklines to visit 8-9 sampling stations, as well as foraging surveys directed by aerial sightings of NARWs, both of which may provide additional photo identifications.

1 http://rwecatalog.neaq.org/Terms.aspx
2 https://coastalstudies.org/right-whale-research/population-monitoring/
2. DFO Canada\(^3\) and Transport Canada\(^4\) aerial surveys in the Gulf of St. Lawrence

In response to apparent recent increases in NARW abundance and observed deaths in the Gulf of St. Lawrence, DFO and Transport Canada now conduct substantial aerial survey effort from spring through fall to locate NARWs. The survey effort has been focused primarily on the main shipping routes within the Gulf of St. Lawrence, as well as over primary fishing regions, but includes some flights into other regions of likely NARW habitat. Oblique identification photographs are collected from the planes, though information on regions with large aggregations of whales is generally passed to NMFS to conduct flights for additional photo-identification efforts. DFO survey efforts account for most of the unique identifications in Canada (Appendix I, Tables 2 and 4).

3. New England Aquarium\(^5\) small boat surveys in the Bay of Fundy, Roseway Basin/Scotian Shelf, and Gulf of St. Lawrence

The NEAq began annual small boat surveys in the Bay of Fundy in 1980 and in the Roseway Basin/Scotia Shelf regions more recently. Traditionally, both surveys provided a reasonable number of unique identifications (Appendix I, Table 2), but the number of NARWs using these areas has declined in recent years. The NEAq has recently been conducting small boat surveys in the Gulf of St. Lawrence in response to an increase in NARW sightings in that region. Many of the NEAq photo-identification efforts are focused on collecting data for individual whale health assessments, requiring more detailed photographs from a variety of angles to provide a robust examination of current health status (e.g., Pettis et al. 2004). The NEAq has been conducting aerial surveys in the offshore waters south of Nantucket and Martha’s Vineyard since 2011, though the steering committee did not have access to these data so they are not discussed specifically in this report.

4. Southeastern U.S. (SEUS) small boat surveys

The states of Georgia and Florida conduct small boat surveys of the winter calving areas, directed by NARW detections from the aerial surveys. This effort serves primarily to collect biopsy samples of calves for genotyping and later identification.

\(^5\) https://www.andersoncabotcenterforoceanlife.org/category/right-whale-research/
Figure 2. Summary of NEFSC aerial survey approaches since 2002 (left panels), and overall survey effort and combined NARW sightings resulting from broad-scale surveys form 2002-2006 (right panel). Provided to Working Group by NEFSC.

Photo-Identification Data Collected by NMFS Aerial Surveys

The NEFSC conducts aerial surveys in a National Oceanic and Atmospheric Administration (NOAA) Twin Otter for much of the year. These include surveys of designated geographic areas as well as other Gulf of Maine sites in spring, summer, and fall, South of the Islands (i.e., Nantucket and Martha’s Vineyard) in fall, winter, and spring, and most recently in the Gulf of St. Lawrence in spring, summer, and fall. Much of the survey effort in the Gulf of St. Lawrence is dedicated to areas of NARW concentration identified from DFO surveys and also to locate dead or entangled NARWs for recovery efforts.
Figure 3. Seasonal distribution of NMFS aerial survey effort in recent years (2016-2019), and previous years (2010 through 2015). Actual effort may vary considerably between locations.

Photo-identification surveys conducted by the NEFSC have evolved substantially over time. These surveys initially flew over the Great South Channel (1998-2001), and then evolved to broad-scale systematic surveys (2002-2006) throughout U.S. waters in the Gulf of Maine and Southern New England (Figure 2 and Figure 3). The results of those broad-scale surveys led to more targeted surveys in designated “boxes” from 2007-2016 in order to maximize survey effort in locations that consistently contained aggregations of NARWs. This was modified starting in 2017 to direct survey efforts to areas with the highest capture rates, to maximize detections of unique individuals. Surveys are flown repeatedly to the same area until the discovery curve for new individuals levels off and few or no new individuals are detected.
SERO, in collaboration with the states of Georgia and Florida, conduct aerial surveys of the winter calving areas. These have been very successful, and not long ago were providing as many as 120 unique identifications per year. However, NARWs’ usage of the area has dramatically declined, and as few as seven NARWs, including accompanied calves, have been identified in recent years.

**Analysis Efforts to Assess Population Status**

The primary tool for integrating and interpreting the photo-identification data into population assessments is the Bayesian integrated population model developed by Pace et al. (2017). Analyses of data collected through 2018 presented at the workshop show relatively constant non-calf (ages 5+) survival rates of ~0.98 and 0.97 (for males and females, respectively) from 1990 to 2014 and a decrease to ~0.96 and 0.95 (respectively) for 2015-2016. Survival rates of calves (0-5 years) were about 2% less than for females ages 5+, and changes in both adult and calf survival rates over time are constrained in the model to follow an identical trend (i.e., the age-sex class effect is additive on the logit scale). Survival rate estimates of NARWs younger than adults have low precision, owing to small sample sizes. Consequently, it remains uncertain whether juvenile survival has changed in recent years. The model estimates an increasing population trend from ~260 in 1990 to a maximum of ~483 in 2011 followed by a decrease to ~410 in 2018.

A calf production index (the proportion of calves in the population) can be estimated from the number of calves observed in a given year and the model-based estimates of population size. Results show that calf production has been very low since 2010 (compared to values in 2001-2009) and is below the level required for replacement of adults. It appears that this recent decline in calf production is largely responsible for the observed decline in population size in recent years. The potential contribution of reduced survival of both young and adult NARWs to the population trend remains uncertain.

The estimated proportion of the population sampled by photo-identification each year (capture probability) has been very high, roughly 90% in the years 2000 to 2010. Capture probabilities began to drop starting in 2011 likely because of changes in NARW distributions (Davis et al. 2017), reaching levels of approximately 50-60% in 2014. With subsequent changes in survey effort, values for the most recent years (2016-17) are again approaching 90%. A high capture probability not only reduces the variance in estimated parameters, it also reduces the likelihood of bias caused by violations in model assumptions.

The higher male survival rate than female survival rate will result in a population with an increasingly biased sex ratio in older individuals, which reduces the reproductive potential for a given total population size. In the published model of NARW population dynamics, Pace et al. (2017) estimate that the ratio of females to males increased from 1:1.15 in 1990 to 1:1.46 in 2015. If this apparent pattern continues, there is concern that population productivity may continue to decrease.
Efforts to Describe Distribution and Habitat

There have been many efforts to describe NARW foraging and mating habitat, drivers of habitat preferences, and habitat quality and variability. The same aerial and vessel surveys that provide identification photographs also provide much of the data used to study distribution and habitat. Opportunistic sightings also provide new insights in areas that are not covered by existing survey effort. Quantitative descriptions of NARW habitat typically require design-based surveys and data from targeted surveys cannot be used for these analyses. Diverse PAM efforts have also been ongoing for almost two decades and collectively provide a rich dataset for examining distribution. However, most passive acoustic recorder deployments have been short-term or funded by partners interested in specific questions or regions, requiring researchers to piece together datasets that do not overlap in time, do not consistently sample the same sites, and may not be recording in optimal seasons or locations.

Several decades of research have shown that NARWs use discrete habitats at specific times of the year (Figure 1), and researchers have taken advantage of this to target data collection. Well documented NARW foraging habitats include Cape Cod Bay, the Great South Channel and edge of Georges Bank, an area to the south of Martha’s Vineyard and Nantucket, the waters around the Bay of Fundy, Roseway Basin, the southern Gulf of St. Lawrence and the western end of Anticosti Island (Davies et al. 2019; Davis et al. 2017; Durette-Morin et al. 2019; Leiter et al. 2017; Mayo et al. 2018; Simard et al. 2019). Additionally, the whales’ only known calving ground extends along the coast of the South Atlantic Bight (Gowan and Ortega-Ortiz 2014; Keller et al. 2012). NARWs respond to environmental changes and may use habitat intermittently over time. The whales have been known to nearly abandon a frequently used foraging habitat only to come back in future years in large numbers. In recent years, the whales have demonstrated actual shifts in distribution, frequenting previously unrecognized foraging habitats. However, sightings data indicate that NARWs may investigate a previously preferred habitat, but not stay if the prey resource is insufficient, so some habitats previously used no longer have high densities of NARWs (Davies et al. 2019; Davis et al. 2017).

A recent effort to aggregate all available and appropriate survey data resulted in monthly predictive habitat models along the U.S. east coast for NARWs and several other cetacean species (Roberts et al. 2016). These habitat-informed density models offer the most comprehensive evaluation of NARW density along the east coast to date and include relevant data through 2016. The Duke University team is currently funded under a cooperative agreement with NMFS to update the models using 2017 and 2018 data as well as create separate models for the periods before and after 2010 when NARW distribution began to shift. It is worth noting that not all NARW surveys or datasets are appropriate for use in this type of quantitative model. This density modeling effort requires survey data collected using line-transect survey protocols. The Roberts et al. models are not able to incorporate opportunistic NARW sightings, non-line
transect survey data, or data from directed survey efforts (i.e., those directed at known aggregations of NARWs).

There have been many PAM efforts throughout the northwest Atlantic over the past decade, including efforts by NEFSC to maintain collaborative long-term monitoring of species occurrence from the northern Gulf of Maine south through the New York Bight as part of the Northeast Passive Acoustic sensing Network (Van Parijs et al. 2015). Acoustic data provide insights into the occurrence of NARWs at times of the year when poor weather and lack of light make visual surveys highly restricted (i.e., late fall to early spring). A recent analysis of NARW seasonal and annual occurrence throughout the Northwest Atlantic using a diverse set of PAM data collected by a large number of collaborators resulted in an impressive assessment of changes in NARW distribution over 11 geographic regions from 2004 through 2014 (Davis et al. 2017). Although the aggregated dataset provides great insights into NARW occurrence and changes in distribution over the decade, the lack of concurrent and continuous monitoring at many locations hinders detailed examination of the movements of NARWs between regions and the changes in distribution over time (see Figure 4).

Figure 4. (Reprinted from Davis et al. 2017, Figure 5). The proportion of year with available passive acoustic recordings in each monitored region (see Davis et al. 2017, Fig. 1). Years are split into quarters from January 2004 to December 2014. Black indicates at least one recorder present for the entire quarter year for that region, lighter gray indicates a portion of that time period with recordings, and white indicates no available acoustic data for that region and time period.

Recent NARW sightings and acoustic detections in the Northeast Atlantic, coupled with historic records of NARW presence, are intriguing and suggest monitoring efforts should expand to targeted surveys in these more eastern areas, at least on a sporadic basis. For example, within the last decade one NARW has been sighted and detected in Icelandic waters during the summer months. Historic whaling records also indicate NARWs used this area in the summer.
Efforts to Assess Population Health

Health status has largely been assessed using photographs from the aerial and vessel surveys using a well-established NEAq protocol. These visual health assessments have been shown to be correlated with survival and birth rates for NARWs (Pettis et al. 2004). Additional biological samples taken during small boat efforts also contribute information on hormone levels and other metrics. Photogrammetric measurements of NARWs have been made from unmanned aerial systems (UAS) deployed from surface vessels and may also contribute useful information on health status. To date, only the visual health assessments are routinely done and other efforts are largely in the research and development phase. Additional research is needed to determine whether other metrics are correlated with survival and birth rates.

In June of 2019, NMFS convened a workshop related to assessing NARW health. The goals of the workshop were to (1) assess current NARW health information data, including associated data gaps, and (2) identify appropriate available and needed tools and techniques for collecting standardized health data that can be used to understand health effects of environmental and human impacts (e.g., entanglement), and inform fecundity and survivorship models to ultimately guide population recovery. A forthcoming report further details this workshop and efforts to assess NARW population health. An important result of the workshop was the recognition that the vast majority of data used to assess NARW health are collected during vessel surveys. Accordingly, in developing recommendations for vessel surveys, the Working Group considered health assessment data needs.

III. DATA GAPS AND LIMITS TO INFERENCE

Need for Spatially-Temporally Standardized Survey Design

As NARW distribution has varied over time, so has the spatial distribution of survey effort, as ‘following’ larger aggregations of animals maximizes collection of photo identifications and other datasets. Indeed, the collection of identification photographs of NARWs has been spectacularly successful, providing for precise estimates of population size and survival rate by year (Pace et al. 2017).

However, there are trade-offs to this adaptive sampling approach. As noted above, such opportunistic (in contrast with design-based) datasets are less amenable to spatial habitat and density-surface modeling. They also make it difficult to assess longitudinal changes in population distributions because the locations of animals are confounded with the locations of effort and new aggregation sites can be difficult to detect (e.g., if NARWs start using unsurveyed areas). In addition, the estimation of certain demographic metrics can be prone to bias under this adaptive sampling approach. In particular, obtaining an unbiased estimate of population size requires that all animals in the population are available to be sampled, meaning that all individuals are at least occasionally present in areas where photo-identification efforts are
occurring. If a segment of the population is, or becomes, unavailable to the survey efforts (by permanently moving to new areas), the population size will be under-estimated. Less obviously, estimates may also be biased if capture heterogeneity (across years or individuals) is extreme. Extreme heterogeneity can occur if, for example, some animals temporarily (for a period of years) emigrate to un-sampled areas, or if individuals are site-faithful to areas sampled more- or less-often. Heterogeneity can be modeled with random effect parameters, but this does not provide a guarantee of eliminating bias (e.g., if heterogeneity is not logit-normal distributed) and does not improve precision. These issues can affect survival-rate estimation as well, although survival estimation is more robust to capture heterogeneity than is abundance estimation. Finally, this adaptive sampling approach means that only a fraction of the population’s distribution is known, with the remainder of the population being distributed in un-surveyed areas. A potential concern is that these ‘missing’ animals could be incurring mortality risk (e.g., from vessel strike or gear entanglement) that is not being managed or assessed. Systematic annual survey area throughout the NARW range, including new areas that may have a relatively high likelihood of being occupied, would provide a more complete picture of whether the population is incurring risks throughout the year.

A coordinated range-wide monitoring plan should achieve a balance between maximizing photo-identification data collection (i.e., targeted effort on aggregations) and obtaining broad-scale, spatially and temporally representative distribution data throughout the range that allows for valid spatial modeling and detecting changes in animal use and movement patterns. There should be continuous monitoring in potential high-risk areas should NARWs start using those areas (e.g., in areas of high fishing vertical line density or vessel traffic), as well as periodic monitoring of some sort (acoustic or visual survey) in areas of potential but previously undocumented use, so that potential colonization of these areas is detectable. Areas of potential use could be identified, for example, by spatial density or occupancy modeling efforts, fit to visual survey or PAM data (cf., Monsarrat et al. 2015; Roberts et al. 2016). The viability of using satellite image data to identify new aggregation areas could also be explored.

**Collection of Consistent Data Elements by All Data Contributors**

There are many researchers and institutions contributing to NARW research and recovery efforts. Many of these institutions have been conducting NARW research for decades and use their own established protocols for various types of data collection. The NARW Consortium has done a tremendous job of aggregating the various data sources to make all data maximally usable to the collective; however, some quantitative analysis efforts have been hindered by differences in data collection approach among data contributors. In particular, NARW spatial density models require standard measures of search effort and perpendicular detection distance, which have not been readily available from all surveys. Although there have been significant post-hoc efforts to standardize data for analyses, this has been a large task that could be mitigated through developing standards for collecting a common data subset across the various data contributors.
Leveraging Existing Data to Address Key Management Questions

The impressive photo-identification catalog and analyses of these data have generated precise inferences about trends in population size, survival, and reproductive rates. However, the full potential of the catalog in addressing additional management questions has yet to be fully explored. Additional, key management questions such as those related to quantifying unobserved human-caused mortality and understanding anthropogenic influences on survival and reproduction may be addressed through additional analyses of the catalog, modifying or extending existing models, and in some cases, through modifying survey efforts to obtain additional necessary data. Below, the Working Group makes several related recommendations on this point.

IV. RECOMMENDATIONS

Essential Population and Individual Metrics

Several key demographic metrics and individual-level metrics have been and continue to be estimated for this population. Some of these, including adult survival and abundance, are estimated with high precision and apparently with little bias. It would be informative to improve estimates of some other metrics and population metrics that are currently either estimated with low precision or not available. Below, the Working Group provides a list of high priority metrics and recommendations regarding their relative need for improvement.

Adult Survival

Adult survival is currently estimated annually with sufficient precision and low bias. This should be continued. The Working Group suggests that survival modeling be further investigated to evaluate support for any change in the disparity between adult male and female survival rates over time. The estimated survival rates in Pace et al. (2017) and updated output shared at the workshop were based on a model with an additive survival effect, which constrains the sex difference to be constant over time. A model with a \( \text{sex x time} \) interaction might indicate whether adult female survival has become relatively lower than male survival in recent years. The initial sex state of individuals of unknown sex (assumed to be at parity) may also affect the change in sex ratio in the model. The Working Group also recommends exploration of alternative assumptions on initial sex ratios.

Calf to Subadult Survival (Roughly Ages 0 to 5 Years)

Calf to subadult survival is currently estimated annually but with relatively low precision owing to low sample sizes. The Working Group recommends exploring alternative capture-recapture model formulations to determine whether any change in survival of young animals has occurred in recent years. One such potential formulation might allow young NARW survival to be estimated independently from adults (i.e., an interaction rather than additive age effect) and with
years grouped appropriately (i.e., before and after some potential change-point year) for young animals in order to increase the precision of estimates for this age class. A proportion of young NARWs are of uncertain age. Precision in age-specific estimates of young NARW survival could be improved by increased effort to determine their ages through genetic sampling and matching with biopsy samples obtained from neonates.

Abundance

Population size is estimated annually and with high precision and low bias. This should be continued.

Calf Production

The number of calves born annually is determined through total enumeration during intensive aerial surveys in the calving area. It is rare to find a new calf on the foraging grounds not previously identified on the southeast calving grounds. Calf production combined with other relevant information can be used to derive other reproductive metrics of interest, including gross reproductive rate (calves per mature female), calves per female (without regard to age), a calving index (calves divided by total abundance), and inter-birth interval. Estimation of calf production should continue, with effort adjusted appropriately to achieve total enumeration without excessive expenditure of survey resources.

Population Age-Sex Structure

The age-sex structure of the NARW population is not currently available. The age-sex structure is a product of the annual survival and reproductive output of a population for a generation. As such, it is a convenient graphical integration of a population’s history. Gaps in one or more ages reflect either a deficit in births or high historic mortality. Furthermore, future population trends are determined by both prevailing vital rates (survival and reproductive rates) and current age-sex structure. If an age-sex structure is significantly perturbed relative to the theoretical stable age distribution associated with the lifetable (matrix of survival and reproductive rates), the future realized population trend may be dominated by the age-sex structure. Currently, the NARW age-sex structure is not estimated, but it could be based on the known individuals in the population and information on their known, estimated, or minimum ages. There will be error in the estimated age-sex structure owing to uncertainty in observed individuals’ ages and sexes, as well as uncertainty in the estimated unobserved portion of the population in a given year. However, given the wealth of data available for this population, it is anticipated that the uncertainty in the age-sex structure will be relatively low. A variety of statistical approaches could be used to incorporate uncertainty in age and sex into the estimated structure. Again, additional effort to biopsy young animals and match them via genetic analysis to already sampled neonates would reduce uncertainty in the calf to subadult ages.
Number of Reproductive Females

This metric is easy to understand and conveys the current dire status of the NARW. It has been estimated in the past but apparently is not updated regularly. This could be readily achieved using reproductive histories of individual females combined with the female population age structure.

Visual Health Index (and Potentially Other Health Metrics)

The preceding metrics are all population-level metrics in that they apply to demographic groups of animals or the entire population. Here the Working Group highlights the priority to measure relevant health metrics at the individual level. An existing visual health assessment index is derived from photographs and incorporates information on qualitative body condition, skin condition, rake marks, cyamid loads, and lesions. These body and skin condition metrics have proven to be a significant predictor of individuals’ survival. A suite of additional individual health associated metrics was identified during the 2019 NARW Health Workshop as potentially informative for health status, future survival, and future reproductive performance. Once the utility of such metrics has been established, their estimation should be considered for integration in the monitoring program.

Interrogating Existing Data to Inform Future Monitoring Schemes

The NARW data that have been amassed to date are an invaluable resource that could be further analyzed to inform a future, more optimized monitoring plan. The Working Group was provided an extensive overview of the data collection and monitoring efforts that have been ongoing by NMFS and other organizations; however, the Working Group did not have an opportunity to analyze existing data to inform monitoring plan recommendations. Although the Working Group presents a monitoring plan below, it acknowledges that aspects of this proposed plan may be refined through additional analyses of existing datasets. The Working Group recommends several analyses of the photo-identification, survey, and other data prior to finalizing a monitoring plan. Below the Working Group outlines desired objectives and a suite of analyses that could be conducted on existing data to help achieve those objectives through the design of an improved monitoring plan.

Objective 1. Optimize Aerial and Vessel Survey Effort to Ensure High Precision and Minimize Bias in Estimates of Survival, New Entrants, and Abundance in an Efficient Manner

Achieving this objective depends upon maintaining high (approximately ≥ 0.90) annual capture probabilities for all age and sex classes, minimizing heterogeneity in capture probabilities among individuals, and re-distributing effort in such a way as to reduce oversampling or undersampling of certain areas (and thereby certain segments of the population).
Proposed retrospective analyses:

A. Enumerate and track number of overall and unique identifications by source, platform, and region. During the workshop, the number of individuals documented per year by platform and organization (Appendix I, Table 1) and geographic area (Appendix I, Table 3) was provided for review, together with the number of individual NARWs seen only by a single platform or source (Appendix I, Table 2) and in a single area (Appendix I, Table 4). This information is extremely informative for determining where effort may be adjusted to maximize the number of individuals identified each year. The 2018-2019 data could not yet be evaluated in this way, but should be added when it becomes available to reflect the most current information for planning future survey effort. Further, while the Working Group aimed to identify the most significant data contributors based on the provided presentations, some significant sources may have been omitted such that the organizations and platforms should be reviewed for completeness.

B. Investigate drivers of individual capture heterogeneity. Heterogeneity can be attributed to both sampling methods and intrinsic biology of animals. It may be possible to discern from existing capture histories if the variability in re-sightability among individuals is mostly due to distribution of survey effort in space and time, variability in animal behavior affecting detection and identification, or variability in mark distinctiveness among individuals. Such information could be used to adjust survey design to reduce heterogeneity.

C. Related to (B), investigate temporal and spatial patterns of occurrence for those NARWs seen only once per year, or which go undetected for one or more years. These NARWs, by definition, have relatively low sighting probabilities. This analysis may suggest strategies for increasing the probability of detecting these NARWs, thereby reducing potential bias in estimates of survival and abundance.

D. Subsample existing sightings histories to simulate how reduced effort (temporally/spatially) might affect the precision and bias of the metrics used to monitor population status. This will help inform whether reducing effort in specific areas, times, or from specific platforms will result in undue bias or unacceptable uncertainty. This will also help evaluate whether the overall capture probability goal could be reduced to less than 90% of the population per year.

E. Determine level of effort required to identify new calves. With the reduced number of calves seen in the southeast area in recent years, a post-hoc re-sampling analysis could be used to determine the level of aerial effort that is needed to find and photograph all calves born in a given year (recognizing that this effort is likely to change as the number of births changes). In addition, the integrated mark-recapture model provides estimates of calf production. These estimates should be compared to independent estimates of calf production (e.g., from the southeast surveys). If the model approach indeed provides good estimates of calf production, this could potentially reduce the need to collect as much winter survey data from the southeast region.
**Objective 2. Maintain Sufficient Effort to Detect Entangled, Injured, and Dead North Atlantic Right Whales**

Achieving this objective is critical for assessing threats, assigning cause of death, designing mitigation strategies, and evaluating the efficacy of those strategies. Between 2010 and 2017, approximately 50% of the estimated NARWs that were killed or seriously injured were detected. Live, entangled NARWs may be disentangled and thereby relieved of suffering, injury, and death. Any adjustment in surveillance for optimizing estimation of demographic metric must be balanced with potential degradation in the likelihood of detecting entangled, injured, and dead NARWs.

**Proposed retrospective analyses:**

A. Map when, where, and by what platform entangled, injured, and dead NARWs have been first detected to date.

B. Subsample existing sightings data to simulate how dead, injured, and entangled NARW detections would have been affected by reduced effort. Determine the level of aerial survey effort needed to detect dead, injured, or entangled NARWs.

C. Estimate unobserved human-caused mortality. Integrating information on human-caused injury and mortality (e.g., entanglements, vessel strikes) into the mark-recapture model may help build on previous efforts to estimate unobserved human-caused mortality (Pace et al. in prep.). For example, for entanglements this would take the form of a multi-state model, where sighting information is used to classify individuals as entangled or not, and this information is used to estimate the probability of transitioning from an un-entangled to an entangled state (taking resight probability into account) and the associated mortality rate. It would also provide estimates of the annual likelihood of animals becoming entangled in a year. Surveys designed to maximize detection of entangled, injured, or dead NARWs, and to identify the location of entanglement, injury, and mortality, would provide more robust data to inform this effort.

**Objective 3. Improve Characterization of Risk Seascape**

Understanding the spatial and temporal distribution of threats is key to designing mitigation measures.

**Proposed retrospective analyses:**

A. The Working Group recommends increased modeling effort to better understand drivers of variation in calf production, the correlation between calf production and survival (for various age classes), and the relative contribution of environmental versus anthropogenic impacts to survival and reproduction. An effort should be made to investigate correlates of survival and reproduction in sighting histories (cf., Wade and Clapham 2000) to determine whether individuals’
distribution patterns have been predictive of subsequent survival, health status, reproductive success, or observation as injured or entangled. Calf production may be reduced by nutritional stress, injury-related stress (vessel strike or entanglement), or the additive or synergistic effect of these. An analysis of an individual’s reproductive success and sighting histories as they relate to these factors may help to tease apart the influence of these factors on calf production.

As with calf production, adult survival may similarly be reduced by nutritional stress and human-caused factors (entanglements and vessel strikes). In general, adult survival is expected to be more robust to environmental conditions than reproduction, but whether the environment is playing a role in reducing adult survival may be detectable by correlation with calf production, annual oceanographic or prey metrics that should relate to the individual’s ability to meet energetic needs, and independent population-health assessment data. Inferences from this effort would better inform risk assessments and the extent to which current population dynamics are within management control vs. driven by environmental conditions.

B. Some risks have been more or less well described for the areas and times where NARWs have traditionally been present. In recent years, NARWS have redistributed in ways that were not predicted nor are even yet well characterized. Given this uncertainty, formally characterizing threats (e.g., vessels/fishing) in areas where NARWs may be spending more time in recent years (e.g., Mid-Atlantic, Canada outside Gulf of St. Lawrence, Iceland, others) could help prioritize survey effort (including acoustic recorders) to characterize NARW use of the highest perceived risk areas.

**Objective 4. Improve Understanding of Relative Detection by Acoustics Versus Visual Survey**

Acoustic and visual (aerial and vessel) surveillance are used to detect presence of NARW and a future monitoring plan will continue to employ both methods. Both methods fail to detect some NARWs that are present. In particular, behavioral state and acoustic propagation conditions may have significant impact on the ability of acoustic monitoring devices to detect NARWs known to be in a given area. Understanding these factors and predicting when each method will provide the greatest surveillance pay-off is key to a cost-effective monitoring plan.

**Proposed retrospective analyses:**

A. Evaluate situations where acoustic recorders were present in the same times and places as aerial or boat surveys. Identify instances where acoustic monitoring indicated NARWs were present but they were not detected visually, and vice versa. This may inform strategies for deploying surveillance resources, especially in currently under-surveyed locations of interest.

**Improving the North Atlantic Right Whale Habitat Model**

NARW spatial density models have been developed at Duke University (e.g., Roberts et al. 2016). There have been a number of challenges associated with expanding the geographic scale
of the models and the types of data that can be used to inform the density predictions. For example, it seems that some data contributors do not distinguish between periods of ‘on-effort’ vs. ‘off-effort’ survey or note the distance to sighted groups. Many of our other recommendations already address some of these challenges (need for systematic effort, need for common data types, etc.). However, the existence of a broad spatial-scale predictive modeling tool would have many uses in facilitating efficient monitoring for NARWs within and between years. Extrapolation of models using environmental covariates to presently un-surveyed areas could provide clues for targeting regions for PAM or focusing aerial surveys in the future.

Further, the Working Group was presented an overview of ongoing work by DFO with regard to developing NARW habitat-prediction models. To the extent feasible, the Working Group recommends a coordinated and unified modeling approach to provide distribution and density predictions across the range of NARW habitat. Such a model would require considerable collaboration among U.S. and Canadian researchers to ensure consistent data inputs, but would provide a powerful tool for examining possible distribution shifts based on future conditions or for identifying locations where future focused effort may be most efficient or effective.

Although NMFS conducts a large share of overall aerial survey efforts, there are several other research groups that regularly or intermittently conduct aerial surveys, including collection of identification photographs. Attempts to integrate and use these data are slowed by the need to standardize the data to a common framework (identifying periods of survey effort versus periods off the transect line for other purposes, measurement perpendicular sighting distance, etc.). Working with contributing research groups, the Working Group recommends developing standards for collecting a common data subset (e.g., effort and perpendicular sighting distance) instituted by all aerial survey efforts to facilitate maximal use of collected encounter and photo-identification data. The identification and collection of a common data subset isn’t meant to replace data collection protocols long used by various survey groups, but rather to ensure that a standard set of data required for quantitative analyses is collected in the same way by all partners, maximizing the utility for all datasets. At minimum, all teams should record whether the survey (or portion of the survey) was systematic, opportunistic, or directed at known aggregations, and for those portions that represent systematic survey effort, indicate when the plane is “on-effort” surveying along the transect line, and the distance to sighted groups.

### An Integrated Passive Acoustic and Visual Survey Monitoring Plan

The Working Group thinks that a well-designed, long-term coordinated visual and PAM effort may yield the greatest benefit by providing consistent input datasets for examining occupancy, predicting (or at least retrospectively identifying) distribution shifts, and supporting abundance analyses and estimation of other vital demographic rates for this population. Passive acoustic recorders can provide continuous monitoring year-round, providing valuable information on
occurrence, even in times of year with poor weather conditions. Visual surveys provide opportunity to collect identification photographs, critical for quantitative assessment. Aerial platforms also provide broad geographic sampling, better for spatial modeling of habitat use, compared to fixed-site PAM efforts.

The complementary strengths of these data collection platforms allow for efficient and cost-effective data collection across a broad area. Monitoring of high risk areas (e.g., shipping lanes, high density vertical line fishing areas) with low densities of NARWs is probably best accomplished with acoustic recorders, whereas monitoring and data collection in high density hotspots is achieved with visual survey platforms where critical identification photographs can be taken, and other biological samples can be collected. While specific regions or periods may be best suited to either passive acoustic or visual survey effort, there are several cases where the combination of monitoring approaches may provide for the greatest and most consistent data collection opportunity. For example, acoustic monitoring data may reveal the presence of NARWs in an area, allowing subsequent targeted visual surveys to that area. In specific regions, deploying near real-time auto-detection buoys may provide opportunity to rapidly deploy visual survey resources when NARWs are detected, allowing for data collection from NARWs that may not be commonly seen in core foraging areas. Conversely, if visual sighting rates fall in an area where NARWs used to occur at higher density, a switch to acoustic monitoring of the area allows for continued monitoring of the region in the event that the NARWs return as conditions change and NARW distribution shifts.

Therefore, the Working Group recommends that NARW passive acoustic and visual surveys become more systematic. There are many areas that should be monitored each year (continuously or seasonally as appropriate) in a similar way, and on a standard cycle. Such monitoring may be acoustic or visual depending on the density of NARWs likely to be in that area, and may switch between visual and acoustic monitoring over time, but consistent monitoring in those spaces should be maintained through some sampling platform. Some areas should continue to be sampled every year. Other areas can be sampled on a less frequent basis, but without abandoning periodic sampling altogether, despite the apparent distribution of NARWs. This will reduce the number of assumptions being made about where the NARWs are, and will let data inform the analyses of NARW distribution, and its change through time. Specific passive acoustic and visual survey recommendations addressing this need for systematic survey efforts are described in more detail in the sections below.

Acoustic Monitoring to Examine Distribution and Habitat Use

Although NARWs are not highly vocal when transiting and mom-calf pairs are often quiet, presumably to prevent detection by predators, PAM efforts have clearly identified occurrence in regions that were not otherwise being monitored. While the detection probability may vary seasonally and by behavioral state, PAM is a low cost monitoring tool, particularly when using
archival recorders and analyzing data with highly efficient and accurate automatic detectors and call classifiers.

While visual surveys, both aerial and vessel-based, have been common for decades, PAM efforts specifically designed for monitoring NARW distribution and habitat shifts have not been broadly or sustainably supported. Several PAM efforts have been undertaken by a large variety of institutions, though many were not specifically designed to assess NARW distribution or occurrence. An impressive effort to consolidate these disparate data to assess NARW trends and distribution over time has resulted in valuable insights (Davis et al. 2017); however, the lack of systematic long-term sampling designs hinder the ability to derive strong conclusions from these data. The Working Group recommends that NMFS establish and analyze long-term permanent passive acoustic stations where recorders will be regularly maintained to ensure long-term records of NARW occurrence at those sites. Analysis of passive acoustic data from specific monitoring locations will allow for identifying shifts in distribution over time and habitat use changes. Some of our recommended monitoring locations occur in Canadian waters. The Canadian Government and some academic researchers have plans for an impressive array of PAM stations in the Gulf of St. Lawrence and surrounding waters. Effort need not be duplicated, but the long-term effort should be sustained independent of the funding streams of these individual researchers.

The Working Group recommends a large number of permanent continuous long-term monitoring sites, augmented by a smaller number of established stations that could be monitored every 2-4 years, or in response to other information such as from visual surveys. There should be a commitment to fund all stations consistently through time and all sites should be monitored with calibrated and standardized equipment to allow for robust quantitative comparisons among sites. Although the location of specific monitoring sites may need to be adjusted over time for various reasons, possible monitoring sites should be well considered in advance to allow for the greatest consistency without additional confounding variables (including differences in site-specific physical features and detection range) that may reduce the value of some datasets for various quantitative or qualitative examination of space use, population trends, or other metrics. Reductions in overall monitoring effort should be carefully considered based on proven redundancy in the results of passive acoustic efforts at neighboring monitoring stations, and the ability to monitor that region with other approaches.

The location of the permanent acoustic stations should be based on a combination of several factors, including:

- Hotspots of historical and/or current NARW distribution
- Shipping lanes where risk of vessel strike is highest
- Areas with high density of fishing gear with vertical lines
- Areas through which migration is thought to occur
Calving areas

The Working Group recommends long-term (multi-year) continuous acoustic monitoring in the regions listed below (Figure 5). The rationale for choosing various locations is noted in parentheses. Some locations may require more than one acoustic monitoring site to adequately monitor the region. Acoustic monitoring has been conducted in several of these locations. If appropriate, use of the same monitoring sites should be considered.

1. Northern Gulf of St. Lawrence near Anacosti Island (current foraging area, high density of fishing gear)
2. Southern Gulf of St. Lawrence near Prince Edward Island (current foraging area, high density of fishing gear)
3. Roseway Basin/Scotia Shelf (historical foraging area)
4. Coast of Maine (high density of fishing gear)
5. Jordan Basin (historical foraging area, seasonally increasing density of fishing gear)
6. Boston Harbor shipping lane (exposure to vessel traffic)
7. Georges Bank (historical forging area, offshore pot fishery)
8. North of Great South Channel (current foraging area, exposure to vessel traffic)
9. Great South Channel (current foraging area, exposure to vessel traffic)
10. South of Islands (e.g., Martha’s Vineyard and Nantucket) (current foraging area)
11. New York Bight (current foraging area, exposure to vessel traffic)
12. Mouth of Delaware Bay (migratory route, historical winter aggregations, exposure to vessel traffic)
13. Mouth of Chesapeake Bay (migratory route, historical winter aggregations, exposure to vessel traffic)
14. Cape Hatteras (migration pinch point)
15. Charleston Inlet (migratory route, exposure to vessel traffic)
16. Southeast US calving ground (calving area, exposure to vessel traffic)

The Bay of Fundy was identified as a high priority area for passive acoustic monitoring; however, strong tidal currents may prevent successful monitoring of this region so it is not listed above. If appropriate and cost-effective mooring options become available, monitoring in this region should be considered. Alternative approaches to monitoring the Bay of Fundy may be needed in the meantime.

In addition to the permanent monitoring areas identified above, the Working Group recommends additional year-round monitoring occur on a periodic basis (every 2-4 years) in the following regions:

- Jeffreys Ledge (historical foraging area)
- Wilkinson Basin, Gulf of Maine (historical foraging area)
- Savannah Inlet (migratory route, exposure to vessel traffic)
Finally, exploratory short-term monitoring should be carried out to investigate the occurrence of NARWs in potential foraging areas that are not being surveyed by other means. Such areas may include regions with infrequent sightings of NARWs, or regions to the northeast where foraging habitat is predicted by various modeling efforts (including that of Monsarrat et al. 2015). This list is not exhaustive, but rather provides suggestions based on the above rationale. Some regions may be better assessed with underwater gliders outfitted with PAM devices. The choice of acoustic monitoring platform can be determined based on hardware available, the size of the possible monitoring region, and the need to monitor for extended duration. After examination of the results in Monsarrat et al. (2015), the Working Group specifically recommends exploratory short-term monitoring in the following areas that have three features: (1) identified as predicted habitat from the model results, (2) historical (pre-1950) records of NARWs, and (3) post-1950 sightings of NARWs:

- **Off of southeast Labrador (possible summer/fall foraging area).** Labrador is approximately the same distance from the Gulf of Maine as is the foraging area in the Gulf of St. Lawrence, suggesting easy travel to this area if it becomes a productive foraging area.
- **Off of southeast Greenland (possible summer/fall foraging area).** Although farther, this area could be utilized once NARWs leave Cape Cod Bay after the spring.
- **Off the east and west coasts of Iceland (possible summer/fall foraging area).** Iceland is more distant than other proposed monitoring areas; however, at least one NARW has been seen recently in local waters.
Figure 5. Proposed acoustic monitoring stations in the U.S. and Canada. Continuous year-round monitoring is recommended at the green sites and periodic monitoring (every 2-4 years) at purple sites. The red site (Bay of Fundy) is considered a priority for continuous monitoring but may require an alternate plan due to strong tidal forces. The locations are approximate and do not represent a specific monitoring site.

In addition to archival long-term monitoring, real-time acoustic monitoring in the mid-Atlantic area and in currently sparsely used foraging areas may provide opportunity for response to intermittent and infrequent aggregations of NARWs in these areas. Auto-buoys provide for near real-time detections of NARW calls that visual survey teams can then respond to for collection of identification photographs or biological samples. Real-time monitoring efforts must be well
coordinated to ensure visual teams are available to respond to relatively rare detection events. If such coordination is not feasible, the cost of real-time efforts may not be worth the investment.

PAM is a powerful and efficient method for monitoring NARW distribution, though its capacity to provide insights is limited by several biological and physical factors that must be considered when designing a PAM network for the species. Calling rates vary among demographic groups and during different behaviors (Parks et al. 2014), such as quieter mother-calf pairs, which may result in lower detection probability in calving regions and along northbound migration routes. Detection probability also varies with different acoustic habitats, bathymetry, and recorders (e.g., Rice et al. 2014; Risch et al. 2014), highlighting the need to use consistent calibrated hardware and quantify detection range seasonally if aiming to use the data in quantitative analyses of NARW distribution, and especially if attempting to estimate NARW abundance using these data.

*Aerial Surveys and Collection of Identification Photographs*

Photo-identification studies are conducted by a number of groups independent of NMFS, including CCS, DFO, and the NEAq. These groups have consistently provided 50% or more of all photo identifications, and their efforts are essential to maintaining a high quality monitoring program for this population. Below, the Working Group provides a strawman survey plan based on the information provided to the Working Group (not informed by the analyses outlined above).

Specifically, the plan assumes continuation of the following efforts by NMFS partners:

- Vessel-based surveys in the Bay of Fundy, Roseway Basin, and in the Gulf of St. Lawrence by the NEAq
- Aerial surveys in Cape Cod Bay and areas adjacent to Cape Cod by CCS
- Aerial surveys in the Gulf of St. Lawrence by Canada DFO and Transport Canada

The evolution of the NEFSC survey effort— from broad-scale surveys, to specific survey boxes, to directed effort in areas of high capture rates—was sensible and highly successful at maximizing the collection of identification photographs. The NEFSC aerial surveys in recent years have often resulted in more than 200 identifications in a year (Appendix I, Table 1), but there is considerable overlap in identifications with other survey efforts, such as with CCS effort in Cape Cod Bay, and in 2017-2018 with DFO efforts in the Gulf of St. Lawrence (Appendix I, Table 4). The proportion of unique identifications attributable to NEFSC aerial surveys averages about 32% per year since 2002, though this identification rate has fallen by about 10% compared to the period of broad-scale surveys (~41%). There are many factors that may confound the rate of capturing unique identifications in recent years, including extent and distribution of survey effort and NARW distribution, and while the Working Group commends the significant NEFSC aerial efforts to collect identification photos, it recommends returning to broader scale surveys that
would allow for identifying habitats being used by NARWs for the first time, return to historically used habitats, and presence of NARWs in high risk areas.

Underlying all of our survey recommendations is the premise that **photo-identification efforts should be designed and maintained to achieve a capture probability of approximately 90%**. A metric for measuring progress towards meeting this objective is the number of unique individuals sampled in a given year. The NEFSC endeavors to maximize the number of animals identified in a year for a given level of sampling effort by targeted sampling of high-density areas. In this way, roughly the same number of unique animals can be detected with significantly fewer flight hours. The Working Group supports this approach, though also recommends that sampling be designed to achieve a wide range of sample locations to reduce potential bias associated with geographic heterogeneity in capture probability among individuals.

The Working Group also recognizes that aerial photo-identification efforts represent a risk to survey personnel. The geographic coverage provided by aerial surveys should be weighed against the high value of data that may be collected using alternative platforms, such as surveys by surface vessels and the use of UAS launched from surface vessels. In particular, the use of UAS for collecting photographs may allow for reducing aerial survey effort for photo-identification. Mindful of the danger of aerial surveys, the Working Group specifically does **not recommend increasing aerial survey effort to achieve a higher than 90% capture probability** to monitor population abundance, trends, and vital rates. Effort reductions may be achieved by reducing the number of days allocated to return to high-density hotspots, and terminating effort there before a full plateau in the discovery curve. From discovery curves presented to the Working Group, it appears that ~1/3 to 1/4 of the survey effort in those locations results in obtaining only a few additional identifications. Of course, one cannot know when the discovery curve will plateau until it is observed. However, sufficient experience in the last few years exists to be able to make some predictions of how many days should be spent returning to a high-density area, in order to reduce the total number of flight days.

The Working Group considers this 90% metric to be cumulative across all data contributors and platforms, such that **the Working Group recommends additional efforts to coordinate identification of individuals across all data collectors** operating along the east coast throughout the survey year. This could be accomplished if survey teams were to determine NARW identities as soon as possible after detection by vessel or aerial surveys. These would ideally be entered into a shared near real-time updated list of unique NARWs identified by any survey platform during the year. When the collective effort from all surveys identifies a number of unique NARWs greater than 90% of the NARW abundance estimated for the previous year, aerial survey efforts should be reduced, or redirected to other tasks, including identifying and tracking dead or injured NARWs.
NARW distribution is likely to continue to vary in the future, and it is important that systematic surveys be conducted to recognize those changes when they occur. The Working Group approves of the current design, whereby key areas of known NARW aggregation are targeted (i.e., boxes in Figure 2) and survey effort is dynamically allocated in those areas until most or all the unique NARWs within them have been identified. However, the Working Group recommends that this approach should be balanced by repeating broad-scale systematic surveys of the entire Gulf of Maine/Southern New England on a regular schedule. The Working Group also notes that some boxes are no longer surveyed in some years, apparently because they have recently contained few or no NARWs (e.g., Jordan Basin in the middle of northern Gulf of Maine). The Working Group recommends that some effort continue in these areas, on an annual basis if possible. This could be accomplished by a lower density of aerial track lines or by a shift to passive acoustic recorders to, at least retrospectively, identify a return of NARWs to that habitat.

The following is an example of an aerial survey plan that accords with our recommendations.

(I) Conduct a broad-scale survey covering the Gulf of Maine and Southern New England every 3rd year.

The Working Group recommends that a broad-scale survey should be conducted every 3rd year. This timing balances detecting distributional shifts in a timely fashion with maintaining higher efficiency in obtaining NARW identifications in other years by focusing effort on high NARW density areas. The survey would be designed to provide data that could be used for modeling the spatial distribution of NARWs, by providing systematic uniform coverage of the survey area. These data would help identify and analyze major changes in NARW distribution and habitat use. This would ensure that emerging habitat hotspots have a high probability of being discovered relatively quickly so they can be included in future photo-identification surveys, and that emerging use of areas with high risk from vessel traffic or high density of fishing gear vertical lines would also be identified. At least two complete surveys should be completed, one in spring, and one in late summer/fall (September/October) to ensure surveys are not missing important areas being used by NARWs. The goal should not be to detect every single NARW in the survey area, rather to achieve a high probability of detecting areas being used by an appreciable number of NARWs.

The Working Group recognizes that conducting such broad-scale surveys could potentially consume all or a large percentage of available flight time in a year. To balance the need for information on broad-scale distribution with collecting identification photographs, a stratified design may be appropriate, where specific strata could be designated to have higher sampling intensity (e.g., more transect lines). Strata with higher sampling would be guided by those areas currently known to contain higher densities of NARWs, such as South of the Islands. The Working Group is aware that the NEAq is currently conducting aerial surveys south of Nantucket and Martha’s Vineyard, and that this effort is not captured in the present enumeration.
of unique identification photos by platform or area. That effort need not be replicated by NMFS
the extent that the NEAq continues to fly in that region and collect the data needed to assess
overall distribution and abundance (i.e., identification photographs and effort information).

(II) In the two other years of a 3-year period, continue targeted photo-identification
surveys, with modification to ensure some systematic components are maintained through
time.

The Working Group is impressed by the efforts to increase the collection of identification
photographs of NARWs from the NEFSC aerial surveys. It is clear that photographs from some
locations are only collected from that platform, and every year these contain identifications of
NARWs only seen in those areas. This especially includes the Great South Channel, the area
north of the Great South Channel, north of Cape Cod Bay, the northern edge of Georges Bank,
and the area South of the Islands. The Working Group encourages continuation of this work, and
commend the NEFSC aerial survey team for their efforts.

The establishment (after the 2002-2006 broad-scale surveys) of designated survey boxes around
hotspots was an excellent idea. The Working Group recommends maintaining consistent survey
boxes through time to provide another source of long-term data to assess habitat use and NARW
movements. It appears from examination of past survey efforts that the geographic boundaries of
some surveyed boxes occasionally changes seasonally or annually. The Working Group
recommends fixing the boundaries of the survey boxes and maintaining a single design of
specified survey boxes. In particular, the Working Group recommends establishing a permanent
survey box South of the Islands (Nantucket and Martha’s Vineyard), to the south of Block
Island, and in the New York shipping lane. This could include a partitioning into an eastern
(south of Block Island) box and a western (south of Nantucket) box. The Working Group also
notes that a large number of NARWs were seen in spring well to the south of the area typically
surveyed (i.e., Nantucket shoal, or south of Block Island), close to the edge of the shelf break.
The Working Group realizes this may be a newly discovered extension of this area, such that the
‘permanent’ box to be surveyed in the future may need to encompass this area, as well.

Further, as shown in Figure 3, there are several locations in the Gulf of Maine that are no longer
surveyed in summer or fall because NARWs are no longer commonly seen there. The
recommended broad-scale surveys will provide information from this area; however, additional
effort in this historical hotspot would be worthwhile given the significant fishing effort there.
Therefore, the Working Group further recommends establishing a regular systematic
rotation through all historical hotspots and in all seasons previously detected. This could be
accomplished by rotating among historical hotspots over the two years of targeted surveys
between broad-scale surveys.

Finally, reiterating our recommendation related to improving the NARW habitat model, the
Working Group recommends working with all data contributors to develop standards for
collecting a common data subset that may be instituted by all aerial survey efforts to facilitate maximal use of collected encounter and photo-identification data. Many aerial survey efforts provide identification photos that contribute to examining population demographics and distribution. With relatively little additional data recording effort, periods of survey efforts that are either systematic, opportunistic, or targeted may be identified, and the effort within each state tracked to allow for use of a border set of survey data within a robust quantitative habitat-modeling framework.

Data Collected on Vessel-Based Surveys

As much as possible, the Working Group recommends substituting vessel-based effort for aerial effort. The Working Group makes this recommendation for several reasons. First, for the safety of researchers, as cumulative time spent flying adds to cumulative risk. Second, genetic, some health assessment, and other biological sample data can only be collected from NARWs on the water. A monitoring plan that aims to provide appropriate data for monitoring individual and population health must include vessel-based survey and data collection efforts. Such efforts provide the only opportunity to collect biopsy samples for genetic and other tissue-based analyses, to fly UAS platforms for photogrammetry or blow sampling, and to allow for collection of fecal samples. The Working Group recommends that vessel-based survey efforts be maintained at least at current levels, or increased to replace aerial survey effort, across all data contributors. Expansion of boat-based UAS surveillance may be a viable replacement for some aerial survey effort though will require investment in vessel support. Vessel-based survey efforts are currently undertaken primarily by NMFS’ partners. If partners are not able to continue vessel-based survey and data collection efforts, such efforts may need to be augmented by or funded by NMFS.

Work by Pettis et al. (2004) has shown that photo-identification images can be used for monitoring the health of individuals. There are also many powerful new techniques and methodologies that have become available in recent years. These include analyses of hormones, various ‘Omics- including ribonucleic acid (RNA) transcriptomics for gene expression such as immune response and photogrammetry for examining body condition and identifying pregnant females. Although many of these analyses are not yet being undertaken on NARWs, every effort should be taken to accommodate the greatest range of future analytical approaches possible. To that end, the Working Group recommends that biopsy samples be placed into small liquid nitrogen dry shippers immediately on collection, to provide high quality genetic material that can be used for cutting edge methods such as RNA transcriptomics, but also archived for methods that have not yet been developed. Further, efforts to obtain biopsy samples from older calves should be prioritized so they can be genetically matched to samples from neonates in order to reduce age and sex uncertainty in assessment models.

At present, the majority of health assessments linked to survival are almost entirely based on photographs collected during vessel-based surveys. Through development and testing of various
proxies, it may be feasible to determine overall health condition through use of aerial imagery, collected by airplane or UAS. As such, the Working Group recommends a set of feasibility studies using imagery collected by UAS. Lateral imagery taken from the vessel paired with aerial imagery collected by UAS for the same whale may provide for development of proxies measured from the aerial photographs for health metrics that are currently only derived from vessel-based photos. In particular, health assessments based on length and girth measurements made from aerial photographs would provide additional health data for a larger sample of NARWs than can currently be achieved by vessel-based photographs alone.

The Working Group members do not consider themselves experts in health assessment, and largely defer to input provided at the June 2019 Health Assessment Workshop. Beyond recommendations for maintaining vessel-based survey effort, the Working Group outlines two research projects it feels should be carried out to further health assessment studies on NARWs.

1. Examine whether body condition or skin condition assessments may provide an early indication of calf production. It is possible that years of low calf production would be preceded by periods of poor body or skin condition.
2. Determine appropriate and efficient biological sampling for establishing pregnancy rates.

Other Research Recommendations

In addition to the monitoring plan recommendations provided above, the Working Group identified several other research tools that could be used to assess NARW distribution and abundance.

Examination of Acoustic Records from the Northeast Atlantic and Adjacent Seas

Many researchers along the west coast of Europe and in the Mediterranean have deployed passive acoustic sensors to study a variety of cetacean and fish taxa. In addition, NARWs have been observed off the coast of France and the west coast of Europe and a portion of adjacent seas have been identified as regions of probable NARW habitat by Monsarrat et al. (2015). Although none of these sensors were deployed specifically to look for NARW calls, the use of efficient and reliable automatic detectors could make such “needle in a haystack” analysis a relatively quick and possibly highly valuable task.

Satellite Imagery

Recent progress has been made in using very high resolution (VHR) satellite imagery to study large whales in remote areas (e.g., Cubaynes et al. 2019) This approach could be useful for identifying new or previously undetected aggregation areas, particularly if any exist to the north of where current survey efforts exist. Spatially extrapolated areas of predicted occurrence would
be a logical first area to explore with VHR imagery. **Satellite image data should be explored as a potential option for identifying NARWs and documenting distribution shifts.**

**Tagging**

It is clear that long-term location satellite tags could help provide valuable data about NARW habitat use, including discovery of unknown foraging areas, return to previously used foraging areas, and other shifts in distribution that might occur. It could also help estimate time spent by NARWs in high-risk areas, and could help further define important migration corridors. However, tag durations are still too short to provide the needed information without deploying deep implantation tags that embed in muscle tissue. Information presented to the Working Group indicated that Low Impact Minimally Percutaneous Electronic Transmitter (LIMPET) tags had fairly short durations and that the newly developed ‘Blubber’ tags, although better, in a test on eight Southern right whales, had a median duration of only 16 days, with a mean of 21 days (A. Zerbini. pers. comm.). The developers of the ‘Blubber’ tag are continuing research and modifications with a goal of trying to extend the median duration to 30 days.

Assuming a travel rate of ~75 nautical miles per day, it would take a NARW leaving Cape Cod Bay ~10 days to reach the Gulf of St Lawrence or southeast of Labrador, but about ~22 days to reach possible foraging areas southeast of Greenland, and even longer to reach Iceland. Migration from South of the Islands to Georgia would take ~11 days. Many of these movements cannot yet be fully documented via existing non-deep-implant tag technology. Documenting shorter distance movements, though potentially feasible, would require deployment of the tag within several days of departure to have a reasonable chance of documenting the journey, a logistical challenge for most research teams.

Given concerns about risk to these critically endangered whales from deep implantation tags, it seems reasonable to wait to evaluate whether the retention time can be increased for novel, less invasive tagging technologies (e.g., LIMPET tags, ‘Blubber’ tags, or other technologies) to the point where they can be used to answer the most pressing questions about NARW movement. **The Working Group recommends evaluating the results from Southern right whale tagging efforts before additional tagging of NARWs.**

**V. CONCLUSIONS AND ACKNOWLEDGEMENTS**

The Working Group assembled by the NARW Steering Committee consisted of NMFS researchers with expertise in marine mammal monitoring and quantitative assessments, but not directly involved in current NARW monitoring efforts. The intent of assembling such a group was to provide a knowledgeable, but independent review of the past and current research efforts by NMFS and its partners, and from that, develop a comprehensive monitoring plan that was not influenced by a direct interest in the long-standing research efforts. The Working Group endeavored to consider the full range of monitoring options, while understanding funding and logistic constraints, the rationale for various research approaches, and the evolution of NARW.
research in the region. The Working Group did not attempt to conduct independent analyses or assessments of the vast wealth of NARW data available. The Working Group did its best to be as detailed as possible with recommendations in hopes that they will be helpful as NMFS considers how to move forward with NARW monitoring over the coming years.

The Working Group could not have accomplished their task without the direct input of several NMFS researchers from the NEFSC (Tim Cole, Lisa Conger, Richard Pace, Sofie Van Parijs), managers from NMFS’ Greater Atlantic Regional Office (Diane Borggaard), NMFS Office of Protected Resources (Caroline Good), and DFO (Simon Nadeau) the NARW Steering Committee (Mike Asaro, Lance Garrison, Sean Hayes, Kristy Long, Eric Patterson, Barb Zoodsma, and see Appendix II) and other independent institutions and agencies dedicated to NARW research and conservation. NMFS and other research institutions and agencies have been working to understand many aspects of NARW biology, ecology, and the threats to the species for decades. The large and impressive collective effort and the cooperation among research groups should be applauded. It is the summary of this impressive effort and large dataset that provided the Working Group with a rich understanding of the rationale for past and current efforts, where efforts could be shifted while maintaining the high quality demographic dataset, and where new approaches or new analyses of existing data may provide new insights.

The Working Group has developed a set of recommendations that include retrospective analyses of existing datasets, expansion of the NARW habitat model, and specific recommendations for the design and execution of an integrated visual and PAM plan. Ideally, these recommendations will contribute to efficient and effective monitoring of important NARW population metrics, while also making those research efforts safer for the dedicated researchers who conduct them every year.
VI. LITERATURE CITED


Pace et al. in prep. Estimates of cryptic mortality in the North Atlantic right whale population.


APPENDIX I. TABLES

Table 1. Total number of NARWs identified by each contributing survey platform and institution from 2001 to 2017 (resights across contributors have not been removed, but resights of individuals within an institution have)\(^6\). Abbreviations are given in Section II. Information provided by Richard M. Pace based on data collected by many individuals and institutions (see acknowledgements in Pace et al. 2017).

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\(^6\) The data used to generate these tables were preliminary working datasets. The tables should be updated prior to use in future planning. Also see recommendations in Objective 1. Optimize Aerial and Vessel Survey Effort to Ensure High Precision and Minimize Bias in Estimates of Survival, New Entrants, and Abundance in an Efficient Manner; Proposed retrospective analyses: A.
Table 2. Number of NARWs uniquely identified by only one survey platform and institution from 2001 to 2017 (NARWs sighted by more than one institution have been removed). Abbreviations are given in Section II. Information provided by Richard M. Pace based on data collected by many individuals and institutions (see acknowledgements in Pace et al. 2017).

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### Table 3

Total number of NARWs identified in each survey location from 2001 to 2017 (resights across locations have not been removed, but resights of individuals within a location have)\(^8\). Abbreviations are for the Bay of Fundy (Fundy), Cape Cod Bay (CCB), the great south Channel (GSC), the Gulf of St. Lawrence (GoSL), the Gulf of Maine (GOM), and the southeastern United States (SEUS). Information provided by Richard M. Pace based on data collected by many individuals and institutions (see acknowledgements in Pace et al. 2017).

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Table 4. Number of NARWs uniquely identified in only one survey location from 2001 to 2017 (NARWs sighted in multiple locations have been removed). Abbreviations are for the Bay of Fundy (Fundy), Cape Cod Bay (CCB), the great south Channel (GSC), the Gulf of St. Lawrence (GoSL), the Gulf of Maine (GOM), and the southeastern US (SEUS). Information provided by Richard M. Pace based on data collected by many individuals and institutions (see acknowledgements in Pace et al. 2017).

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### APPENDIX II. WORKSHOP PARTICIPANTS AND CONTRIBUTORS

Table 5. List of workshop participants, contributors, affiliations, and role and contributions.

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Foraging rates of ram-filtering North Atlantic right whales

Julie Marie van der Hoop1 | Anna E. Nousek-McGregor2 | Douglas P. Nowacek3 | Susan E. Parks4 | Peter Tyack5 | Peter Teglberg Madsen1,6

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Handling Editor: Jeremy Goldbogen

Abstract
1. North Atlantic right whales spend their summer months foraging primarily in American and Canadian Atlantic waters on high-energy-density prey. Here, they rapidly accumulate and store energy obtained within a few months to support future migrations and reproduction while fasting. High drag from their ram-filter foraging strategy places a limit on what prey densities will be energetically efficient to target.

2. Our understanding of the volume of prey-laden water filtered by right whales during a dive or foraging bout, and what information they use to decide to forage or not, has been limited by the difficulties of measuring when they feed at depth, how fast they swim during continuous ram filtration and how often they might swallow accumulated prey.

3. We used 10 DTAG deployments from right whales in the Bay of Fundy, Canada, to quantify swimming speeds and estimate the volume of prey-laden water filtered per dive. We used the tag’s inertial sensors to evaluate the timing of frequent biomechanical changes that likely indicate the truncation of continuous filtration, and whether the number or timing of these fluking bouts relates to longer feeding dives or other foraging decisions.

4. During foraging dives, right whales descended at 1.4 (±0.2 SD) m/s and slowed to swim at 1.1 (±0.3) m/s while filtering. We found consistent pauses in the fluking behaviour of foraging right whales, every 56 (±22) s. Whales filtered on average 78 (±30) m³ of water per fluking bout and on average 673 (±201) m³ per dive.

5. Right whales filter large volumes of water at low speeds with a high duty cycle, but require sufficiently high prey energy densities to compensate for a high-drag foraging strategy. Closely related bowhead whales have a larger gape but swim more slowly, filtering greater volumes with lower drag. Our findings highlight that right whales acquire their energy in a relatively short period of intense foraging; even moderate changes in their feeding behaviour or their prey energy density are likely to negatively impact their yearly energy budgets and therefore reduce fitness substantially.
1 | INTRODUCTION

Endangered North Atlantic right whales (Eubalaena glacialis, hereafter right whales) are capital breeders that spend their summer months foraging on planktonic prey, primarily lipid-rich copepods (including Calanus spp.) in American and Canadian Atlantic waters. Here, they obtain food with high energy density (Davies, Vanderlaan, Smedbol, & Taggart, 2015; Michaud & Taggart, 2007), which allows rapid accumulation of energy over a short period of time. The energy acquired during a foraging season facilitates the growth of dependent calves, the energetic recovery of lactating females (Christiansen et al., 2018; Miller, Best, Perryman, Baumgartner, & Moore, 2012; Miller et al., 2011) and the storage of energy for future demands. Accumulated lipid stores are required to sustain individuals during prolonged fasting migrations, are critical for successful calving and nurture (Christiansen et al., 2018), and can buffer against effects from human stressors, including unanticipated energetically costly life-history events such as entanglement (van der Hoop, Corkeron, & Moore, 2016).

The abundance and distribution of prey in right whale foraging habitats are known to vary year-to-year and in multiyear regime shifts (Greene et al., 2013; Patrician & Kenney, 2010). Prey availability has been linked to changes in population health (Rolland et al., 2016), reproduction (Hlista, Sosik, Martin Traykovski, Kenney, & Moore, 2009; Meyer-Gutbrod & Greene, 2014; Miller et al., 2011) and distribution (Davies et al., 2015), and recent observations suggest that declines in the occurrence of whales in the Bay of Fundy since 2010 have coincided with changes in food supply (Davies et al., 2019). Quantification of the rates and dynamics of food acquisition in this endangered, capital breeding species is therefore critical to evaluate the energetic consequences of changing habitats and human stressors (Harcourt, van der Hoop, Kraus, & Carroll, 2019).

Right whales target prey patches above $10^3$ copepods/m$^3$ (Murison & Gaskin, 1989) and up to $10^5$ copepods/m$^3$ (Baumgartner & Mate, 2003; Baumgartner, Wenzel, Lysiak, & Patrician, 2017; Mayo & Marx, 1990). In the Grand Manan Basin in the Bay of Fundy, a right whale critical habitat and summer foraging area (Brown et al., 2009), individual diving behaviour is strongly correlated with the depth of maximum Calanus abundance between 100 and 150 m (Baumgartner & Mate, 2003; Baumgartner et al., 2017). There, 4–8 km patches of copepods with energy densities above 15 J/m$^3$ develop; within the large patch, concentration and energy density can vary on spatial scales of 500 m (Michaud & Taggart, 2011). To target these high densities of small prey, right whales ram filter feed as they propel themselves forward with their mouths agape (Goldbogen et al., 2016; Lambertsen, Rasmussen, Lancaster, & Hintz, 2005; Potvin & Werth, 2017; Watkins & Schevill, 1976; Werth, 2001). Through cross-flow filtration, water moves parallel along the inner surface of the baleen plates, rather than perpendicular; this concentrates small (1–3 mm) copepods while slowing the overall flow of prey-laden water through the mouth, to then be swallowed (Potvin & Werth, 2017).

Right whales show morphological adaptations to their high drag foraging mode, with fused vertebrae to maintain rigidity when swimming with an open mouth (Sanderson & Wassersug, 1993). Similarly, one would expect biomechanical adaptations, such as the low-speed, continuous swimming adopted by other ram filter feeders (Simon, Johnson, Tyack, & Madsen, 2009; Sims, 2000b). Simon et al. (2009) noted consistent, brief pauses in the swimming behaviour of bowhead whales (Balaena mysticetus) and proposed these pauses likely indicate the truncation of a continuous filtration event and the processing (swallowing) of accumulated prey. It would therefore be expected that with their shared foraging strategy, right whales would show similar biomechanical patterns that may relate to the rate of prey acquisition.

However, we still know very little about how a gigantic filter feeder with one of the highest predator-prey size ratios survives on a very specific resource that is constrained in both space and time. This lack of understanding primarily stems from the difficulties of measuring when right whales feed at depth, how fast they move during continuous ram filtration and how often they might swallow accumulated prey. Subsurface behaviour of right whales is difficult to observe, but the analysis of high-resolution acoustic biologging tag data has provided insights into the fine-scale movement and behaviour (van der Hoop, Nowacek, Moore, & Triantafyllou, 2017; Nowacek et al., 2001), body condition (Nousek-McGregor, Miller, Moore, & Nowacek, 2013), acoustic ecology (Parks et al., 2011) and foraging of right whales (Parks, Warren, Stamieszkin, Mayo, & Wiley, 2012).

Here, we harness the rich potential of multisensor biologging DTAGs to quantify swimming speeds and test hypotheses related to the detailed foraging behaviour and biomechanics in right whales. Specifically, we use 10 DTAG deployments from right whales feeding in the Bay of Fundy, Canada, to address the following questions: (a) How fast do right whales filter? Optimal diving behaviour would maximize the time spent foraging on high-energy-density prey, while staying within oxygen requirements (Thompson & Fedak, 2001). This can be accomplished by minimizing the proportion of time spent travelling to and from the resource at depth and also recovering at the surface, or by reducing oxygen consumption at depth. To reduce the energetic demands of a high-drag feeding strategy (and therefore increasing time in the prey layer), we hypothesized that right whales would adopt a slow filtering speed, similar to bowhead whales. However, given their relatively small mouth apertures compared to bowhead whales, do right whales swim and therefore filter water faster than bowheads? We investigate how the factors

**KEYWORDS**

biomechanics, drag, filter feeding, foraging, ram filtration, right whale
of gape, speed and foraging time affect the volumes of water filtered across different species and groups of ram filter feeders.

We expected biomechanical adaptations to a high-drag foraging strategy: (b) Do right whales show the same characteristic gait patterns as other ram filter feeders during foraging dives? (c) If so, are pauses in fluking consistent in their timing (i.e. a biomechanical pattern; intrinsic) or are they variable in duration and filtered volume (i.e. related to prey processing/density/patch structure; extrinsic)? If biomechanically driven, we would expect low variation in bout duration. If extrinsically driven, we would expect fluking bouts to be variable in duration and filtered volume. Further, (d) are these diving behaviours and foraging biomechanics linked? We hypothesized that if fluking bout duration is inversely related to prey density, and if right whales maximize their diving behaviour to forage within high-quality patches, dives with shorter bouts would be longer (i.e. if pauses are linked to prey processing, and if that processing is linked to accumulated prey mass, then shorter fluking bouts would reflect more dense prey, and longer or more tortuous dives would maximize time spent in a high-quality prey patch).

2 MATERIALS AND METHODS

We used archival digital acoustic recording tags (DTAGs) to record the acoustic environment and locomotor behaviour of right whales in the Bay of Fundy, Canada, in the late-summer foraging season, July and August 2001, 2002 and 2005 (Table 1; Nowacek et al., 2004; Nowacek et al., 2001; Parks et al., 2011). The tags recorded sound at 32 kHz (2001 and 2002) and 96 kHz (2005). The DTAG includes a pressure sensor and 3-axis accelerometers and magnetometers; sensor data were recorded at 23.5 Hz (2001, 2002) and 50 Hz (2005) and were decimated to ~5 Hz for analysis. We used a combination of existing biologging tag analysis tools (animaltags.org) and additional software, custom written in MATLAB 2015b (MathWorks, Natick, MA, USA) for all analyses.

DTAGs were initially deployed on right whales in the Bay of Fundy to test for whales’ responses to sounds, including vessels and alerting stimuli, following a playback protocol (Nowacek et al., 2004). We made use of this existing tag library and selected deployments where no playbacks occurred (tags 01_214a, 01_221a, 02_233a, 05_219a; Table 1). Additionally, we analysed data from deployments where >2 hr of data was available 2 hr after the end of the final sound exposure to the animal (Table 1). For one whale, we used the 2 hr preceding the playback (02_221d). We chose a 2-hr wait from the end of the last playback to be cautious, though exposed whales were reported to return to normal activity within minutes (Nowacek et al., 2004). For transparency, we show the full depth record of all deployments and the temporal extent of the playbacks and the time frame of our analysis for each deployment in Figure S1.

Balaenid whales show characteristic U-shaped foraging dives and V-shaped non-foraging dives (Baumgartner & Mate, 2003; Nowacek et al., 2001; Simon et al., 2009). We distinguished between U- and V-shaped dives based on bottom-phase duration: the bottom phase of
dives began the first time the pitch angle became positive after the whale left the surface, and ended when the pitch was last negative. U-shaped foraging dives had a clear bottom phase with only slightly variable depth, whereas V-shaped dives had bottom phases < 5 s (Figure 1). We defined dives as departures from the surface >50 m as has been the convention for characterizing diving behaviour of right whales in deep-water foraging habitats (Baumgartner & Mate, 2003; Nowacek et al., 2001). There were no instances of shallow feeding excluded from the analysis; shallow feeding was not expected or observed as most Calanus were in diapause and concentrated at depth (Baumgartner & Mate, 2003; Baumgartner et al., 2017; Michaud & Taggart, 2007). We checked the sensitivity of the dive depth threshold based on the breakpoint in the cumulative distribution function of all dive depths >5 m. Setting the depth threshold at 50 m rather than 10 m did not lead to a difference in the number of estimated foraging or non-foraging dives: the shallowest foraging dive was 100 m, no matter the threshold used. Incomplete dive cycles due to tag release were not included in the analysis.

2.1 | Speed estimation

For applications where animal speed is used to test ecological and physiological hypotheses, many biologging tags have introduced external sensors to measure passing flow. Many have calibrated measured speed with the rotation rate of external impellers (Blackwell, Haverl, Le Boeuf, & Costa, 1999; Burgess, Tyack, Le Boeuf, & Costa, 1998; Watanabe, Lydersen, Fisk, & Kovacs, 2012) and micro-turbines (Gabaldon et al., 2019), as well as the amplitude of vibrations as measured by the tag’s accelerometers (Cade, Barr, Calambokidis, Friedlaender, & Goldbogen, 2018). Absolute speed estimates are sensitive to stalling at high and low speeds, tag shape and placement on the body, orientation with respect to the flow and calibration technique, as well as to the estimation errors in the analytical techniques (e.g. reviewed in Cade et al., 2018). Another method is to use the relationship between the amplitude of low-frequency (50–500 Hz) flow noise recorded on the tag’s hydrophones, which is approximately cubic with speed (Finger, Abbagnaro, & Bauer, 1979).

This method has proven useful in estimating speed by calibrating measured flow noise in situ to the vertical speed of a tagged animal when it is oriented at sufficiently high pitch angles (von Benda-Beckmann, Wensmar, Samarra, Beerens, & Miller, 2016; Goldbogen et al., 2006; Miller, Johnson, Tyack, & Terray, 2004; Sato, Mitani, Cameron, Siniff, & Naito, 2003; Simon et al., 2009).

We estimated the vertical swimming speed as the change in depth divided by the sine of the pitch angle, when the absolute pitch angle exceeded 30 degrees to ensure reliable speed estimation (sensu Simon, Johnson, & Madsen, 2012). To estimate swimming speed for times when the pitch angle was low (e.g. the bottom phase of foraging dives), we used the low-frequency flow noise as recorded on each tag as a proxy for speed (following, e.g. Burgess et al., 1998; Goldbogen et al., 2008; Simon et al., 2009). We computed flow noise as the noise power centred at 500 Hz, band-pass filtered with a 2-pole Butterworth filter and subsequently decimated to a resolution of 25 Hz (Simon et al., 2009). For each tag and all dives, we then computed the mean noise power in 5 s bins and the mean vertical speed in the same 5 s bins. We ignored the first and last 5 s of each dive as air bubbles could often be heard escaping the plastic housing of the tag at these times. We obtained a flow-noise calibration by fitting a second-order polynomial to the relationship between the log10(noise power) and vertical speed (as in Goldbogen et al., 2006; Goldbogen et al., 2008) for each deployment, and applied this relationship to estimate speeds from flow noise when the pitch angle was low.

2.2 | Inertial sensor analysis

We derived pitch, roll and heading from the accelerometer and magnetometer signals after correcting for the orientation of the tags on the whales by rotating each three-element vector (Johnson, 2015; Johnson & Tyack, 2003). We calculated the pitch deviation as the difference between the instantaneous and mean body posture orientation (following e.g. Simon et al., 2012; van der Hoop et al., 2017). This cyclic pattern in pitch deviation is reflective of fluking behaviour as swimming motion is along the pitch axis (Figure 1). We detected pauses in fluking behaviour by

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**Figure 1** Example V-shaped non-foraging (left) and U-shaped foraging (right) dive profiles of North Atlantic right whales. Diving depth is coloured by estimated speed (m/s), overlaid with total body pitch (degrees, black). Pitch deviation (degrees, orange) is plotted above each dive, with triangles indicating the start of pauses between fluking bouts detected in the foraging dive. Dive phases of descent, bottom and ascent, as determined from the pitch record, are also noted.
detecting instances where the Hilbert-transformed pitch deviation signal was lower than its 10% value for that deployment >2 s. This 10% cut-off is similar to the <0.04 radian Hilbert transform threshold previously used for glide detection (van der Hoop et al., 2017; Nousek-McGregor et al., 2013; Woodward, 2006) but allows for differences in tag placement between deployments which can lead to different measured pitch values. The 2-s detection threshold was set specifically to distinguish between pauses in fluking behaviour and prolonged gliding behaviours previously described in right whales (Nousek-McGregor, 2010; Nousek-McGregor et al., 2013; Nowacek et al., 2001). Detected pauses were checked for each dive and manually confirmed. We detected pauses only during the bottom phase of U-shaped dives and only when body pitch was <30 degrees, i.e. when the whale was not orienting upwards or downwards or changing depth (Figure 1).

We computed the duration of each bout of active fluking between consecutive pauses. We expected that if short bouts (i.e. frequent pauses) indicated higher prey densities, then longer U-shaped foraging dives would be associated with shorter fluking bouts, to maximize the time at depth in a good prey patch; to test this hypothesis, we used a linear model for the effect of foraging bout duration on dive duration. We calculated the instantaneous fluke-stroke rate (Hz) over the deployment as the time between successive peaks in the pitch deviation signal. We calculated the mean instantaneous fluke-stroke rate over (a) the descent, bottom and ascent portions of each dive, and (b) each fluking bout.

We constructed dead-reckoned pseudo tracks of each whale within each dive from the accelerometer, magnetometer and depth sensors, and the estimated speed within each dive. We used the derived northing and easting at 10-s intervals with each dive. The tortuosity metric here was computed as 1 minus the estimated distance covered/the stretched-out track length over the time interval; the index therefore ranges from 0 for straight-line movement to 1 for extreme circular movement (Wilson et al., 2007).

### 2.3 Filtered volume estimation

We obtained the ID number and age at tagging from the NARWC (2006). Length measurements from aerial photogrammetry were available for 4 individuals (W. Perryman Personal Communication; Table 1, Figure 2), and for all other individuals, we estimated body length from the length-at-age curve in Moore, Knowlton, Kraus, McLellan, and Bonde (2004). Only minimum age was available from the catalog for two individuals that were not measured (02_221d, Eg 2350; 05_226b, Eg 3360), so we used these available ages to obtain conservative length estimates for these individuals. To estimate gape, we fit a linear model to aerial photogrammetry measurements of North Atlantic and southern right whale (*E. australis*) calves and adults (*n* = 56) from Miller (2005) and Miller et al. (2012) to estimate the mouth width (width at 10% of the body length; m) from total body length (m). We estimated the length of the longest baleen plate (m) for each individual from body length (m) based on values reported for North Pacific (*E. japonica*, *n* = 21) and Southern right whales (*n* = 14; Figure S2; Omura, Ohsumi, Nemoto, Nasu, & Kasuya, 1969; Best & Schell, 1996). We were unable to find similar measurements for North Atlantic right whales in the literature or in the North Atlantic Right Whale Consortium Necropsy Database. Following previous work (Kenney, Hyman, Owen, Scott, & Winn, 1986; Watkins & Schevill, 1976), we estimated the gape area as the (mouth width * x longest

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**FIGURE 2** Estimated gape area (m², purple), head width (m, blue) and baleen length (m, orange) with body length (m) and age of North Atlantic right whales. Dotted lines represent 95% CI. Circles represent estimated gape for individuals with measured (open) and estimated (closed) body lengths in this study. Baleen lengths are from North Pacific (Omura et al., 1969) and southern right whales (Best & Schell, 1996), head width from Miller (2005) and Miller et al. (2012), and length-at-age curve for North Atlantic right whales from Moore et al. (2004).
baleen plate length)/2 (Figures 2 and S2), and propagated errors from the age-length, length-width and length-baleen length estimates. The volumetric filtration rate was estimated by integrating the estimated swimming speed (m/s) and the estimated gape of each tagged whale (m²) over bout durations and dive durations (sensu Simon et al., 2009).

We used a linear model to assess the effect of estimated swimming speed, gape area and bottom time on the total volume filtered per dive. We used linear models to test whether the proportion of time spent foraging per dive differed with dive depth, with the expectation that if dive duration was aerobically limited, then deeper dives would have significantly shorter bottom times due to transit to and from the foraging depth. We computed these statistics for foraging dives only.

3 RESULTS

For 10 whales tagged for longer than 74:06 hr:min, we analysed a total of 57:04 hr:min of tag data (range 1:18–11:34 hr:min per whale; Table 1, Figure S1) during which individuals completed a total of 140 dives >50 m. Of these, 132 were categorized as U-shaped (foraging) dives and 8 as V-shaped (non-foraging) dives. The mean depth of U-shaped foraging dives was 138 (±25) m, and the shallowest foraging dive was 89 m (tag 02_221d; Table 1). The mean depth of V-shaped dives was 124 (±25) m.

For the 10 tag records, the $R^2$ for the flow-speed correlations averaged 0.76 (±0.5 0.19), with an RMSE of 0.13 m/s (±0.05; Figure 3). For U-shaped foraging dives, right whales descended at mean (±SD) pitch angles of −58 (±9) degrees, at speeds of on average 1.4 (±0.2) m/s with fluke stroke rates of 0.07 (±0.04) Hz (Figure 1). Ascents were similar, with mean pitch angles of 54 (±10) degrees and speeds of 1.5 (±0.2) m/s, with fluke stroke rates of 0.14 (±0.02) Hz. At the bottom of U-shaped foraging dives, right whales on average slowed to 1.1 (±0.3) m/s while actively swimming with fluke stroke rates of 0.16 (±0.2) Hz. In contrast, during V-shaped dives, pitch angles on descent and ascent were −5 (±5) and 23 (±14) degrees, respectively, at speeds of 1.5 (±0.2) and 1.3 (±0.2) m/s.

We detected pauses in consistent fluking behaviour at the bottom of foraging dives, every 56 (±22) seconds (Figures 1 and 4b). The median duration of these pauses was 3.5 s. These pauses did not appear to be a consequence orientation in a different axis: within 20 s preceding and following a pause in continuous fluking, rolls were occasional, and heading was often continuously changing; the change in depth ranged ± 10 m (Figure S3). We hypothesized that if bout duration was inversely related to prey density, and if right whales maximized their diving behaviour to forage within high-quality patches, dives with shorter bouts would be longer. We found no relationship between dive duration and the duration of fluking bouts within each dive ($R^2 = 0.001$; Figure 4b). The number of fluking bouts increased with dive duration, as expected as both are related to time; however, the number of bouts within a dive ranged from 0 to 14 (mean 8.2 ± 3.1). During these bouts, estimated swimming speed was 1.1 (±0.3) m/s.

Whales filtered on average 78 (±30) m³ of water per fluking bout, but fluking bouts did not end after a fixed volume of water had been filtered (range 10–328 m³). Per dive, whales filtered a mean of 673 (±201) m³ of water total (Figure 4a), and dives were not terminated at a fixed volume of water filtered per dive (Figures 4a, 5 and 6). At the bottom of foraging dives, the mean filtration rate was 1.4 (±0.3) m³/s; however, including transit time, mean filtration rates per complete foraging dive were 0.9 (±0.2) m³/s or 3,210 (±870) m³/hr. The total volume filtered over the course of a tag deployment varied from 342 m³/hr (01_214a) to 3,315 m³/hr (05_219a), primarily driven by activity budgets, as whales exhibit other (e.g. non-foraging) behaviours (Figure 4c).

In foraging dives, whales descended to the foraging depth within the first 17 (±5)% of the dive duration (2.0 ± 0.4 min) and foraged until 85 (±5)% of the dive duration (10.9 ± 1.5 min) before ascending (Figure 5c). We detected a significant relationship between dive depth and the proportional time of onset of foraging ($F_{1,129} = 5.71$, $p_{slope} = 0.0184$), but the effect size was 3 (±3)%; this means the onset of foraging varied from 14% (SE 13%–17%) into the dive cycle for a 82-m dive compared to 19% (SE 17%–20%) for a 177-m dive. Further, depth of dive explained little to no variance in the proportional time to onset of feeding ($R^2 = 0.035$). Similarly, the proportional time of the end of foraging decreased significantly with depth ($F_{1,129} = 16.9$, $p_{slope} < 0.0001$), with a similarly small effect size of −6 (±3)% and $R^2 = 0.119$ (Figure 5c). The total proportion of the dive spent foraging decreased with depth by a total of 10% (73% to 63%) across the range of dive depths (82–177 m; $R^2 = 0.088$). There was no significant relationship between the depth of each dive and the total volume filtered ($R^2 = 0.001$, $F_{1,115} = 0.212$, $p = 0.884$; Figure 4d). Even in the shortest dives with <5 min and <50% of bottom time (Figures 4a and 5b,c), whales performed fluking bouts.
Three variables contribute to the total filtered volume per dive: swimming speed (estimated from flow noise), gape (estimated from age and morphometrics) and time per dive spent foraging (bottom time, estimated from tag data). We used a linear model to assess the effect of each of these variables on the total volume filtered per dive. The three factors explained 89.5% of the variability in filtered volume ($F_{3,126} = 357, p < 0.0001$). The dive bottom time had the greatest effect size ($875 \pm 71 \text{ m}^3$), followed by swimming speed ($704 \pm 53 \text{ m}^3$). Gape had the lowest effect size of $349 \pm 67 \text{ m}^3$ across the range of 1–1.8 m$^2$.

Based on the dead-reckoned tracks of individuals, whales exhibited a variety of subsurface foraging behaviours (Figure 7). The tortuosity of horizontal movement within dives was on average 0.022 ($\pm0.025$), up to 0.117, and varied even between sequential dives (Figure 7). We expected tortuosity to reflect animals “working a patch,” maintaining residence in an area, and therefore hypothesized that dives with higher filtered volumes, or more or shorter fluking bouts, would have more tortuous paths. We found no relationship between the total volume filtered per dive and the mean tortuosity within that dive ($F_{1,128} = 0.793, p = 0.375, R^2 = -0.002$) nor the bout duration (inter-pause interval) and the tortuosity of the dive ($F_{1,128} = 0.003, p = 0.958$).

4 | DISCUSSION

Balaenid whales acquire their food in a short period in the spring and summer, putting a premium on understanding where, how and how much prey-laden water these ram filter feeders process to fuel their capital-breeding lifestyle. We employed pressure, inertial and acoustic sensors on biologging tags to estimate the filtration rates of...
right whales and the biomechanics relevant to their foraging behaviours: (a) How fast do right whales filter? (b) Do right whales show the same characteristic gait patterns as other ram filter feeders during foraging dives? (c) If so, are pauses in fluking a biomechanical pattern or related to prey processing/density/patch structure?

We found that right whales made repeated foraging dives to depths where they slowed to 1.1 (±0.3) m/s or 0.09 (±0.03) body lengths/s. At depth, they carried out a repetitive gait with short, ~2 s pauses between bouts of higher frequency fluking behaviour. We suggest that, similar to observations in bowhead whales, right whales swim at consistently low speeds when foraging to reduce the drag of their open mouths. However, right whales only slow down by 26% (compared to 40% for bowhead whales; Simon et al., 2009), likely due to the smaller cross-sectional mouth area per body size; the faster swimming speed of right whales provides a higher filtration rate, but only partially compensates for the smaller mouth area. To acquire similar prey resources as bowheads, right whales must feed on higher density prey aggregations, on prey with higher energy density, and (or) for longer periods of time.

Based on in situ speed estimates, measured diving behaviour and individual-specific gape measurements, the right whales in this study filtered on average 3,211 (±874) m$^3$/hr of water per hour during complete foraging dives (i.e. a round trip from the surface, including time of descent and ascent). Over the course of deployments, filtration rates varied from 342 m$^3$/hr to >3,300 m$^3$/hr depending on individual behaviour and size. During active foraging at the bottom of U-shaped dives, the whales filtered 4,520 (±1,230) m$^3$/hr, which is ~30% lower than the estimates of 6,250 m$^3$/hr by Kenney et al. (1986) and 6,534 m$^3$/hr by Baumgartner and Mate (2003). This difference is primarily due to explicitly including variation in mouth gape with age.

**FIGURE 5** Total volume of water filtered per dive (m$^3$) versus dive duration (min; a) and bottom foraging duration (min; b) for 10 North Atlantic right whales. The vertical bars in c show the proportional time of onset of foraging to the end of foraging, at the foraging depth of each dive; circles represent the total proportion of each dive spent foraging. In all panels, colours indicate the gape area size (m$^2$) of different whales.

**FIGURE 6** The estimated bottom speed (m/s; ± prediction error in grey), gape area (m$^2$) and bottom time (sec) of the dives of 10 North Atlantic right whales, coloured by the estimated total volume of water filtered (m$^3$) per dive. 2D projections are shown in grey circles; gape is jittered randomly up to 0.05 m$^2$ to see overlapping points.
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(determined from body size and baleen length, Figure 2), as well as in situ estimates of swimming speed as these individuals foraged at depth with their mouth agape (Figure 1).

Previous models of foraging in right whales assumed a constant mouth area of 1–1.2 m$^2$ and speeds of 1.5 m/s (Baumgartner & Mate, 2003; Kenney et al., 1986), whereas our gape estimates account for changes with age for the first time (1–2 m$^2$, a doubling over the life span). Not including this variation would lead to considerable underestimates of the volumes filtered and subsequent prey consumed by adult right whales. This study included many subadult individuals, aged 2–4 years, with estimated gape areas of 1.1–1.3 m$^2$ (Table 1).

The difference in estimated filtered volumes for these animals, using age-specific gape versus a constant gape of 1.2 m$^2$ (Baumgartner & Mate, 2003; Kenney et al., 1986), is negligible at ~4%. However, the underestimate of filtered volume is considerable in older and larger individuals with estimated gape areas of up to 1.8 m$^2$ (Figure 2). We estimated a gape of 1.8 m$^2$ for an >11-year-old male (02_221d) in this study. This individual filtered an average of 760 (±400) m$^3$ of water per dive. Per-dive volume estimates would have been 530 (±270) m$^3$, 230 m$^3$ or 30% less than if we had assumed a non-age adjusted gape of 1.2 m$^2$.

Second, previous studies used higher fixed values for swimming speed, or at least minimum swimming speeds of 1.5 m/s (Baumgartner & Mate, 2003; Kenney et al., 1986; Watkins & Schevill, 1976, 1979). We estimated swimming speeds of 1.1 (±0.3) m/s for whales when foraging, based on our tag data. Though this difference may seem minimal, it translates to considerable differences in volume filtered: an 8-m whale with a gape of 1.6 m$^2$ would filter 8,640 m$^3$/hr swimming at 1.5 m/s, compared to 5,760 m$^3$/hr (33% less) swimming at 1.0 m/s. Considering the error in our speed estimation (mean RMSE = 0.13 m/s), filtered volume estimates are likely within ±10%, still less than the difference between assuming a constant speed versus an estimate from flow noise. Speed estimates from flow noise do have a low-speed limitation because (a) flow noise must be higher than background noise and self-noise of the recorder, so will be more challenging to detect at slow speeds, and (b) the regression relationships can induce errors at either end of the measured speeds (Figure 3; von Benda-Beckmann et al., 2016; Blackwell et al., 1999; Burgess et al., 1998; Cade et al., 2018). We measured vertical speeds in the range of 0.4–3.5 m/s (Figure 3). Though there are limitations in the flow-noise approach, it provides estimates of variation in swimming speed, critical to addressing our main hypotheses. Including morphological variation and tag-derived estimates of swimming speed through water with the time spent foraging during the bottom phase of U-shaped dives refined the estimates of filtration and therefore hourly prey ingestion during foraging with variable behaviour over the course of a day.

We found a marked stereotypy in the diving behaviour of right whales in deep-water foraging habitats: individuals performed repeated foraging dives to consistent depth and duration for periods of >10 hr (34 dives, Figures 4a, S1). Right whales are able to rapidly descend to foraging depth at high pitch angles, and similarly return to the surface quickly after foraging, optimizing their time at depth (Baumgartner & Mate, 2003; Nowacek et al., 2001). We hypothesized that if whales were consistently diving to their aerobic dive limit, they would have filtered lower total volumes of water in deeper dives, due to the time required to transit to the foraging
patch (Thompson & Fedak, 2001). However, the lack of a significant effect of dive depth on the total volume filtered per dive and the low explanatory power of depth on foraging duration emphasizes that by completing many shorter, aerobic dives with steep ascents and descents and short surface intervals right whales maximize the time spent foraging in a consistent prey patch, regardless of its depth (Baumgartner et al., 2017). While individuals are able to optimize their time foraging in high-density prey layers, they apparently will also go without foraging for extended periods of time (2+ hr; Figure S1) in this otherwise rich environment. Understanding why individuals do or do not forage should be explored with future prey-density measurements simultaneous with tag deployments (Baumgartner & Mate, 2003; Parks et al., 2012); this may improve our understanding the effects of physiological mechanisms such as digestion and prey processing that may limit the duration of productive foraging bouts (Horning, 2012).

Previous descriptions of right whale diving behaviour in deep-water foraging habitats categorized three types of dives based on k-means clustering: foraging dives, V-shaped dives and “other” or “Type 2” dives (Baumgartner & Mate, 2003; Nousek-McGregor, 2010). These “Type 2” dives are often to depths just above of the bottom mixed layer and even to the seafloor (Baumgartner & Mate, 2003). These dives have previously been described as intermediate between foraging and V-shaped dives: they do not maximize the time spent at depth, with longer ascents compared to typical foraging dives (Baumgartner & Mate, 2003; Nousek-McGregor, 2010). However, the reduction in speed in the clear bottom phase of these dives is consistent with foraging (Nousek-McGregor, 2010). In this analysis, we separated deep dives into foraging and non-foraging categories based only on a clear bottom phase and found that shorter dives with a lower proportion of time spent on the bottom (fitting the description of “Type 2” dives) do show clear fluking bouts at low speeds (Figures 4a and 5b,c). The “Type 2” or “other” dives therefore may be those where foraging was terminated, perhaps due to inadequate prey densities (Hazen, Friedlaender, & Goldbogen, 2015; Stephens, 2008; Thompson & Fedak, 2001). The deep non-foraging dives may serve to locate and/or judge prey patches. The diverse suite of sensors in these DTAGs is therefore useful to further elucidate behaviours previously inferred from time-depth recorders, without inertial sensors.

Presenting dive behaviour through time can be misunderstood to suggest that a submerged animal’s path is straight in the horizontal dimension. The incorporation of inertial sensors in tags enables the estimation of a dead-reckoned track, though these are also imperfect due to additive error in the sensors and ignorance to external forces, e.g. currents (Johnson & Tyack, 2003; Liu, Battaila, Trites, & Zidek, 2015; Schmidt et al., 2007; Shiomi et al., 2010). Irrespective of these errors, pseudo tracks do, however, capture the qualitative nature of animal movement and can be useful in inferring how animals move, rather than where they go; for our purpose, these tracks illustrate the degree to which right whales move horizontally within dives (Figure 7). The variation in the horizontal movement patterns of whales foraging at depth (Figure 7) as well as small-scale changes in the vertical dimension between dives (Figure S3) further suggest that right whales are capable of detecting fine-scale variations in prey density and adjusting their foraging behaviour accordingly (Baumgartner et al., 2017; Kenney, Mayo, & Winn, 2001; Mayo & Goldman, 1992; Mayo & Marx, 1990). Simultaneous measurements of the vertical distribution of prey and right whale diving behaviour made in foraging habitats have shown how right whales are able to repeatedly target the depth of maximum copepod concentrations (Baumgartner & Mate, 2003; Parks et al., 2012). By making fine-scale adjustments in the vertical dimension (~20 cm), right whales can increase energy intake by as much as 20% (Mayo & Goldman, 1992). In the horizontal plane, copepod energy density can vary by a factor of 3.5 over a horizontal distance of 2 km in the Bay of Fundy (Michaud & Taggart, 2011), and high energy (10–30 kJ/m²) patches ~1km in length and 1–10 m thick can form in similar deep-water foraging habitats of right whales (Davies, Taggart, & Smedbol, 2014); variations in C5 concentration, lipid content and energy density are considerable at horizontal scales of 500 m (Michaud & Taggart, 2011). Further study to map the fine-scale horizontal distribution of copepod layers, and their nutritional value, especially relative to surface-corrected 3-D movements of foraging whales could further elucidate how right whales exploit and detect patches of different energy densities and dimensions.

The bowhead whale is a closely related balaenid species with similar foraging ecology and behaviour to right whales; both target calanoid copepod prey by continuous ram filtration (Laidre, Heide-Jorgensen, & Nielsen, 2007; Pomerleau et al., 2011; Walkusz et al., 2012). Bowhead and right whales share similar morphology (Figures 8 and 9) but differ considerably in the magnitude of their gape area, as well as their baleen areas, widths and lengths for a similar body size (George et al., 2016; Lamberts et al., 2005; Omura et al., 1969; Werth, 2004; Werth et al., 2018). We have shown that right whales slow to 1.1 (±0.3) m/s during presumed foraging bouts, faster than the estimate by Simon et al. (2009) of 0.7 (±0.1) m/s for foraging bowhead whales. The slow foraging speed of balaenids has been linked to their ram-filtering strategy that incurs high drag, the level of which is a function of the frontal area of the whale, that is its gape and the square of the forward speed. The estimated gape sizes for right whales in this study were 1.1–1.8 m²; a 12-m right whale would have a gape of 1.3 m², compared to the 4.2 m² gape of a 12-m adult bowhead (Simon et al., 2009; Werth, 2004). Due to their smaller gape per body size compared to bowheads (Figure 8b), right whales have a lower frontal area and therefore can forage at higher swimming speeds while likely incurring similar levels of drag and energetic cost as bowheads. Within the tagged right whales in our study, this is illustrated in the inverse relationship between gape and foraging speed (Figure 6 projected on bottom). However, foraging at higher speeds only partially compensates for a smaller gape and still does not achieve the same filtration rate.

Drag increases linearly with area, but with the square of velocity (Vogel, 1994). While the baleen area primarily affects drag forces
and the outflow speed after water is filtered through the baleen (Potvin & Werth, 2017; Werth & Potvin, 2016; Werth et al., 2018), the mouth opening area affects the inflow volume of prey-laden water. The trade-offs in the relationship between mouth friction drag, area and speed have been illustrated by Potvin and Werth (2017); we present the estimated open-mouth friction drag relative to bowhead whales (i.e. scaled by gape area) and put these values in context with their resulting filtration rates (Figure 8a). When foraging at higher speeds, right whales incur similar drag forces to bowhead whales, due to their smaller gape area; however, even at these speeds their filtration rate remains lower. At 1.1 m/s, an 11-m right whale filters at a rate of 1.1 m$^3$/s; a bowhead of the same length with a gape of 4.2 m$^2$ filters nearly 3 m$^3$/s of water at its preferred speed (Figure 8). That same right whale, with a gape of 1 m$^2$, would achieve a filtration rate of 3 m$^3$/s only by swimming at 3 m/s, where its drag force would be roughly 4× greater than the bowhead filtering at the same rate swimming at 0.7 m/s. A larger (14 m) right whale with a gape of 2 m$^2$ could filter 3 m$^3$/s swimming at 1.5 m/s, but would incur twice the drag cost doing so. While the filtration of ram feeding versus intermittent lunge/suction feeding has been often contrasted in cetaceans (Goldbogen et al., 2016; Werth et al., 2018), there has been little discussion of the drag and size trade-offs in filtration efficiency within balaenids.

With a smaller gape than bowhead whales, and with greater drag-induced costs and pressures, right whales have been predicted to target higher densities of prey when foraging. Prey-field sampling in areas around right whales when foraging or not has suggested density thresholds of 800–1,000 copepods/m$^3$, below which right whales are unlikely to forage (Werth et al., 2018).
whales will stop feeding (Beardsley et al., 1996; Mayo & Marx, 1990; Murison & Gaskin, 1989). At those thresholds, right whales in this study, which filtered 1.4 m³/s at the bottom of foraging dives, would be concentrating >60,000 copepods per minute in their mouths. In situ measurements of the prey field in the vicinity of whales tagged with time-depth recorders suggest that right whales target prey patches of 10³–10⁵ copepods/m³ (Baumgartner & Mate, 2003). By selectively targeting high-density prey patches, right whales are likely able to obtain sufficient energy to offset their high-drag foraging strategy. There are few estimates of prey densities selected by foraging bowhead whales, especially around tagged individuals. Laidre et al. (2007) report densities of 1 g/m³ in surface waters but do not provide densities at depths where bowhead whales spend the majority of their time feeding (Simon et al., 2009). Such densities appear low; even assuming prey densities around bowhead whales are an order of magnitude higher (10 g/m³), right whale energy acquisition considerably outpaces that of bowheads.

If right whales waited until the end of a dive to process or swallow prey, a massive accumulation of material would occur in the mouth (Werth, 2001; Werth et al., 2018). We estimated that right whales filtered 670 m³ of water per foraging dive (mean body length = 12.1 ± 0.6 m). Even assuming the lowest threshold of copepod density measured in the Bay of Fundy (800 copepods/m³; Murison & Gaskin, 1989), and with a capture efficiency of 95% (Mayo, Letcher, & Scott, 2001), a 12-m right whale would accumulate 5 × 10⁵ copepods in their mouth by the end of a dive (1.7 MJ based on the lower individual energy content of 3.4 J; Michaud & Taggart, 2007). At the highest measured copepod densities of 15,000 copepods/m³ (Baumgartner & Mate, 2003), this would translate to as many as 9 million copepods per dive (18–36 L, 45 MJ based on the upper individual energy content of 5 J; Michaud & Taggart, 2007). Such high maximum feeding rates highlight why right whales may be able to acquire a large proportion of their total annual energy intake in the months when copepods are at their highest energy densities and when and where they maximally aggregate. It also highlights that taking brief pauses from foraging to swallow prey throughout the dive is therefore likely to be necessary.

Simon et al. (2009) reported a characteristic swimming gait in bowhead whales, where periods of high-amplitude and high-frequency (0.12 Hz) fluking were interrupted by consistent pauses, half a fluke stroke in duration, occurring every 2.4 min, or ~480 m³ of water filtered. They suggested these pauses may be related to prey handling and that the consistency of the behaviour may be due to exploitation of continuous prey patches. In balaenids, the prey slurry likely accumulates in the postlingual recess just before the oesophagus, prior to swallowing (Lambertsen et al., 2005). If pauses in fluking are linked to prey processing, and if that processing is linked to accumulated prey mass (i.e. if it is limited by pharynx/oesophagus size, 3–10 cm; Albert, 1981; Lowry & Frost, 1984), then the timing of the pauses should be a function of swimming speed and prey density. We detected similar pauses, ~3 s long, between ~50 s bouts of fluking behaviour. We found that the timing of pauses did not occur at completely fixed time intervals (SD 22 s) or after specific volumes of water were filtered (SD 30 m³), which is consistent with the alternative hypothesis that the rate of prey acquisition or bolus formation may instead be the driver of these intervals. These pauses lasted less than half a full fluke stroke cycle (~6.25 s) and therefore differ from prolonged glides (>5 s) employed in burst-and-coast swimming (Videler & Weih, 1982; Weih, 1974; Williams, 1999). These pauses are also consistent with observations of right whales “nodding” at the surface while skim feeding (Mayo & Marx, 1990). Further, the more frequent timing of these pauses in right whales compared to bowheads is consistent with filtering much more dense concentrations of prey, in concert with the morphological differences described above.

After obtaining prey via an efficient cross-flow filtration system (Potvin & Werth, 2017; Sanderson, Roberts, Lineburg, & Brooks, 2016), accumulated prey must be swallowed; pausing filtration to swallow has been observed in other ram filter feeders ranging in size from basking and whale sharks (Figure 9; Motta et al., 2010; Nelson & Eckert, 2007; Sims, 2000b) to paddles (Sanderson, Cech, & Cheer, 1994) and herring, shad, sardines, menhaden and alewife (Sanderson & Wassersug, 1990). Hallacher (1977) and later Sims (2000b) noted pauses in the open-mouth feeding behaviours of basking sharks, with ~3 s interruptions to swallow prey. The rates of prey-handling pauses may therefore be additional density-mediated foraging behaviours (Hallacher, 1977; Runge, Pepin, & Silvert, 1987). The differences in gape areas, body size, filtration rate and prey density between balaenids and large fishes (Figure 9) illustrate how continuous ram filtration in large fishes is much less efficient per unit time, though they often forage on similar prey species. Basking sharks often forage on calanoid copepods, though in different habitats they will forage on larger zooplankton prey (Baduni, 1995; Sims, 2008; Sims & Merrett, 1997). The much longer feeding season and an order of magnitude lower metabolic rate in large ram-filter-feeding fish (Motta et al., 2010; Sims, 2000a; Watanabe, Goldman, Caselle, Chapman, & Papastamatiou, 2015) likely allow for much lower acquisition rates. Additionally, fish are able to forage continuously, as they do not have the same time restriction of returning to the surface to breathe as whales; the oxygen demands of filter-feeding fish are met within the medium and by the same water flow through the gills as is used to filter prey (Sanderson et al., 1994; Sanderson, Cheer, Goodrich, Graziano, & Callan, 2001; Sims, 2008). Still, ram-filter-feeding fish show evidence for threshold feeding behaviours, leaving patches when prey densities are <0.5–0.7 g/m³ (Sims, 1999). Specific models to incorporate metabolic rate and oxygen demand versus drag, speed and filter area of ram-filter-feeding marine animals may elucidate how different species and groups address these trade-offs in morphology, movement and energetics.

Some of the parameters used to estimate filtration rates of swimming animals could incorporate improved measures in future studies. For example, changes in mouth aperture or gape are hard to measure, especially at depth. At the surface, aerial footage from surface-feeding whales may be useful to quantify rates of mouth closure or small changes in gape or mouth position through time, but how these movements translate from surface feeding to depth would be unknown. Use of sensors on tags to measure gape would help refine these estimates (Liebsch, Wilson, Bornemann, Adelung,
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AUTHORS’ CONTRIBUTIONS

J.M.v.d.H. and P.T.M. conceived the ideas and designed methodology with input from the other authors; D.P.N., S.E.P. and P.L.T. designed the initial experiments; D.P.N. and S.E.P. collected the data; J.M.v.d.H. and A.E.N.-M. analysed the data; J.M.v.d.H. led the writing of the manuscript. All authors contributed critically to the drafts and gave final approval for publication.

DATA ACCESSIBILITY

Code and data associated with the manuscript are available at https://doi.org/10.5281/zenodo.2660074 (van der Hoop et al., 2019).

REFERENCES


& Plötz, 2007; Robson, Thomas, García de Leaniz, & Wilson, 2009). Prey density and energy content are important to inform the optimal filtering speed for trade-offs between energy expenditure and acquisition. Attempts to co-locate zooplankton sampling with time-depth recorders have led to estimates of energy acquisition (Baumgartner & Mate, 2003), but there is always some degree of spatial and temporal decoupling that may lead to substantial errors in these estimates. In situ prey-field measurements from onboard sonar tags would address many of the temporal and spatial decoupling problems between tag data and ship-based echosounders (Goulet et al., 2019; Lawson et al., 2015). These, in concert with the speed estimates and biomechanics, could help elucidate individual foraging decisions, fluking behaviours and how they directly relate to measured prey densities.

Short-duration, minimally invasive acoustic biologging tags provide glimpses into the foraging behaviours of right whales at depth. These technologies can be combined with repeated aerial photogrammetry or photographs over time to estimate changes in body shape and condition (Miller et al., 2011; Nousek-McGregor et al., 2013; Pettis et al., 2004, 2017), as well as over what time periods and in what areas right whales may be obtaining sufficient energy resources. With the recent observed changes in distribution, body condition and prey availability (Angell, Wilson, Moore, & Stegeman, 2004; Davis et al., 2017; Greene et al., 2013; Meyer-Gutbrod & Greene, 2014), it is critical to further understand the energetic trade-offs between filtration and acquisition in right whales. If prey densities or energy content decreases (DFO, 2018), the energy gained per energetic cost incurred will not balance and could result in an energy-deficit and poor body condition (Fortune, Trites, Mayo, Rosen, & Hamilton, 2013). Comparative studies that integrate prey measurements, filtration and biomechanics could further quantify how foraging in different habitats directly contributes to individual health, nutritive status and the fitness necessary for the survival and recovery of the species.


Williams, T. M. (1999). The evolution of cost efficient swimming in marine mammals: Limits to energetic optimization. Philosophical Transactions


SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Manipulative Trapping Experiments
In The Monhegan Island Lobster Conservation Area

NEC Award #05-949

Period of Performance: August 1, 2004 through June 30, 2008

Submission Date: January 2010

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Abstract

Two manipulative trapping experiments were conducted within the Monhegan Island Lobster Conservation Area (MILCA) during September through October 2005 and August through September 2007. In addition the MILCA fishery was evaluated with respect to annual catch, trap hauls, maximum trap limits and season length through daily harvester logbooks. The objectives of the trapping studies were to test the impact of trap density on catch rates and the cumulative catch, and to determine the relationship between soak time and catch rates. In 2005, catch rates for medium (167 km$^{-2}$) and low (50 km$^{-2}$) trap density areas always exceeded those of high (500 km$^{-2}$) trap density areas. Catch rates for all areas paralleled an increase in lobster abundance, determined by independent video monitoring, over the course of the study. The cumulative catch found in high trap density areas was 16 and 68% higher than medium and low density areas respectively. However, soak times in medium trap density areas could have been decreased to compensate for losses in total catch. Migration within the MILCA, as measured by recapture rates in trapping areas, suggest that in excess of 90% of lobsters moved out of the areas within eight days after initial capture. In 2007, the impact of soak time on catch was non-linear and indicates that a maximum catch for traps with reduced competition from other traps is 4.2 times higher than is observed in the surrounding Maine lobster fishery. The extension of the MILCA season by two months and reduction of the maximum trap limit from 600 to 300 traps following the 2006/2007 season resulted in a median 72 and 67% increase in landings for MILCA participants in the two seasons following the change. These studies suggest the current Maine lobster fishery could reduce traps with little impact on total catch, but the level and spatial extent of any reduction would need to be matched to the annual movements of the lobster resource and fishery.

Introduction

All three American lobster stocks in the United States are acknowledged to be heavily exploited. Yet, the assessment of the US lobster resource provides a mixed picture relative to stock status. The Southern New England stock is considered to be depleted with fishing mortality estimates above and abundance below the 1982 to 2003 median. The Gulf of Maine (GOM) and Georges Bank (GBK) stocks continue to benefit from favorable recruitment with resulting fishing mortality levels below and the abundance levels above median 1982 to 2003 levels (ASMFC 2009). This contrasting stock status serves as an opportunity to understand the mechanisms driving the trajectory of stock abundance and potential measures to improve unfavorable conditions.

While managers and fishermen have little influence on environmental conditions that may contribute to stock increases or decreases, steps have been taken manage aspects of the fishery in their control. Within the last ten years, the Atlantic States Marine Fisheries Commission (ASMFC) working with Lobster
Conservation Management Teams (LCMTs) as directed to develop plans designed to control or reduce fishing mortality. Each management area has taken steps to reduce traps in the fishery by implementing trap limits or establishing historical participation levels. Over 10,000 fishermen have been affected by these reductions directly or indirectly in the expectation of increased biological benefit. Unfortunately, the relationship between the number of traps and the associated fishing mortality rate is poorly understood, raising questions about the effectiveness of limiting traps to control fishing mortality.

Understanding how traps influence fishing effort is fundamental to our understanding of the assessment and management of the lobster resource in the Northwest Atlantic. The performance and selectivity of traps can be influenced by the availability of lobsters, inter and intra-specific interactions, bait efficiency and gear selectivity (Miller 1990, Krouse 1989). To date attempts to model the interaction of traps, fishing effort and fishing mortality have been limited and have offered little guidance to managers (Russell 1994). By conducting controlled fishing experiments, the effects of many of the above mentioned variables can be separately identified, possibly resulting in clearer understanding of how traps influence fishing effort, exploitation and finally fishing mortality.

Many studies have looked at the complexity of interactions with baited traps in the lobster fishery. In reviews by Krouse (1989) and Miller (1990) several factors were identified as contributing to the potential efficiency of traps, such as the quantity of bait used, bottom sea water temperatures, physical and biological characteristics of the bottom, inter and intra trap saturation effects, trap entrance and exit selectivity, and variable fishing strategies. All these factors make defining fishing effort in the lobster fishery difficult.

All lobster stocks in the Northwest Atlantic show signs of stress from fishing effort. Measures of the effect of fishing effort on the population and fishery include a reduced mean size, biased sex ratios, reduced reproductive potential and loss of revenue to the fleet (ASMFC 2009, Skud 1974, Krouse 1989, Rothschild 1972).

Fishing mortality and exploitation rates can be measured from fishery dependent and independent sources. Assessment techniques include tag recapture experiments (Ricker, 1975), Length cohort analysis and catch-effort methods (Estrella and Cadrin 1996) and survey based estimates (ASMFC 2000). In recent years change-in-ratio (CIR) methods have been successfully used in the Tasmanian rock lobster fishery (Frusher et al. 1997), similar approaches have been introduced for the Gulf of St. Lawrence (Comeau and Mallet 2001) and Nova Scotia (Claytor and Allard 2003).

Ultimately the number of traps do relate to fishing mortality. However, because the lobster fishery has the ability to compensate for reductions in traps by
increasing efficiency, the relationship between trap number and effective fishing effort is likely to be highly nonlinear (Russell 1994). Reductions in effort (traps) to decrease fishing mortality have been questioned by industry and have not been successful in practice.

**Project Objectives and Scientific Hypothesis**

**Objectives**

- Identify eight suitable 0.9 km² areas of equivalent depth and bottom characteristics within the Monhegan Island Lobster Conservation Area (MILCA).
- Deploy traps in areas covering three experimental trap densities that are representative of the variation along the coast of Maine.
- Conduct trapping experiments over a two-month period standardizing for soak time, bait and gear.
- Record catch composition (legal, sublegal, V-notch and egg bearing) for each trap hauled using electronic logbooks and on-board observers.
- Tag each lobster with batch tags unique to each trapping day.
- Record the location, incidence, size and biological status of recaptured lobsters over the study period.
- Determine habitat specific lobster density before, during and after the study period using remote video cameras.
- Monitoring the MILCA fishing season
- Record daily catch statistics during the MILCA fishing season (traps hauled, average depth fished, average location, bait used, soak time)
- Investigate the impact on catch with variable soak (2005, 2007)

**Hypothesis**

- Catch rates of lobsters are influenced by trap density
- Cumulative impacts on local population structure (fishing “mortality”, density, size composition, sex ratio) vary by trap density and trapping duration.
- Catch rates are not influenced by soak time.
- Using the continuous change in ratio (CIR) method advanced by Claytor and Allard (2003) determine the trajectory of daily exploitation of MILCA fishing season relative to changes in catch and catch rates over the course of the season.
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Methods

The waters surrounding Monhegan Island have been a seasonal winter fishery since 1907; in 1998 the Maine legislature officially recognized this area as the Monhegan Island Lobster Conservation Area (MILCA). Participation in the MILCA is limited to 17 lobstermen in approximately 95 km² immediately surrounding Monhegan Island (Figure 1). The MILCA is the only area in New England that is closed during summer and fall months when the rest of New England’s lobster fishery is at its peak. The MILCA represents a rare opportunity to conduct experiments in a trap free setting in one of the most productive lobster regions of the coast. An explicit aim of the Maine legislature, when establishing MILCA, was to promote scientific studies, a goal that complements the Northeast Consortium goal of evaluating closed areas and improving fishing practices.

Multibeam Survey of MILCA Waters

In April 2005, a week long Multi-Beam survey was conducted to survey the Monhegan Island Lobster Conservation Area. The survey was conducted by mounting the multi-beam transducer to the off-side of the F/V Seldom Seen. The survey was sub-contracted through the Pennsylvania State University, under the leadership of Dr. Tom Weber (now with UNH). The resulting survey produced a map with a horizontal resolution of 5-meters and a 1-meter depth. Backscatter data was recorded and will be used as a proxy for habitat, but was not available at the time of site selection. Subsequent video drops were conducted in July, 2005 to validate backscatter data.
Figure 1. Bathymetry of the Monhegan Island Lobster Conservation Area (MILCA). The MILCA is located in the Mid-coast region of Maine, and is the only area seasonally closed to the lobster fishery in the US. Soundings were taken during a weeklong multi-beam survey on the F/V Seldom Seen.

The impact of trap density on catch (September and October, 2005)

Eight 0.9 km² experimental trapping areas were selected based on their bathymetric characteristics, six areas were randomly selected for the trap density experiment (Figure 2). Three levels of trap densities (50, 167 and 500 traps km⁻²) were assigned to these areas, with soak time standardized at 4-nights (96 hours). Fishermen were randomly assigned areas and the number of traps to be
placed in each area. The remaining two experimental areas were assigned a density of 167 km\(^2\) to test the impact on catch with variable soak times described below (Table 1 and Figure 2).

![Figure 2. Defined areas indicate the location and trap density tested for the 2005 trapping experiment.](image)

Table 1. The distribution of traps by industry participant for the 2005 manipulative trapping project.

<table>
<thead>
<tr>
<th>Area</th>
<th>Fisherman</th>
<th>MW</th>
<th>RB</th>
<th>SS</th>
<th>DM</th>
<th>LC</th>
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<td>167</td>
<td>150</td>
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</table>

* Random Soak

Trapping experiments were conducted from August 30 (traps set) through November 1, 2005 (traps removed). Traps in the six areas with a fixed 4-night soak time were hauled 12 times.
All traps were set as pairs. Each trap was a standard 4-foot, double parlor, wire trap with a minimum of one escape vent for juvenile lobster. All traps were hauled and rebaited on predetermined dates. If traps were missed (entangled, lost buoy, gear loss) these were noted and replacement traps were added to the area on the next hauling date.

The contents of each trap were counted for composition of the lobster catch (legal, sublegal, V-notch, egg bearing and oversize). Crab counts were collected after October 1, 2005 through the completion of the experiment. All lobster and crab counts were immediately entered in to a Thistle Marine Electronic Logbook, which subsequently attached a latitude longitude location and time stamp to each entry. Legal lobsters were removed, banded and placed in on-board recirculating tanks. At the end of the day all legal lobsters were released at a common drop point within the MILCA (N 43°46.2” W 69°20.0”). At-sea observers were placed on 20% of all trips (20 of 99) to record detailed biological information on lobsters encountered.

**Investigation of soak on catch (2005 and 2007)**

Two experiments were conducted, in 2005 and 2007, to test the impact of soak time on catch. In 2005, two 0.9 km² areas were assigned a 167 trap km⁻² density. In this case one fisherman (M. Thomson, F/V Pats Girl) was the only industry participant (Table 1 and Figure 1). Soak time varied from one to eight days and were randomly assigned throughout the experiment. The two areas with random soak times were scheduled to be hauled 15 times. In this experiment, legal lobsters were immediately returned to the water.

A second soak time experiment was conducted between August 15 and September 15, 2007. For this experiment the entire MILCA was used as a test area (Figure 1). In total, 360 traps were set as pairs. Half of the traps were assigned random locations that remained fixed over the course of the experiment. The second half of the traps were moved at the discretion of the industry participants. The 90 fixed sites were evenly distributed between three depth strata (0-30, 31-60, 60-90 m). These fixed sites were evenly distributed between industry participants (Chioffi, Weber and Stanley). All traps were hauled ten times on random dates, with soak times varying from one to six days. On rare occasions some traps were hauled on as little as five hours soak. Each industry participant had an independent hauling schedule to ensure soak times were evenly assigned throughout the experiment and minimize the effect of changing lobster availability.

Table 2. The hauling schedule for three industry participants was determined by random draw of soak times from one to six days. Each participants hauled fixed location traps and industry selected locations each designated day. The experiment began August 15 and ended September 15, 2007.
As each pair was hauled; location, depth and trap contents were recorded on a paper log. The number of legal, sublegal and illegal lobster in each pair was noted. Each lobster was “knuckle banded” and returned immediately to the water. Any recaptures were noted and rebanded.

To determine the relationship between catch rate and soak time, individual haul data was fit to the three parameter model described in Saila et. Al. (2002) where the catch at time \( C_t \) is described as

**Equation 1.0**

\[
C_t = ab + a(t - b)e^{-ct}
\]

Where \( C_t \) is the catch at time \( t \), and \( a \), \( b \) and \( c \) are parameters to be solved for. The time when a trap reaches maximal catch, \( T_{max} \), can be resolved via the equation

**Equation 2.0**

\[
T_{max} = \frac{1}{c} + b
\]

And the maximal catch, \( C_{max} \), via

**Equation 3.0**

\[
C_{max} = ab + ac^{-1}e^{-(1+cb)}
\]

The product of the parameters \( a \) and \( b \) is the asymptotic catch and parameters \( a \) and \( c \) depend on local animal density and trap entry rates; however, \( c \) largely reflects the probability of escape (Saila et al. 2002).

The model parameters were estimated by least squares minimization using MS Excel Solver. In the case of the 2005 experiment, all traps (recorded as pairs but reported as catch per trap) were used from both areas as the catch rates between the two areas were not significantly different. For the 2007 experiment, fixed location traps were compared to industry selected traps regardless of depth.

Finally, the catch at time was compared to the state wide Lobster Port Sampling Program results from 2000-2007, an intercept survey that randomly selects 10
dealers each month and interviews harvesters that land their catch on the selected day. Each interviewed harvester is asked a series of catch and effort questions; including total pounds landed, traps hauled and average soak time. In this case, model parameters were estimated using trip level data reported on a per trap basis.

**Tag and recapture experiment**

All lobster encountered during the 2005 trap density experiment were batch tagged with a daily, uniquely colored, “knuckle band”. In the six trapping areas with constant soak time, legal lobsters were removed, banded and placed in on-board recirculating tanks. At the end of the day all legal lobsters were released at a common drop point within the MILCA (N 43°46.2” W 69°20.0”). All sublegal and illegal (V-notch, Egg bearing, Oversize) lobsters were “knuckle banded” and immediately returned to the sea.

In the two trapping areas investigating the impact of variable soak times in 2005, all lobsters were “knuckle banded” and immediately released after counts were taken.

Recaptures were entered into the Thistle Marine Electronic Logbooks and recorded by on-board observers for both experiments in 2005. Specific information taken for each recaptured lobster included the original date of capture and additional recaptures (derived from band color and quantity), location, size, sex, and reproductive status.

For the 2007 experiment on soak time, all lobsters were “knuckle banded” immediately and released after counts were recorded. For this experiment, unique batch colors were not assigned as the hauling schedule varied randomly between the three industry participants (Table 2). Recaptures were recorded and an additional “knuckle band” was added. Recaptures were recorded as sublegal, legal or illegal and were counted independently of other lobsters.

**Independent monitoring of MILCA during experimental trapping**

In an attempt to quantify lobster density in experimental trapping areas throughout the 2005 experiment, video surveys were conducted on four dates, September 2 and 30 and October 19 and 21, 2005, to determine relative abundance of lobster and crab. Surveys were conducted by drifting with prevailing winds and currents. Four transects were conducted in each area on each day, with a planned minimum transect length of 100 m or approximately 15 minutes of video. The video camera was suspended off the sea floor bottom, with an average viewing area of 1.0 m². Four 150 watt halogen lights were located at the base of the camera frame and were adjusted for lighting conditions. A location and time stamp was over laid on the video feed to facilitate
post processing. All video was recorded using a Sony Digital-8mm recorder and a Sub Sea Video system. Fields notes were confirmed with lab based video processing. Each transect location, start and stop times, errors in recording, substrate and presence of crabs and/or lobster were noted.

**Monitoring of the MILCA fishing seasons**

The Monhegan Island Lobster Conservation Area (MILCA) is the only closed season lobster fishery in the US lobster fishery and provides an opportunity to compare the compounded impacts of depletion within a determined area.

Three initiatives were used to track the seasonal patterns of the MILCA fishing season and annual catch from 2004 through June 2009. Prior to the 2005 trapping experiments, logbooks were distributed to participating MILCA fishermen. Each participant was asked to record the daily catch and effort. The season ran from December 1, 2004 through May 30, 2005. Specific elements captured were catch, trap hauls, average soak time, depth fished and general location on a daily basis.

In 2007, MILCA participants submitted a bill to the Maine Legislature to extend their season from a December 1, start date to October 1 (Maine Public Law Chapter 219). As part of this law, the Maine DMR Commissioner “…shall establish by rule a trap limit for the open season established… The trap limit may not exceed 475 traps per individual...” (12 MRSA 6472). The subsequent 2007/2008 and 2008/2009 season trap limit was set at 300 traps per individual. Two additional sources of information to monitor the MILCA season became available as part of the law change. MILCA participants were asked to voluntarily submit the prior three season total landings to use a baseline to evaluate the season and trap change. Finally, each MILCA participant is now required to complete daily trip reports similar to those described for the 2004/2005 season.


**Data**

All experimental catch, biological measurement and video surveys will be available in raw or summarized format by request to Carl Wilson (Carl.Wilson@maine.gov 207.633.9538). Harvester logbook records collected prior to the 2005 trapping experiment and in subsequent seasons are considered confidential information by the Maine Department of Marine Resources, and therefore will only be available in summarized format. The multibeam data is available on request and is currently referenced on the Gulf of Maine Mapping Initiative website (http://www.gulfofmaine.org/gommi/coverage-map.php ).
Results and Conclusions

The impact of trap density on catch (September and October, 2005)

During the experimental trapping period, 20,100 trap hauls were conducted with approximately 72,000 lobsters counted, measured, banded and released. The designated number of traps in each area were maintained during the course of the experiment by adding traps as they were lost. The standardized 4-day soak was maintained throughout the experiment with the exception of haul #10, when high seas extended the soak time to 5-days.

Technical errors with the Thistle Marine Electronic Logbooks resulted in the direct loss of 33% of the potential trap hauls information. Difficulties encountered included box malfunction, data entry, modem upload, and database errors. In the six areas where soak time was held constant and trap densities varied between 50, 167 and 500 traps km\(^{-2}\) data remained representative as each treatment had a minimum of two participating fishermen and information was recorded for each haul. At sea observers provided detailed catch and effort information on 5,038 trap hauls (25% of the total). In some cases at sea observer data can be used on trips where the electronic logbook failed, lessening the impact of data losses.

Significant differences in catch rates were observed between all areas. During the course of the experiment, catch rates in all areas significantly increased, independent of the trap density (p<0.001). High density areas (500 traps km\(^{-2}\)) always had a lower catch rate than medium (167 traps km\(^{-2}\)) or low (50 traps km\(^{-2}\)) density areas. In aggregate, medium and low density areas had 2-4 times higher catch rate than high density areas. There was one medium density (Figure 3, Area 6M) where catch rates equaled or exceeded low density catch rates.

Increases in catch rates over the duration of the experiment in all areas may indicate a regional scale (10-20 km) increase in lobster availability. We did not observe localized depletion even as legal lobsters were removed from the study areas on every haul.
Figure 3. Catch per pair of legal lobster in high (500 traps km$^{-2}$), medium (167 traps km$^{-2}$) and low (50 traps km$^{-2}$) density areas. The experiment began August 30, and ended October 18, 2006. Hauls were on four night soaks except Haul 10 when weather delayed hauling.

There were significant differences between all areas and trap density treatment, however these impacts were local (10-100 m) and were overwhelmed by the regional (10-20 km) changes in lobster availability. The distribution of the legal catch varied within each trapping area. In areas with trap densities of 500 traps km$^{-2}$ the highest legal catch was observed on the edges of the areas. Catch rates often declined within 50 meters of the edge and remained consistent to the center of the area. Traps in the center of high density areas had consistently lower catch rates, the largest incidence of zero catches and were likely influenced by competition from nearby traps.

In low and medium density areas (50 and 167 traps km$^{-2}$) catch rates were largely uniform throughout the areas. The incidence of trap hauls that recorded zero legal lobsters were rare and catch rates did not decline from the edge to the center of the area. We infer that trap competition was lower between adjacent traps in these areas. In one area (167 traps km$^{-2}$) directly to the southwest of Monhegan Island, catch rates were consistently high in the northeast corner, or the area closest to the Island. It is speculated that this corner represented a corridor for lobsters moving from shallow waters near the island to deeper waters (Figures 4 and 5).
Figure 4. Trap haul location and catch in eight experimental trapping areas. Trap densities of high (500 traps km$^{-2}$), medium (167 traps km$^{-2}$) and low (50 traps km$^{-2}$) were maintained for the duration of the experiment. A total of 20,100 traps were hauled during the experiment. Legal catch per pair is reflected as a color gradient from white (zero) to red (11-34). * Indicates areas where random soak time was applied.
Figure 5. Trap haul locations in three experimental trapping areas. Trap densities of High (500 traps km-2), Medium (167 traps km-2) and Low (50 traps km-2) were maintained during the experiment. Legal catch per trap is represented with red (+) as zero and increasing bubble size to a maximum size representing 9-34 lobster.

When the average cumulative effect of the number of trap hauls and catch is compared between low, medium and high density areas, the medium density areas caught 16% less than the high density areas despite the fact that high density areas had three times more traps. Low density areas had the highest per trap average, but were unable to compensate for the loss in total catch with constant soak times of 4-nights (Figure 3, Figure 6).
The impact of soak time on catch

In the two areas designed to test the impact of variable soak time on catch in 2005, a total of 2,564 trap hauls were recorded. In these traps 11,411 lobsters and 3,493 crabs were counted. Legal lobsters were the most prevalent (n=5,824) followed by sublegal lobster (n=4,800) and finally illegal lobster (n=787).

The most significant loss due to electronic logbook error was encountered in the two areas where soak time was varied randomly, 33% of the potential day/area combinations (10 out of a possible 30) were lost completely. Poor sea conditions and a scarcity of available crew limited this portion of the experiment to days when the larger six area trapping experiments were not hauling and inadvertently increased the maximum planned soak times from six to eight days (Table 3).

Table 3. Haul dates, associated soak times and trap hauls recorded for the 2005 experiment on the impact of soak time in two experimental areas with a density of 167 traps km$^{-2}$. Electronic logbook errors resulted in the loss of all records in Area 3, and greatly reduced the number recorded in Area 2 after 9/30/2005.
<table>
<thead>
<tr>
<th>Haul</th>
<th>Date</th>
<th>SOAK</th>
<th>Area 2</th>
<th>Area 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9/3/2005</td>
<td>4</td>
<td>144</td>
<td>128</td>
</tr>
<tr>
<td>2</td>
<td>9/9/2005</td>
<td>6</td>
<td>144</td>
<td>144</td>
</tr>
<tr>
<td>3</td>
<td>9/11/2005</td>
<td>2</td>
<td>148</td>
<td>136</td>
</tr>
<tr>
<td>4</td>
<td>9/15/2005</td>
<td>4</td>
<td>138</td>
<td>142</td>
</tr>
<tr>
<td>5</td>
<td>9/19/2005</td>
<td>4</td>
<td>146</td>
<td>146</td>
</tr>
<tr>
<td>6</td>
<td>9/20/2005</td>
<td>1</td>
<td>146</td>
<td>140</td>
</tr>
<tr>
<td>7</td>
<td>9/24/2005</td>
<td>4</td>
<td>144</td>
<td>134</td>
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<td>9/30/2005</td>
<td>6</td>
<td>126</td>
<td>140</td>
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<td>9</td>
<td>10/19/2005</td>
<td>8</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>10/21/2005</td>
<td>2</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>10/29/2005</td>
<td>8</td>
<td>138</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>10/31/2005</td>
<td>2</td>
<td>76</td>
<td></td>
</tr>
</tbody>
</table>

As with the other medium and low density areas, the catch was largely uniform from the edge of each trapping area to the center, indicating minimal competition between traps (Figure 4). Additionally the experimental areas where soak was held constant, a pattern of increasing catch rates from the start of the experiment was observed similar to those areas where soak was held constant (Figures 3 and 7).

![Figure 7](image_url)

**Figure 7.** Catch per trap haul of legal lobsters in two 0.9 km² areas in 2005 with soak times between 1 and 8 days (Table 3). The trapping experiment began on August 30 and concluded on November 30. Errors uploading catch data from Area 3 resulted in this information being lost after the eighth haul.

Catch rates between the two soak experimental areas were not significantly different (P > 0.05); therefore, all trap hauls were combined to determine the
relationship between catch and soak (Figure 8). A non-linear asymptotic relationship was fit to the individual haul data as described by equation 1.0. The maximum catch per trap was estimated to be 5.2 legal lobsters per trap, a number exceeded by less than 9% of all trap hauls recorded. The calculated maximum soak time was 35.2 days, nearly four times the tested maximum soak (Table 4). The estimated catch was 1.3 legal lobster per trap at two days, and 2.2 at four days. This non-linear relationship results suggest that soak times in medium density areas (and by inference low density) could be reduced to increase the frequency of trap hauls and to compensate for the lower number of traps in these areas when compared to high trap density areas.

![Figure 8](image)

Figure 8  Combined haul data (n=2,564 trap hauls) for the two medium density areas used to test the impact of soak time on catch in September and October 2005. Model results follow least square estimations described in Equation 1.0.

In 2007, the trapping experiment encompassing the entire MILCA to test the impact of soak time on catch recorded a total of 3,474 trap hauls that caught 14,112 legal, 6,194 sublegal, 2,014 illegal and 5,066 crab. A total of 5,679 lobsters were recaptured, and will be discussed below. Industry selected sites accounted for 51% of trap hauls but 65% of the lobsters.

In general industry participants did not change the location of traps after the first haul. Industry traps tended to concentrate in depths less than 40 m with the highest catch rates (Figures 9 and 10).
Figure 9. The location of fixed (black “+”) and industry selected sites (red “o”) for the 2007 experiment to investigate the impact of catch rates on soak. Each location represents one pair of traps. The experiment ran from August 15 through September 15, 2007. Industry participants could change the location traps if desired.
Figure 10. The catch rate of legal lobsters for fixed and industry selected stations for the 2007 experiment to investigate the impact of catch rates on soak. The experiment ran from August 15 through September 15, 2007.

Unlike the 2005 study, we did not observe a difference of catch rates over the course of the 2007 experiment regardless of soak time and depth (Figure 11). The majority of lobsters caught had molted for the season. We speculate that lobsters are less migratory in August/September than in September/October. The catch rates did decline with respect to depth for fixed and industry selected stations (Figure 12).
Figure 11. Legal catch per trap for fixed locations (+) and industry selected locations (O) from August 15 through September 15, 2007. A total of 3,474 trap hauls that caught 14,112 legal lobsters.

Figure 12. Legal catch per trap for fixed locations (+) and industry selected locations (O) by depth (fathoms) from August 15 through September 15, 2007. Linear regression fit applied independently to industry (solid blue line) and fixed sites (solid black line).

When model parameters are estimated to determine the relationship between soak and catch, following Equations 1.0, 2.0 and 3.0, differences between fixed and industry selected locations are evident. The estimated maximum catch for fixed traps was 3.4 legals per trap and 40% more for industry selected sites at 6.5 legals per trap. The estimated maximum soak time was 9.7 days for fixed locations and 16% more at 22.1 days for industry selected locations. As was
estimated for the 2005 experiment, the maximum soak time exceeded the maximum of 6 days tested. Approximately 23% of trap hauls exceeded the estimated maximum catch for fixed stations and 30% for industry selected sites.

Finally, when parameters are estimated for the relationship between soak and catch based on the 2000-2007 Lobster Port Sampling Program (LPS), the maximum catch and the maximum soak was 40 to 85% lower than was observed in the 2005 or 2007 experiments (Table 4). The variability in the maximum soak and maximum catch may indicate that trap capacity had not been reached. If longer soak times, in excess of 10-14 days, had been tested, the escape parameter, c, may have been estimated with more certainty.

The non-linear relationship between soak and catch for all scenarios tested above indicates that there is efficiency to be gained, by decreasing soak and competition between traps, that would offset reductions in catch by reducing traps (Figure 13 A). It is important to note that the current Maine lobster fishery, largely regarded as a intensively trapped fishery, with an average catch of 1.4 at the average soak time of 5.2 days could increase by 4.2 times to achieve the catch rates observed in the 2007 industry selected sites (Table 5).

The asymptotic relationship expressed by Equation 1.0 allows an interpretation of the maximum catch at a maximum soak time and an interpretation of catch per trap per day. For all scenarios tested in Table 4, there is an inverse relationship for maximum catch per trap per day with soak. The maximum catch per trap per day is observed after one day of soak for all scenarios, followed by values declining rapidly until approximately six nights. The disparity between the average soak of 5.2 days measured by the LPS and the maximum catch per trap per day for all tested scenarios suggests the current lobster fishery is fishing 80% below maximum efficiency with regards to soak time (Figure 13 B).

### Table 4. Estimated model results and parameters to determine the relationship between catch and soak from Saila et al. (2002). Model results for the 2005 and 2007 Monhegan trapping experiments are based on trap haul data. Results for the 2000-2007 Lobster Port Sampling program are based on daily trip results. Parameters were estimated using least square methods with MS Excel Solver.

<table>
<thead>
<tr>
<th>Survey</th>
<th>Number</th>
<th>Max Catch per Trap</th>
<th>Max Soak</th>
<th>Model parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial values</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005 Medium Density*</td>
<td>1,282</td>
<td>5.2</td>
<td>35.2</td>
<td>0.21  25.12  0.1</td>
</tr>
<tr>
<td>2007 Fixed Stations*</td>
<td>888</td>
<td>3.4</td>
<td>9.7</td>
<td>0.46  7.33  0.42</td>
</tr>
<tr>
<td>2007 Industry Selected Stations*</td>
<td>925</td>
<td>6.5</td>
<td>22.1</td>
<td>0.32  20.45  0.59</td>
</tr>
<tr>
<td>2000-2007 Port Sampling**</td>
<td>3,915</td>
<td>1.4</td>
<td>5.6</td>
<td>0.52  1.81  0.27</td>
</tr>
</tbody>
</table>

* pairs  ** interviews
Figure 13. The relationship between soak time and catch (A) for the 2005 and 2007 experiments and the 2000-2007 Lobster Port Sampling Program following Equation 1.0. The projected catch per trap per day (B) for each scenario tested.
Table 5. Model fit catch per trap at five nights soak, from Equation 1, for the 2005 and 2007 soak time experiments and the 2000-2007 Lobster Port Sampling Program.

<table>
<thead>
<tr>
<th>Survey</th>
<th>Catch per Trap at five nights</th>
<th>Catch per Trap per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005 Medium Density*</td>
<td>6.2</td>
<td>1.24</td>
</tr>
<tr>
<td>2007 Fixed Stations*</td>
<td>3.3</td>
<td>0.66</td>
</tr>
<tr>
<td>2007 Industry Selected Stations*</td>
<td>2.6</td>
<td>0.52</td>
</tr>
<tr>
<td>2000-2007 Port Sampling**</td>
<td>1.4</td>
<td>0.28</td>
</tr>
</tbody>
</table>

* pairs   ** interviews

Tag and recapture results

Of the estimated 72,000 lobsters captured and tagged in the 2005 trapping experiments, less than 15% were recaptured in subsequent hauls. In areas where legal lobsters were removed after each haul, on average recapture rates were consistently less than 10%. In the two areas (medium density and random soak times) where legal lobsters were tagged and returned to the same area a greater, yet still low, percentage of 10-15% were recaptured on the next haul (Figure 14).

When recaptures are interpreted as a function of days at large in areas with fixed 4-night soak times, we find that less than 5% of lobsters were recaptured after twelve days (3 hauls) (Figure 15). Even in the two areas where soak time was varied randomly, legals were returned to the same area, and initial recapture rates were the highest, less than 5% returns were observed after three subsequent hauls (Figure 16). These results suggest that movement into and out of each experimental area was an important factor in this experiment as a complete overturn in each area likely occurred on a continual two-week basis.

The observations that recapture rates decline significantly after initial capture and were consistent among trap density treatments violates assumptions of a closed population needed for tag based estimates of population structure and fishing removals.

There were distinct biological differences in the make up of recaptures from areas where legal lobsters were removed and in areas where legals were returned immediately to the same area. In the six trapping areas where legal lobster were removed, a total of 3,575 were recaptured one or more times. Nearly 70% of recaptures in these were female (n = 2,526), suggesting females were 2.5 times more likely to be recaptured than males in these areas. Of the total recaptures in the fixed soak time areas, 32% were “legal”, indicating movements of legal lobsters from the common drop off location or from random soak areas back through trapping areas (Figure 17 A).

In the two areas where legal lobsters were immediately returned to the same trapping areas 2,326 lobsters were recaptured. Of these, only 49% of the

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recaptures were females, indicating males were just as likely to be recaptured as females in these areas. Additionally, 72% of the returns were “legal” in size and disposition (Figure 17 B). Although the increases in catch rates in all areas over the course of the experiment and low recapture rates have suggested no depletion in the experimental areas, the differences in the biological composition of the catch suggest that removing legals from the trapping areas did have an impact at some level.

Figure 14. The average percentage recaptures after one haul for the eight experimental trapping areas. The areas in dark blue indicate treatments where legal lobsters were removed from the study areas. Light blue (Medium density, random soak times), indicates treatments where legal lobsters were returned to the study areas. Error bars are the standard deviation of the percentage of first day recaptures by area.
Figure 15. Average percentage of recaptures as a function of days at large and trap density in areas where soak time was standardized to 4-nights.

Figure 16. Average percentage of recaptures as a function of hauls since initial capture in areas where soak time was randomly selected between one and eight nights.

Figure 17. Size composition and biological makeup of recaptured lobster in (A) areas where legal lobsters were removed and (B) areas where legal lobsters were immediately returned. Red line indicated the break between sublegal and legal size.

In contrast to the 2005 trap density experiment, the 2007 trap study did see compounding impacts of trapping on the incidence of recaptures. Over the course of the experiment covering 30 days and spanning five weeks, the proportion of legal recaptures increased from 10-15% after the first week, to 25-35% in the final week of the experiment (Figure 18). Industry selected traps tended to be clustered in string of pairs which may have resulted in a consistently higher proportion of legal recaptures than the fixed stations which were relatively isolated. Regardless of industry selected stations or fixed stations, a higher proportion of legal recaptures were observed than was recorded in the 2005
experimental trapping areas. This disparity may be a reflection of water depth and timing of the experiment. The 2005 trapping had medium depth of 55 m while the 2007 experiment was 40 m. The 2007 experiment was conducted in August/September while the 2005 experiment covered October/November.

![Graph showing proportion of legal recaptures to total legal lobsters caught by week in 2007 experiment.](image)

Figure 18. The proportion of legal recaptures to the total legal lobsters caught by week in the 2007 experiment. The experiment began on August 15, and concluded September 15, 2007. Lobsters were “knuckle-banded” and immediately returned to the water in the same location.

**Monitoring the MILCA fishery**

The 2004/2005 MILCA fishing season ran for 180 consecutive days from December 1, 2004 through May 30, 2005. Each of the 12 MILCA participants was licensed to fish 600 traps. Four MILCA participants (or 4 of 7 listed as participants on this project) completed daily trip reports.

At the beginning of the season the average soak time was three days with participants averaging 3.75 pounds per trap haul. Within six weeks the average soak time had increased to seven days and catch rates had dropped to less than 2.5 pounds per trap (Figure 19). The first month of the MILCA is very important, 50% of the annual catch is caught within the first three weeks of the season (Figure 20). The rapid decline in catch rates and increases in soak time are thought to be a result of the cumulative impact of the removal of legal lobster,
lobster movement out of MILCA waters and a decrease in water temperatures lowering the propensity of lobster to enter traps.

Figure 19. Average pounds per trap haul, pounds per trap per day soak and soak observed during the 2004/05 MILCA season. The season started December 1, 2004 (week 1) and ended May 30, 2005 (week 26).

Figure 20. The percent catch and cumulative percent of the annual catch by week during the 2004/05 MILCA season. The season started December 1, 2004 (week 1) and ended May 30, 2005 (week 26).

Following the 2006/2007 season MILCA participants successfully facilitated a legislative change to expand their season from 180 to a maximum of 240 days. In doing so they accepted a lower trap limit, not to exceed 475, but set by the MEDMR Commissioner. In letters to the MEDMR from MILCA participants, it
was generally understood that MILCA goals were to increase their profits by 25% relative to the previous three seasons. The 2007/2008 season was set with a start date of October 1, 2007 and closing June 7, 2008 with a trap limit of 300 traps. The dates and trap numbers for the 2008/2009 season remained at these levels.

A direct result of the 2007 law change was that fewer traps were hauled more often for a longer period of time that resulted in a higher catch. Relative to the average of the three seasons prior to the 2007 law change, the catch of MILCA participants who submitted information (n=7) increased by a median of 72 and 67% for the 2007/2008 and 2008/2009 season (Figure 21). When total annual trap hauls, a gross measure of effort, is compared before and after the 2007 law change (n=4 participants), there was an 18% increase in trap hauls for the 2007/2008 season and a 18% decrease for the 2008/2009 season as compared to the 2004/2005 season (Figure 22).

The success of the two seasons following the change to the MILCA season and subsequent 50% reduction of the maximum trap limit should not be considered a “real-world” application of reducing traps in the lobster fishery. While the reduction in traps was significant, the opportunity to expand the MILCA to previously un-fished months far exceeded the loss of traps. The overall trap density within MILCA is less than 100 traps km$^{-2}$. At this density traps are likely competing with each other when set nearby, but are not saturating the MILCA waters with traps relative to the rest of the Coast of Maine. There are no other areas along the Coast of Maine that are seasonally closed; therefore, an expectation of increasing total catch as a result of a trap reduction, as was seen within the MILCA, are unlikely.
Figure 21. The median percentage difference of each seasons’ landings relative to the average of 2004/2005, 2005/2006 and 2006/2007 landings. Values for the 2007/2008 and 2008/2008 seasons (shaded gray) follow the change in MILCA law that extended the season by two months and reduced the maximum number of traps fished from 600 to 300.

Figure 22. Median total trap hauls for four MILCA participants spanning the 2004/2005, 2007/2008 and 2008/2009 seasons. Values for the 2007/2008 and 2008/2008 seasons follow the change in MILCA law that
extended the season by two months and reduced the maximum number of traps fished from 600 to 300.

Independent monitoring of MILCA during experimental trapping

A total of 128 video transect were conducted over four days and among the eight experimental areas on the F/V Pandora. The average transect length was 130 m with a minimum of 70 m and a maximum of 240 m (Figure 23). A total of 16,582 m² were surveyed, with 298 lobster and 1,299 crabs observed. Lobster densities on the bottom increased over the course of the experiment (Figure 24). The average density of lobster was 0.02 m⁻², with a low of 0.006 m⁻² on September 2, and a high observed on October 19 (of 0.026 m⁻²).

The consistent increase in lobster density over the course of the experiment substantiates the regional pattern of increased catch rates observed.

Figure 23. The number (n = 128) and length (mean = 130 m) of video transects conducted before during and after the trapping experiments.
Figure 24. The average lobster density (number per m$^{-2}$) in four experimental treatments conducted during September 2 and 30 and October, 19 and 21, 2005.

Partnerships

This project could not have been completed without direct industry involvement in all aspects of the project. As the project was designed to “simulate” fishing, there was a natural fit of collaboration with 7 of 12 fishermen licensed to fish in MILCA waters. In total over 25 members of the commercial industry directly participated in this project.

Impacts and Applications

This project has broad impacts for trap fisheries in the US and Canada. Understanding how traps catch lobster helps to make informed decisions when changes in traps are proposed or interpreting results of previous trap reductions/changes. In general terms, understanding that reductions in traps (in this case trap density), can be partially or fully compensated by decreasing average soak time is an important component to any decision. These results present a double edge sword to proponents and opponents of trap reductions. Catch rate increased with decreasing trap density. However, total catch and therefore fishing mortality are likely not impacted until traps are reduced to the point where increases in catch rates and decreases in soak times can not make up for the loss in total catch.

This project has identified that individual trap catch rates are influenced by surrounding traps in the area. Across the scale of trap densities tested in this experiment, somewhere between 167 and 500 traps km$^{-2}$, there is a transition from saturating an area with traps and saturating individual traps. This tipping point is an important level to know, and could in part be investigated by
conducting additional controlled trapping experiments, where lobster competition in and around traps could be monitored through video.

The MILCA is the only seasonally closed area for lobster fishing in the US. Experimental areas for the 2005 experiment were isolated “islands” of traps, surrounded by unfished areas. It is unknown if the baited traps in these islands may have attracted lobster from surrounding unfished areas and influenced the catch rates. The 2007 trapping experiment to test the impact of soak time was conducted in the entire MILCA, with traps having little to no competition among traps. Regardless of the experiment in MILCA waters, we have demonstrated that traps at known densities or in relative isolation can have a cumulative biological and fishery impact on the local lobster resource even when 70% or more or captured lobsters were never recovered.

Future trap density experiments should be conducted in defined areas, in regions where there is active fishing. We observed significant differences in catch between high density and low density areas at times when lobster density was low and high. Based on the 2005 trap density experiments, it is reasonable to assume if trap densities could be reduced in actively fished areas, then catch rates should increase and compensate for any reduction.

Testing the cumulative impacts of the lobster fishery on the resource may be difficult to do by manipulating defined areas (km) as we have demonstrated that lobsters are unlikely to be caught in the same area in as little as two weeks. Fixed areas would not adequately capture the natural movements of lobsters and the fishery that pursues them. A more appropriate test would be to manipulate trap numbers at a scale that would reasonably capture regional movement of lobsters in one year (10s km).

Finally, the trapping experiments were conducted at an opportunistic time for MILCA participants. The 2005 experiment followed the first of three consecutive years with declining catch. In meetings prior to submission and funding of this project, some MILCA participants expressed skepticism to the availability of lobsters in MILCA waters outside of their fishing season and to the risks associated with reducing traps. However; the 2005 experiment, regardless of trap density treatment, demonstrated an increase in lobster availability in the early Fall within the MILCA waters. It is this knowledge that may have reduced some of the uncertainties and risk MILCA participants undertook by expanding their season in 2007 while reducing the maximum trap limit from 600 to 300. In the two seasons following the 2007 legislative change, total catch has increased dramatically, but a significantly lowered boat price and increases in the cost of bait and fuel have dampened the success of the season/trap change. At the writing of this report it is clear that the perceived success of the MILCA is more closely linked to the financial success of participants and the Monhegan Island community then to the undefined standards of exclusive fishing rights in a state sanctioned Lobster Conservation Area.
Presentations

This project has been presented to many different groups and audiences. A partial list is as follows:

February 2006
  Monhegan Island Fisherman, Monhegan Maine
  Commissioner of Marine Resources, Hallowell Maine
  Zone D, Rockland Maine

March 2006
  Phippsburg Public Library, Phippsburg, Maine
  Wiscassett Public Library, Wiscassett, Maine
  Zone D, Rockland, Maine
  Cutler Fishermen, Cutler, Maine

April 2006
  Swans Island Fishermen, Swans Island, Maine
  Isle Au Haut Fishermen Co-op, Isle Au Haut, Maine
  Maine Sea Grant Review, Orono, Maine
  Lobster Advisory Council, Augusta, Maine
  University of New Hampshire, Durham, NH

May 2006
  Irish Lobster Fishery Conference, Galway, Ireland
  Lobster Conservation Management Team, Portsmouth, NH
  Lobster Advisory Council, Augusta, ME

September 2006
  Maine Offshore Lobstermen Association, Brunswick, ME
  Downeast Lobsterman Association, Ellsworth, ME
  Chewonki Foundation, Boothbay Harbor, ME
  Commissioner of Marine Resources, Hallowell Maine

November 2006
  Lobster Advisory Council, Augusta, ME

February 2007
  Fishermen and Scientist Research Society, Truro, NS
  Zone C, Bucksport, ME
  Zone E, Wiscassett, ME
  Zone F, Cape Porpoise, ME

March 2007
  Outward Bound Science Educators, Portland, ME
  GMRI Fish Tank, Portland, ME

April 2007
  Zone B, Bar Harbor, ME
  Zone D, Rockland, ME

August 2007
  Gulf of Maine Research Foundation, Damariscotta, ME

September 2007
8th International Conference on Lobster Biology and Management, Charletown, PEI
February 2008
University of Southern Maine, Portland, ME
March 2008
Maine Fishermans Forum, Rockland ME
April, June and July 2008
Tenants Harbor Fishermen, St. George, ME.

Published reports and papers

This project has not been submitted for peer review. However, extensive coverage of the preliminary results were published in the Fisherman Voice (March 2006) and featured in the NEC contribution to the Commercial Fisheries News (May 2006).

Images

All images are available on request in full resolution. Maine Department of Marine Resources should be credit for all photos, unless otherwise specified.

Figure 25. (A) Captain Mathew Thomson, F/V Pats Girl. (B) Lobster tagged and re-caught three times during the 2005 soak time experiment. (C) F/V Seldom Seen and (D) F/V Kathleen.
Figure 26. (A) Entering trap haul information on Thistle Marine Electronic Logbook. (B) Monhegan Island from air. (C) A lobster that was recaptured three times during the 2005 soak time experiment. (D) View of Monhegan Harbor from Fish Beach.

Figure 27. (A) The Monhegan Island fish house, location of project meetings. (B) F/V Pandora. (C) Jessica Stevens, primary sea sampler for the 2005 experiments. (D) F/V Pandora loading traps on trap day, December 2005.
Figure 28. (A) Captain Robert Bracy, F/V Pandora. (B) F/V Pats Girl, (C) Captain Dan Murdock, F/V Sylvia Anne and (D) Captain David Boegel and crew Rusty Spear, F/V Kathleen.

Figure 29. (A) Drop camera system onboard the F/V Pandora. (B) Captain Sherm Stanley and Matt Schweier, F/V Legacy. (C) Kohl Lord coiling rope at the conclusion of the 2005 trapping experiment. (D) F/V Sylvia Ann taking up traps.
Figure 30. (A) F/V Fenris, (B) F/V Sylvia Anne, and (C) M. Schweier and S. Stanley unloading traps. (D) Traps on the Monhegan wharf at the conclusion of the 2005 trap density experiments.

Figure 31. (A) Monhegan Harbor. (B) Angela Iannicelli and Matt Weber rowing to F/V Seldom Seen. (C) Captain Matt Weber, F/V Seldom Seen, with a standard 4-foot trap hauled in a medium density area. (D) F/V Sylvia Anne in the distance.
Figure 32. (A) Dr. Tom Weber, UPENN now at UNH, during the April 2005 multibeam survey. (B) Multibeam display on board the F/V Seldom Seen. (C) F/V Seldom seen, leaving Monhegan Harbor while conducting the multibeam survey. Monhegan Boat Line ferry, M/V Laura B, in the distance.
Figure 33. (A) S. Stanley and K. Lord haul typical trap from industry selected sites for the 2007 experiment on soak time. (B) M. Weber and Chris Smith hauling a pair, while Jeni Menendez, DMR sea sampler, records and measures lobsters. (C) Lucas Chioffi, captain F/V Fenris recovers a pair of traps while Carl Wilson, DMR, records and measures lobsters.

Figure 34. Lucas Chioffi rebaits a trap, with lobsters and the 2007 logbook in the foreground. (B) An exceptional catch. (C) S. Stanley prepares to set traps using experimental low profile whale line. (D) F/V Legacy.
Figure 36. (A) L. Chioffi and M. Weber haul and rebait traps while J. Menendez records and measures lobsters aboard the F/V Fenris. (B) K. Lord sets a trap. (C) S. Stanley, K. Lord and Tasmanian Rock Lobster fisherman, Neville Perryman recover a pair of trap. (D) F/V Seldom seen having just set a pair of traps in Monhegan Harbor.
Future research

The MILCA offers a unique opportunity to conduct controlled experiments on lobster in a trap free environment. The basic findings of this project that relate to trap density, soak time and recapture rates have broad implications for the Maine lobster fishery and lobster biology. However; caution should be used if specific results are applied to other areas of the Coast of Maine. The preliminary results of the trap density studies have been presented to various industry councils and to public audiences. The potential application of experimental results to areas outside the MILCA is the largest criticism received and presents the strongest case for future research.

The Maine DMR was approached, by fishermen in Tenants Harbor, Maine, to conduct a trap density experiment in their fishing area. Tenants Harbor is a heavily fished area, approximately 30 km from Monhegan Island. Nearly 90 licensed fishermen, fish up to a maximum of 800 traps, in an area the size of the MILCA. Fishermen report that trap densities in excess of 2,000 traps km\(^{-2}\) are not uncommon during summer months when fishermen shift traps to inshore waters to catch newly molted lobsters.

In August 2009, a two week experiment was conducted in two 1/2 nm\(^2\) experimental areas near Tenants Harbor. The objective of this study was to document the impact of removing 50% of the traps. Aerial over flights prior to the start of the experiment recorded nearly 3,000 buoys in the experimental areas, and on the water observations suggested as many 40 fishermen fished there. Fishermen were asked to remove traps on a voluntary basis and were compensated to do so. Preliminary results suggest that an insufficient number of traps were moved to test the impacts of reduced trap density. However; the challenges of conducting controlled experiments in an open fishing area were revealed and can serve to guide additional studies.
March 1, 2021

Dr. Paul Doremus  
Acting Assistant Administrator for NOAA Fisheries  
National Marine Fisheries Service  
1315 East-West Highway  
Silver Spring, MD 20910

Re: Comment on Proposed Risk Reduction Rule to Modify the Atlantic Large Whale Take Reduction Plan

Dear Dr. Doremus,

Thank you for the opportunity to provide comments on behalf of the International Fund for Animal Welfare (IFAW) on the proposed risk reduction rule entitled “Taking of Marine Mammals Incidental to Commercial Fishing Operations; Atlantic Large Whale Take Reduction Plan Regulations; Atlantic Coastal Fisheries Cooperative Management Act Provisions; American Lobster Fishery”. We write as a veterinarian and biologists-- active members of the right whale research and conservation community – who lead necropsies on dead right whales, assist with Unusual Mortality Event documentation, and serve on the Take Reduction Team and the Board of the North Atlantic Right Whale Consortium (NARWC). We believe this rule as proposed will fail to reduce incidental mortality and serious injury to the North Atlantic right whale caused by entanglement in fishing gear to or below the federally mandated limit.

The modifications currently proposed in this rule were based on discussions held at the April 2019 TRT meeting with the goal of achieving at least a 64 percent risk reduction in mortalities and serious injuries. In the two years since this goal was originally discussed, there have been 21 additional documented right whale serious injuries and mortalities.1 This egregious exceedance of “allowable takes,” which are fewer than one NARW per year is a clear indicator that the population is in free fall and the previously agreed upon goals will not be sufficient to prevent extinction. Additional risk reduction measures must be enacted in order to preserve this species and ensure NOAA’s compliance with both the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA).

Considering the vast complexities of formulating a new suite of risk reduction measures, we acknowledge NOAA Fisheries’ dedicated efforts to this process. However, current proposals do not incorporate the best available science regarding current population status, which is estimated at 356 individuals and fewer than 90 breeding females. Right whales are one of the most endangered marine species in the world.2 Since 2017, when the current right whale Unusual

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Mortality Event was declared, 48 right whales (or 13.5 percent of the known population) have died or are presumed to have died – alarming scientists, policymakers, and advocates working to protect this critically endangered species. Just two days ago, “Cottontail” – a right whale sighted last October with a severe entanglement and the focus of several rescue attempts – was found dead off the coast of South Carolina, emaciated and fatally entangled in fishing gear. This whale joins a long and growing list of whales that have succumbed to their entanglements; IFAW-led research has shown that entanglement in fishing gear is the leading threat to right whales, with nearly 60 percent of determined causes of death between 2003 and 2019 from entanglement.

Given these urgent circumstances, we offer the following comments on three key areas in which the proposed risk reduction measures are insufficient and urge NOAA to opt for the “alternative 3 (non-preferred) option”:

1. The 64 percent risk reduction should be increased to 80 percent (70 percent at a minimum)

The proposed rulemaking is based on outdated information and does not account for the most recent right whale population estimate showing a continued and marked decline in North Atlantic right whales. The overarching goal of these measures is to reduce serious injuries and mortalities of right whales to below Potential Biological Removal (PBR), or the maximum number of incidental human-caused deaths per year that will not prevent a species from recovering. When developing the proposed risk reduction percentage targets over a year ago based on an over-estimated population assessment, NOAA Fisheries used a PBR value of 0.9 and determined that at least a 60 percent reduction in risk was adequate for a population of approximately 409 whales. However, with the recently revised population estimate of 356 and the unfortunate subsequent 13 mortalities documented in the past year, these new data points dictate that the PBR would be lower than 0.9 and risk reduction needs to be at least 70 percent for the species to recover. This can only be reached through the “alternative 3 option.” In fact, the US Marine Mammal Commission recommended that any proposed new rule include a baseline risk reduction target of 80 percent. The foundation of the proposed rulemaking is therefore fundamentally flawed as it aims to meet a mark that is too low to stop the current population decline. The 64 percent target of reduced risk outlined in the proposed rule should be increased to 80 percent.

2. Weak Line is Not a Solution

The management measures proposed in the rulemaking are insufficient to achieve the level of risk reduction needed to save the species for the long-term. The proposed rulemaking does include some meaningful measures that would reduce the number of vertical buoy ropes (VBR) in the water. These include “trawling up” (putting more traps between buoys),
particularly within Maine waters where VBR risk is high due to heavy fishing concentration, capping the number of VBR at half the number used in 2017, and restricting the use of VBR in some high whale density/high-risk areas through seasonal fishing closures. In fact, the “alternative 3 option” further reduces VBR in the water, and should therefore be prioritized.

However, the proposed extensive implementation of 1700-pound breaking strength rope (i.e., “weak rope”) as a key risk reduction measure will neither protect young right whales from lethal entanglements, nor eliminate the long-term health impacts on adults chronically entangled in gear. Calves and some juvenile right whales are not likely to be able to generate sufficient force to break 1700 lbs. of rope. Chronic entanglement in any line can have sub-lethal impacts on right whales, and is likely a major contributing factor to their reduced reproductive rates in recent years. Only by actually reducing VBR in the water will we make strides to save right whales from extinction. Weak lines can only be seen as an inferior and interim risk reduction measure until ropeless fishing can be adopted by all fishermen. Where vertical lines continue to be used in the interim, they should be reduced to 1700 lbs throughout the entire length not just the upper portion. NOAA Fisheries should not view weak rope as a long-term solution.

- As an example of the inability of weak rope to protect juveniles, and the cascading effect on the future population, we point your attention to the mother of one of the first right whale calves born this season, right whale #4040 “Chiminea.” In April 2011, when she was just four years old, “Chiminea” was sighted entangled in hundreds of feet of line in Cape Cod Bay. As young as she was, “Chiminea” would not have been protected by reduced breaking strength systems. Fortunately, in her case, all of the many factors that must align did and she was successfully disentangled and able to contribute to population growth, and recently sighted off Georgia with her first calf on December 4, 2020. NOAA Fisheries cannot continue to rely on disentanglement as the solution to the entanglement problem, as it simply is not enough to protect all right whales. VBR must be removed from the water column and not just replaced with weak rope.

3. Ropeless is the Solution

NOAA Fisheries should provide a more concrete pathway for ropeless fishing technology in the proposed risk reduction plan. Ropeless fishing eliminates the need for vertical buoy rope in the water column, except during the final stage of active retrieval, eliminating the risk of entanglement to whales. Removing VBR from the water column will protect right whales, while allowing fishermen to maintain – and even expand – their access to important fishing areas. Ropeless gear technology is the most effective long-term solution that can reduce entanglement risk, ensure fishermen can pursue their livelihoods, and protect the marine ecosystem. Specifically, ropeless technology should operate through a streamlined permitting process. While we commend NOAA Fisheries on the inclusion of ropeless fishing as a potential option in seasonally restricted areas, fishermen need a clear permitting process that provides a path for the use of ropeless gear to protect right whales while allowing fishermen to fish. A viable legal path for ropeless would further incentivize fishermen to use this innovative gear that does not harm whales. Relying on current one-off Exempted Fishing Permits (EFPs) granting use of non-compliant gear for ropeless is not a long-term solution.

Given these critical deficiencies within the proposed rule modifications, we urge you to: 1) apply up to date and accurate right whale population and PBR data, 2) reduce emphasis on weak rope as a solution to entanglement and instead focus on VBR reduction, and 3) expand and accelerate permitting of ropeless fishing gear in order to strengthen the proposed rule and achieve the necessary 80 percent risk reduction. In the event these essential changes require significant additional time for agency review --time critically endangered right whales do not have-- or NOAA Fisheries’ current preferred option cannot be amended to achieve the percent risk reduction needed to reduce entanglement, **we support the non-preferred or “alternative 3” option of 70 percent or greater as the adequate regulatory approach within the rulemaking framework and timeline.**

The International Fund for Animal Welfare (IFAW) is a Massachusetts-based nonprofit organization with experts across the U.S. and around the world. Our Marine Mammal Rescue and Research team, located on Cape Cod, is a leader in right whale mortality investigation and provides on the ground expertise to evaluate causes of death in this critically endangered species. Realizing from this work the true causes and that long-term solutions are needed, IFAW’s campaign to protect and save North Atlantic right whales is founded on our desire to seek out collaborative, pragmatic solutions that bring together diverse stakeholders in pursuit of meaningful change on the water. We have a long history of working with fishermen to understand their concerns and find a sustainable path forward, and facilitated and subsidized sinking ground line, partnering with fishermen to test, refine, and promote ropeless fishing technology, and worked with gear manufacturers to ensure their innovations can come to market. Informed by this expertise and first-hand experience we urge you to include expansion and implementation of ropeless fishing technology in the current proposed risk reduction plan to save right whales.

Thank you again for the opportunity to comment and for the hard work you, and the rest of NOAA Fisheries, are undertaking for this urgent conservation challenge. IFAW scientists and experts would be pleased to engage with you and your staff in whatever ways would be helpful.

Sincerely,

**Brian Sharp**  
Director, IFAW Marine Mammal Rescue & Research and ALWTRT Member

**CT Harry**  
IFAW Marine Campaigner and ALWTRT Alternate Member

**Dr. Sarah Sharp**  
IFAW Veterinarian and North Atlantic Right Whale Consortium Board Member- Elect
February 26, 2021

Colleen Coogan  
National Marine Fisheries Service  
Greater Atlantic Regional Fisheries Office  
55 Great Republic Dr.  
Gloucester, MA 01930

Sent via regulations.gov

Re: Taking of Marine Mammals Incidental to Commercial Fishing Operations; Atlantic Large Whale Take Reduction Plan Regulations; etc. (NOAA-NMFS-2020-0031)

Dear Ms. Coogan:

Supporters of the Humane Society Legislative Fund (HSLF) and the Humane Society of the United States (HSUS) signed onto letters regarding the National Marine Fisheries Service’s request for comments on the proposed rule amending the Atlantic Large Whale Take Reduction Plan. 85 Fed. Reg. 86878 (Dec. 31, 2020). Our supporters believe the proposed rule does not go far enough to protect this imperiled species and request that NMFS provide additional protections in the final rule to help ensure North Atlantic right whales are provided the federal protections required by law.

Over 15,000 HSUS and HSLF supporters signed onto the attached comment letters. The text of the letters sent to supporters of each organization were identical. We are submitting their names to be considered by the Agency in its review process.

- The document titled “HSUS Supporters Right Whale Comments 2.25.21” contains 10,775 signatures.
- The document titled “HSLF Supporters Right Whale Comments 2.26.21” contains 5,147 signatures.

Thank you for providing our supporters the opportunity to weigh in on this action. If you have any questions, please do not hesitate to contact me.

Sincerely,

Keisha Sedlacek  
Director of Regulatory Affairs, Federal Affairs  
Humane Society Legislative Fund  
ksedlacek@hslf.org  
(202)-955-3661
Subject: NMFS's proposed rule to address North Atlantic right whale fishing gear entanglements is not sufficient

To Whom It May Concern:

The National Marine Fisheries Service's proposed rule to address North Atlantic right whale entanglements in fishing gear does not go far enough to save this species from extinction.

With fewer than 360 individuals surviving and only about 70 breeding females remaining, it is imperative that the agency address entanglements in fishing gear in a meaningful way. Severe entanglement in lobster and crab trap/pot gear is the leading cause of death for this species. Scientists have determined that more than 85 percent of right whales have been entangled in fishing gear at least once in their lifetimes, and 60 percent have been entangled multiple times.

There is technology available that potentially reduces the risk of entanglement in trap/pot fishing gear known as "ropeless" or "pop-up" gear, and other less protective technology known as "weak line" rope; however, the most effective management tool short of converting all traps to ropeless throughout the fishery is to simply close areas to fishing when these animals are known to be in those waters.

Signed,

[Name]
March 1, 2021

MS. Donna Wieting, Director
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, Maryland 20910

RE: ALWTRP Proposed Rule, RIN 0648-BJ09

Dear Ms. Wieting:

On December 31, 2020, the National Marine Fisheries Service published a proposed rule to amend the Atlantic Large Whale Take Reduction Plan (ALWTRP) to reduce takes of North Atlantic right whales in the Northeast U.S. lobster pot fishery. Staff of the Georgia Department of Natural Resources’ Wildlife Resources Division has reviewed the proposed rule and the accompanying draft environmental impact statement (DEIS).

The North Atlantic right whale is Georgia’s official state marine mammal, and our coastal waters lie at the center of the species’ only calving ground. Right whales are critically endangered, in large part because of human-caused mortality. Since 2011 the species has declined by an estimated 23 percent, erasing population gains made from 2004 to 2010. Federal waters offshore of Georgia have been closed to fixed fishing gear (e.g., crab pots, gillnets) each winter since 2015 to protect right whales from rope entanglements. Various measures have also been implemented in Northeast U.S. waters through the ALWTRP process. However, entanglement remains the leading cause of whale death and injury, and over 90% of fixed gear buoy ropes in U.S. Atlantic waters are attached to lobster pots in the Northeast U.S. We prefer that NMFS rewrite the final rule around DEIS Alternative 3 to address this problem. Our comments on the proposed rule are attached; we appreciate NMFS’ careful consideration of these concerns in developing the final rule.

Thank you for the opportunity to comment on the proposed ALWTRP rule. We look forward to continued cooperation with NMFS staff on this and other matters. If you have further questions, please contact Clay George at 912-262-3336 or clay.george@dnr.ga.gov.

Sincerely,

Ted Will

Attachment
The proposed rule seeks to reduce entanglement risk by approximately 60% by (1) reducing the number of buoy lines in the water column, (2) implementing new seasonal restricted areas, and (3) reducing the severity of entanglements when they occur. Our comments are as follows:

- The draft environmental impact statement (DEIS) underestimates the number of right whale mortalities and serious injuries attributable to the lobster fishery. Mortality and serious injury will need to be reduced by over 80% to bring takes below the current Potential Biological Removal threshold of 0.8 whales per year (Hayes et al. 2020).
- There is significant uncertainty that the proposed rule, based on Alternative 2, can meet the proposed objective to reduce entanglement risk by ~60%. Specifically:
  - The benefit of increasing trap/trawl limits (“trawling-up”) is debatable. Trawling-up is a core component of the 2015 ALWTRP amendment and there is no clear evidence this strategy has reduced number of buoy lines deployed. Further, there is no guarantee that additional trawling-up will result in broadscale reduction in lobster buoy lines. Lastly, trawling-up may encourage fishermen to use stronger buoy lines, thereby increasing severity of injuries (Hayes et al. 2018, Knowlton et al. 2016).
  - Proposed seasonal gear closures in LMA1 and LMA2 are not sufficient in size or duration to reduce whale/gear co-occurrence and discourage gear relocation.
  - The frequency of weak rope breakaways is insufficient to reduce injury in deeper waters where buoy lines are longer and stronger.
  - The benefits of weak rope breakaways are uncertain and have not been implemented on a large scale.
- We recommend that NMFS rewrite the final rule based on Alternative 3 with the following additional considerations:
  - The 50% buoy line cap should also be required in the offshore lobster fishery (LMA3). Right whales occur year-round throughout LMA3 (Roberts et al. 2016).
  - The proposed restricted areas in LMA1 and LMA3 are insufficient in size and duration. Their conservation benefit will be offset if gear is relocated to the restricted area boundaries. NMFS should develop an adaptive approach to timing, duration and size restrictions.
  - Requiring weak rope “toppers” on the top 75% of buoy lines could lower risk of whale injuries when entanglements occur. This may be particularly important if the buoy cap encourages some fishermen to increase the number of pots fished per trawl. NMFS should require weak rope “toppers” on the top 75% of buoy lines.

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1 Mortality rates should be calculated from statistically-derived mortality estimates (Pace et al. 2021) as follows:
also require toppers to be used in LMA3. The long trawls\(^2\) that are fished in LMA3 likely pose a high risk of mortality and serious injury if whales become entangled.

- We recommend that NMFS analyze the effects of closing the Northeast U.S. portion of LMA3 to persistent buoy lines year-round. Offshore waters are used by right whales year-round (Roberts et al. 2016). The heavy gear used in the offshore fishery may be inherently dangerous to whales (Knowlton et al. 2016). This change would impact a small fraction (approximately 5%) of federal lobster permits\(^3\), and may encourage the further development of “rope-less” gear systems.

- We support opening restricted areas to rope-less fishing gear to incentivize the continued development of that technology.

References


\(^2\) Current ALWTRP regulations require a minimum of 20 pots per trawl and a maximum trawl length of 1.5 nmi in LMA 3. Both DEIS alternatives propose to increase trawl lengths to 1.75 nmi and a minimum of 45 pots per trawl.

\(^3\) NMFS GARFO issued 91 lobster permits for LMA3 in 2018. 1,732 permits were issued in LMA1, LMA2 and OCC (DEIS 4-117).
March 1, 2021

Mr. Chris Oliver
Assistant Administrator for Fisheries
NMFS Northeast Region
1 Blackburn Drive
Gloucester, MA 01930

SUBJECT: Comment submittal concerning Proposed Rule For Amending Regulations implementing The Atlantic Large Whale Take Reduction Plan

Dear Mr. Oliver,

The states’ of Connecticut and New York Marine Fisheries Programs have reviewed the Proposed Rule to amend the regulations implementing the Atlantic Large Whale Take Reduction Plan (Proposed Rule) and are committed to working with the NOAA Fisheries Service to find ways that protect large whales from negative interactions with fishing gear. However, it is also very important that the alternatives approved to protect large whales from entanglement risks do not pose safety at sea concerns for members of the regulated fishing community.

Upon review of the Proposed Rule, our programs support the proposed changes to restricted areas, the gear modifications surrounding weak line or weak insertions in buoy lines as well as the gear marking requirements as proposed. However, due to safety concerns, we cannot support the measures proposed to reduce the number of buoy lines in Lobster Management Area 2 (LMA2) and Lobster Management Area 3 (LMA3) as proposed. Our programs strongly urge the Service to keep the current minimum lobster trap trawl requirements for LMA2 (3-12 nm = 10 traps per trawl; >12nm 15-20 traps per trawl) and LMA3 (20 traps per trawl) in place.

**Background of Connecticut and New York Federal Lobster Permits**

Currently, Connecticut has a total of 4 and New York has a total of 2 LMA2 federal permit holders with trap allocations. It is important to note that not all of these federal permits have been active. The total trap allocation for LMA2 in 2021, after the 2020 mandatory reduction is 1,815 traps for CT and 886 traps for NY. Based on the current minimum trawl up requirements for LMA2 (10 traps/trawl) and 2 buoy lines per trawl, Connecticut estimates 120 active buoy lines in LMA2 and New York estimates 177 buoy lines in LMA2 for 2021.

New York has a total of 5 LMA3 federal permit holders with a 2021 total trap allocation of 5,253 traps. Based on the current minimum trawl up requirements for LMA3 (20 traps/trawl) and 2 buoy lines per trawl, New York estimates 525 buoy lines in LMA3 for 2021. New York is most concerned about the safety of trawl up requirements of 45 traps/trawl for small vessels (less than 45 to 50 feet).
Reasons for keeping current minimum trawl length requirements in LMA2 and LMA3

Due to the nature of the southern New England lobster fishery and how it is executed, safety at sea is the primary concern surrounding trawling up requirements for LMAs 2 and 3. The average size of the CT vessel fishing in LMA2 is 38’ and NY is 36’. Smaller southern New England lobster vessels do not have rope wells below deck, which results in a large amount of vertical and ground line on deck when traps are hauled and tended. Additionally, some of these vessels do not have stern cutouts and require traps to be set on the rails surrounding the stern, with the first trap being manually deployed upon reset. Requiring 15-25 traps per trawl for vessels of this size would increase the risk of a fisherman becoming entangled and possibly being swept overboard due to a greater amount of line on deck and the need to manually set traps in a trawl of that size. The larger number of traps per trawl proposed would require trap stacking along the rails surrounding the stern and each stacked trap would need to be manually deployed as to prevent multiple traps from going over simultaneously and the trawl becoming tangled. There are similar concerns about the 45 trap/trawl requirements for LMA3 for smaller vessels. The average vessel size of the NY vessel fishing LMA3 is 56’, with the smaller vessels less than 45’.

Together, the fishermen from the states of CT and NY comprise a very small portion of the lobster trap effort that takes place in the federal waters of southern New England. This is due both to a large attrition in the number of federal permit holders in each state, as well as mandatory, systematic reductions in federal trap allocations implemented by the Addendum XVIII to the Atlantic States Marine Fisheries Commission’s Interstate Fisheries Management Plan for American Lobster. Additionally, the states of CT and NY have 100% mandatory monthly reporting requirements for commercial lobstermen. Through mandatory trip level reporting, the number of vertical lines fished by each permit holder is documented and can be monitored.

Continuing the minimum 10 trap trawl requirement for the nearshore waters of LMA2 (3nm - 12nm), and a minimum 15-20 trap trawl for the offshore waters of LMA2 (>12 nm) and 20 traps for LMA3 ensures the safety of our fishermen at sea when retrieving and redeploying lobster traps and, due to the limited number of participants and gear, would not contribute to a significant change in the risk reduction for large whales that the Service is hoping to achieve. An alternative approach to maintaining the current minimum trawl lengths could be to provide an exemption to the trawling up requirement in LMA2 and LMA3 for vessels smaller than 45’ in length.

The states recognize that protection of large whales and eventual restoration of stock abundance is a principal requirement of the Endangered Species Act and the Marine Mammal Protection Act which we strongly support; however the safety of our fishermen is of primary importance. In summary, we hope the Service will grant an exception to the buoy line reduction measures as proposed and we support the other proposed gear modification requirements as recommended to address risk reduction for Atlantic large whales while still preserving the remaining important fishery.

Thank you for the opportunity to comment. We very much appreciate the efforts of the NOAA Fisheries Service to accommodate the disparate views of all interested parties on this important issue.

Yours truly,

Justin Davis, Ph.D.
Assistant Director, Fisheries Division
CT DEEP

James Gilmore
Director, Marine Resources
NY DEC

JD/JG/cg/km

cc: Captain Keith Williams, CT DEEP Environmental Conservation Police Marine District
Peter Aarrestad, Director CT DEEP Fisheries Division
March 1, 2021

Mr. Michael Pentony
Regional Administrator
Greater Atlantic Regional Fisheries Office
National Marine Fisheries Service
Gloucester, MA 01930

ATTN: Large Whale Proposed Rule (NOAA-NMFS-2013-0095)

Dear Mr. Pentony,

Please accept the following comments on proposed amendments to the Atlantic Large Whale Take Reduction Plan which are designed to limit the frequency and severity of interactions between large whales and trap/pot fishing gear in the Northeast Region.

**Trawl Up/Line Reduction.** MA DMF supports trawling up measures proposed in the Preferred Alternative (Alternative Two) which call for minimum standards for traps per trawl in various zones as a function of distance from shore and Lobster Management Area (LMA). In DMF’s Right Whale Conservation Plan which was submitted to NMFS on March 6, 2020, we proposed the future prohibition upon permit transfer of fishing with single traps in MA state waters by fishermen using a vessel 29’ and longer. However, DMF subsequently introduced a modified version of this proposal, that would simply ban the use of fishing singles on vessels larger than 29’ as part of a rule making package developed in December of 2020. This aspect of the state’s proposal was not approved at the January 28, 2021 meeting of the Marine Fisheries Advisory Commission. DMF and the Commission received substantial opposition to the proposal from many lobstermen, especially those who fish in the OCC LMA and LMA 2 with small trap allocations and small- to medium-sized vessels. These lobstermen told DMF and the Commission that they have developed a business model that optimized safety and profits. Many fishermen responded to the agency’s proposal with plans to purchase a smaller vessel to continue fishing single traps. The Commission concluded that the goal of further reducing vertical lines (if warranted in the future) should be accomplished through other means that would not compromise safety nor be easily subverted as noted. The Commission has created a subcommittee to study the issue and assist DMF to devise successful solutions.

**Seasonal Buoy Line Restricted Areas.** DMF supports many of the aspects of the Preferred Alternative (Alternative Two).

- We support the Massachusetts South Island Restricted Area in Alternative Two and are pleased that the agency is presenting this area as part of the Preferred Alternative. This area was identified by DMF as part of the proposed conservation plans submitted to NMFS last year and in our opinion encompasses an area that host large seasonal aggregations of whales based on the most recent sighting trends. Since 2010, although Cape Cod Bay...
been a persistent aggregations every winter/spring, right whales have demonstrated range shifts away from some traditional feeding grounds and a propensity to aggregate in new areas. Given the increased variability in right whale movement patterns we recommend that sightings data be evaluated every 3 years to ensure that all time-area closures adequately protect seasonal aggregations of whales.

• We would like to reaffirm the conservation benefits of the Massachusetts Bay Restricted Area Closure. This area seasonally hosts the largest aggregation of North Atlantic right whales in the world and serves as a critically important feeding area. This closure affects much of the Massachusetts inshore fishery, with a significant portion of our fleet losing the opportunity to fish in order to protect right whales. While this closure is important, and a necessary measure toward the recovery of right whales, it is critically important that the Service continue to include its benefit in all evaluations of risk reduction.

• We request that NMFS change their proposed measure to reflect that Massachusetts state waters portions of the MBRA will be closed through May 15. DMF will continue to use the authority of the Director to dynamically manage the Massachusetts Bay Restricted Area during the month of May. We will open the fishery in May if aerial surveillance demonstrates that right whales have left the area. The entire area would remain closed if whale aggregations persist. In the event that smaller number of whales remain in the MBRA, smaller portions of the area would remain closed when surveillance reveal 3 or more whales are present. DMF has enacted closure extensions in early May for four of the last six years when right whales have remained in Cape Cod Bay, and state regulations give the authority to the Director to keep areas closed under the authority of a declaration. DMF recently enacted new regulations that extend the closure in state waters from the MBRA up to the New Hampshire border. This area extension of the MBRA will be managed in the same manner.

• DMF agrees with the proposal to modify seasonal closures to allow fishing “without persistent buoy lines” but additional administrative process must be accomplished before this can be a successful fishery management strategy year-round. NMFS’ Exempted fishery permit process, NEPA analyses, and communication to fishermen using competing gears and other fishing fleets about “ropeless fishing” and the development of the technologies needs to be delineated before this can be widely implemented. We anticipate being able to provide you more advice about how to permit and manage “ropeless fishing” at the end of the year upon completion of the NFWF funded study (“Ropeless Fishing Gear Feasibility Study”), a 12-month project which will evaluate legal, regulatory, technological, and fishing challenges and opportunities of alternative lobster gear to reduce entanglements).

Other Line Reduction. DMF supports NMFS factoring in the expected buoy line reductions associated with the ongoing effort reduction plans of the ASMFC’s interstate lobster management plan in two lobster management zones (LMA 2 and LMA 3). The long-term reduction on buoy lines will be commensurate with trap allocation reductions.

Weak Line. DMF supports the adoption of weak line as a conservation management strategy. Since the inception of the Large Whale Take Reduction Team in 1996, a variety of proposals have been considered for break-away links or devices along the vertical line as a means to reduce risk of serious injuries and mortality. However, none were embraced due to concerns about operations safety for fishermen. Since
that time, however, research has been conducted on the appropriate breaking strength to reduce whale
injuries, as well as work on potential weak insertions for buoy lines to achieve that breaking
strength. The New England Aquarium’s Amy Knowlton’s research on rope breaking strength and
entanglement severity appears to find a “sweet spot” with her conclusion that 72% of right whale
serious injuries and mortalities could be eliminated if rope breaking strength was 1,700 lbs. or less. In
addition, the South Shore Lobstermen’s Association partnered with New England Aquarium and the
Commonwealth of Massachusetts to test weak sleeve insertions for buoy lines that would break at 1,700
lbs. The success of those sleeves and the recent development of fully-formed reduced breaking strength
rope make weak buoy lines a more operationally feasibly conservation measure. In Massachusetts state
waters, DMF is implementing a requirement for vertical lines to either be comprised of fully-formed
1,700 lb. breaking strength line or for lines stronger than 1,700 lbs., they must be equipped with weak
insertions every 60 feet in the upper 75% of the line that breaks at 1,700 lbs. We believe this frequency
of weak insertions offers a significantly precautionary measure to reduce entanglement severity and
should be counted as a fully weak rope under the Take Reduction Plan. The Massachusetts plan would
offer a significantly higher level of risk reduction from weak line than what is proposed under
Alternative 2, where only 26% of buoy lines will be converted to fully weak rope.

Weak Link Modification. DMF supports removing the longstanding weak link requirement at the
surface system as found in Alternative 3. The new 1,700 breaking strength buoy line proposals have
introduced a new approach for breakaways. Moreover, there may be advantages to having the buoy
remain affixed to any entangling ropes - at least temporarily:

- It could enhance disentanglement efforts if the disentanglement teams are
  better able to grab the entangling lines by tying on the trailing surface system;
- It could provide some level of drag that may contribute to the rope being pulled
  naturally off the whale;
- It could enhance the potential to better identify gear involved in
  entanglements. The most definitive gear identification information is inscribed
  onto the buoy which could further contribute to our understanding of
  where entanglements occur, a critical shortfall in the ongoing conservation efforts
  and will allow future regulations to be more surgical in time and space.

Gear Marking. DMF supports the modification of gear marking regulations to introduce state-specific
colors and an increase in the number and area of marks on buoy lines. Gear is not retrieved and/or the
fishery of origin or type of fishing gear is not known for most entanglements. It is imperative that the
gear marking scheme eliminate any ambiguity in the possible determination of the jurisdiction and
location where each entanglement occurred and the authority that licensed the gear. In the interest
of achieving more granular data regarding where entanglements occur, we recommend that the Service
consider a gear marking scheme that clearly differentiates gear set in state waters from gear set
in federal waters. Ideally, the state-specific color should cover only those buoy lines that are actually set
in state waters, or the additional mark for designating fishing in the EEZ be affixed more frequently in
the buoy line than the current proposal of a single green mark in the upper portion of the buoy line. It
will be critical to attribute any future entanglements to the jurisdiction where the gear was set. The rule
as currently drafted could result in improper attribution to a state waters fishery if the single green mark
is lost when the top of the buoy line is parted off. This ambiguity in marking could lead to the improper
assignment of a future entanglement to the wrong jurisdiction (i.e. state vs. federal waters). If NMFS is
interested in differentiating gear from different lobster management areas within federal waters, we
suggest that it develop a unique LMA marking scheme for fisheries operating in federal waters. We
acknowledge that having separate and distinct marking scheme for state and federal waters puts a
substantial burden on dual (state and federal) permit holders who regularly move gear between state and federal waters. Unfortunately, the increased burden associated with separate and non-ambiguous gear marking schemes in state and federal waters is necessary, especially in light of the fact that the draft Biological Opinion published in February of 2021 has an incidental take statement that only applies to fisheries prosecuted in federal waters. Accordingly, it is critical to ensure that a well thought-out distinct marking scheme be developed to accurately identify gear back to the jurisdiction where it was set. We recommend NMFS continue to consult its gear specialists and state representatives on the TRT before enacting a final regulation.

Thank you for the opportunity to comment and we look forward to future collaborations on these important matters.

Sincerely,

Daniel J. McKiernan, Director

CC: Massachusetts Marine Fisheries Advisory Commission
March 17, 2021

Michael Pentony, Regional Administrator
NOAA Fisheries, GARFO
55 Great Republic Drive
Gloucester, MA 01930

Dear Mr. Pentony,

The Rhode Island Department of Environmental Management, Division of Marine Fisheries (RIDMF), would like to submit the following comments for consideration on the Proposed Rule and Draft Environmental Impact Statement for amending the Atlantic Large Whale Take Reduction Plan. Specifically, these comments address the LMA 2 portion of the Take Reduction Plan. These comments are intended to continue the commitment Rhode Island has to ensure the continued survival of the North Atlantic Right Whale (NARW) while allowing the Rhode Island lobster and Jonah crab fisheries to persist and be profitable during a challenging time for those fisheries.

Sincerely,

Jason McNamee, PhD
Deputy Director RIDEM

The State of Rhode Island offers the following comments related to the Draft Environmental Impact Statement and proposed rule related to the taking of marine mammals incidental to commercial fishing, which includes the NE trap/pot fishery which occurs under the jurisdiction of the state waters portion of lobster conservation management area 2 (LCMA 2).

As a long-standing member of the National Oceanographic and Atmospheric Administration (NOAA) Atlantic Large Whale Take Reduction Team (ALWTRT), Rhode Island Department of Environmental Management supports actions needed to reduce the likelihood of entanglements of large whales which cause serious injury or mortality and reduce the potential biological removal (PBR) to the specified level to assure rebuilding of large whales, specifically the north Atlantic right whale (NARW).

As described in Section 3.1.1.2 of the DEIS, Rhode Island supports the risk reduction associated with the parallel regulatory track of fishery management measures in lobster management area 2 in the form of an Atlantic States Marine Fisheries Commission (ASMFC) effort control plan (Addendum XVIII) that has continued into the 2021 fishing year. The remaining reduction in risk comes from full weak vertical line or weak insertions and trawling up measures based on distance from shore where fixed gear fisheries take place.

Rhode Island supports the proposal offered to NOAA Fisheries in spring of 2020, which achieved the needed risk reduction of 60% through the amended ASMFC interstate fishery management plan that reduced traps by 50% and an associated vertical line reduction as reported by an RIDMF accompanying analysis.

The proposed rule would reduce the number of vertical buoy lines fished outside of areas exempted under the Plan by increasing the minimum number of traps required per trawl (known as trawling-up), based on area fished and distance from shore. The following comments pertain to the changes proposed to reduce the number of vertical buoy lines through the trawling up alternative.

The Rhode Island component of LCMA 2 is comprised of vessels which range in size from 25’-50’ in length. Federally permitted vessels prosecute the lobster and Jonah crab fisheries outside of exempted waters, the state waters demarcation line out to and beyond the 12nm territorial sea line. Additionally, a strong seasonal component of the fishery exists throughout the summer months outside of 12nm, however this coincides with a period of time when large whales are less likely to be present.

Due to the status of the lobster resource in SNE, participants have made choices to make their business flexible, profitable and increase efficiency by fishing alone. The trawling up alternatives for distance fished from shore 3-12 nm and greater than 12 nm are a safety concern for smaller vessels that are generally less than 35’ in length fishing in coastal waters for some portion of the fishing year. Trawling up measures for such a small portion of the RI lobster management area (LMA) 2 fleet offer minimal risk reduction values of less than 1% according to the updated model runs of the decision support tool (DST). Rhode Island supports standardized minimum traps per trawl coastwide but understands the practical and operational differences by jurisdiction. A conceivable example would be participants who currently fish 15 traps per trawl will continue to do so (therefore will not reduce even though they can), however those who fish with fewer traps per trawl could continue to do so for safety reasons. Given this trade off, the change in risk reduction would be minimal. Due to the portion of the industry affected and the slight risk
reduction, Rhode Island supports an exemption for vessels operators who fish alone, be held to a minimum of 10 traps per trawl in portions of LMA 2 inside 12nm.

In addition to the above exemption request, the RIDMF, based on industry comments, supports the analysis of a conservation equivalency to the trawling up measure in areas greater than 12 nm from shore from 25 traps per trawl to 15 traps per trawl through the use of full weak vertical line and its associated risk reduction benefit as opposed to weak inserts within the Rhode island portion of LMA 2. We request that full weak vertical line risk reduction be used as a conservation equivalency to the line reduction measures using weak insertions specified in section 3.2.1.2 of the Preferred Alternative 2 of the draft environmental impact statement (DEIS). Although the number of vertical lines may not be reduced, the risk reduction values are minimal and using full weak vertical line will decrease the likelihood of large whales incurring serious injury in the unlikely event that an entanglement occurs.

The RI fixed gear fishery has been using a unique marking requirement for single trap/pots in the state waters portion of LMA 2 for greater than 5 years. With new enhanced gear marking requirements for each state jurisdiction as well as a unique federal waters fishery mark, the state supports the elimination of the state specific single pot gear marking requirement.

The RIDMF supports the Preferred Alternative 2 in section 3.2.1.2 for the Massachusetts South Island Restricted Area and does not support additional seasonal restricted areas at this time.

The RIDMF supports the use of seasonal restricted areas open to ropeless fishing as specified in section 3.3.2.1 of the DEIS in an effort to foster the development these technologies under exempted fishing permit (EFP) controls but contend that ropeless fishing should not be implemented on a large scale coastwide until questions and issues are addressed regarding interactions among the various fishing sectors using these areas.

The RIDMF would like to comment and support the need and ability of both federal and state law enforcement agencies to have adequate resources to effectively enforce amendments to the management plan. Without the resources to enforce updated rules, the effectiveness of these alternatives will be unsuccessful. The RIDMF supports the enforceability of weak line through identification by means of a manufactured colored strand, an aspect that identifies the lines breaking strength compliance.

The RIDMF supports an appropriate implementation date to the final rule that allows the industry time prior to the start of a fishing years to re-configure both line and gear modifications using the upcoming fishing season to develop and test configurations to meet the management plans overall risk reduction target.

Finally, the RIDMF would like to comment on other federal fixed gear fisheries. It is our understanding that any trap, pot, contrivance etc. that is capable of catching a lobster is required to have a valid lobster trap tag affixed to it. This would indicate that any trap which falls into this category is subject to the marking, weak insert, and trawling up requirements of this rule. We would ask for clarification on this assumption from NOAA, which should help to guide discussions in the next ALWTRT process which will be aimed at the addition gear types of gill nets and fish pots.
March 1, 2021

Mr. Michael Pentony  
Regional Administrator  
Greater Atlantic Regional Fisheries Office  
National Marine Fisheries Service  
55 Great Republic Drive  
Gloucester, MA 01930

Dear Mr. Pentony:

Thank you for the opportunity to provide comments on the Draft Environmental Impact Statement (DEIS) Regulatory Impact Review, and Initial Regulatory Flexibility Analysis for Amending the Atlantic Large Whale Take Reduction Plan (ALWTRP): Risk Reduction Rule.

The New Hampshire Fish and Game Department (NHFGD) supports Alternative Two of the alternatives presented in the DEIS that seeks to reduce the mortality and serious injury of the North Atlantic right whale by 60% or more in the Northeast Region Trap/Pot Management Area lobster and Jonah crab trap/pot gear. This alternative:

- Increases the number of traps per trawl (trawling up) based on area fished and miles fished from shore in the Northeast Region (Maine to Rhode Island),
- Initiates two new seasonal closures and extends the Massachusetts Restricted Area Closure,
- Initiates the conversion of vertical buoy lines to weak rope, or insertions in buoy lines of weaker rope or other weak inserts, with a maximum breaking strength of 1,700 lbs, and
- Creates area specific gear marking requirements that differentiate vertical lines by state and federal waters and expands into areas previously exempt from gear marking.

As these measures may meet the current co-occurrence conditions of large whales encountering vertical lines, the NHFGD would recommend evaluations (e.g., sighting surveys, zooplankton surveys, etc.) be conducted more frequently to assure the measures are working as intended, as well as detect the right whale range shifts and adjust management measures as needed.

While the NHFGD agrees with finding alternative methods or new technology that will continue to reduce serious injury or mortality due to entanglements, there should be more robust evaluations to assure of their effectiveness, interactions with other area competing fishing gears, enforceability, and economic viability for the lobster fishing industry. In the future, maintaining
a workgroup of various industry members, state and federal agencies, and gear specialists to consider new methodologies with all fishing industries would be beneficial with industry buy-in when new technology is being considered.

Reducing vertical lines in areas of high co-occurrence, such as trawling up more traps, as well as mitigating occurrences with high volume vertical lines and low whale sightings (e.g., weak rope or weak insertions) are measures the NHFGD agree should reduce serious injury and mortality with Right whales and meet the 60%+ risk reduction goal. In addition to these two measures, other risk reduction efforts should be continuously factored into the risk reduction model. These would include, but not limited to, current and future effort reduction efforts ASMFC initiates in interstate lobster or Jonah crab fisheries management plans so the fishing industry is being credited with their continued efforts. An important consideration in trawling more traps to vertical lines should be allowing safety exemptions for new/young harvesters, smaller vessels, nearshore fisheries, shallow waters, etc.

The NHFGD supports weak rope or weak contrivances in vertical line as a risk reduction management strategy. As this technology is still developing to meet the industry’s varying area operational needs it is important to allow for continuous tested variations to be accepted fishing practices. NMFS should dedicate specialists and funding to testing, working with rope manufacturers, and determining several variations of weak line contrivances in 2021. If these rules will be enacted in 2022, it will be critical to the industry to know a variety of options. Any variations should be well publicized as accepted rope or contrivances so the industry can be adaptable in meeting operational and financial needs to these new and developing rules. The New Hampshire fishing industry finds operational utility in allowing weak insertion placement at 60 feet intervals instead of 40 foot intervals to address the varying depths between state and federal waters while moving gear on a seasonal basis.

The use of the current weak links at the surface system should be an option even if weak rope or contrivances are to be enacted. While there is a question as to whether this technology has worked as intended in releasing rope from an entanglement situation the offshore lobster industry finds utility in maintaining this early gear modification as stated in the DEIS as well as some ALTWRT members indicating:

- A buoy provides resistance through the water as a whale moves forward, pulling the line away from the whale and in a simple entanglement possibly pulling line out of baleen or off of a whale.
- The buoy, especially if it is pulling line away from the whale, provides the disentanglement team with an opportunity to grapple the line and pull it from the whale and/or attach tracking buoys to help monitor an entanglement.
- And commercial fishery regulations require harvesters to include identification information on buoys. Identification of last known set location of the gear retrieved from large whales is often only possible when a buoy has been retrieved.

Extensive gear marking that will help determine where entanglements occur will be critical in determining effective future risk reduction measures. NHFGD supports the gear marking proposed in the proposed rules to assure assignment of future entanglements are clearly
identified and management measures be taken based on these observations instead of the current uncertain assignments. This should also help further clarify identification between the US and Canada gear and allow for a more appropriate distribution of risk apportionment. NHFGD would also recommend more defined marking in federal waters to demarcate LMA’s to better determine future management measures by lobster management area based on entanglement data.

In conclusion, NHFGD supports Alternative Two of the DEIS. It will be critical in the future to develop a monitoring plan to assure management measures are effective over time and to track the implementation and innovations of gear modifications. It will be important for next steps of the ALWTRT to start risk reduction measures for other fishing gears, ship strikes, and other developing ocean uses (e.g., aquaculture, offshore energy), etc. that may affect the whale conservation measures the lobster fishing industry is undergoing.

Thank you again for the opportunity to comment.

Sincerely,

Cheri Patterson
Chief, Marine Fisheries

cc: Scott Mason, Executive Director
Colleen Coogan  
National Marine Fisheries Service  
Greater Atlantic Regional Fisheries Office  
55 Great Republic Drive  
Gloucester, Massachusetts 01930

Dear Mrs. Coogan,

The Maine Department of Marine Resources (ME DMR) submits these comments on the Proposed Rule and Draft Environmental Impact Statement (DEIS) regarding the *Taking of Marine Mammals Incidental to Commercial Fishing Operations; Atlantic Large Whale Take Reduction Plan Regulations; Atlantic Coastal Fisheries Cooperative Management Act Provisions; American Lobster Fishery* (85 FR 86878).

In general, ME DMR supports National Marine Fisheries Service’s (NMFS) preferred Alternative 2 given it achieves the 60% risk reduction target for the Northeast lobster fishery and, apart from the LMA 1 Restricted Area, includes measures for Maine which are primarily based on the December 2019 proposal submitted by ME DMR. This proposal was developed with significant industry input which is critical to ensuring successful adoption of the measures.

Detailed comments on each of the measures in the Proposed Rule follow; however, we provide a summary of our three primary comments below.

1. **ME DMR supports the inclusion of equivalency within the trawling-up provisions.** A key part of ME DMR’s proposal was that a trawl with two endlines is equivalent to a trawl with half as many traps and one endline. This type of flexibility, whereby fishermen maintain a consistent proportion of vertical lines to traps in a trawl, is critical to ensure the measures designed to provide protections for right whales (NARWs) also ensure safety at sea. As was repeated over and over at many of the industry meetings ME DMR hosted, the diversity of Maine’s lobster fleet means a one-size-fits-all approach does not work; allowing for trawl configurations which achieve the same level of risk reduction is critical to maintain fleet diversity. The Proposed Rule cites concern over fishermen safety and gear conflicts as reasons for not implementing this type of equivalency. Ironically, it is the safety concerns repeatedly raised by fishermen which lead ME DMR to propose this type of measure. It is not dramatic to say, without this type of provision, fishermen’s lives will be in danger.

2. **There is a lack of evidence supporting NMFS finding that the LMA 1 Restricted Area will result in significant protections for right whales.** Results of the Duke Habitat Model suggest the
LMA 1 Restricted Area is a ‘hot-spot’ of right whales in the late fall and early winter. In fact, risk reduction calculated by the Decision Support Tool indicates the LMA 1 closure, if implemented, would become the most important conservation area to NARWs along the coast. However, there is very little data, particularly recent data, supporting this finding. The DEIS references a paper by Cole et al. (2013) indicating the presence of NARWs in the region; yet, the paper by Cole et al. considers data between 2002 and 2008. Given the well-documented shift in NARW distribution since 2010, particularly in the Gulf of Maine, it is unlikely that this data reflects current trends in NARW distribution. In addition, the DEIS points to data from recent acoustic gliders in the Gulf of Maine. However, when ME DMR mapped glider positions from those NARW detections against the bounds of the closure, 73% of them were outside of the closure area. Data underlying the Habitat Model also raise questions. As acknowledged in the DEIS, there is a lack of recent standardized surveys in the offshore Gulf of Maine to inform the Habitat Model. This is an important consideration given the aforementioned change in NARW distribution since 2010. As ME DMR found, when comparing data in the Habitat Model from 2003-2009 and 2010-2018, there was a two-fold decrease in the predicted number of whales in the closure after 2010. Thus, data collected prior to 2010 is amplifying the identification of this area as a ‘hot-spot’.

There is very little data supporting the finding that this closure will provide meaningful protections to NARWs, let alone that it will be the most important area closure to NARWs in terms of risk reduction. As a result, ME DMR does not support the LMA 1 closure because it creates a dangerous precedent in which closure areas identified in a model are implemented without corroborating evidence from surveys or other monitoring efforts. Additionally, it appears that the hot spot analysis used to generate the closure was based solely on the risk associated with Maine’s portion of LMA 1. A more biologically meaningful closure would result if that methodology was applied to the region as a whole, irrespective of lobster management areas.

If NMFS concludes the LMA 1 Restricted Area is necessary, ME DMR supports a trigger approach. Importantly, ME DMR strongly recommends that the trigger mechanism and the closure be spatially and temporally aligned. At present, the trigger described in the DEIS is based on future actions in the Northeast trap/pot fishery at-large, rather than future conditions in Maine. As a result, an action outside of Maine waters could trigger a closure that primarily effects Maine fishermen. Additionally, as currently proposed, information assessed prior to the closure time period may trigger the closure; however, this means there is no alignment between the time period of information informing the trigger and the time period of the closure. ME DMR recommends that, if used, the trigger be based on conditions in Maine so that the cause and effect are spatially and temporally linked.

3. **ME DMR recommends the inclusion of conservation equivalency proposals developed by the Maine Lobster Zone Councils in the final rule.** Throughout 2020, ME DMR worked with the regional Lobster Zone Councils to develop conservation equivalency (CE) proposals to the statewide plan. This was done in recognition that each region has unique fishing conditions and practices, and

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that the risk for NARWs is not consistent along the Maine coast. Thus, a one size fits all approach does not work for Maine. All of Maine's Zones developed and voted on CE proposals which focus on changes to the trawling-up and weak point measures. In total, ME DMR calculates that the proposals achieve a higher risk reduction than what was achieved in the statewide plan. Equally important, this process fosters industry buy-in to the management process by allowing fishermen to recommend measures for implementation in their region. ME DMR strongly recommends NMFS incorporate these Zone-specific CE proposals into the final rule.

I. Comments on Underlying Methods and Relative Risk

Two and a half weeks before the end of the public comment period on the Proposed Rule, ME DMR was informed that NMFS’s calculation of the risk reduction achieved by Maine’s proposal was significantly less than what ME DMR had calculated. Specifically, while ME DMR had calculated at least a 52% risk reduction from the measures included in Maine’s proposal (the percentage was expected to be higher with the inclusion of measures implemented in Maine’s exempt area but ME DMR did not receive feedback from NMFS on how much risk reduction these measures added), NMFS revealed that, by their calculations in the DEIS, Maine’s plan only achieved a 37% risk reduction; with the addition of the LMA 1 Restricted Area, Maine achieved a 52% risk reduction.

To say that this news came as a surprise would be an understatement. When Maine was finalizing its state plan, ME DMR had a conference call with NMFS on December 19, 2019. Participants on the call included staff from ME DMR, the Greater Atlantic Regional Fisheries Office (GARFO), and the Northeast Fisheries Science Center (NEFSC). On the call, NEFSC staff member Sean Hayes confirmed verbally to ME DMR that he was calculating a similar risk reduction to that of ME DMR. Further, the fact that ME DMR and NEFSC were using slightly different methods but ended up with very similar risk reductions was seen as corroboration of ME DMR’s calculation. Since this call, it is clear NMFS’s method to calculate risk reduction has significantly changed. What is unclear is why these changes were never communicated to ME DMR. In the roughly thirteen months since ME DMR submitted its proposal, NMFS had ample time to communicate these changes in the risk reduction scores. Further, in written correspondence between the Greater Atlantic Regional Fisheries Office (GARFO) and ME DMR shortly after the submission of Maine’s proposal, GARFO had several opportunities to communicate their own risk reduction calculations to ME DMR.

While this revelation may not have specific impacts on the total risk reduction achieved in the Northeast lobster fishery, there are large ramifications for Maine. Starting in 2019 ME DMR held 60 meetings, with over 2500 industry members, trying find a solution that recognizes the diversity of Maine’s lobster fleet. This included meetings with each of the Lobster Zones to develop conservation equivalency proposals. With this new information, there are now multiple methods to calculate the risk reduction percentages associated with different management tools. This change also undermines industry’s confidence in the management process as the risk reduction percentages associated with various management measures appear to be in constant flux.

Ultimately, the largest change comes from the method used to calculate the risk reduction associated with weak points. In the DEIS, NMFS uses the average of two methods to assess the risk reduction of weak points; one method considers the depth of the weak points and the other considers their frequency relative to a 40ft spacing. As outlined in greater detail on page 6-7 of these comments, ME DMR does not support the method which considers the spacing of weak points relative to 40ft. In this calculation, NMFS assumes a weak point every 40ft is equivalent to full weak rope; however, there is no information in the literature to support this finding. In fact, the origin of 40ft spacing came from a gear marking...
proposal and not a discussion on weak points. Further, this method fails to consider how full 1700-lb rope breaks; specifically, it too breaks at its weakest point. Extensive breaking strength data collected by Maine DMR and shared with NMFS, has shown that the weakest part of a rope is at a connection point in the line. Different types of splices and knots used to connect pieces of rope together in a vertical line will reduce the strength of the rope by up to 60%. In a piece of weak rope, this weakest point would be where it ties into the rest of the vertical line and not necessarily on or close to an entangled whale. As a result, a rope with its weakest point 50% down the vertical line should break at the same point as a vertical line with weak rope in the top 50% of the line. Importantly, NMFS methods fail to consider this point and assign very different risk reductions to the two configurations.

Given these deficiencies, ME DMR finds the method which considers the depth of the lowest weak point to be the most defensible method to assess risk reduction because it considers at what depth the vertical line is likely to break. This is the same method that ME DMR employed when developing Maine’s original proposal. ME DMR highlights that, if this method is used alone, the risk reduction calculated in the DEIS for measures in Maine’s waters achieves the 60% risk reduction set out by the Atlantic Large Whale Take Reduction Team (ALWTRT).

ME DMR also highlights the vast difference in relative risk between Maine’s waters and the broader Northeast region. While Maine accounts for 64% of all vertical lines on the entire east coast, it represents just 30% of the risk associated with the New England region that is being regulated through this proposed rule. Lobster fisheries in Maine, New Hampshire and parts of Massachusetts make up LMA 1, which constitutes 74% of the entanglement risk in New England. The Maine fishery alone has more than 90% of the LMA 1 vertical lines yet it’s risk relative to that area is less than half at 40%. Stated again, even though Maine makes up more than 90% of the gear, the risk is relatively low because of the low occurrence of right whales. This discrepancy is made all the more obvious in Maine’s exempt waters which constitute 73% of vertical lines in the Maine lobster fishery but just 3% of the state’s risk. This imbalance between number of vertical lines and associated risk indicates that whale density is a driving factor in the calculation of risk, making it difficult to move the needle on risk reduction in areas of low right whale occurrence. Moreover, the low overlap with right whales requires impacting a large number of fishermen for even low to moderate risk reduction benefit.

II. NMFS’s Preferred Alternative 2

The following comments pertain to NMFS preferred Alternative 2. Given most of these measures, with the exception of the LMA 1 Restricted Area, align with the state proposal, ME DMR is generally supportive of preferred Alternative 2. Detailed comments on each of the proposed management measures are included below.

Trawl Length Minimums
ME DMR supports the inclusion of trawl length minimums as a method to reduce the number of vertical lines in the water. While increases to trawl length minimums must be balanced with safety at sea, the measures included in preferred Alternative 2, for the most part, reflect the trawl length minimums submitted by the states and developed through extensive industry outreach. As a note, on page 3-54 to 3-55 of the DEIS, it appears Maine’s LMA 1 trawling up measures between 6-12nm are not listed; this should be added in the Final Environmental Impact Statement (FEIS).

As described starting on page 18 of this letter, ME DMR has worked with the regional Lobster Zone Councils since Maine’s submission of the statewide proposal to develop Zone-specific CE proposals. For
these proposals, Zones could consider modifications to the trawling up minimums and weak point measures as long as they achieved the same, or greater, level of risk reduction as was achieved under the statewide plan. All Zones pursued this option. ME DMR strongly recommends NMFS include the trawl length minimums proposed by the Zone-specific CE proposals in the final rule (see Table 2) as they represent significant industry time and commitment to balance regional fishing practices with risk reduction goals. Many of the CE proposals drafted by the Zones include a slightly higher trawl length minimum between 3 and 6 miles from shore (5 traps per one endline/10 traps per two endlines). Whereas in the proposed rule less than 1% of Maine’s risk reduction is achieved by the trawl length minimums from 3-6nm, these CE proposals should increase the risk reduction achieved in this distance from shore.

For the trawling-up measures in both Maine’s statewide proposal and for those included in the Zone CE proposals, ME DMR strongly recommends NMFS include the use of endline equivalencies. A key element of ME DMR’s proposal was the fact that a trawl with two endlines achieves an equivalent level of risk reduction to a trawl with one endline and half as many traps (i.e. an eight trap trawl with two endlines is equivalent in terms of risk reduction to a four trap trawl with one endline). Page 18 of the Proposed Rule states the option for fishermen to use an equivalent proportion of buoy lines to traps was not included given concerns over gear conflicts and safety. Ironically, fishermen safety is one of the primary reasons ME DMR proposed this type of equivalency. Throughout public meetings with fishermen, ME DMR consistently heard one size does not fit all and moving to longer trawls would imperil those who fish on vessels which are smaller or have less deck space. In recognition of these very real safety concerns, Maine proposed trawl length equivalencies through which fishermen can comply by either trawling up or reducing the number of endlines on a trawl. This system does not compromise the risk reduction achieved and ensures a broad array of fishermen can safely adopt the new measures. In essence, this is similar to the idea behind the endline cap proposed by NMFS in Alternative 3; provide fishermen a level of flexibility to best adapt the new regulations to their unique fishing practices.

Without this flexibility, fishermen safety will be compromised. The Proposed Rule also references a need to modify 50 CFR 697.21(b)(2), which requires both endlines be marked with a buoy and radar reflector when there are more than three traps on a trawl. ME DMR supports modifying this regulation to allow a greater number of traps per single endline given it will reduce the number of vertical lines in the water. Modifying this regulation may also provide an opportunity for a broader conversation on the radar reflector requirement given there have been ongoing discussions between Maine Marine Patrol and the US Coast Guard regarding the enforcement of this provision.

In the DEIS, NMFS discusses two ways in which trawling up may not achieve the anticipated risk reduction targets. The first is longer trawls may result in fishermen using stronger vertical lines, causing more lethal entanglements. ME DMR highlights that as a part of Maine’s proposal, every vertical line in the Maine lobster fishery will be required to have a weak point which breaks at 1700-pounds. This measure will limit the breaking strength of vertical lines. The second concern raised focused on the activation of latent effort. As described in Maine’s proposal, the level of latent effort in the Maine lobster fishery has been incredibly stable over the last decade. In fact, in 2014 and 2016, the two years straddling the last trawling up rule, Maine recorded the same number of latent licenses. As a result, there is not a history of increased effort following previous modifications to the trawl length requirements. ME DMR also notes that the total number of licenses in the Maine lobster fishery is decreasing as many Zones have implemented exit ratios which require multiple licenses to be retired before a new license is issued. Specifically, since 2016, the total number of Maine lobster licenses has decreased by 134.

ME DMR also notes slide 29 of NMFS’s presentation on the Proposed Rule shows that, by far, the greatest impact of the new trawling up measures is on the Maine lobster fishery. Specifically, the table
estimates 1,602 fishermen in Maine non-exempt waters will be impacted by the new trawl length minimums. In contrast, 82 fishermen in LMA 3, 21 fishermen in Massachusetts, 7 fishermen in Rhode Island, and 0 fishermen in New Hampshire are expected to be impacted by the trawling-up measures. Given the magnitude of impact in Maine, ME DMR is confident the higher trawl length minimums will reduce the number of vertical lines in Maine waters.

**Weak Points**
ME DMR generally supports the weak point configurations as proposed in NMFS’s preferred Alternative 2. As noted above when discussing trawling-up minimums, the Maine Lobster Zone Councils worked to develop CE proposals which recognize Maine’s diverse fishing practices. Some of the CE proposals recommend changes to the weak point configurations and these proposed changes can be found in Table 2. ME DMR strongly recommends NMFS include the Zone-specific CE proposals in the final rule.

Within the Proposed Rule and DEIS, Maine’s proposal for weak points between the exemption line and the three-mile line is incorrectly stated. In Table 3 of the Proposed Rule, Maine’s weak point measures between the exemption line and the three-mile line are written as 2 weak points, one 25% and one 50% down the vertical line. However, Maine’s proposal included 1 weak point 50% down the vertical line in all state waters; this is identical to what is proposed for New Hampshire, Massachusetts, and Rhode Island state waters. The error is also found in Table 1.1 and Table 3.3 of the DEIS; however, it appears it is correctly written on page 3-55 of the DEIS. To be clear, ME DMR is proposing, and supports, 1 weak point 50% down the vertical line in all state waters.

Throughout the DEIS, it is frequently stated that weak points every 40ft are equivalent full weak rope. However, there is no citation or scientific support provided for this statement. To the knowledge of ME DMR staff, there has been no study which equates a specific number of weak points to full weak rope. As described in Maine’s original proposal to NMFS, the use of 40ft spacing was originally discussed in a 2009 report by the International Fund for Animal Welfare on gear marking. The report suggests that because 90% of the gear recovered from whales is at least 40 ft in length, marking gear every 40 ft would result in 90% of recovered gear having a mark which can be used to discern fishery and/or set location. The first time 40ft spacing was used in conjunction with weak points was in a 2017 Massachusetts South Shore Lobstermen’s Association proposal. Here, the Lobstermen’s Association proposed implementing a weak sleeve every 40ft to have the sleeves act as both weak points and gear marks, not because scientific literature supported this spacing. It now appears the 40ft spacing has taken on a life of its own, becoming a standard against which weak point proposals are judged.

The DEIS also appears to misconstrue how and where rope breaks, particularly with regard to engineered 1700-lb rope. The DEIS asserts that the greater number of weak points in a vertical line, the closer the line is to full weak rope, at least in its calculation of risk reduction. The DEIS also notes the greater number of weak points in the line, the more likely the weak point will be outside of the mouth of the NARW where it can more easily break free. The implicit assumption here is with a full weak rope, a NARW should be able to break the line at any place because there will be a section of line outside of the whale’s mouth which breaks at 1700-lbs. However, this fails to recognize that a rope breaks at its weakest point, which is where that piece of rope connects to another. Even a full 1700-lb line will be 40-60% weaker at its connection point and will break there (Figures 1, 2), making the trailing gear left on a whale the same whether there is a single weak point halfway down or a 50% full weak line topper. ME DMR has conducted breaking tests involving more than 1,500 pieces of rope, weak rope, and weak point connection types. These tests have shown lines consistently break at the connection point. Therefore, the
The weakest point on full 1700-lb rope is where it is connected into the rest of the vertical line, and not some intermediate point on the rope.

**Figure 1:** Percent reduction in break strength from rope breaking tests conducted by ME DMR. The samples include new rope from a variety of manufacturers, and in varying diameters. Reductions in breaking strength for various connection point types, as well as segments of rope with no connections, are shown. Reduction in breaking strength was measured from the breaking strength of the weakest rope in the configuration.

**Figure 2:** Picture of a 1700-lb weak rope on the rope breaking machine at ME DMR. This example shows a ½” weak rope (1700 lb) and ½” Everson sink, connected by a butt (or inline) splice. The weak rope broke at the connection point to the Everson sink line.
For these reasons, ME DMR does not support NMFS’ method to calculate risk reduction based on the frequency of weak points relative to 40ft. In the DEIS, NMFS averages two methods to determine the potential risk reduction from weak points. One method, which DMR supports and used, considers the depth at which weak points are implemented. This calculation makes sense because it acknowledges at what depth the vertical line is likely to break. It also acknowledges that a rope with its weakest point 50% down the line will break at the same place as a vertical line that has a 50% weak rope topper. ME DMR believes this method is valid, defensible, and doesn’t arbitrarily award higher risk reduction to some configurations without evidence to support it.

The second method considers the frequency of weak points, with the assumption that a weak point every 40ft is equivalent to full weak rope. For the reasons outlined above, ME DMR does not support this method because it relies on a 40ft standard which has no basis in literature. It also relies on rationale which does not accurately reflect how and where rope breaks. Giving credit only to the to the 40ft. of rope on either side of a weak point does not acknowledge the fact that the line broke free with a decreased risk of serious injury and mortality. Assigning higher risk reduction credit for a higher frequency of weak points or full weak rope gives a false sense of knowledge about where that rope will break.

In using the first method, rather than averaging the output of the two methods, the measures proposed in Maine waters achieve a 60% risk reduction. As noted in Knowlton et al. (2016), the “adoption of ropes with breaking strengths of \( \leq 7.56 \, \kN (\leq 1700 \, \text{lbs}) \) could reduce the number of life-threatening entanglements for large whales by at least 72%.” As a result, literature supports significant risk reduction from the use of vertical lines which break at 1700 lbs.

**LMA 1 Restricted Area**

There is insufficient evidence to support the finding that the LMA 1 Restricted Area will achieve significant protections for NARWs. In particular, ME DMR is surprised to see that, of all the closures (either existing or proposed) in the DEIS, the LMA 1 Restricted Area is expected to achieve the highest level of risk reduction. As outlined below, the DEIS lacks adequate data to support this finding.

Page 3-71 of the DEIS describes a hot-spot analysis used to identify the bounds of the LMA 1 Restricted Area. This analysis primarily relies on the Duke Habitat Model and appears to be conducted solely in Maine’s portion of LMA 1. Given the DEIS admits that “aerial surveys in recent years have been sparse for this area”, ME DMR questioned if older data may be driving the identification of this closure within the Habitat Model. This consideration is important given there has been a well-documented shift in NARW distribution since 2010. As a result, should NARW sightings prior to 2010 be driving the identification of the area as a ‘hot-spot’, the proposed Restricted Area may not reflect current trends in NARW distribution, especially given this analysis does not incorporate the rest of the New England region covered by this proposed rule. To investigate this, ME DMR reviewed the Duke Habitat Model to compare the number of NARWs measured in the proposed LMA 1 Restricted Area across time. Our investigation found that, within this closure, the number of NARW units is two times higher between 2003 and 2009, than it is between 2010 and 2018. Thus, older data seems to be having a larger influence on the identification of the LMA 1 Restricted Area. Interestingly, the DEIS acknowledges this decline in NARW occurrence in the Gulf of Maine, but argues “while there is a reduction in the magnitude of use

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in the Gulf of Maine, the distribution of NARWs has remained consistent\(^5\). ME DMR disagrees with NMFS’s assertion that older data is still suitable as long as the distribution has not changed. ME DMR contends that the magnitude of NARWs in the Gulf of Maine is a critical factor in assessing the efficacy and impact of potential management measures, particularly area closures. Further, the magnitude of NARWs in a region directly contributes to risk reduction levels. It is thus counterintuitive for an area which is experiencing a decrease in the magnitude of NARWs to achieve such high levels of risk reduction from a closure.

NMFS also identified two additional sources of information as supporting evidence for the proposed LMA 1 Restricted Area. First, the DEIS cites a paper by Cole et al. 2013 indicating the presence of NARWs in the region. The aerial surveys in this paper were conducted between 2002 and 2008\(^6\), before the 2010-shift in NARW habitat use. As a result, these aerial surveys do not reflect current trends in NARW distribution. The DEIS also cites recent work with acoustic gliders in 2018 and 2019 in the offshore Gulf of Maine. ME DMR mapped NARW detections from the last few years of glider data and found that 73% of the reported positions of the NARW detections were outside of the proposed LMA 1 Restricted Area (Figure 3). Further, the temporal deployment of the gliders is inconsistent with the timing of the proposed closure. The gliders are deployed from eastern Maine in December, reaching the closure sometime in January. In contrast, the LMA 1 Restricted Area is proposed to start in October and end in January. The minimal overlap in timing between the glider and the proposed closure means this acoustic data provides very little data supporting the findings of the Habitat Model.

![Figure 3: NARW detections (red circles) recorded by acoustic gliders between 1/12/2019 and 1/25/2019. The yellow box represents the proposed LMA 1 Restricted Area.](image)


The analysis presented in the DEIS also raises questions about the methods used to identify the LMA 1 Restricted Area and its expected utility. Table 3.4 of the DEIS shows various risk reduction percentages for the different measures included in the DEIS. ME DMR was surprised to see the risk reduction expected for the LMA 1 Restricted Area (10.8%) is higher than the risk reduction achieved with the closure of the Massachusetts Restricted Area (MRA) from February through April (9.9%). Given over half of the NARW population annually visits the MRA during the closure, it seems unreasonable to expect a lower risk reduction for the MRA than for the proposed LMA 1 Restricted Area, where there is no evidence showing significant and recent NARW aggregations. A comparison of the proposed LMA 1 Restricted Area versus the proposed Georges Basin closure in Alternative 3 raises similar questions, particularly since both closures were derived using the same methodology. The Georges Basin closure is only expected to achieve a 6.5% risk reduction; however, in comparing Figures 3.4 and 3.5 from the DEIS, the scale on the Georges Basin hot spot analysis is 5 times higher than that of the LMA 1 Restricted Area. If the two figures were presented on the same scale, it is likely the region within the LMA 1 Restricted Area would not be identified as a hot spot. It is unclear how the scales for the two figures can be so different, but the LMA 1 Restricted Area receives a higher risk reduction percentage.

It is also unclear why NMFS conducted a hot-spot analysis for LMA 1 and then a separate hot-spot analysis for LMA 3. If the intent is to identify closure locations which provide the greatest benefit to NARWs, ME DMR suggests the region should have been analyzed as a whole, rather than by management area. When ME DMR assessed the outputs of the Habitat Model across the northeast region, as opposed to just looking at a single LMA, the results showed that predicted areas of high right whale density were not confined to LMA 1. In fact, Figure 4 shows that LMA 1 appears to be a relatively small portion of an offshore Gulf of Maine ‘hot-spot’. Therefore, it seems incongruous, and counter to the biological basis of the LMA 1 Restricted Area, to have different management measures in different areas of this broader ‘hot-spot’.

**Figure 4:** Image from Duke Right Whale Habitat Model showing right whale abundance per 100km² from October through January. Data in the Duke Habitat Model is from 2010-2018. Black lines outline the Maine Lobster Management Zones in Maine’s portion of LMA 1.
Overall, there is very little data supporting the finding that this closure will provide meaningful protections to NARWs, let alone that it would be the most important area closure to NARWs. Instead, evidence reviewed by ME DMR suggests that this closure will result in disproportionate negative impacts to the Maine lobster fishery compared to its resulting protection to NARWs. As a result, ME DMR does not support the LMA 1 Restricted Area. An area closure is an appropriate management tool for regions where there are known and consistent aggregations of whales. For the proposed LMA 1 Restricted Area, the number of whales using the Gulf of Maine has decreased and there are no data to suggest continued and consistent use of this area by NARWs. As a result, NMFS has failed to provide evidence that the LMA 1 Restricted Area meets the necessary criteria of an effective area closure. Implementation of the LMA 1 Restricted Area would set a dangerous precedent in which management measures are implemented based on model outputs with very little corroborating data or evidence. Given the change in distribution of NARWs in the last decade, monitoring of potential closure areas should be undertaken before implementation of area closures to ensure model outputs match reality.

If, despite these concerns, NOAA concludes the closure is necessary, ME DMR supports the trigger approach over immediate implementation of the closure. The trigger approach acknowledges the lack of data supporting the biological benefit of this closure and allows future conditions to determine its implementation. The trigger approach also allows for the collection of data to better inform future decision making.

There are several data collection efforts which could provide much needed information on the presence of right whales and fishing gear in the region, and thus inform a future trigger. ME DMR has recently received a grant to purchase and deploy at least eight passive acoustic sound traps to record right whale vocalizations within the offshore Gulf of Maine. Sound traps will be set in the spring of 2021 and will be used to target offshore areas of interest, including the proposed LMA 1 Restricted Area. These archival units will also be run in tandem with eight existing sounds traps that have been placed in inshore Maine through a collaboration between DMR and the NEFSC. The deployment of sound traps will provide a critical source of information to annually assess right whale occurrence and habitat use. This information could also be used to inform future management, including a trigger for the LMA 1 Restricted Area. Based on information collected with the sound traps, NMFS could develop a trigger for the implementation of the closure based on a specific number of detection days. For example, a recorded number of detection days in year 1 could be compared to a trigger to determine implementation of the LMA 1 Restricted Area in year 2.

Equally important is the collection of data on fishing effort in the region. As is noted in the DEIS, there is a lack of information on the spatial location of the lobster fishery. This means the amount of fishing gear in the proposed LMA 1 Restricted Area must be estimated based on models and assumptions. NMFS staff has suggested there is concern about effort in the lobster fishery moving offshore. If this concern is driving the proposal of the closure, the easiest way to elucidate spatial trends in fishing effort is to require the use of trackers on all vessels wishing to fish in the LMA 1 Restricted Area. This would not only allow for the collection of data on fishing activity, but it would better inform expected risk reductions and strengthen our understanding of potential economic impacts. Requiring trackers on vessels looking to access an area is comparable to other federal fisheries where, if a vessel wants to fish in an exemption area or gear restricted area, greater levels of reporting and observer coverage are generally required. ME DMR supports the requirement for trackers on vessels wishing to access the LMA 1 Restricted Area and notes that, like the sound traps, information collected through trackers could be used to develop a trigger for implementation of the closure based on fishing effort.
Importantly, ME DMR strongly recommends that the trigger mechanism and the closure be aligned spatially and temporally. While DMR has provided some suggestions on the development of potential triggers, as currently proposed, the Regional Administrator would annually assess conditions in the Northeast trap/pot fishery to determine if the implementation of the closure is necessary to reduce the frequency of entanglements by 60%. Given how few entanglements have been linked to the Northeast trap/pot fishery, ME DMR interprets this to mean that any entanglement in the Northeast trap/pot fishery would trigger implementation of the closure. A primary concern of ME DMR is that, under this proposed approach, it would be possible for an NARW entanglement outside of Maine to trigger a closure in Maine waters. This breaks the causal link between a potential future entanglement and the subsequent management response. If NMFS is going to use a trigger approach for implementing the LMA 1 Restricted Area, ME DMR strongly recommends the trigger mechanism and the resulting closure be spatially aligned so that future conditions in Maine are the basis of the trigger. Further, the information to assess the need for a closure should be temporally aligned with the timing of the closure. At present, the Regional Administrator would assess conditions in advance of October to determine if the closure is necessary. However, this method assumes that unfavorable conditions in the first half of the year can be remedied by a closure starting in October. This assumption is not true as risk varies through time and space. Instead, conditions in October through January in year 1 should dictate the implementation of a closure in year 2.

Also important to the success of a trigger is the amount of advanced notification given to fishermen. The proposed rule does not specify a date by which fishermen would be notified about the triggering of the LMA 1 Restricted Area. Given its distance from shore, DMR anticipates that it could take significant time for a lobsterman to remove gear from the region, particularly if the majority of his or her traps are located offshore. As noted above, ME DMR supports a trigger mechanism that is aligned spatially and temporally with the Restricted Area, such that conditions in year 1 determine whether the closure is implemented in year 2. This system would provide ample notice to fishermen to plan out the location of their fishing activities in a subsequent year.

ME DMR also underscores industry-identified deficiencies in the economic impact analysis associated with the LMA 1 Restricted Area. Chapter 6 of the DEIS states that implementation of the LMA 1 Restricted Area will impact 45 vessels at an economic cost of $106,000-315,000. Many industry members have reached out to ME DMR indicating that this economic analysis significantly underestimates the impact of the closure. Based on 10% harvester reporting and 100% dealer reporting, ME DMR estimates that in the fourth quarter of 2019 (October – December), there were 2,687 trips to waters outside of 12nm from shore in Zones C, D, and E. These trips landed a total of 3,972,842 pounds of lobster at an estimated value of $22.3 million. Looking at the first quarter (January – March) of 2019, ME DMR estimates there were 1,075 trips to Zones C, D and E outside of 12nm. These trips landed a total of 798,414 pounds of lobster at an estimated value of $5.1 million.

To better identify economic impacts of the closure, ME DMR staff took the ratio of the area of the proposed LMA 1 Restricted Area to the total area of each zone outside 12 miles from shore. This was then multiplied by the first and fourth quarter values for each zone outside 12nm in which the closure occurs to estimate the value of the fishery within the closure. The result is that, in the first and fourth

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8 Value is based on the average value for that quarter based on dealer reports.
quarter of 2019, ME DMR estimates 19.4% of Maine’s lobster landings from outside 12 miles from shore came from the proposed LMA 1 Restricted Area. This results in an estimated economic value of $12.7 million. Based on this analysis, the economic impacts in the DEIS appear to significantly underestimate the value of the catch impacted by this closure. In fact, based on this analysis a 5% and 10% decrease in the value of catch would equate to $636,000 and $1.27 million, respectively; this estimate is 3.6 times higher than what is shown in Table 6.12 of the DEIS. As a note, ME DMR is unclear how the 5% and 10% reductions in catch were calculated from the data presented in Table 6.12. When ME DMR multiples “Total Catch (kg)” by “Price ($/kg)” and then takes 5% and 10% of this product, Maine gets significantly different values than what is presented in the columns labeled “5% Value ($)” and “10% Value ($)”.

Finally, in calculating the costs associated with the closure, NMFS only focuses on the estimated 45 displaced vessels and deducts percentages off their catch. However, this analysis does not consider the indirect impacts on other fishermen in adjacent regions. As ME DMR noted in its September 2019 scoping comments, an area closure can result in increased gear density around the closure boundary. The DEIS predicts this aggregation of gear will occur as fishermen impacted by the LMA 1 Restricted Area are expected to relocate gear closer to shore, as oppose to remove their gear from the water. While analysis in Chapter 5 of the DEIS suggests this will not result in an increase in right whale co-occurrence, this does not consider resulting impacts on fishermen. For example, for fishermen who do not fish in the closure but just adjacent to it, the relocation of gear shoreward of the closure boundary will negatively impact their catch. Denser aggregations of gear outside the closure may also result in increased set overs. These secondary impacts are not accounted for in the DEIS but represent real-life consequences to implementation of a restricted area.

**Gear Marking**

ME DMR supports the gear marking scheme proposed in preferred Alternative 2. While gear marking does not specifically reduce the risk of entanglement to NARWs, entanglements of unknown cause which are subsequently attributed to a region or fishery do have real world consequences for fisheries with vertical lines. NMFS’s proposal to increase the number of markings, and the spatial specificity of those markings, should help increase the frequency with which future entanglements can be linked to a specific fishery.

As is noted in the Proposed Rule, ME DMR implemented enhanced gear marking in the Maine lobster fishery in September 2020. The gear marking scheme outlined in the Proposed Rule and DEIS largely follows what was implemented by ME DMR; that said, there are a few inconsistencies. First, in Maine’s regulations, the number of 1-foot marks in state waters, in addition to the 3-foot mark, is based on the length of the buoy line as opposed to the depth of water, as indicated in Table 3.3 of the DEIS. Maine’s regulation for buoy lines less than 100ft in length appears to be correctly described on page 3-77 of the DEIS. Second, in the sliver between Maine’s exempted waters and federal waters, ME DMR requires the 6-inch green mark in the top two fathoms of the buoy line. While this appears to align with what is presented in Table 3.3 of the DEIS, it is different than what is included in Table 1.1 of the DEIS and in the Fact Sheet, where the six-inch green mark is only required in federal waters. To be clear, Maine is requiring a 6-inch green mark outside of exempted waters, including the sliver area.

ME DMR was disappointed to see that the economic impacts of gear marking in the Maine lobster fishery were not included in the DEIS. While the justification given is that the costs of gear marking have already occurred and are not a direct result of the Proposed Rule, ME DMR highlights that the enhanced gear marking requirements were implemented in direct anticipation of this Proposed Rule.
Moreover, knowing additional gear marking was going to be proposed in the rulemaking, ME DMR proactively implemented regulations. By not including the economic costs of gear marking in the Maine lobster fishery, the economic impact of this rulemaking is not fully captured. Further, this policy creates a disincentive for states to proactively implement regulations to protect NARWs, given it is now clear any associated costs will not be analyzed in the DEIS. ME DMR’s highest priority is on-time rulemaking. That said, ME DMR strongly recommends the costs associated with gear marking in the Maine lobster fishery be included in the FEIS.

**Testing of Ropeless Technology in Closed Areas**

The Proposed Rule includes a renewed focus on the development of ropeless fishing. This is proposed primarily through the use of Exempted Fishing Permits (EFPs) within closed areas. Given the need to apply for an EFP to use ropeless fishing gear, ME DMR agrees with NMFS inherent assessment that ropeless fishing is not ready for ‘prime time’.

While there has been increased testing regarding the retrieval of a trap from the ocean floor via ropeless gear, significant challenges with the operation of ropeless technologies within the broader maritime community still exist. For example, mobile gear fishermen need to identify the location of ropeless gear so they can avoid gear conflicts when operating bottom-tending gear. To date, impacts to the mobile gear fleet have largely been ignored. Dynamics within Maine’s lobster fishery provide additional challenges as fishermen often sets traps close to one another as they compete for hard and dynamic bottom substrate. The effectiveness of ropeless fishing gear when it is set close together, or on top of one another, has not been tested. There are also financial challenges regarding the adoption of ropeless gear, including the high cost of the technology relative to existing operating costs. Maine lobster license holders are both owners and operators. Fisherman have been clear that, based on the current estimated cost of ropeless fishing, adoption of this technology will upend their business models putting many out of business. Uncertainties regarding long-term costs of ropeless fishing also make business planning impossible. For example, it is unclear how frequently ropeless technology will need to be replaced or at what rate gear will be lost, whether that be from the ropeless technology failing to deploy or increased gear conflicts.

ME DMR recognizes that some fishermen are interested in pursuing ropeless fishing technology to be able to access closed areas. That said, ME DMR is concerned that the proposed method for administering the testing of ropeless fishing has not been thoroughly considered, and that the impacts to other fisheries have not been evaluated in the DEIS. The use of an EFP to test ropeless fishing allows NMFS to track the number of fishermen testing this technology; however, it is unclear how other fishermen would know about these tests or the precise location of the ropeless gear. According to a GARFO webpage on EFPs, the location of the exempted fishing activity is required in the application; yet, location is described in terms of broad areas such as statistical area or closed area. In reality, specific coordinates would be needed so mobile gear fishermen and ropeless technology can co-exist in areas where both fisheries operate. In the absence of this information, ME DMR is concerned mobile gear fishermen will be forced out of large areas given the uncertainty in the precise location of the ropeless fishing gear. In fact, NMFS’s intent to close areas which are sufficiently large to provide protections to whales results in greater uncertainty for the mobile fleet in terms of where ropeless technology may be located. At present, the DEIS does not, either qualitatively or quantitatively, discuss impacts to the mobile gear fleet.

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On the January 7th Atlantic Large Whale Take Reduction Team call, a question regarding the potential impacts of ropeless fishing gear on the mobile gear fleet was raised. ME DMR was surprised to hear NMFS suggest a potential solution to this problem would be to require an agreement between mobile gear fishermen and the trap fisherman as a condition of the EFP. Asking a fisherman to undertake a potentially controversial negotiation with other fishermen seems unreasonable and unrealistic. Industry agreements between the mobile gear fleet and trap/pot fisheries have occurred in the past but many, such as an agreement in Closed Area II, are codified in fishery management plans. It is unlikely NMFS is asking for codified agreements between segments of the fishing industry, but it is also unclear what would constitute a sufficient level of agreement for approval of an EFP or how NMFS would ensure all affected parties have been party to and agreed to any negotiated outcome.

ME DMR is also concerned that by permitting the testing of ropeless technology through an EFP, there is no mechanism to enforce lobster resource management measures by participating vessels. Currently, no marine enforcement vessels in Maine are equipped with the technology needed to retrieve ropeless fishing devices and appropriately set back the gear. Without adequate resources to properly equip law enforcement vessels and train officers on the use of that equipment, the testing of ropeless fishing in closed areas, such as the proposed LMA 1 Restricted Area, could result in inadequate enforcement of lobster resource management measures.

Overall, if NMFS pursues the EFP as a method to test ropeless fishing, ME DMR strongly recommends the FEIS include an evaluation of potential impacts on the mobile gear fleet and on the ability to enforce lobster resource management measures. There are many challenges facing ropeless fishing, both in the development of the technology and in its testing. Unfortunately, the lobster fishery finds itself in a situation where future risk reductions prescribed in the draft Biological Opinion could require adoption of this technology. ME DMR is willing to engage with NMFS on ropeless technology to address the issues outlined above, but we need to work within operational realities. A potential area of collaboration is on NMFS’s roadmap to ropeless fishing; development of this roadmap presents an opportunity for ME DMR to highlight challenges with ropeless fishing, consider solutions, and identify metrics to determine when specific challenges have been addressed.

III. NMFS’s Non-Preferred Alternative 3

Overall, ME DMR does not support NMFS Alternative 3. However, we provide the following comments on measures included in Alternative 3 given some of the management tools were considered, but ultimately rejected, by ME DMR when developing the state’s proposal.

Line Cap for Federal Permit Holders

As mentioned in the DEIS, ME DMR discussed a line tag system, very similar to a line cap, when developing the state proposal. The obvious advantage of this system is it provides flexibility to adapt new regulations to a diverse set of individual fishing practices and businesses. Even with this flexibility, ME DMR decided not to pursue this alternative for several reasons. The first is that developing a method to allocate vertical lines is a tremendously complex and time-intensive process. Just like developing an allocation system for quota takes many years, a line cap system would similarly have to pinpoint primary data sources, identify qualifying criteria, outline an allocation method, and engage industry. This is made all the more challenging by the fact that, for most lobstermen, we don’t know how many vertical lines they fish. In recognition of this, the DEIS proposes using dealer data to determine the number of endlines allocated to a fisherman; however, this means landings, not effort data, would be used to
determine the number of vertical lines a fisherman receives. Since catch per unit effort is not uniform across time and space, pounds of lobster landed is not an appropriate proxy for the number of vertical lines used. Furthermore, dealer data does not consider the existing trawling up requirements in place, whereby an offshore fisherman and an inshore fisherman may land a similar number of pounds but be subject to different trawling-up requirements. For any allocation method developed, there would undoubtably have to be an appeal process in which fishermen could petition for a different number of vertical lines based on new, missing, or incomplete information. With all of this complexity, it is almost certain the trawling up measures, as proposed in Alternative 2, could be more efficiently implemented than a line cap system. The ability to implement new regulations in a reasonably expedient timeframe is important given the poor status of the NARW population.

The administrative burden of a line cap system is also something which deterred ME DMR from pursuing this management measure. Already, the lobster fishery uses trap tags to identify legal traps and monitor the number of traps being fished by an individual. The annual administrative burden of executing contracts with a trap tag provider and distributing trap tags to thousands of fishermen is not insubstantial. Importantly, for a line cap system this administrative burden not only includes the annual tasks associated with distributing line tags for both ends of the buoy line but also upfront staff time to develop the allocation system. Based on the description of the line cap on page 5-142 of the DEIS, it appears NMFS plans to divert both of these responsibilities to the Atlantic States Marine Fisheries Commission and the New England states. Placing these burdens on the New England states will exceed staff resources at ME DMR.

Extension of LMA 1 Closure into February
A key aspect of the Alternative 3 proposal is the extension of the LMA 1 closure into February. Interestingly, the DEIS describes the closure in February as a ‘soft restricted area’ where, based on aerial or acoustic surveys, the Regional Administrator could shorten the closure if no NARWs are detected. Given the lack of existing aerial surveys or consistent real-time acoustic assets in the Gulf of Maine during this time period, it is unclear how this dynamic closure approach would be feasible. While ME DMR plans to deploy sound traps to the offshore region, these do not provide real-time data and could not be used to support dynamic management.

The extension of the LMA 1 restricted area into February also appears to result in very little additional risk reduction. In comparing the risk reduction percentages achieved under the two alternatives in Table 3.4 of the DEIS, it appears the risk reduction benefit of the February closure is, on average, only 0.7%. That said, the economic impacts of this extension are substantial, particularly given the generally high price for lobster at this time of year, as noted in Table 6.12. As described on page 12 of this letter, in the first quarter of 2019, ME DMR estimates there were 1,075 trips to Zones C, D and E outside of 12nm. These trips resulted in 798,414 pounds of lobster landed with an estimated value of $5.1 million. While this represents an upper-bound of the economic impact of the extended closure given the longer time period and larger area considered, it does suggest there would be substantial costs from expanding the timeframe of the closure.

Weak Line 75% Down Vertical Line
Alternative 3 proposes full weak rope in the top 75% of all buoy lines. ME DMR is opposed to this management measure because of feedback from fishermen that it would be unsafe to haul gear with weak points below 50% of the vertical line. Additionally, load cell data collected by ME DMR and the University of Maine documenting hauling strains of fishing gear corroborates these serious safety concerns for fishermen using longer trawls, fishing in deeper water, or fishing in strong tidal currents. As
discussed on pages 22-25 of ME DMR’s December 2019 proposal, the data collected by load cells on hauling strains indicates a combination of longer trawls (20 trap trawls or greater) and deeper water (100 fathom or deeper) frequently result in loads above 1700 pounds. Given increases in the number of traps per trawl are included directly in Alternative 2, and indirectly through line caps in Alternative 3, it is likely all trawls outside of 12nm from shore will exceed 20 traps and, depending on depth, will experience loads greater than 1700 pounds during hauling. Other conditions such as set-overs, hang downs, strong tides, and poor weather or sea conditions will further increase hauling strains, causing lines which may be in less than 100 fathom of water or attached to fewer than 20 traps to exceed 1700 lbs of load and break. ME DMR is opposed to any management measure which will compromise the safety of fishermen at sea.

If a requirement for full weak rope in the top 75% of all buoy lines was to be implemented, a likely response would be for fishermen to drastically increase the amount of rope in the water. This would occur two ways. The first response would be to lengthen the scope of the vertical line so that there is still enough length in the 25% of the line which is not weak rope to ensure sufficient strength when hauling multiple traps in the water column. The second response would be to increase the length of groundline between the first and second traps, in order to reduce the number of traps in the water column, and thus the hauling load, on the vertical line. In either case, adding more rope to the water column is contrary to the intent of this Proposed Rule. More rope, both in the scope of the vertical line and in the groundline, creates slack which can pose greater risk to NARWs.

**Gear Marking with Woven Identification Tape**

Alternative 3 proposes, in addition to a state-specific gear mark at the top of the line, an ID tape woven throughout the length of a vertical line. The intent is to increase the frequency with which gear associated with a NARW entanglement can be identified. While ME DMR generally supports efforts to increase gear marking, the substitution of a woven ID tape for fewer state-specific gear markings seems not only confusing to industry but also disingenuous to their recent gear marking efforts. Thousands of Maine fishermen have spent countless hours repainting their vertical lines with purple and green marks; to change these requirements yet again will result in frustration and poor compliance.

The concept of an ID tape also appears to be far from ready for implementation. Page 6-220 of the DEIS notes that ID tape ropes are not currently available from suppliers and pricing of this technology could not be determined. As a result, important questions about the ID tape remain such as how often it needs to be replaced or what the costs are to industry. The DEIS also fails to estimate any economic impact of a woven ID tape on the Maine lobster fishery. While the DEIS uses the fact that Maine has already implemented state-specific gear marking as justification for not including the fishery in the economic analysis in Alternative 2, the DEIS fails to acknowledge that no state has adopted woven ID tapes as described in Alternative 3. Therefore, Alternative 3 would impose additional costs on Maine fishermen which are not represented or calculated in the DEIS. This is on top of the costs which Maine fishermen have already incurred from the state proactively adopting enhanced gear marking.

**600-lb Weak Link**

Alternative 3 considers the removal of the 600-lb weak link for all vertical lines which incorporate 1700 lbs weak points or use weak line. The requirement for weak links at the buoy was one of the earliest measures adopted in the Atlantic Large Whale Take Reduction Plan (ALWTRP). However, as outlined in the DIES on page 3-64, there are now concerns that the weak link may have unintended consequences such as removing resistance created by the buoy in an entanglement or hampering disentanglement efforts and the subsequent identification of fishing gear. Based on these comments, ME DMR is
concerned the 600-lb weak link is not an effective management tool and recommends it be removed from the ALWTRP. Following this rulemaking, fishermen will be subject to a significant number of regulations which increase the cost of their operation and compromise safety at sea. Requiring measures which are not effective is not helpful to NARWs or fishermen.

IV. Zone Conservation Equivalency Proposals

Following submission of Maine’s statewide NARW proposal, ME DMR initiated conversations with each of the Lobster Zone Councils to provide the opportunity to develop CE proposals. Through this process, Zones were asked if they wanted to make Zone-specific changes to the state-wide proposal (i.e. traps per trawl minimums and weak points) to address regional concerns. Importantly, the CE proposal had to meet a similar level of risk reduction, or achieve a higher level of risk reduction, as the Zone originally achieved under the statewide plan. These criteria ensured the cumulative changes to ME DMR’s statewide plan would not result in a loss of risk reduction, but instead would maintain or increase the level of risk reduction achieved.

ME DMR staff worked with the Lobster Zone Councils throughout 2020 to identify potential alternatives and conduct analysis on the risk reduction achieved. These Zone-specific conversations allowed industry to tailor plans which reflect the distribution of gear (taken from the IEC model) and modeled ‘whale units’ (taken from the Duke whale model) in their region. For example, between 3nm and 12 nm from shore, Zones C and D have a very low percentage of modeled whale units while Zones A and B have greater than 30% of their whale units (Table 1). This means changes to measures between 3-12nm from shore have large impacts on the risk reduction achieved in Zones A and B but relatively little impact in Zones C and D. These types of considerations allowed the Lobster Zone Councils to propose measures which balance their regional concerns with an understanding of where their Zone-specific risk is highest.

Table 1: Percent of annual modeled whale units and annual vertical lines, by Maine lobster zone and distance from shore, from the risk reduction model. Annual modeled whale units to not reflect sightings but are derived from the Duke habitat model.

<table>
<thead>
<tr>
<th>Zone</th>
<th>% Annual Whale Units</th>
<th>% Annual Vertical Lines</th>
<th>Zone</th>
<th>% Annual Whale Units</th>
<th>% Annual Vertical Lines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone G</td>
<td>Ex-3 miles 1%</td>
<td>47%</td>
<td>Zone</td>
<td>Ex-3 miles 2%</td>
<td>59%</td>
</tr>
<tr>
<td></td>
<td>3-12 miles 19%</td>
<td>45%</td>
<td></td>
<td>3-12 miles 7%</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>12+ miles 80%</td>
<td>8%</td>
<td>Zone B</td>
<td>3-12 miles 27%</td>
<td>38%</td>
</tr>
<tr>
<td>Zone F</td>
<td>Ex-3 miles 0%</td>
<td>38%</td>
<td></td>
<td>3-12 miles 2%</td>
<td>59%</td>
</tr>
<tr>
<td></td>
<td>3-12 miles 1%</td>
<td>47%</td>
<td></td>
<td>3-12 miles 27%</td>
<td>38%</td>
</tr>
<tr>
<td></td>
<td>12+ miles 99%</td>
<td>18%</td>
<td>Zone B</td>
<td>3-12 miles 27%</td>
<td>38%</td>
</tr>
<tr>
<td>Zone E</td>
<td>Ex-3 miles 0%</td>
<td>60%</td>
<td>Zone A</td>
<td>Ex-3 miles 3%</td>
<td>59%</td>
</tr>
<tr>
<td></td>
<td>3-12 miles 2%</td>
<td>27%</td>
<td></td>
<td>3-12 miles 30%</td>
<td>33%</td>
</tr>
<tr>
<td></td>
<td>12+ miles 98%</td>
<td>12%</td>
<td></td>
<td>12+ miles 67%</td>
<td>8%</td>
</tr>
<tr>
<td>Zone D</td>
<td>Ex-3 miles 0%</td>
<td>66%</td>
<td></td>
<td>Ex-3 miles 3%</td>
<td>59%</td>
</tr>
<tr>
<td></td>
<td>3-12 miles 4%</td>
<td>22%</td>
<td></td>
<td>3-12 miles 30%</td>
<td>33%</td>
</tr>
<tr>
<td></td>
<td>12+ miles 96%</td>
<td>12%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the end, all Zones chose to make some modifications to the statewide plan to reflect their specific fishing conditions and their spatial trends in risk. ME DMR notes two significant benefits which resulted from this process. First, by ME DMRs calculation, the risk reduction achieved by the compilation of the
CE proposals is higher than the risk reduction achieved under the statewide plan. Second, enabling the Zones to develop a CE proposal helped to build industry buy-in to the new measures; industry became instrumental in developing a bottom-up approach to these measures.

Table 2 outlines the CE proposals being brought forth by the seven Lobster Zone Councils. As is evident in the description of each of the Zones’ proposals below, they all rely on the use of trawl-length equivalency, whereby a trawl with two endlines is equal in terms of risk to a trawl with one endline and half as many traps. The innate need for this flexibility has been previously described in this comment letter but ME DMR highlights this point again in the Zone Council proposals. Many times, Zones struggled to find a trawl-minimum which worked for all fishermen in their region; the only way they were able to ensure adequate risk reduction and fishermen safety was by using trawl length equivalencies.

For some Zones, trawl length equivalencies are also critical because they have trawl length maximums in state regulations. For example, Zone B currently has a three-trap trawl minimum and maximum from 3-6 miles from shore and a five-trap maximum and minimum in some, but not all, waters from 6-12 miles from shore (Figure 5). These trawl maximums were implemented to prevent gear conflicts created by the uniqueness of the area. Specifically, Zone C fishermen fish significant amounts of gear in Zone B, as Maine lobstersmen are allowed to fish up to 49% of their traps in a neighboring zone. This resulted in an amalgamation of different trawl lengths and fishing practices in a single area. Further, large offshore trawls, with differences in magnitude much greater than the trawl length equivalencies proposed by Maine, were being moved inshore; nothing prevented fifteen trap trawls from being fished next to three trap trawls. Due to these area-specific challenges and the Zone’s authority to set trawl maximums, Zone B is interested in maintaining equivalent trawl minimums and maximums. They are proposing to raise their trawl minimum and maximum to 5 traps per single endline between 3-6 miles from shore as a way to achieve risk reduction but also maintain the uniformity in trawl lengths. Between 6-12 miles from shore, Zone B is proposing to maintain its five trap trawl maximum and minimum on the eastern half of the Zone by fishing with one endline; outside of this trawl line, there is no trawl maximum. As a result, Zone B is proposing trawl length minimum equivalencies of 5 traps per single endline/10 traps per 2 endlines between 6-12 miles from shore to address these different maximum trawl requirements in state regulations. To do this, NMFS will need to modify 50 CFR 697.21(b)(2) to allow trawls with more than three traps to be set with a single endline in federal waters.
Table 2: Conservation equivalency proposals by the Maine Lobster Zones. ME DMR recommends these measures be included in the FEIS.

<table>
<thead>
<tr>
<th>Traps Per Trawl</th>
<th>Zone G</th>
<th>Zone F</th>
<th>Zone E</th>
<th>Zone D</th>
<th>Zone C</th>
<th>Zone B</th>
<th>Zone A West</th>
<th>Zone A East</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-6 Miles</td>
<td>3’s per one endline; 3’s per one endline</td>
<td>5’s per one endline; 5’s per one endline</td>
<td>5’s per one endline; 10’s per two endlines</td>
<td>5’s per one endline; 10’s per two endlines</td>
<td>5’s per one endline; 10’s per two endlines</td>
<td>5’s per one endline; 10’s per two endlines</td>
<td>5’s per one endline; 10’s per two endlines</td>
<td>4’s per one endline; 10’s per one endline; 8’s per two endlines</td>
</tr>
<tr>
<td>6-12 Miles</td>
<td>10’s per one endline; 10’s per two endlines</td>
<td>5’s per one endline; 5’s per one endline</td>
<td>5’s per one endline; 10’s per two endlines</td>
<td>5’s per one endline; 10’s per two endlines</td>
<td>5’s per one endline; 10’s per two endlines</td>
<td>5’s per one endline; 10’s per two endlines</td>
<td>8’s per one endline; 10’s per one endline; 15’s per two endlines</td>
<td>10’s per one endline; 20’s per two endlines</td>
</tr>
<tr>
<td>12+ miles</td>
<td>10’s per one endline; 10’s per two endlines</td>
<td>5’s per one endline; 5’s per one endline</td>
<td>5’s per one endline; 10’s per two endlines</td>
<td>5’s per one endline; 10’s per two endlines</td>
<td>5’s per one endline; 10’s per two endlines</td>
<td>5’s per one endline; 10’s per two endlines</td>
<td>8’s per one endline; 10’s per one endline; 15’s per two endlines</td>
<td>10’s per one endline; 20’s per two endlines</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weak Points</th>
<th>Zone G</th>
<th>Zone F</th>
<th>Zone E</th>
<th>Zone D</th>
<th>Zone C</th>
<th>Zone B</th>
<th>Zone A West</th>
<th>Zone A East</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 3 Miles</td>
<td>1 weak point 50% down line</td>
<td>1 weak point 50% down line</td>
<td>1 weak point 50% down line</td>
<td>1 weak point 50% down line</td>
<td>1 weak point 50% down line</td>
<td>1 weak point 50% down line</td>
<td>1 weak point 50% down line</td>
<td>1 weak point 50% down line</td>
</tr>
<tr>
<td>3-12 Miles</td>
<td>1 weak point 33% down line</td>
<td>1 weak point 33% down line</td>
<td>2 weak points 25% and 50% down line</td>
<td>2 weak points 25% and 50% down line</td>
<td>2 weak points 25% and 50% down line</td>
<td>2 weak points 25% and 50% down line</td>
<td>2 weak points 25% and 50% down line</td>
<td>2 weak points 25% and 50% down line</td>
</tr>
<tr>
<td>12+ Miles</td>
<td>1 weak point 33% down line</td>
<td>2 weak points 25% and 50% down line</td>
<td>2 weak points 25% and 50% down line</td>
<td>2 weak points 25% and 50% down line</td>
<td>2 weak points 25% and 50% down line</td>
<td>2 weak points 25% and 50% down line</td>
<td>2 weak points 25% and 50% down line</td>
<td>1 weak point 33% down line</td>
</tr>
</tbody>
</table>
Zone G
Zone G expressed concern about the operational safety of weak points, particularly at greater depths. As a result, they proposed increasing the minimum trawl lengths in federal waters to be able to move weak point requirements further up in the water column. Specifically, Zone G proposed increasing the minimum trawl length from 3-6 miles to 5 traps per one endline/10 traps per two endlines, and increasing the minimum trawl length from 6-12 miles to 10 traps per one endline/20 traps per two endlines. The hope of the Zone was that this would allow them to implement 1 weak point 33% down the vertical line in federal waters. Ultimately, this initial concept fell short of the original risk reduction percentage. As a result, Zone G proposed a hybrid weak point configuration outside of 12nm from shore, where their modeled whale units are highest. The hybrid concept requires 1 weak point 33% down on one endline of a trawl and 2 weak points, 25% and 50% down, on the other endline of a trawl.

Zone F
Like Zone G, Zone F also expressed concern about the operational safety of a weak point 50% down the vertical line in federal waters. As a result, they sought alternatives which resulted in a single weak point 33% down the vertical line in federal waters. Zone F also considered the CE proposals from their neighboring Zones, Zones G and E. Given lobster harvesters in Maine can fish up to 49% of their traps in an adjacent Zone, it was important to fishermen in Zone F to consider the proposals from neighboring Zones and create as much consistency as possible, particularly regarding trawl minimums. With these dynamics in mind, Zone F proposed adopting Zone E’s minimum number of traps per trawl from 3-12nm from shore (5 traps per one endline/10 traps per two endlines) and Zone G’s minimum number of traps per trawl outside of 12 miles from shore (25 traps per two endlines).

Zones E and D
Zones E and D expressed concern about the ability for vessels to safely fish 25 traps per trawl outside 12 miles from shore. To make up for this loss of risk reduction outside 12nm from shore, Zones E and D proposed adding an additional weak point further down the line in order to have a trawl length of 20 traps in this region. Both zones also opted to have the same number of traps per trawl required in the 3-6nm and 6-12nm distances from shore; this resulted in a uniform trawl length of 5 traps per one endline and 10 traps per two endlines from 3-12nm. Finally, since both zones had 0% of their whale units between the exemption line and 3 miles from shore area, they were able to implement a minimum trawl length of two traps per endline in this region without impacting the overall risk reduction.

Zone C
Like Zones E and D, Zone C expressed concern about the ability of all vessels to safely fish 25 traps per trawl outside 12 miles from shore. Unlike Zones E and D, Zone C was not able to achieve a 20-trap trawl length by adding a second weak point further down the vertical line. As a result, Zone C added an additional weak point outside 12nm from shore and increased the trawl length minimums between 3-6nm and 6-12nm from shore. This resulted in a minimum of 5 traps per one endline/10 traps per two endlines from 3-6nm from shore and 10 traps per one endline/20 traps per two endlines from 6-12nm from shore. These increases in the trawl length, and the fact that only 1% of Zone C’s whale units are between the exemption line and 3 miles from shore, meant the Zone could implement doubles between the exemption line and 3 miles.

Zone B
Zone B expressed concern about the trawl length minimums from 6-12 miles from shore. This is primarily driven by the location of Mount Desert Rock which, while surrounded by state waters, is located offshore (Figure 5). As a result, there is a “bubble” of state waters around Mount Desert Rock,
followed immediately by trawl regulations for 6-12nm from shore. Given this geography, Zone B fishermen were cognizant of the change in trawl minimums from state waters to 6-12nm from shore and were uncomfortable with the jump from 3 traps per trawl in state waters to 8 traps per one endline/15 traps per two endlines immediately adjacent. Zone B fishermen also expressed concern about trawl length maximums in their Zone. From 3-6 miles from shore there is both a 3 trap trawl minimum and maximum. From 6-12 miles from shore there is a trawl line which runs from the eastern edge of the Zone northwest to the 6 mile line (depicted in the double hatched polygon seaward of the six-mile line in Figure 5). Within this polygon, there is both a 5 trap trawl minimum and maximum.

![Figure 5: Regulatory map of Maine Lobster Zone B. Orange lines indicate east and west boundaries of Zone B. The green line is the exemption line, the purple line is the 3 mile line, and the blue line is the 6 mile line. The different colors indicate the distance from shore bands. Mount Desert Rock is located within the blue circle that is outlined in purple. The hatched marks indicate trawl maximums in state regulations. All waters in Zone B from 3-6 miles from shore have a trawl maximum as well as the northeastern section of 6-12 miles from shore, as depicted by hatched markings.](image)

To address these concerns, Zone B sought to achieve a minimum trawl length of 5 traps per one endline/10 traps per two endlines from 6-12 miles from shore. As a result, Zone B proposed increasing the trawl minimum from 3-6 miles from shore to five traps per one endline as well as increasing the number the number of weak points outside 12nm from shore, where the majority of their annual whale units are modeled.

In response to the trawl length maximums in state regulation, Zone B plans to amend the current state regulations such that the new trawl minimum of 5 traps per one endline between 3-6 miles from shore is also the new trawl maximum. This is why the Zone B proposal only includes a minimum of 5 traps per one endline from 3-6 miles from shore, as opposed to also having the equivalent risk reduction configuration of 10 traps per two endlines. From 6-12 miles from shore, part of Zone B has a 5 trap trawl maximum, which Zone B plans to keep, and the other part of the Zone has no trawl maximum. Therefore, from 6-12nm from shore, Zone B is proposing the equivalent risk reduction configurations of
a minimum of 5 traps per one endline/10 traps per two endlines to account for these differing regulations in trawl maximums. Trawl length equivalencies are vital to Zone B’s plan to maintain trawl length uniformity given the unique gear conflict challenges faced in this area.

Zone A
When Zone A began its discussion on a CE proposal, the industry members were split. The western part of the Zone supported maintaining the measures in the coastwide plan, noting that the trawl minimums, while an increase, were still operationally safe. The eastern part of the Zone expressed grave concern about the location and depth of the weak points. Several industry members from the eastern most part of the Zone noted the extreme and powerful tides which increase the strain and hauling load on their vertical lines. They also noted that they are quite often contending with set-overs from Canadian lobster gear. As a result, they were concerned not only about the potential for massive gear loss but also for the safety of their crew.

The Zone originally tried to develop a single set of trawling up measures and weak point requirements which balanced the needs of the two ends of the Zone; however, a compromise could not be struck which achieved the needed level of risk reduction. As a result, ME DMR tried to identify a longitudinal point at which the oceanographic conditions significantly changed. Looking at the literature, ME DMR found tidal currents are strongest in Grand Manan channel.10 Specifically, maximum velocities off of Schoodic Peninsula, the western end of Zone A, are approximately 0.6 m/s while maximum velocities in Grand Manan channel, the eastern part of Zone A, are more than double at 1.3 m/s.11 Further, models of the currents in eastern Maine show a persistent region off of Cutler, Maine and through the Grand Manan Channel which develops high water velocities with each tidal cycle (Figure 6).12 Given this information, ME DMR worked with industry to identify a line which would split Zone A based on oceanographic conditions and fishing practices. This line ended up being 67°18’ longitude, which runs due south from Cross Island. To the west of this line, Zone A is proposing to maintain the statewide proposed measures and not pursue a CE. To the east of this line, Zone A is proposing to increase the minimum trawl length from 3-12nm to 10 traps per 1 endline/20 traps per two endlines. This is a significant increase in the minimum trawl length, particularly between 3-6nm from shore where the proposed trawl length minimum is over double what is in the DEIS. This large increase in the trawl minimums was offered so fishermen in the eastern part of Zone A could have 1 weak point 33% down the vertical line in federal waters.

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11 Conlon et al., 2018.
12 Conlon et al., 2018.
Creating a line in Zone A makes it difficult to use the risk reduction model to determine the resulting risk reduction percentage in the eastern part of Zone A. As a result, ME DMR used sea sampling data from this region to determine if the trawl minimums recommended in the CE proposal were higher than the trawls lengths currently used in the fishery. Since the proposed trawl lengths for the eastern part of Zone A are higher than those in the statewide plan, by the transitive property a reduction in vertical lines under the CE proposal would result in a higher level of risk reduction than originally achieved in the statewide plan. Sea sampling data showed the vast majority of trawl lengths ranged from 6 to 15 traps per two endlines (Figure 7). As a result, moving to a trawl minimum of 20 traps per two endlines would reduce the number of vertical lines east of 67°18', and to a greater extent than the trawl minimums under the statewide plan. Further, since a reduction in vertical lines, which addresses the need to reduce serious injury/mortality and the risk of entanglement, was being proposed in place of a second weak point, which only addresses the need to reduce serious injury/mortality, ME DMR felt the CE proposal resulted in a stronger conservation plan for NARWs.
Overarching Observations

As previously mentioned, every Zone took the opportunity to fine-tune a risk reduction plan which addressed their region’s specific needs. The multitude of proposals can at first glance appear overwhelming but interestingly, many similarities emerged from the Zone-specific work. For example, every Zone except Zone A is proposing a minimum of five traps per one endline from 3-6 miles from shore. Given this is a higher trawl length minimum than what is outlined in the proposed rule, this should result in a higher percentage of risk reduction coming from 3-6nm. Outside 12nm from shore, four Zones are proposing a 25-trap trawl minimum and three zones are proposing a 20-trap trawl minimum. Similarly, between the exemption line and 3 miles from shore, the same four Zones are proposing a 3-trap trawl minimum while the other three zones are proposing a 2-trap minimum. Thus, in the end, there are many similarities between what the Zones are proposing.

V. Additional Comments

Conservation Equivalency

A key component of Maine’s December 2019 proposal was a method for CE, by which measures of equal or greater risk reduction value could be swapped with existing measures. Based on the presentations given by NMFS staff on this Proposed Rule, there appears to be an opportunity for states, within their public comment, to propose CE proposals; ME DMR has taken the opportunity to do this with the Zone Council proposals. However, there does not appear to be a process to do this in a nimble manner in the future. ME DMR recommends NMFS establish a permanent process by which stakeholders can propose measures which achieve equal, or greater, protection for NARWs. At present, state proposals must be vetted through the ALWTRT and then implemented through rulemaking; all told, this process can be time consuming. An alternative structure for quickly accepting and vetting amendments to the Plan should be implemented to allow for greater flexibility and adaptability within the ALWTRP. This could become critically important given NARW distribution continues to change and there may be a need for timely action in the future. Specifically, ME DMR supports an amendment to the existing regulatory structure such that, as long as NMFS calculates a CE proposal achieves the same (or greater) level of conservation value, the CE proposal goes straight to rulemaking.

In addition, as outlined on page 34 of Maine’s proposal, ME DMR supports individual safety exemptions for the small number of fishermen who, due to the physical limitations of their boat, will have to purchase a new vessel in order to come into compliance with the measures in the proposed rule. These concerns are primarily related to the higher trawl length minimums proposed, which will require more traps on deck. ME DMR is not asking for these fishermen to be exempt from the risk reduction requirements but instead is requesting the flexibility to address these safety concerns on an individual basis. Given the economic impacts related to this proposed rule, the uncertainty of the fishery created by the draft Biological Opinion, and the fact that the purchase of a new boat can be cost prohibitive, ME DMR envisions that, in these few cases, individuals would be subject to other management measures, such as a trap reduction, in order to safely fish shorter trawls but still remove vertical lines from the water. ME DMR can license an individual reflecting a lower trap limit, ensuring that the Maine Marine Patrol is aware of this type of individual CE safety exemptions.

Implementation Timeline

Neither the Proposed Rule nor the DEIS outline an implementation timeline. ME DMR recognizes there are still many uncertainties which will impact the pace of implementation, including the timing of the final rule being published. That said, ME DMR highlights there must be a balance between quickly providing additional protections to NARWs and providing fishermen adequate time to safely implement
the new measures. Of the measures included in preferred Alternative 2, the implementation of weak points and changes to trawl length minimums will likely require the greatest amount of time and effort by fishermen to implement. Early summer is a time when many Maine fishermen are putting traps in the water, and around the time we anticipate publication of the final rule. Implementing weak points and changing trawl length configurations on the water, once gear has been set, will be extremely difficult for most fishermen and near-impossible for others with limited deck space. As a result, when developing the implementation timeframe, NMFS should heavily rely on industry comments and needs. ME DMR notes that deadlines based on calendar years, such as January 1, are not necessarily relevant to the fishery; instead, deadlines based on operational ‘seasons’ of the fishery are more appropriate.

Enforcement
Page 3-77 of the DEIS discusses the importance of enforcement and monitoring in the lobster fishery. ME DMR agrees these are integral components of any successful suite of management measures. The DEIS mentions that an offshore enforcement plan, which involves traditional methods and use of new technologies, will be presented to the Take Reduction Team in early 2021. ME DMR stresses the importance of engaging Maine’s Marine Patrol in the development of this enforcement plan. Marine Patrol hauls and inspects the majority of lobster gear in the Northeast, and their input on ways to advance enforcement and monitoring will be critical to the development of an effective plan.

Maine Marine Patrol’s involvement is particularly critical as new technologies for enforcement are developed. At a recent New England Fishery Management Council meeting, representatives from NOAA’s Office of Law Enforcement discussed a pilot program in which an ROV was used to conduct inspections of offshore lobster gear. Following the Council meeting, Maine Marine Patrol had a meeting with the Office of Law Enforcement to learn more about the pilot program. They found that the ROV pilot program cost approximately $100,000 to inspect a modest amount of gear. Further, the inspection primarily consisted of an assessment of presence vs. absence of management measures, as opposed to being able to measure things like the size of escape vents. While it is unclear if ROVs will be included in the upcoming enforcement plan, ME DMR shares this story to highlight the importance of engaging with Marine Patrol throughout the course of a project so that future work can be maximized for the understanding and benefit of all enforcement agencies. Factors such as relative cost and the ability to assess multiple aspects of a management measure (such as the presence of an escape vent and its size) are important when developing an enforcement plan.

As NMFS explores new enforcement technologies, ME DMR believes the offshore areas of LMA 1 and LMA 3 must be patrolled by traditional methods as well. While the Maine Marine Patrol has vessels up to 46 feet in length, it is clear there is strong need for larger vessels to be deployed to patrol these offshore waters. ROV’s, while potentially a valuable tool for the enforcement of whale rules, will not assist us in ensuring lobster regulations related to the sustainability of the resource are followed. It is also not clear that the ROV costs are sustainable in the long-term. There is no better enforcement tool than the presence of a vessel capable of hauling gear.

Related to the effectiveness of offshore enforcement is the ability to track vessels. Offshore fishing areas pose unique challenges to enforcing regulations because the areas are vast. As a result, significant time can be spent looking for offshore lobster gear before it can be inspected. This increases the costs associated with enforcement offshore. As a result, ME DMR supports continued conversations between NMFS and the Atlantic States Marine Fisheries Commission (ASMFC) to advance the use of vessel tracking in offshore waters. As stated earlier in this letter, ME DMR believes vessel tracking could become an integral part of a trigger mechanism for the LMA 1 Restricted Area.
\textit{Trap Reductions and ASMFC}

Throughout industry discussions on the proposed rule and DEIS, there continue to be significant conversation around trap reductions. This includes those who support trap reductions as a way to reduce the number of vertical lines and those who oppose trap reductions given it is the line, not the trap, that entangles whales. Should NMFS consider this tool during this or future rulemaking, ME DMR strongly recommends NMFS immediately engage with the ASMFC. Not only is ASMFC home to the American Lobster Fishery Management Plan, but it is also a venue for dialogue between the Northeast states. This will be important given, as ME DMR’s understands it, trap reductions would have to be implemented across an LMA as opposed to in a single state.

\textit{Canada’s 2021 Measures}

While the proposed rule and DEIS are focused on the US lobster and Jonah crab fisheries, ME DMR would be remiss if it did not comment on the record its deep disappointment with Canada’s 2021 fishery management measures. On February 18\textsuperscript{th}, the Department of Fisheries and Oceans Canada (DFO) announced its 2021 measures to protect right whales.\textsuperscript{13} The contrast between Canada’s measures, and those being considered in this proposed rule for US fisheries, could not be starker.

Canada is once again relying almost entirely on dynamic area closures which are triggered upon detection of a right whale. As ME DMR has noted numerous times, this method is completely reactive in providing protections to right whales. In contrast, almost all the measures being proposed for US fisheries are proactive in nature, meaning the detection of a right whale is not needed for their implementation. This is critical given the many challenges associated with monitoring large portions of the ocean and the difficulty in sighting right whales. To speak plainly, should a plane be unable to fly, or an acoustic device fail to operate, an undetected right whale will not receive protections in Canadian waters.

To make matters worse, in 2021 DFO is reducing the strength of the dynamic closure system by requiring a right whale be detected multiple times in order to extend the closure through November 15\textsuperscript{th} in the Gulf of St. Lawrence, or to extend the closure by 15 days in the Bay of Fundy and critical habitat areas in Roseway and Grand Manan basins. This means that a monitoring system which is already fraught with challenges and potential inadequacies will be even more critical to provide protections to right whales.

Further, while NOAA is proposing the use of 1700-lb weak points in this proposed rule, DFO has also announced that they are delaying the implementation of weak rope until the end of 2022. This represents a full year delay. It is not until after the implementation of weak rope that DFO will also consider implementation of other gear specific measures such as sinking groundline or a prohibition on float rope at the surface. These measures have been required in US fixed gear fisheries for well over a decade.

The consistent weakening of Canada’s measures to protect right whales is not only frustrating, but it is disastrous for US fixed gear fisheries. Given the status of the right whale population and the risk reduction measures outlined in the draft Biological Opinion, the fate of US federal fixed gear fisheries is inextricably linked to Canada’s ability to reduce right whale mortality. If Canada implements measures

which successfully and consistently reduce right whale mortality and serious injury, the risk reductions required in US fisheries may be lessened; if Canada is not successful, US fisheries will be forced to completely re-invent the manner in which they operate.

Right now, US fisheries need a strong voice from NMFS highlighting the need for more comprehensive and timely right whale protections in Canadian waters. With the announcement of Canada’s 2021 measures, NMFS should immediately engage with DFO to discuss why these measures are insufficient and outline a more aggressive timeline for the implementation of proactive measures which are already required in US waters. ME DMR requests participation in all future bilateral meetings with Canada as the potential impacts to Maine’s fixed gear fisheries cannot be understated.

ME DMR appreciates the opportunity to comment on this proposed rule.

Sincerely,

[Signature]

Commissioner Patrick Keiher
Mr. Michael Pentony, Regional Administrator  
Greater Atlantic Regional Fisheries Office  
National Marine Fisheries Service  
55 Great Republic Drive  
Gloucester, MA 01930–2276

Subject: Comments on Proposed Amendments to the Atlantic Large Whale Take Reduction Plan

Dear Mr. Pentony:

On 31 December 2020, the National Marine Fisheries Service (NMFS) published a proposed rule and request for comments on an amendment to the Atlantic Large Whale Take Reduction Plan (the ALWTRP or Plan, herein) (85 Fed. Reg. 86879). At the same time, NMFS published a Draft Environmental Impact Statement (DEIS) and Regulatory Impact Review / Initial Regulatory Flexibility Analysis. The stated goal of the proposed amendment to the ALWTRP is to reduce the risk of ‘human-caused mortality and serious injury’ (MSI) of North Atlantic right whales (Eubalaena glacialis; right whales herein) and other large whales caused by the entanglement in Northeast Region lobster and Jonah crab trap/pot fisheries. The DEIS analyzes the potential environmental impacts of alternative potential amendments to the ALWTRP under the National Environmental Policy Act (42 U.S.C. § 4321 et seq.).

Section 118 of the Marine Mammal Protection Act (MMPA), added to the Act in 1994, governs the “Taking of Marine Mammals Incidental to Commercial Fishing Operations”. Section 118(a)(1) establishes as the MMPA’s “immediate goal” the reduction of MSI due to commercial fishing to “insignificant levels approaching zero within 7 years after the date of enactment,” i.e., by 30 April 2001. This goal is carried forward in section 118(b), which mandates that commercial fisheries meet the goal by the specified date. Further, for strategic stocks taken by Category I or II fisheries,1 section 118(f) requires NMFS to “develop and implement a take reduction plan designed to assist in the recovery or prevent the depletion of each [such] stock.” In addition, section 118(f)(2) identifies two ALWTRP goals, the reduction of: (1) MSI due to fisheries interactions (fMSI) to a level less than the stock’s potential biological removal level (PBR) within six months of plan implementation, and (2) fMSI to “insignificant levels approaching a zero mortality and serious injury rate” within five years, “taking into account the economics of the fishery, the availability of existing

1 MMPA section 118(c)(1) requires NMFS to publish a list of fisheries that cause “(i) frequent incidental mortality and serious injury of marine mammals; (ii) occasional incidental mortality and serious injury of marine mammals; and (iii) a remote likelihood of or no known incidental mortality or serious injury of marine mammals.” In implementing regulations (60 Fed. Reg. 45086, August 30 1995), NMFS defines fisheries as being Category I (“frequent” MSI): the fishery is “itself responsible for the annual removal of 50 percent or more of any stock’s potential biological removal level”; or Category II (“occasional” MSI): “collectively with other fisheries, is responsible for the annual removal of more than 10 percent of any marine mammal stock’s potential biological removal level and that is by itself responsible for the annual removal of between 1 and 50 percent, exclusive, of any stock’s potential biological removal level”.
technology, and existing State or regional fishery management plans.” What became known as the ‘zero mortality rate goal’ (ZMRG) was set by NMFS in regulation as 10 percent of a stock’s PBR (50 CFR § 229.2). Section 117 of the MMPA, also enacted in 1994, requires NMFS to prepare and publish stock assessments for all U.S. marine mammal stocks that occur in U.S. waters on a prescribed schedule. Those stock assessments provide estimates of the best and minimum estimates of population size, PBR, fMSI, MSI due to other human causes, and the total MSI (tMSI). Stocks for which tMSI exceeds PBR or that are listed as endangered or threatened under the Endangered Species Act (ESA) are designated as ‘strategic’ stocks. The North Atlantic right whale is a ‘strategic’ stock under both criteria, as it was listed as an endangered species in 1970, and the stock’s tMSI has exceeded PBR in every year since these values were first calculated in 1995.

As thoroughly documented in the DEIS and Biological Opinion, North Atlantic right whales are declining and at an increasing risk of extinction. As detailed herein (see the Appendix), despite earlier population growth, the number of right whales has decreased significantly since 2010. Entanglement in lobster- and crab-trap gear is the primary proximate driver of the decrease, which is also significantly contributed to by vessel strikes. In addition to deaths from these causes, persistent entanglement injuries have caused a decline in the condition and health of individuals, and, in females, reduced fecundity. NMFS and the entire community of individuals and organizations linked to the issue of right whale entanglement (e.g., fishermen, scientists, conservationists), are well aware that a significantly improved mitigation effort is needed to reverse the decline in the population.

Considering the population status, and in recognition of its statutory obligations, NMFS used its take-reduction process and consultations with New England states to develop the mitigation measures, Preferred Alternative, and Non-preferred Alternative in the proposed amendment to the ALWTRP (see the Appendix for details). As described in the Appendix, NMFS is proposing the implementation of measures that would (1) reduce the number of vertical lines deployed; (2) expand existing, and establish new, time-area closures to buoyed trap fishing, (3) require the use of so-called weak line (ropes used for buoy- or end-line that can be broken by a right whale that becomes entangled in them), and (4) improve gear-marking regulations; see the Appendix for a discussion of these and other mitigation measures.

The Marine Mammal Commission (the Commission), in consultation with its Committee of Scientific Advisors on Marine Mammals, provides the following comments and recommendations on the ALWTRP amendment options and DEIS alternatives.

The Commission found NMFS’s proposed amendment to be substantially inadequate to meet the requirements of the MMPA, and therefore in need of extensive revision. The Commission’s recommendations, described in detail below in the Recommendations and Rationale section, are summarized here:

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2 A ‘strategic’ stock is defined in the MMPA, section 3(19), as one “for which the level of direct human-caused mortality exceeds the potential biological removal level”, or “which is listed as a threatened species or endangered species under the Endangered Species Act of 1973”.


1. NMFS has been managing North Atlantic right whales and attempting to mitigate the impact of lobster- and crab-trap fisheries for over 25 years, and has yet to fulfill its MMPA section 118 obligations to reduce this source of fMSI to insignificant levels (ZMRG). Neither the Preferred nor the Non-preferred Alternative of the proposed amendment would achieve the necessary outcome. To do so, NMFS must replace the proposed rule with regulations and TRP amendments that have a much higher likelihood of immediately meeting the requirements of the MMPA.

2. In the final rule implementing the TRP amendment, NMFS must: 1) rely on measures most likely to meet expectations, namely direct line controls, dynamic time-area closures, rope that is weak throughout, and so-called ropeless gear; and 2) use a short-term, adaptive management approach to assess and recalibrate the measures to reach the expected effectiveness at achieving TRP goals.

3. NMFS has crafted its proposed measures to attain a risk-reduction target that is substantially too low. In light of: 1) the agency’s long-standing failure to reduce fMSI to required levels, 2) uncertainty regarding the efficiency of the newly proposed measures, 3) underestimation of the expected risk reduction due to double counting, and 4) the agency’s failure to set a target that adequately takes account of unobserved deaths (cryptic mortality), NMFS must set a much more risk-averse target, and take into account the best available data and science to ensure the accuracy of that target.

4. For the reasons articulated in the previous recommendations, NMFS must reject the Preferred Alternative, and select the Non-preferred Alternative with these modifications or modifications similar in effect:

   A. Mitigation measures designed to achieve an expected risk reduction sufficiently in excess of 80 percent to account for (i) performance uncertainty, (ii) double counting, and (iii) the best-available scientific estimate of the total mortality rate, which could be achieved by:
      1. Increasing the sizes or durations of proposed closures, or establishing additional closures;
      2. Designing dynamic time-area closures similar to those implemented in Canada;
      3. Capping the number of vertical lines at much lower levels; and
      4. Establishing additional buoyless restricted areas in offshore areas, or requiring the offshore fishery to adopt pop-up gear within three years.

   B. Monitoring and adaptive modification of these measures and their proximate effects are mandated as an annual or biennial process to ensure that the actual performance of the proposed measures is matching expected performance.

5. To increase understanding of the dynamics of entanglement to better inform mitigation measures and the derivation of more accurate, site-specific, risk-reduction targets, NMFS must implement gear marking regulations that (i) are specific to more jurisdictional and environmental areas than currently proposed, (ii) applicable to all elements of the gear,

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5 These are areas in which all fixed gear fishing that uses persistent surface buoys are prohibited, but do allow fixed gear that uses pop-up technology.
(iii) require 40-60 foot spacing along all lines, and (iv) require marks that are replaced before they become unreadable.

6. Given that the maximum gear-marking benefit would be accomplished if marks were specific to each fisherman, NMFS should undertake the necessary research and development to enable manufacturers to create individual marking schemes or devices that are operationally feasible and affordable.

Recommendations and Rationale

Failure to meet MMPA requirements. NMFS has been attempting to achieve the “immediate” goal of section 118(f) of the MMPA for right whales—to reduce fMSI to below the species’ potential biological removal level within six months of take reduction plan implementation—for 27 years. Since 1999, when it published the first TRP for these fisheries, the agency has yet to achieve even that short-term goal, and remains even further away from meeting the Act’s more ambitious ZMRG goal, or from satisfying the negligible impact standard necessary to obtain the separate incidental take authorization required under section 101(a)(5)(E). Although NMFS had consistently predicted that U.S. fishery-management programs would be sufficiently protective of right whales to meet MMPA requirements and enable the agency to make ‘no jeopardy’ findings under the Endangered Species Act (ESA), it is clear in retrospect that those predictions were based on overly optimistic assumptions concerning the programs’ expected and actual effectiveness.

NMFS’s failure is attributable in part to the difficulty the ALWTRT encountered over the years in trying to reach consensus on prescribing strong mitigation measures, and in part to NMFS’s failure to adequately supplement the team’s recommended plan and amendments in order to meet the MMPA’s take reduction mandates. Once again, it appears that the agency is overestimating the effectiveness of the measures being proposed as amendments to the ALWTRP. In a related process, NMFS released a draft Biological Opinion on 15 January 2021 assessing the impacts of 10 Greater Atlantic Region fisheries, including the lobster fishery, on species listed as endangered or threatened under the ESA, including the North Atlantic right whale.6 NMFS, in an implicit recognition that the measures included in the proposed rule would, by themselves, not reduce fMSI sufficiently to meet the applicable ESA and MMPA standards, created what it is calling a Conservation Framework.7

The Conservation Framework describes a series of mitigation measures to be implemented in phases over the next decade. In phase one of the 10-year implementation period, the proposed rule and the amendments to the ALWTRP under review in this rulemaking would be implemented during the first half of 2021. NMFS expects these measures to reduce fMSI of right whales by roughly 60 percent. In phase two, in 2023, NMFS would implement measures to reduce mortality and serious injury in gillnet and other trap fisheries (besides the American lobster and Jonah crab fisheries) by 60 percent. After implementing phases one and two, NMFS intends to evaluate the performance of those measures. Phase three, which NMFS would implement through rulemaking in 2025, is designed “to further reduce [fMSI] by 56% in all federal fixed gear fisheries….’’ Phase three

6 https://www.fisheries.noaa.gov/bulletin/draft-biological-opinion-10-fishery-management-plans-released
8 The 60 percent reduction in mortality and serious injury expected to result from the measures in the proposed TRP amendment would occur in both federal and state waters. Because most of the risk of mortality and serious injury occurs in federal rather than state waters, the risk reduction in federal waters will be slightly less than the overall target of 60 percent, namely 57 percent.
will be followed by another evaluation period in 2025-2026. NMFS intends to implement phase four in 2030 with the goal “to further reduce [mortality and serious injury] (by) up to 87% in fixed gear fisheries.”

The Biological Opinion sets the current level of right whale MSI at 4.94 whales per year due to fisheries operating in federal waters, with an additional 1.78 whale deaths and serious injuries occurring annually in state waters. Assuming that measures implemented under the Conservation Framework are as effective as predicted, fMSI in federal waters would be reduced in phase one from its current level of 4.94 to 2.2, in phase two to 2.13, in phase three to 0.85, and finally in phase four (i.e., in 2030) to 0.11. While specific measures have been identified and proposed for phase one of the Conservation Framework, NMFS has not identified any specific measures that would be adopted under the latter three phases to achieve the specified take-reduction targets. Additionally, NMFS explains that the “Conservation Framework specifies targets rather than particular measures to be implemented” and that NMFS is “committed to working with [its] partners on the implementation of measures to meet the goals of the Conservation Framework.” In the Conservation Framework, NMFS does list measures that could be employed, which include, but are not limited to, further trawling up, weakening of vertical lines, the use of pop-up gear, additional time-area closures for buoyed gear, and buoy-line reduction, perhaps through an allocation program that would cap line numbers.

Even if take-reduction measures proposed in the Preferred Alternative and phases 2-4 of the Conservation Framework prove fully effective, entanglement risk to right whales will not be reduced to insignificant levels approaching a zero rate for at least another ten years, roughly 30-35 years longer than required by the 1994 MMPA amendments. Moreover, fMSI of right whales would continue to exceed the species’ PBR level for most of the next decade despite the directive in section 118(f) that the immediate goal of the TRP is to reduce fMSI to below PBR within six months. NMFS states that it is committed to “implement[ing] measures that are necessary for the recovery of right whales….” However, it is impossible to know at this point whether the yet-to-be-specified measures that NMFS ultimately adopts over the next ten years will be adequate to achieve that goal. The increasing extinction risk facing right whales demands that NMFS take actions having a greater likelihood of success. The Conservation Framework stresses that NMFS will have to engage in adaptive management to ensure that the Framework is successful. The Commission agrees and commends NMFS for recognizing this necessity, but notes that the Framework provides scant information on fisheries monitoring, evaluation of efficacy, and development of subsequent adaptive measures. Given the long history of failure to adopt effective take reduction measures, the Commission stresses the necessity of promulgating stronger more immediately effective measures rather than assuming that a successful outcome will result from the vaguely defined Conservation Framework. The Commission submitted comments on the draft Biological Opinion and Conservation Framework on 19 February 2021, raising similar concerns regarding the Agency’s track record and optimistic predictions, with respect to the proposed no-jeopardy finding and associated incidental take statement.

Therefore, the Commission recommends that NMFS fulfill its obligations under section 118 of the MMPA by replacing the proposed rule with regulations and TRP amendments that have a much higher likelihood of immediately reducing fMSI of right whales across all commercial fisheries (including cryptic mortality) to below PBR and with a detailed proposal for further reducing fMSI to
insignificant levels (i.e., below ZMRG) in less than five years. The proposed amendment to the TRP and the Preferred Alternative are insufficient to achieve either of these outcomes. The Commission’s concerns over the proposed rule and options for strengthening the agency’s response are detailed below.

Insufficient risk reduction. In light of the historical failure of past risk-reduction measures, there are reasons to expect that the measures proposed herein will also fail to achieve the risk-reduction target set in the proposed amendment, let alone the immediate and long-term goals of the MMPA and the ALWTRP.

First, static time-area closures are a potentially highly effective means to reduce the number of vertical lines in the water, but they only work as long as the whales continue to aggregate in the designated times and areas. Arguably, the North Atlantic right whale is in increased peril now because of an environmental regime shift that occurred over an unknown timespan around 2010, which resulted in the population’s distribution shifting, thus increasing the risks from anthropogenic impacts. There are no guarantees that ocean warming-driven shifts in distribution will not continue, further reducing the effectiveness of static time-area closures. In addition, trawling-up as a means to reduce the number of vertical lines is an as yet unproven method to reduce entanglement frequency, and there is every reason to expect that entanglements that do still occur will be more severe. Fishermen are well known for finding innovative and unanticipated ways to adapt to regulations that restrict their fishing practices. Often their best choice is to comply with a regulation, but sometimes they choose a legal option that does not change their practices as the regulators intended (i.e., in this case reducing the number of vertical lines in the water). NMFS could avoid this uncertainty if it chose to control the number of lines directly by capping their numbers, i.e., by adopting this element of the Non-preferred Alternative. Finally, the best available science (Knowlton et al. 2015) provides a strong expectation that weaker buoy lines will reduce the severity of entanglement injuries and the likelihood of deaths. However, much less is known about how large whales free themselves from entanglements by breaking entangling ropes. It is not known whether the complicated and varying schemes for weakening buoy lines in the Preferred Alternative will have the desired outcome.

Experts have argued that numerous weak insertions placed in buoy lines every 40 feet or so, or rope that is weak throughout, should be the most effective at reducing entanglement, but even that is largely conjectural. Nonetheless, if the experts are correct, then the Non-preferred Alternative should be more effective at reducing injury severity. The efficacy of the proposed measures will not be known until they are in widespread use, and then only with adequate monitoring. Monitoring of the proximate effects of the measures (e.g., whether trawling up is achieving the anticipated vertical line reduction; what could be called ‘operational performance’) can be conducted annually or biennially, but detecting intermediate effects (e.g., reduced entanglement rates), or ultimate effects (e.g., improved demographic rates) will take years. During those years, if the expected risk reduction does not occur, North Atlantic right whales will suffer and the species will become further imperiled.

The Commission suggests that these sources of effectiveness or performance uncertainty require the agency’s attention. It is not acceptable management practice to implement measures of highly uncertain effectiveness, and assume that they will work until proven otherwise. In part, that is how the agency has arrived at this juncture, where more than 25 years of management have not

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9 As noted above, NMFS and the fisheries should be achieving the ZMRG immediately—they are 20 years overdue in meeting this mandate. However, even reducing incidental take to below PBR would be an important first step.
produced the desired results and right whales are declining toward extinction. The Commission fully understands that the availability of “proven entanglement mitigation measures” is limited and that often what is available are measures that experts and experienced individuals can only predict to have a good chance of working.

In this situation, the Commission recommends that the appropriate path forward is to: 1) rely on the measures that are most likely to be as effective as expected (specifically—direct line controls, dynamic time-area closures, rope that is weak throughout, and pop-up gear, which holds the promise of greatest effectiveness if it can be made practicable in the densely fished areas), and 2) use a ‘quick-cycle’,10 adaptive management approach to assess and readjust the suite of mitigation measures being used to achieve ALWTRP goals. We emphasize ‘quick-cycle’ (e.g., 1-2 years) because ineffective management that is in place for five years before being assessed will result in an unacceptable increase in the risk of extinction.

Second, the Preferred Alternative includes a risk-reduction ‘credit’ of 9.9 percent to account for the likely benefits provided by the Massachusetts Restricted Area (MRA). That credit is included in the estimated risk reduction expected from the Preferred Alternative, but its effect should already be reflected in the 2017 baseline fMSI. Thus, the actual expected risk reduction of the Preferred Alternative is less than even the lower limit of the 60-80 percent target. The DEIS states—

Given the large scale of the current MRA and the importance of the area for right whales, the take reduction team agreed that Massachusetts fishermen should get equivalent credit for maintaining the closure from February through April. This closure was implemented effective June 2015 through modifications to the Atlantic Large Whale Take Reduction Plan, impacting a portion of LMA One and the outer cape LMA. The Take Reduction Team recognized the high and increasing value of this recently expanded area, and recognizes its disproportionate impact on Massachusetts fishermen when they recommended inclusion of the closure area risk reduction towards the 60 percent risk reduction target.

The Commission’s representative and several other Team members opposed inclusion of MRA credit in calculating risk reduction achieved by the measures included in the Preferred Alternative. Although the Commission appreciates the desire of Massachusetts fishermen to receive credit for their considerable past and ongoing conservation efforts, which are undeniable, NMFS will have to include additional risk-reduction measures in the Preferred Alternative if it is going to reach the predicted risk reduction of 64 percent.

Third, as mentioned above, the 80-percent upper limit of the risk-reduction target was included by NMFS to account for cryptic mortality. The lower limit takes into account only known fMSI. NMFS stated that its approach, at the time Team members were developing their recommendations, was to assume that “half of the estimated undocumented incidents occurred in U.S. waters and were caused primarily by incidental entanglements.” In the DEIS, NMFS states—

If we assume half of the estimated mortalities and serious injuries [observed and cryptic] occur incidental to U.S. fisheries (5.25), mortality and serious injury is more than five times higher than potential biological removal and requires an 83% reduction … [and] serious

10 One that is focused on the operational performance, i.e., the proximate effects of the newly implemented measures
injury and mortality of right whales in U.S. fishing gear must be reduced by 60% (documented) to 80% (estimated) to achieve potential biological removal.

However, NMFS noted that “given the assumptions and other sources of uncertainty in the 80 percent target, as well as the challenges of achieving such a target without large economic impacts to the fishery, the Take Reduction Team focused on recommendations to achieve the lower 60 percent target.” The Commission suggests that the difficulty the Team faced in trying to get risk reduction above 60 percent also stemmed from the lack of agreement about including additional time-area closures. This resulted in the Team simply aiming, by default, to achieve the lower limit of the target (i.e., 60 percent).

Throughout the Team’s deliberations, NMFS was very clear that not all the carcasses of North Atlantic right whales that die are detected and reported and that this necessitates reducing risk by roughly 80 percent. The Commission is therefore perplexed that NMFS would adopt the lower limit as the target in the proposed amendment. In the DEIS, NMFS notes the difficulty in apportioning cryptic mortality between entanglement and ship strike, but this difficulty should not have precluded the agency from placing bounds on the proportion likely due to entanglement. To adopt the 60-percent target is to implicitly assume that there is zero undetected/unreported, i.e., cryptic, mortality, which the agency knows is not true and runs counter to the findings of its own scientists. Additionally, NMFS fails to acknowledge in the DEIS that the magnitude of cryptic mortality is likely much greater than was thought in 2019 to be the case. In deriving the 80-percent target to account for cryptic mortality, NMFS relied on an estimate provided by an analysis led by a NMFS scientist. As described in the DEIS and above, using the methods of Pace et al. 2017, an estimated 40 percent of right whale deaths are not observed and reported (i.e., they are ‘cryptic’). However, a new analysis focused explicitly on estimating the cryptic mortality rate found that cryptic mortality accounts for 64 percent of the estimated total number of deaths in the population (Pace et al. 2021), an increase of 60 percent over the Pace et al. 2017 estimate. Thus, even the 80-percent risk reduction target is a significant underestimate of the magnitude of decrease in fMSI that is needed to reach the ZMRG level. It is not clear why the proposed rule and DEIS fail to cite or incorporate the cryptic mortality results in Pace et al. 2021. While this paper was published after NMFS had released the proposed rule and DEIS, the lead author is a NMFS scientist and the agency would have been in possession of the results approved by its own internal review process prior to the paper’s being submitted for publication in July 2020. It is clear that the proposed rule and DEIS have not used the best available data and science as presented in Pace et al. (2021).

In light of all the issues raised in this section, the Commission recommends that NMFS (a) reassess its risk-reduction target in light of: 1) the agency’s long-standing failure to reduce fMSI to required levels, 2) uncertainty regarding the efficiency of the newly proposed measures, 3) underestimation of the expected risk reduction due to double counting of the effect of the MRA, and 4) the agency’s failure to set a target that adequately takes account of cryptic mortality; and (b) promulgate a final ALWTRP amendment that includes those measures that have the greatest chance of achieving the requisite risk-reduction level. The first two factors mentioned above suggest that NMFS should set a conservative (i.e. substantially more risk-averse) risk-reduction target that has an uncertainty buffer as a way of improving the chance that the nominal target will be reached, while the latter two factors require that NMFS take into account the best available data and science to ensure the accuracy of that target.
Alternatives. The Commission believes it highly unlikely that the Preferred Alternative will be as effective as anticipated. Effectiveness in this context relies on measures that are to varying degrees untested or potentially unreliable. Rather than directly regulating the number of vertical lines that can be fished at any given time, the Preferred Alternative relies on an indirect method, trawling-up, to reduce the number of vertical lines, without any assurance that this approach would achieve the expected magnitude of line reduction. The Preferred Alternative also relies on weak-rope configurations that have not been tested. There is reasonably strong scientific support for requiring ropes to break at 1700 pounds or less, but it is unknown whether right whales will be able to break lines that have just one or two weak insertions, rather than lines with insertions every 40 feet or that are weak throughout, as recommended by scientists. Therefore, whether the proposed configurations will be effective is almost entirely speculative. Finally, the Preferred Alternative further relies heavily on fixed closures to continue providing protection for right whale hotspots, which is problematic in an era when marine environments are changing in response to ocean warming. This is in contrast to dynamic closures such as those being used in Canada, apparently with considerable success. The Commission therefore recommends that NMFS reject its Preferred Alternative as inadequate for the many reasons articulated above.

The Non-preferred Alternative will likely be more effective than the Preferred Alternative, but is likely still inadequate to achieve the goals of the MMPA. On the positive side, it relies on direct control of the number of vertical lines. This is an improvement on the trawling-up approach, but it is not without challenges. Although capping line numbers appears straightforward and could be achieved by permitting lines in addition to traps, Massachusetts is the only State where buoy or end lines currently are counted or regulated. Other states currently lack the data and regulatory mechanisms for implementing this approach. Implementing line caps will require a phase-in period during which regulatory agencies develop the necessary policies to regulate and monitor vertical line numbers, and collect baseline data on the number of lines being used. Another improvement offered by the Non-preferred Alternative would be the establishment of a larger closure south of Nantucket, which has become recognized as important winter habitat for right whales, and another closure north of Georges Bank. In addition, the Non-preferred Alternative would, for the most part, require fully weak rope. In contrast to these positive elements, however, the Non-preferred Alternative would not offer much improvement in the risk reduction in LMA3, and it also does not achieve the upper limit of the take-reduction target. NMFS and independent experts suspect that LMA3, where the offshore fishery operates, is responsible for a disproportionate number of entanglements, especially severe entanglements, that lead to fMSI. Because of the depths at which the gear is fished, the strong currents, and the large number of traps per trawl, that fishery uses very heavy (strong) lines, which almost certainly cannot be broken by adult right whales, let alone younger animals. Also, because of these factors it is difficult for the gear to incorporate weak insertions without compromising the ability of the fishermen to successfully retrieve their gear. As a result, under either alternative it is not likely that the offshore fishery will be able to achieve a risk reduction of more than 15 percent (Table 3.4 in the DEIS).

Considering the discussion and recommendations above, the Commission recommends that NMFS adopt the Non-preferred Alternative, with the following modifications—

1) Changes are made to the proposed mitigation measures to achieve an expected risk reduction sufficiently in excess of 80 percent to account for (i) performance uncertainty, (ii) double counting of the MRA ‘credit’, and (iii) the 64-percent cryptic mortality rate estimated by Pace et al. 2021, the best available science, which could be achieved by:
a. Increasing the sizes or durations of proposed closures, or establishing additional closures targeted at right whale hotspots with moderate to high entanglement risk;

b. Designing dynamic time-area closures similar to those implemented in Canada;

c. Capping vertical lines at much lower than present levels;\(^{11}\) and

d. Establishing additional buoyless restricted areas in LMA3, or requiring the offshore fishery to adopt pop-up gear within three years.

2) Monitoring and adaptive modification of these measures and their proximate effects are mandated as an annual or biennial process to ensure that the actual performance of the proposed measures is matching expected performance.

*Gear marking.* One of the major sources of uncertainty in determining appropriate area-specific risk-reduction targets is the shortage of information on the types and sources of gear that entangles right whales. As described in the DEIS, the source (e.g., country, state, or fishery) could be identified in just 24 percent of the cases of whales found to be seriously injured or dead as a result of entanglement. Identifying the gear involved is critical to deriving accurate area-specific risk-reduction targets, and for improved understanding of the entanglement dynamics that lead to serious injuries and deaths. NMFS recognizes this imperative, as evidenced by the expanded gear-marking regulations included with the 2014 amendment to the ALWTRP, and by the improved marking schemes that are part of the proposed amendment’s Preferred and Non-preferred Alternatives (see Table 3.3 in the DEIS). While the new regulations would allow, in some cases, retrieved gear to be linked to a state or management area (e.g., federal waters), the Commission believes that they fall well short of what is needed.

To improve understanding of entanglement dynamics and derive more accurate and site-specific risk-reduction targets, the proposed marking regulations need to be strengthened considerably. Among other things, gear-marking provisions should require more marks on lines and include unique marks for more fishing areas and marks that distinguish whether the rope was used as a buoy or end line or as a groundline. The Commission believes that this is the only way to provide the information needed to evaluate the effectiveness of current mitigation measures and to make informed decisions on any necessary further measures.

Therefore, at a minimum, the Commission recommends that NMFS revise the gear-marking measures in the proposed TRP amendment to include the following features:

1. Area-specific marking schemes are developed for jurisdictional areas (e.g., United States vs Canada, individual states, state vs federal waters) and areas of high entanglement risk (e.g., hot spots where there is a strong correlation or overlap between whale abundance and gear density);

2. All vertical end or buoy lines and groundlines are marked, including with an additional mark to distinguish vertical lines from groundlines;

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\(^{11}\) The Decision Support Tool (DST) should be used to determine the actual amount of vertical line reduction, in combination with other measures, necessary to account for serious injuries and total deaths in the population.
3. Identifying marks are sufficiently spaced, such as every 40-60 feet, to ensure that the maximum amount of recovered gear can be identified; and
4. Marks on buoys, lines and traps are replaced before they become unreadable due to abrasion or other degradation processes.

The Commission recognizes the difficulty and added expense associated with jurisdictionally and/or geographically fine-scale marking schemes. A fisherman who fishes widely in state and federal waters might need to have several sets of lines, each with a different set of marks. There is, however, a simple and powerful solution to this problem, which is to make all marks specific to the owner of the gear. Thus, each fisherman would mark his or her gear with a unique combination of marks, or a strand of uniquely identifiable wire or tape woven into all ropes, throughout or at regular intervals along the rope. Although this would be more expensive, within a few years it likely would settle the question of to what extent each fishery is responsible for the entanglement of right whales, and it would provide detailed information to be used in studies of entanglement dynamics, data that are critical for developing improved mitigation measures. While fishermen might object to being individually identified, this is already a reality because buoys and traps have to be marked individually in the two states with the largest number of lobster fishermen, Maine and Massachusetts. Therefore, the Commission recommends that NMFS undertake the necessary research and development to enable manufacturers to create individual marking schemes or devices that are operationally feasible and affordable.

Conservation Action

The Commission supports NMFS’s intention to protect and recover right whales, but believes, as reflected by the agency’s decision to undertake this rulemaking, that it must be much stronger and that additional actions are needed to meet the various mandates of the MMPA.12 Most pressing is the need for the United States and Canada to prevent any human-caused mortality and serious injury, thereby beginning to reverse the downward population trend. Adoption of vessel-speed regulations and entanglement mitigation measures by the United States over roughly the past three decades apparently helped to reduce the mortality rate and contributed to the positive population growth rate observed prior to 2010 (Pace et al. 2017, Corkeron et al. 2018). However, even when the population was growing, the estimated rate of 2.8 percent was substantially below what might be expected for this species given the 5.3-7.2 percent population growth rates observed in the closely related southern right whale, and the 4.0 percent intrinsic rate of increase ($R_{max}$) estimated for the North Atlantic right whale (Corkeron et al. 2018).

In 2006, when the right whale population was still growing, a panel convened by the Commission recommended that NMFS adopt a more aggressive and precautionary approach to managing right whale interactions with fisheries (Reeves et al. 2007). The panel's report concluded that:

“In general, [NMFS] should set higher standards of protection and place greater reliance on the ability of industry to adapt to those  

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12 These include reducing mortality and serious injury to less than PBR and ultimately to insignificant levels approaching a zero mortality and serious injury rate (§ 118(f), not allowing the taking of right whales incidental to commercial fisheries unless it would have a negligible impact on the stock (§ 101(a)(5)(E), and ultimately replenishing the stock to the point where it no longer is depleted (§ 2(2), 2(6)).
standards, rather than continuing to depend on a complex, shifting, inefficient, and ineffective network of regulatory measures to protect the whales. The guiding principle should be to separate high-risk human activities from right whales, in both space and time, to the maximum extent feasible.”

Although NMFS chose not to adopt that advice in 2007, it remains relevant, and even more critical to right whale recovery now that the population is declining at an alarming rate. The protection of right whales can no longer rely on unproven measures and overly optimistic projections. If strong mitigation measures prove to be effective in reducing MSI below PBR, then NMFS can assess whether economic and other considerations weigh in favor of scaling those measures back and take more time to determine how to satisfy the ZMRG. The setting of higher standards, followed by adaptive modifications, is the approach Canada adopted following the large number of entanglement and vessel-strike deaths that occurred in the Gulf of St. Lawrence in 2017, and the United States should follow suit.

We hope these comments and recommendations are helpful. Please contact me if you have questions regarding the Commission’s recommendations and rationale.

Sincerely,

Peter O. Thomas, Ph.D.,
Executive Director

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APPENDIX – Additional, Supporting and Background Information.

Population Status

Since 2010, the right whale population has been declining steadily at approximately one percent per year, and faces an increasing risk of extinction (Kraus et al. 2016, Pace et al. 2017, Pettis et al. 2020). A recent population assessment revealed poor body condition of North Atlantic right whales compared to three populations of southern right whales (Christiansen et al. 2020). Both lethal and sub-lethal anthropogenic trauma from entanglements and vessel collisions are thought to contribute to this decline in population abundance (Sharp et al. 2019, Christiansen et al. 2020, Moore et al. 2021). Sub-lethal effects of entanglements of individual whales whose health is already compromised, as evident from poor body condition, can result in reproductive failure. The best available scientific information clearly identifies entanglements in fishing gear, especially lobster and crab pots or traps (generically, traps hereafter), and vessel strikes in both the United States and Canada as the two main anthropogenic drivers of the decline (NMFS 2019). Vessel strikes were, for a period of at least 10 years, the primary documented cause of right whale deaths in U.S. waters, but now entanglement in fishing gear is the leading documented cause of both mortality and serious injury (Sharp et al. 2019, Moore et al. 2021). Early analyses of rules designed to limit vessel speeds in U.S. waters to reduce the number of vessel strikes of large whales indicated that the regulations were having the desired effect (Laist et al. 2014, van der Hoop et al. 2015), but a recent analysis indicates that the effect is not very large (NMFS 2020a, Moore et al. 2021). Vessel strikes were a significant cause of right whale deaths in Canada in 2017 (Daoust et al. 2017) and again in 2019.

Although the population had been increasing at a relatively slow rate of 2.8 percent per year during the 1990s and 2000s (Pace et al. 2017, Corkeron et al. 2018), it peaked at an estimated 483 whales in 2010 and decreased to an estimated 356 whales at the end of 2019 (DEIS, Biological Opinion, Pettis et al. 2020), a decline of 36 percent in just a decade. On the positive side, in 2020, only two whales are known to have died in U.S. waters and 10 calves were observed. As of mid-February 2021, 15 calves had been detected, although one is known to have died due to a vessel strike. Particularly alarming is the fact that no more than 90 reproductive-age females remained as of 2017 (Hayes et al. 2018), and their numbers are declining more rapidly than males’ (Pace et al. 2017). Two studies have found that females accounted for 66 percent of deaths of adults (Moore et al. 2004, Sharp et al. 2019).

Entanglement in fishing gear is so frequent that 83 percent of all right whales bear entanglement scars (a term meant to encompass both healed and unhealed wounds as well as amputations), and 59 percent have scars from multiple entanglements (Knowlton et al. 2012a). Every year, on average, 26 percent of the whales acquire new entanglement scars (Knowlton et al. 2012a), leading to the conclusion that, over a ten-year period, each whale has a 95 percent chance of being entangled at least once (Hayes et al. 2018). This situation is exacerbated by the fact that

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13 From 2012 to 2016, over twelve times as many whales died due to entanglement compared to vessel strikes (NMFS 2019).
15 NMFS, using the method of Pace et al. 2017 estimated there were 366 individuals in the population as of January 2019 (95-percent credible interval 353-377), from which Pettis et al. 2020 subtracted the number of known deaths in 2019 to produce the estimate of 356 at the end of January 2021. The actual number was probably somewhat lower because Pettis et al. (2020) did not account for likely undetected deaths, which easily could have equaled or exceeded the number of known deaths (Pace et al. 2017, Pace et al. 2020).
moderate to severe entanglements are becoming more frequent, apparently due to increases in the strength of rope used by fishermen (Knowlton et al. 2015), and the likelihood that an entanglement leads to death or serious injury is increasing by 6.3 percent per year (Hayes et al. 2018).

The known number of right whales dying has increased rapidly since 2010 (Figure 1, Pace et al. 2021), and the proportion of deaths attributable to entanglements also has increased substantially (Figure 4, NMFS 2020b), although population modeling has indicated the mortality rate of adult right whales has not declined (Pace et al. 2017).16 Roughly 34 deaths and serious injuries of entangled right whales have been documented in the most recent five years of data (2014-2018; NMFS 2020b). NMFS's North Atlantic right whale stock assessment reports17 indicate that the annual mean of observed MSI increased from 1.3 prior to 1999, to 5.8 from 2000-2009, and to 6.9 from 2014 to 2018. Moreover, this should be considered a minimum, as the carcasses of an estimated 64% percent of all right whales presumed to be dead go undetected (‘cryptic mortality’; Pace et al. 2021). Thus, the number of undetected deaths from 2014 to 2018 could have been as high as 19 right whales, although Pace et al. (2021) recommend making such extrapolations cautiously as the likelihood of detection of MSI differs substantially between entanglements and vessel strikes. In a recent presentation to the NMFS's Atlantic Scientific Review group Dr. Pace cautioned that most deaths predicted to have occurred by his population model (Pace et al. 2017) go undetected and that the number of detected deaths and serious injuries is a very poor predictor of the total.

Even minor entanglement in fishing gear can have sub-lethal effects. The condition and health of entangled females can be severely compromised (Knowlton et al. 2012b, Robbins et al. 2015, Rolland et al. 2016, van der Hoop et al. 2017, Knowlton et al. 2018), and this contributes to the recent and prolonged low calving rate (Kraus et al. 2016, Pace et al. 2017). Females require at least two or three years to build the nutritional reserves needed to calve, and apparently do not calve if they are in poor condition (Schick et al. 2013). Given the annual scarring rate, it is likely that about half of all reproductive-age females are entangled during the inter-birth period. The mean inter-birth interval increased from roughly 3-4 years during 2009-2011, to 4.5-6.5 years between 2012 and 2016, to 7-10 years from 2017 to 2020 (Pettis et al. 2020). Calving rates declined by nearly 40 percent between 2010 and 2016 (Kraus et al. 2016, Pace et al. 2017), and in 2018 no calves were seen. From 2010 to 2016, an average of 16 calves were observed each year (range, 7-22), but only 22 calves in total were seen from 2017-2020 (average=5.5 per year, range, 0-10; Pettis et al. 2020). Entanglement-caused health decline is not the only driver of lower calving rates,18 but it is a significant factor (Corkeron et al. 2018). Further, the situation is likely worse than these statistics indicate because observed scarring rates do not fully reflect entanglement rates, as not every scar is detected and not every entanglement results in scarring.

Mitigation Measures

The mitigation of entanglement risk for North Atlantic right whales rests primarily on two approaches: 1) reducing the likelihood of entanglement, which is achieved mostly by removing entangling lines from the environment, and 2) reducing the severity of entanglements and the

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16 This suggests that the increase in the number of known deaths is a change in the discover/reporting rate, and that the decline in the population is due to a decrease in the reproductive rate.


18 Reproductive rates are also dependent on prey availability and energy expenditure, both of which have been changing (references in Hayes et al. 2018).
resulting injuries, which is achieved primarily by making it more likely that an entangled whale can break the line and shed the attached gear. While right whales can become entangled in ground lines, the large majority of entanglements appear to be in buoy or end lines (often referred to generically as vertical lines).

**Likelihood of Entanglement.** Eliminating vertical lines would virtually end the entanglement of right whales.19 Although this could be achieved by closing fisheries, such an action is socially, economically, and politically infeasible. So-called ropeless, buoyless, or pop-up gear eliminates the need for vertical lines while allowing fishing to continue, conceivably without reducing fishing effort. This option is seen by many as the ideal solution, but by others as infeasible, particularly those engaged in trap fisheries. In 2018, when the current take reduction plan (TRP) amendment process began, pop-up gear designs were deemed insufficiently advanced for adoption in American and Canadian lobster and crab trap fisheries. However, a great deal of progress has been made in the last two years, and several trials that are underway various types of pop-up gear are showing encouraging early results. Some developers claim that their gear is ready to use now in certain segments of the fisheries. The biggest current obstacle to widespread implementation of pop-up gear is the lack of a universally available interoperability system that would enable everyone to “see” deployed pop-up gear virtually.20

Effort reduction is another approach to reducing the number of vertical lines. It is generally believed that direct control, which would be achieved by capping the number of lines permitted to be used by individual fishermen or the fishery as a whole, would be the most effective form of effort control. However, the states have not embraced this approach and have instead focused on indirect approaches for reducing the number of vertical lines, such as allowing or requiring an increased number of traps per vertical line, a practice referred to in New England as ‘trawling up’.

Vertical-line reduction can also be achieved by reducing fishing effort (e.g., number of permitted traps, fishermen or vessels) or prohibiting fishing where and when whales are most likely to be present. Such fixed time-area closures are being used now in parts of Massachusetts and adjacent federal waters (referred to as restricted areas),22 and dynamic time-area closures are being used in Canada to reduce the risk of entanglement and in the U.S. and Canada to reduce the risk of vessel strikes. Dynamic management areas (DMAs) implemented to reduce vessel-strike risk in the U.S. have had some success (NMFS 2020a). However, fishery DMAs trialed by NMFS in the early 2000s were rejected due to logistical difficulties encountered by fishermen (e.g., the difficulty of pulling gear quickly) and the accompanying monitoring requirements. The benefits may now outweigh the costs, especially in an era when environmental changes driven by ocean warming are affecting fishing effort and whale distribution patterns from year to year, as the Canadians have demonstrated in the last four years. With the right whale population declining and at a much greater

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19 However, even in the absence of vertical lines, traps would still be connected by ground lines. Although, the use of sinking ground lines, which are required in all U.S. lobster fisheries, reduces the chance of entangling large whales, that chance is not zero because right whales are known to feed on the bottom.

20 In the absence of surface marking with a buoy or buoys, and interoperability software system would allow any legitimate user with an acoustic modem (e.g., the owner of the gear, other fishermen in the same fishery or co-occurring fisheries, enforcement agencies) to gain access to data on the location of the pop-up gear.

21 Some states lack the regulations necessary to set line caps, and/or lack data on how many lines are being used.

22 Current restricted areas protect large numbers of right whales in Cape Cod Bay and around Cape Cod during February, March, and April, and in the Great South Channel during April, May, and June.
risk of extinction than it has been for a considerable time, the cost-benefit analysis for fishery DMAs likely has changed.

Other methods have been tested to reduce the likelihood of entanglement, such as stiff or taut line or acoustic deterrents, but most of these alternatives have been found to be impractical or ineffective (FAO 2021). A recent research project suggested that red ropes would be more readily detected by right whales than ropes of other colors (Kraus et al. 2014), an idea that has gained some traction with the TRT.

Severity of Entanglement. The risk of death and severity of injuries whales sustain increase with entangling rope strength and the mass attached (Knowlton et al. 2015, 2018). Research has found that adult and juvenile right whales are not found entangled in rope with a breaking strength of less than 1,700 pounds, suggesting that right whales are able to free themselves from ropes with lower breaking strength (Knowlton et al. 2015). Most rope currently in use is much stronger, especially in conditions in which high loads are placed on vertical lines during gear retrieval. This occurs when there are strong currents or ‘sticky’ substrates, pots/traps are very heavy (e.g., in the Canadian snow crab fishery), or large numbers of traps are fished together in a single ‘trawl’ (e.g., in the offshore/deep-water lobster fishery).

NMFS and the Atlantic Large Whale Take Reduction Team (the ALWTRT, or the Team) have considered a variety of approaches for reducing the strength of the rope used in New England, referred to in shorthand as ‘1,700-pound equivalents’. More generally, rope that whales are able to break is referred to as ‘weak rope’, whether it is weak throughout or has weak insertions or links. The ‘1,700-pound equivalents’ include 1) rope with a breaking strength of 1,700-pound throughout, and 2) 1,700-pound splices, knots, or sleeves (insertions) used to join sections of rope. Deploying 1,700-pound rope, or stronger rope with 1,700 pound sleeves, has been considered the most promising weak-rope option, although a reliable commercial source of 1,700-pound rope has not yet been found (C. Coogan, GARFO, pers. comm.). Splices and knots are regarded as easier and less expensive options for fishermen to implement, compared to sleeves, but much more difficult to design to ensure that they have the right breaking strength. In addition, there is a strong concern that knots would make the line more likely to get snagged in a whale’s baleen, thus increasing the likelihood of severe injury. Although promising and successfully trialed by a few fishermen, sleeves have not been scientifically tested and it is unknown how they will perform in entanglement situations.

Background to Proposed ALWTRP Amendment

NMFS’s early actions and performance. As prescribed in section 118(f)(6)(A) of the MMPA, in 1996, NMFS established a take reduction team, which would become the ALWTRT, and charged it with developing and submitting to NMFS within six months a draft TRP. In February 1999, NMFS published a final rule implementing the TRP. Subsequently NMFS was unable to reduce tMSI to ZMRG within seven years, unable to reduce fMSI to less than PBR within six months, and unable to reduce fMSI to less than ZMRG within five years. In fact, the agency has not achieved the first goal in the 27 years since the amendment of the MMPA in 1994, or the second and third goals in the 21 years since the implementation of the TRP in 1999.

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23 Rope strength depends on the diameter, construction and composition of the rope.
Although NMFS had not achieved any of the MMPA’s prescribed goals, the population was increasing relatively slowly in the late 1990s and 2000s (Waring et al. 2011, Pace et al. 2017, Corkeron et al. 2018), which gave the agency some reason to believe that the take-reduction measures were working. However, several developments over the last decade have countered that view. First, an analysis led by a NMFS scientist found little evidence that past entanglement mitigation measures recommended by the Team, and implemented by NMFS and the states, had been effective (Pace et al. 2014). Second, population modeling has definitively shown that the population has been declining since 2010, MSI has been increasing, and fMSI alone has exceeded PBR by 2-3 whale deaths per year (Pace et al. 2017, Corkeron et al. 2018, Hayes et al. 2019). Third, in 2017, 17 right whales died from vessel strikes and entanglements in the United States and Canada; until that point the number of dead whales found in any one year had not exceeded seven (average 3.15 per year).24

**NMFS’s response to the crisis.** Concerned about the status of right whales, NMFS convened an in-person meeting of the ALWTRT in October 2018. Before the meeting, Team members were invited to submit proposals specifying the measures they considered necessary to meet at least the first goal of the ALWTRP (reducing fMSI to less than the PBR). The measures developed by Team members representing environmental NGOs or states (likely in collaboration with fishermen and fishing industry representatives), and scientist members, included the use of—

- weak rope/links used for/within buoy lines;
- weaker, smaller-diameter buoy lines;
- direct limits (caps) on the number of buoy lines;
- indirect controls on the number of buoy lines by limiting trap numbers or by ‘trawling up’;25
- transitioning to pop-up gear;
- expanding the duration and area of existing restricted areas (time-area closures to buoyed trap fishing);
- new restricted areas where buoyed trap fishing is not permitted;
- line that is more visible to right whales; and
- improved enforcement.

The proposals also included a variety of measures that would generally contribute to entanglement mitigation indirectly and over time, things such as research, monitoring and gear marking, however, those measures were not included in risk-reduction calculations.

After much discussion of these measures, the Team did not reach consensus on recommendations concerning an amendment to the ALWTRP. It did identified a need for an objective risk-reduction target and a tool for evaluating mitigation options against that target. Multi-stakeholder sub-groups within the team developed ‘work-plan’ recommendations meant to enable NMFS to focus its data gathering and analyses toward that end before the next meeting, which was scheduled to take place in April 2019.26

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24 Data extracted from Figure 1 in Pace et al. 2021
25 Increasing the number of traps allowed or required per buoy/vertical line.
26 Summaries of each of these meetings are available at: https://www.fisheries.noaa.gov/new-england-mid-atlantic/marine-mammal-protection/atltantic-large-whale-take-reduction-plan
Prior to the April 2019 meeting, NMFS assessed the relative contributions of U.S. and Canadian fisheries to the entanglement-related mortality and serious injury of right whales, and completed the development of the first generation of a decision-support tool (model; the DST) to assess entanglement risk reduction that could be expected from proposed mitigation measures, singly or in combination. Based on the best available science, NMFS estimated that, to reduce fMSI to less than PBR, a 60-80 percent reduction in entanglement risk in the United States would be necessary, independent of the mitigation of other sources of risk in the United States and Canada. NMFS charged the Team with finding a combination of mitigation measures from those identified during the October 2018 meeting that could be implemented immediately and would achieve the target of a 60-80 percent reduction in entanglement risk. The assumption was that implementation of those measures would in practice reduce fMSI by an amount within that range. The 60-percent level reflected the known number of fMSIs, while the 80-percent level reflected the total estimated number of deaths due to fisheries. At the time, it had been estimated that 40 percent of presumed deaths due to all causes go undetected (‘cryptic mortality’; Pace et al. 2017). The Team and NMFS recognized that the 60-80-percent targets had a great deal of associated uncertainty because they were based on analysis of a relatively small number of entanglements and estimating the number of unknown deaths, respectively. Also, much of that uncertainty would remain unresolvable because the source of most gear recovered from right whales cannot be assigned to a particular fishery or fishery component, due largely to inadequate gear marking. As described above, analyses conducted since that meeting have indicated that the level of cryptic mortality is higher than thought at the time. Therefore, the upper bound of the range for the entanglement risk-reduction target should be higher, probably substantially higher, than 80 percent.

At the start of the April 2019 meeting, NMFS signaled its intention to initiate rulemaking in May of that year, and its intention to augment the Team’s TRP amendment recommendations if they did not have the potential to reach the 60-percent risk-reduction target at a minimum, and preferably the 80-percent target. In addition, NMFS indicated that the agency wanted to achieve the 80-percent risk reduction. During that meeting, the Team used the DST to estimate the potential risk reduction of different entanglement mitigation measures, and to build suites of measures designed to achieve the 60-80 percent risk reduction target. Due to strong opposition by industry and some state representatives to the expansion, or establishment of additional, time/area closures, those options were effectively excluded from consideration by the Team. This left basically just two mitigation measures on the table – reduction in the number of vertical lines and reduction in the strength of lines. The first is meant to reduce the likelihood that a whale will become entangled, the second, to reduce the severity of injuries once a whale is entangled. It quickly became apparent that the 80-percent risk-reduction target could not be achieved with line-number and rope-strength measures alone, i.e. without the inclusion of time/area closures. Therefore, the Team’s efforts ended up focusing on achieving a reduction in risk of at least 60 percent. Finally, because of the necessity to involve states in coordinating their regulations with federal regulations to reach the target risk reduction for the entire region, the Team focused on developing state-specific suites of measures.

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27 [describe the tool]
28 The use of pop-up gear was excluded from consideration because it was judged to be several years from being ready to be used in the fisheries in question.
29 The 60-percent target is based on known mortalities and serious injuries, while the 80-percent target is based on total mortalities, which is the sum of known mortalities and serious injuries and the estimated number of cryptic mortalities.
The suite of measures that was recommended to NMFS as an amendment to the ALWTRP is shown in (Table 3.1 in the DEIS).

For the most part, the measures proposed by the Team in (DEIS Table 3.1) were projected to reach or approach the lower limit of the risk-reduction target with one important exception. Those members representing the offshore lobster fishery, which operates in LMA3 (lobster management area 3), were unable to offer a proposal to meet the risk-reduction target. Because the fishermen in this sector already used long trawls, trawling up would not reduce the number of end lines significantly, and because they fish in deep water with large numbers of traps per trawl, they could not use weak rope. They argued that their fishery needed more time to study the problem and pledged to develop measures that would meet the target. Although relatively few vertical lines in New England belong to this fishery, because it uses heavy rope and trawls with large number of traps, and the fishery overlaps significantly with right whale presence, it likely represents a disproportionately large risk to right whales.

On 2 August 2019, NMFS published a notice of intent to prepare a draft Environmental Impact Statement (DEIS) and a request for comments on potential amendments to the ALWTRP (84 Fed. Reg. 37822). The DEIS was to analyze the potential environmental impacts of alternative potential amendments to the ALWTRP under the National Environmental Policy Act (42 U.S.C. § 4321 et seq.). NMFS stated that proposals recommended by the Team at the April 2019 meeting would form the basis of those alternatives, and that the DEIS would inform subsequent NMFS rulemaking to implement the ALWTRP in order to meet the take reduction requirements of the Marine Mammal Protection Act (MMPA). In its comment letter of 23 September 2019, the Commission recommended that:

1. DEIS alternatives rely most heavily on options that would: 1) produce the greatest estimated risk reduction, 2) remove substantial numbers of vertical lines from the water column, 3) have strong scientific support, and 4) be most likely to reduce MSI to MMPA-mandated levels;
2. DEIS alternatives should include measures from the following categories: 1) substantial reductions in vertical line numbers in all states and LMAs, 2) time-area closures to protect the largest and most predictable concentrations and migratory pathways of right whales, 3) use of weak rope (1,700-pound equivalents) in every trap fishery, 4) use of any other proven measures that will reduce entanglement risk severity, such as high-visibility rope, and 5) actions taken or planned by NMFS to secure the cooperation of and the implementation of comparable measures by other jurisdictions, such as state and Canadian management agencies;
3. The final rule require the offshore lobster fishery to a make the transition to pop-up gear on an aggressive, time-bound schedule, if it cannot implement a weak-rope option;
4. The DEIS's preferred alternative be crafted to achieve an 80-percent entanglement risk reduction;

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30 Lobster management areas are labeled in Figure 3.1 of the DEIS.
5. The DEIS evaluate options for the expansion of and establishment of new restricted areas;
6. The DEIS assess the risk reduction achieved by restricted-area options and the potential for those closures to increase risk in other areas due to displaced effort;
7. The final rule require NMFS to monitor and assess the effectiveness of all fixed closures and to use the results to modify the geographic and temporal extent of the closures on a regular basis;
8. The DEIS evaluate the costs and benefits of using dynamic closures to protect right whale aggregations, similar to those implemented by Canada in 2018, and work with the states to overcome any impediments to implementing dynamic closures in U.S. waters.

Proposed ALWTRP Amendment

On 31 December 2020, NMFS released the draft rule to implement a proposed amendment to the ALWTRP and the DEIS analyzing the effect of that rule. Besides the pro-forma ‘no action’ alternative, the DEIS included a Preferred and a Non-preferred Alternative, both of which included measures in three general categories — line reduction, restricted areas, and weak line (Table 3.2 in the DEIS).

Line reduction. In the Preferred Alternative, line reductions are anticipated to result from ‘trawling-up’ requirements that vary among states, from LMAs, and by distance from shore, while the Non-preferred Alternative primarily would require a 50-percent cap on the number of vertical lines that could be fished in federal waters and portions of Maine’s state waters.

Restricted areas. The Preferred Alternative would create two new restricted areas (DEIS Table 3.2)—a closure in Maine’s offshore waters from October to January (“LMA1 Restricted Area”), and a closure south and southeast of Nantucket in Massachusetts’s offshore waters in February and April (“Massachusetts South Island Restricted Area”) (Figure 3.1 in the DEIS). The Non-Preferred Alternative also includes the LMA1 Restricted Area, two versions of a larger South Island Restricted Area, and the Georges Basin Restricted Area, an additional area at the Hague Line east of Cape Cod (Figure 3.2 in the DEIS). Both alternatives modify existing closures and establish new closures to allow fishing without buoy lines (i.e., with pop-up gear).

Weak line. The Preferred Alternative requires a complex system of weak insertions that vary in number and positioning on the line by state, LMA, and distance from shore (DEIS Table 3.2). The Non-preferred Alternative requires the use of fully weak rope in the top 75 percent of all buoy lines.

Expected risk reduction. NMFS used the DST to estimate the expected entanglement risk reduction of different measures and alternatives (Table 3.4 in the DEIS).

The DST estimates that the Preferred Alternative would achieve a 64.3-percent risk reduction. Individual contributions were made by weak-line insertions (14 percent), trawling up (12 percent), the two new closures (15 percent), and a combination of trawling up and weak lines in
LMA3 (8 percent). Interestingly, 9.9 percent of the total risk reduction in the Preferred Alternative is linked to an “MRA credit”. This element reflects a proposal first made by Team members from the State of Massachusetts, and ultimately accepted by NMFS, that Massachusetts be given credit for the risk reduction already achieved through the earlier establishment of the Massachusetts Restricted Area, which includes Cape Cod Bay and areas east of Cape Cod. The risk reduction target of 60-80 percent was based on the latest available estimate of entanglement-related mortality and serious injury attributed to U.S. fisheries, relative to the PBR; 2017 was used as the baseline year for these calculations. Because any risk reduction achieved by the MRA had already affected the level of fMSI, adding it to the predicted risk reduction to be achieved with the Preferred Alternatives amounts to double counting. Therefore, the risk reduction that can be expected to be achieved by the Preferred Alternative would be 54.4, not 64.3 percent.

In contrast, the Non-preferred Alternative would be expected to achieve a 70-73 percent risk reduction depending on which options are chosen. In this case, the 50-percent cap on vertical lines (45 percent), more extensive use of weak-line insertions (35 percent), and closures (33 percent) were the major contributors to the estimated 70+ percent risk reduction.

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32 The individual risk-reduction estimates are not additive. For example, the effect of a weak-rope measure depends on how much rope is being used. Suppose that a weak-rope, assessed by itself (i.e., under baseline conditions), achieve an X-percent risk reduction, while a line-reduction option assessed by itself achieves a Y-percent risk reduction. Then, the risk reduction achieved by implementing the line-reduction and weak-rope options would be less X+Y, because with the line reduction in effect there is less line than under baseline conditions that could be converted to weak rope.
References


February 26, 2021

Mr. Michael Pentony
Regional Administrator
NMFS/GARFO
55 Great Republic Drive
Gloucester, MA 01930

Re: Atlantic Large Whale Take Reduction Plan Regulations (85 FR 96878; NOAA-NMFS-2020-0031)

Dear Mike:

The New England Fishery Management Council (Council) reviewed the proposed changes to the regulations implementing the Atlantic Large Whale Take Reduction Plan, as well as the Draft Environmental Impact Statement (DEIS) that supports the proposed rule. These changes would modify regulations for the American Lobster and Jonah Crab trap/pot fisheries. While the Council does not manage either of these fisheries, we do manage seven fisheries that use mobile gear. We are concerned that the proposed rule and DEIS ignore the possible impacts on these fisheries. Changes to restricted areas and closures have the potential to impact mobile gear fishermen; these impacts are not addressed in any way in the DEIS. Indeed, the DEIS does not even identify mobile gear fisheries as Affected Fisheries and ignores their communities. Estimates of economic impacts are only provided for the lobster and crab fisheries. These are shortcomings that should be addressed in the FEIS. As explained below, we are also concerned about the proposal to allow ropeless fishing in restricted areas.

Section 6.3 of the DEIS discusses the impacts of seasonal restricted areas closed to trap/pot buoy lines. The analysis notes that trap fishermen have three possible responses: suspend fishing, relocate gear, or use ropeless retrieval systems. The latter two responses could negatively affect mobile gear fishermen. In the following paragraphs we explain our concerns about the ropeless gear proposal as currently drafted and identify issues that should be analyzed in the final EIS (FEIS).

The Council is concerned by the proposal to allow ropeless fishing in restricted or closed areas (after approval of an EFP) because how this gear would be avoided by mobile bottom-tending gear is not addressed. There would seem to be two possibilities to minimize this problem: either mariners purchase equipment that can detect and display the location of the gear, or trap-only areas are identified. The DEIS does not analyze the impacts of either of these possibilities. As noted in a presentation given to the Council in December 2020, one of the issues with ropeless fishing that has yet to be solved is how gear locations are marked for other mariners. Since
ropeless gear is not marked on the surface, there is a concern that mobile bottom tending gear will drag over the trap or pot trawls. There are no cost estimates provided if mobile-gear vessels either decide (or are required) to purchase the equipment needed to locate the traps. If the number of fishermen who choose ropeless gear is initially small, the costs to other fisheries may exceed the cost to trap fisheries. Purchasing and installing the necessary equipment could easily cost $10,000 or more per trawl vessel¹. The second approach – limiting ropeless gear to trap-only areas – would also impose costs that are not addressed in the DEIS. There is no explanation of how trap-only areas would be determined: would they be limited to areas currently closed to mobile bottom-tending gear?

As the DEIS notes, new area measures may cause fishermen to relocate. The DEIS acknowledges in Section 5.2.3.1 that the expansion of ropeless gear in restricted areas could lead to reduced bottom trawling in these areas, but the analyses only notes this may have positive benefits for benthic habitat and does not discuss the economic impacts on mobile gear fishermen². We acknowledge that the impacts on mobile gear fishermen should trap fishermen relocate are difficult to evaluate, but they are completely ignored by the DEIS. As noted by recent Council gear conflict discussions, mobile and trap gear fishermen compete for access to the ocean. On the one hand, if all traps are removed from an area during a closure, mobile gear fishermen might benefit from a period where they do not have to avoid lobster gear. On the other hand, if the gear is moved such that another area can no longer be fished, that will have a negative impact. It is possible that one mobile gear fishery could benefit while another is disadvantaged. Gear conflicts may increase, particularly if the traps/pots are moved out of an area where mobile gear is not permitted into an area where it is allowed (for example, out of the habitat management area that is overlapped by the proposed South Island Restricted Area). The FEIS should include analyses that explore these possibilities. This could be done using available data on the location of different fisheries that overlap the proposed restricted areas, using information and analytic approaches developed for analyzing the impacts of offshore wind areas. The Council recognizes that definitive conclusions may not be possible because of the difficulty in forecasting the response of trap fishermen to the regulations, but the FEIS should still discuss this issue.

In order to characterize the number of mobile gear vessels that may be affected by ropeless gear areas or the relocation of lobster fishing effort, my staff examined recent mobile gear (bottom and midwater trawl, dredge) and fixed gear (bottom longline, sink gillnet) fishing effort in the proposed restricted areas. The results of that analysis are attached. There are hundreds of mobile gear vessels that fish in the proposed restricted areas. In the proposed South Island Restricted Area, surfclam and scallop dredge vessels appear most likely to be affected. In addition, scallop dredge, clam dredge, bottom trawl, and fixed gear vessels that fish in both the Great South Channel Restricted Area and the Massachusetts Restricted Area are also at risk. The FEIS should

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¹ We have been unable to definitively determine the cost of equipment that will detect ropeless gear in time for a trawl vessel to alter course and avoid it. This estimate is based on the cost of purchasing and installing a forward-looking depth sounder on a fishing vessel. It may underestimate the cost if multiple transducers are required. It also does not consider the availability of vessel haulout facilities.

² This conclusion of possible positive habitat impacts is suspect. The seasonal exclusion of mobile bottom-tending gear is not likely to have a major habitat benefit, given that recovery time scales are on the order of months to years.
take a close look at these results and evaluate the impacts on these vessels. The final rule should address how the concerns of these vessels will be addressed.

To summarize our comments, the Council has great concerns about the proposal to allow ropeless fishing because at present there is no clear mechanism for mobile gear to avoid it and the costs to these fisheries are unknown. We also urge the agency to improve the economic analyses to address the effects of the entire proposed rule on mobile gear fisheries. Thank-you for providing us the opportunity to comment. Please contact me if you have questions.

Sincerely,

Thomas A. Nies
Executive Director

Attachment: Fishing Effort in the Proposed Whale Restricted Areas
Fishing effort in the proposed whale restricted areas

Source: VTR, Clam Logbook. Data compiled by Geret DePiper and Dennis Corvi, NEFSC and summarized by Michelle Bachman. February 25, 2021

Pot/trap effort, as well as effort using some additional gear types with small amounts of total landings, are not included in this summary.

South Island Restricted Area

Activity was grouped across multiple gear codes as follows:

- Clam dredge: DRC
- Scallop dredge: DRS, DSC, DTC, DTS
- Bottom trawl: OHS, OTC, OTF, OTO, OTR
- Bottom fixed gears: GNS, LLB

Target species (>40,000 lb during 2019 in that gear category):

- Clam dredge: Surfclam, ocean quahog
- Scallop dredge: Sea scallop
- Bottom trawl: Butterfish, cod, haddock, longfin squid, monkfish, redfish, summer flounder
- Fixed gears: Monkfish, tilefish

Trips shows unique TRIPID values from VTR, except for clam dredges, where the GEARID field was used, because the clam logbooks do not have TRIPID.

The column ‘Average percent inside’ relates to the proportion of the trip footprint estimated to occur within the restricted area, averaged across the records in the table. This is based on the fishing footprints method, where the latitude/longitude reported on the VTR is the assumed center of the spatial distribution of effort, but where activity is inferred over a circular footprint around the center point. The higher percentages for clam and scallop dredges suggest that clam dredge, and to a lesser extent scallop dredge, trips are truly focused inside this area, while there is less direct overlap for other gears. This indirect overlap due to the footprint method is likely responsible for some of the deeper-water target species indicated in the results, such as red crab.

Considering individual seasons and permits (this is not shown in the table below), there are many vessels with just a few (<5) overlapping trips, but some clam and scallop dredge vessels show many (i.e. 10-30 trips) overlapping the area, suggesting a greater dependency on the area for those fishermen.

Data are for February, March, and April only.
<table>
<thead>
<tr>
<th></th>
<th>Trips</th>
<th>Permits</th>
<th>Average percent Inside</th>
<th>Total quantity kept</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2015</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clam dredge</td>
<td>182</td>
<td>11</td>
<td>73.49%</td>
<td>1,863,818</td>
</tr>
<tr>
<td>Scallop dredge</td>
<td>128</td>
<td>75</td>
<td>30.06%</td>
<td>1,492,653</td>
</tr>
<tr>
<td>Bottom trawl</td>
<td>81</td>
<td>51</td>
<td>2.04%</td>
<td>2,866,961</td>
</tr>
<tr>
<td>Fixed</td>
<td>7</td>
<td>6</td>
<td>7.05%</td>
<td>144,936</td>
</tr>
<tr>
<td><strong>2016</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clam dredge</td>
<td>190</td>
<td>14</td>
<td>77.37%</td>
<td>2,128,354</td>
</tr>
<tr>
<td>Scallop dredge</td>
<td>194</td>
<td>87</td>
<td>36.57%</td>
<td>1,945,667</td>
</tr>
<tr>
<td>Bottom trawl</td>
<td>80</td>
<td>55</td>
<td>1.62%</td>
<td>1,538,089</td>
</tr>
<tr>
<td>Fixed</td>
<td>7</td>
<td>3</td>
<td>11.23%</td>
<td>35,590</td>
</tr>
<tr>
<td><strong>2017</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clam dredge</td>
<td>135</td>
<td>14</td>
<td>90.15%</td>
<td>1,528,607</td>
</tr>
<tr>
<td>Scallop dredge</td>
<td>584</td>
<td>137</td>
<td>22.08%</td>
<td>2,613,525</td>
</tr>
<tr>
<td>Bottom trawl</td>
<td>90</td>
<td>55</td>
<td>1.26%</td>
<td>4,181,955</td>
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<tr>
<td>Fixed</td>
<td>3</td>
<td>3</td>
<td>13.51%</td>
<td>11,222</td>
</tr>
<tr>
<td><strong>2018</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clam dredge</td>
<td>156</td>
<td>13</td>
<td>87.18%</td>
<td>1,657,760</td>
</tr>
<tr>
<td>Scallop dredge</td>
<td>262</td>
<td>117</td>
<td>47.73%</td>
<td>2,443,301</td>
</tr>
<tr>
<td>Bottom trawl</td>
<td>70</td>
<td>37</td>
<td>1.93%</td>
<td>2,824,948</td>
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<tr>
<td>Fixed</td>
<td>13</td>
<td>6</td>
<td>35.22%</td>
<td>163,189</td>
</tr>
<tr>
<td><strong>2019</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clam dredge</td>
<td>162</td>
<td>12</td>
<td>89.90%</td>
<td>1,565,979</td>
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<tr>
<td>Scallop dredge</td>
<td>629</td>
<td>211</td>
<td>17.77%</td>
<td>8,022,149</td>
</tr>
<tr>
<td>Bottom trawl</td>
<td>55</td>
<td>37</td>
<td>0.57%</td>
<td>3,971,207</td>
</tr>
<tr>
<td>Fixed</td>
<td>18</td>
<td>9</td>
<td>7.18%</td>
<td>226,407</td>
</tr>
</tbody>
</table>
Activity was grouped across multiple gear codes as follows:

- Bottom trawl: OHS, OTB, OTF
- Bottom fixed gears: GNS, LLB
- Other: HND, OTM, PTM, PUR

Target species (>40,000 lb during 2019 in that gear category):

- Bottom trawl: American plaice, lobster, cod, haddock, monkfish, pollock, redfish, whiting, white hake, witch flounder
- Bottom fixed gears: Pollock
- Other: Herring

The column ‘Average percent inside’ relates to the proportion of the trip footprint estimated to occur within the restricted area, averaged across the records in the table. This is based on the fishing footprints method, where the latitude/longitude reported on the VTR is the assumed center of the spatial distribution of effort, but where activity is inferred over a circular footprint around the center point. Unlike the higher percentages for clam and scallop dredges in the South Island RA, these lower percentages suggest that trips occur partially inside and partially outside LMA 1.

Considering individual seasons and permits (this is not shown in the table below), there are many vessels with just a few (<5) overlapping trips, but some vessels show 6-20 trips overlapping the area (higher values for some pot vessels), suggesting a greater dependency on the area for those fishermen.

Data are for October, November, December, and January only.
Table 2. Fishing effort in LMA 1 with select gear types.

<table>
<thead>
<tr>
<th></th>
<th>Trips</th>
<th>Permits</th>
<th>Average percent inside</th>
<th>Total quantity kept</th>
</tr>
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<tr>
<td><strong>2015</strong></td>
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<td></td>
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<tr>
<td>Bottom trawl</td>
<td>258</td>
<td>44</td>
<td>4%</td>
<td>4,351,353</td>
</tr>
<tr>
<td>Fixed</td>
<td>92</td>
<td>13</td>
<td>12%</td>
<td>513,457</td>
</tr>
<tr>
<td>Other</td>
<td>46</td>
<td>13</td>
<td>6%</td>
<td>4,868,137</td>
</tr>
<tr>
<td>Pots</td>
<td>341</td>
<td>36</td>
<td>9%</td>
<td>1,119,310</td>
</tr>
<tr>
<td><strong>2016</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottom trawl</td>
<td>301</td>
<td>49</td>
<td>4%</td>
<td>4,238,240</td>
</tr>
<tr>
<td>Fixed</td>
<td>66</td>
<td>13</td>
<td>9%</td>
<td>404,642</td>
</tr>
<tr>
<td>Other</td>
<td>17</td>
<td>8</td>
<td>1%</td>
<td>5,314,607</td>
</tr>
<tr>
<td>Pots</td>
<td>278</td>
<td>37</td>
<td>7%</td>
<td>992,949</td>
</tr>
<tr>
<td><strong>2017</strong></td>
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<td>Bottom trawl</td>
<td>340</td>
<td>55</td>
<td>8%</td>
<td>6,259,539</td>
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<tr>
<td>Fixed</td>
<td>70</td>
<td>13</td>
<td>12%</td>
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<tr>
<td>Other</td>
<td>17</td>
<td>5</td>
<td>4%</td>
<td>610,380</td>
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<tr>
<td>Pots</td>
<td>288</td>
<td>34</td>
<td>4%</td>
<td>843,158</td>
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<tr>
<td><strong>2018</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Bottom trawl</td>
<td>298</td>
<td>44</td>
<td>10%</td>
<td>6,559,828</td>
</tr>
<tr>
<td>Fixed</td>
<td>69</td>
<td>11</td>
<td>11%</td>
<td>533,021</td>
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<td>Other</td>
<td>15</td>
<td>4</td>
<td>0%</td>
<td>1,663,553</td>
</tr>
<tr>
<td>Pots</td>
<td>295</td>
<td>35</td>
<td>7%</td>
<td>786,011</td>
</tr>
<tr>
<td><strong>2019</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Bottom trawl</td>
<td>266</td>
<td>41</td>
<td>9%</td>
<td>5,864,087</td>
</tr>
<tr>
<td>Fixed</td>
<td>36</td>
<td>8</td>
<td>20%</td>
<td>271,566</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>4</td>
<td>3%</td>
<td>484,333</td>
</tr>
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<td>Pots</td>
<td>150</td>
<td>27</td>
<td>8%</td>
<td>690,753</td>
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</tbody>
</table>
Great South Channel Restricted Area

Activity was grouped across multiple gear codes as follows:

- Clam dredge: DRC
- Scallop dredge: DRS, DSC, DTC, DTS
- Bottom trawl: OHS, OTB, OTF, OTO, OTR, OTS
- Fixed gears: GNS, LLB
- Midwater trawl: OTM, PTM

Target species (>40,000 lb during 2019 in that gear category):

- Clam dredge: Surfclam
- Scallop dredge: Sea scallop
- Bottom trawl: American plaice, American lobster, cod, haddock, Illex squid, longfin squid, monkfish, pollock, redfish, scup, silver hake, skates, white hake, winter flounder, witch flounder
- Fixed gears: Skates
- Midwater gears: Atlantic herring

Trips shows unique TRIPID values from VTR, except for clam dredges, where the GEARID field was used, because the clam logbooks do not have TRIPID.

The column ‘Average percent inside’ relates to the proportion of the trip footprint estimated to occur within the restricted area, averaged across the records in the table. This is based on the fishing footprints method, where the latitude/longitude reported on the VTR is the assumed center of the spatial distribution of effort, but where activity is inferred over a circular footprint around the center point. The higher percentages for scallop dredges and fixed gears suggests these trips are truly focused inside this area, while there is less direct overlap for other gears.

Data are for April, May, and June only.
Table 3. Fishing effort in GSC Restricted Area with select gear types.

<table>
<thead>
<tr>
<th></th>
<th>Trips</th>
<th>Permits</th>
<th>Average percent inside</th>
<th>Total quantity kept</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clam dredge</td>
<td>28</td>
<td>7</td>
<td>2%</td>
<td>604,934</td>
</tr>
<tr>
<td>Scallop dredge</td>
<td>385</td>
<td>120</td>
<td>42%</td>
<td>2,678,375</td>
</tr>
<tr>
<td>Bottom trawl</td>
<td>436</td>
<td>110</td>
<td>19%</td>
<td>13,049,800</td>
</tr>
<tr>
<td>Midwater trawl</td>
<td>33</td>
<td>10</td>
<td>8%</td>
<td>17,147,686</td>
</tr>
<tr>
<td>Fixed</td>
<td>24</td>
<td>17</td>
<td>34%</td>
<td>297,826</td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clam dredge</td>
<td>78</td>
<td>11</td>
<td>6%</td>
<td>912,153</td>
</tr>
<tr>
<td>Scallop dredge</td>
<td>183</td>
<td>87</td>
<td>40%</td>
<td>1,994,880</td>
</tr>
<tr>
<td>Bottom trawl</td>
<td>410</td>
<td>120</td>
<td>15%</td>
<td>13,038,256</td>
</tr>
<tr>
<td>Midwater trawl</td>
<td>37</td>
<td>11</td>
<td>35%</td>
<td>18,583,674</td>
</tr>
<tr>
<td>Fixed</td>
<td>70</td>
<td>25</td>
<td>30%</td>
<td>1,361,869</td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clam dredge</td>
<td>87</td>
<td>9</td>
<td>9%</td>
<td>1,280,561</td>
</tr>
<tr>
<td>Scallop dredge</td>
<td>171</td>
<td>102</td>
<td>38%</td>
<td>1,583,087</td>
</tr>
<tr>
<td>Bottom trawl</td>
<td>396</td>
<td>109</td>
<td>19%</td>
<td>8,827,336</td>
</tr>
<tr>
<td>Midwater trawl</td>
<td>22</td>
<td>9</td>
<td>23%</td>
<td>11,608,135</td>
</tr>
<tr>
<td>Fixed</td>
<td>65</td>
<td>19</td>
<td>42%</td>
<td>647,718</td>
</tr>
<tr>
<td>2018</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clam dredge</td>
<td>32</td>
<td>9</td>
<td>35%</td>
<td>1,043,009</td>
</tr>
<tr>
<td>Scallop dredge</td>
<td>707</td>
<td>151</td>
<td>81%</td>
<td>3,241,612</td>
</tr>
<tr>
<td>Bottom trawl</td>
<td>306</td>
<td>79</td>
<td>20%</td>
<td>8,113,599</td>
</tr>
<tr>
<td>Midwater trawl</td>
<td>1</td>
<td>1</td>
<td>15%</td>
<td>150,600</td>
</tr>
<tr>
<td>Fixed</td>
<td>43</td>
<td>17</td>
<td>46%</td>
<td>391,530</td>
</tr>
<tr>
<td>2019</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clam dredge</td>
<td>62</td>
<td>10</td>
<td>21%</td>
<td>907,942</td>
</tr>
<tr>
<td>Scallop dredge</td>
<td>708</td>
<td>138</td>
<td>88%</td>
<td>2,614,005</td>
</tr>
<tr>
<td>Bottom trawl</td>
<td>306</td>
<td>80</td>
<td>20%</td>
<td>8,609,141</td>
</tr>
<tr>
<td>Fixed</td>
<td>35</td>
<td>14</td>
<td>39%</td>
<td>362,085</td>
</tr>
</tbody>
</table>
Massachusetts Restricted Area

Activity was grouped across multiple gear codes as follows:

- Other dredge: DRC, DRO
- Scallop dredge: DRS, DSC, DTC, DTS
- Bottom trawl: OHS, OTC, OTF, OTR, OTS
- Fixed gears: GNS, LLB
- Midwater trawl: OTM, PTM

Target species (>40,000 lb during 2019 in that gear category):

- Other dredge: Surfclam
- Scallop dredge: Sea scallop
- Bottom trawl: American plaice, American lobster, cod, haddock, monkfish, pollock, redfish, skates, white hake, winter flounder, yellowtail flounder
- Fixed gears: No single species above threshold
- Midwater gears: Atlantic herring

Trips shows unique TRIPID values from VTR, except for the other dredge category, where the GEARID field was used, because the clam logbooks do not have TRIPID.

The column ‘Average percent inside’ relates to the proportion of the trip footprint estimated to occur within the restricted area, averaged across the records in the table. This is based on the fishing footprints method, where the latitude/longitude reported on the VTR is the assumed center of the spatial distribution of effort, but where activity is inferred over a circular footprint around the center point. The higher percentages for scallop dredges and fixed gears suggests these trips are truly focused inside this area, while there is less direct overlap for other gears.

Data are for February, March, and April only.
Table 4. Fishing effort in Massachusetts Restricted Area with select gear types.

<table>
<thead>
<tr>
<th>Row Labels</th>
<th>Trips</th>
<th>Permits</th>
<th>Average of Percent Inside</th>
<th>Total quantity kept</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2015</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other dredge</td>
<td>164</td>
<td>11</td>
<td>23%</td>
<td>1,526,971</td>
</tr>
<tr>
<td>Scallop dredge</td>
<td>361</td>
<td>75</td>
<td>84%</td>
<td>928,924</td>
</tr>
<tr>
<td>Bottom trawl</td>
<td>346</td>
<td>78</td>
<td>26%</td>
<td>5,519,323</td>
</tr>
<tr>
<td>Midwater trawl</td>
<td>7</td>
<td>4</td>
<td>80%</td>
<td>2,278,366</td>
</tr>
<tr>
<td>Fixed</td>
<td>12</td>
<td>5</td>
<td>7%</td>
<td>109,024</td>
</tr>
<tr>
<td><strong>2016</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other dredge</td>
<td>145</td>
<td>12</td>
<td>23%</td>
<td>1,454,743</td>
</tr>
<tr>
<td>Scallop dredge</td>
<td>439</td>
<td>106</td>
<td>69%</td>
<td>1,446,450</td>
</tr>
<tr>
<td>Bottom trawl</td>
<td>578</td>
<td>89</td>
<td>25%</td>
<td>4,913,809</td>
</tr>
<tr>
<td>Fixed</td>
<td>100</td>
<td>17</td>
<td>67%</td>
<td>126,220</td>
</tr>
<tr>
<td><strong>2017</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other dredge</td>
<td>67</td>
<td>12</td>
<td>23%</td>
<td>834,111</td>
</tr>
<tr>
<td>Scallop dredge</td>
<td>573</td>
<td>135</td>
<td>86%</td>
<td>2,077,342</td>
</tr>
<tr>
<td>Bottom trawl</td>
<td>634</td>
<td>99</td>
<td>22%</td>
<td>6,147,289</td>
</tr>
<tr>
<td>Fixed</td>
<td>74</td>
<td>16</td>
<td>73%</td>
<td>101,331</td>
</tr>
<tr>
<td><strong>2018</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other dredge</td>
<td>51</td>
<td>6</td>
<td>31%</td>
<td>697,069</td>
</tr>
<tr>
<td>Scallop dredge</td>
<td>919</td>
<td>115</td>
<td>82%</td>
<td>1,426,691</td>
</tr>
<tr>
<td>Bottom trawl</td>
<td>576</td>
<td>80</td>
<td>26%</td>
<td>6,103,193</td>
</tr>
<tr>
<td>Midwater trawl</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Fixed</td>
<td>78</td>
<td>17</td>
<td>60%</td>
<td>151,037</td>
</tr>
<tr>
<td><strong>2019</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other dredge</td>
<td>58</td>
<td>10</td>
<td>32%</td>
<td>673,205</td>
</tr>
<tr>
<td>Scallop dredge</td>
<td>1062</td>
<td>139</td>
<td>85%</td>
<td>2,288,495</td>
</tr>
<tr>
<td>Bottom trawl</td>
<td>521</td>
<td>71</td>
<td>27%</td>
<td>6,747,962</td>
</tr>
<tr>
<td>Midwater trawl</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Fixed</td>
<td>73</td>
<td>13</td>
<td>80%</td>
<td>91,132</td>
</tr>
</tbody>
</table>
Dear Mr. Pentony,

I am writing on behalf of the Atlantic States Marine Fisheries Commission (Commission) to provide comments on the Draft Environmental Impact Statement (DEIS) and proposed rule to modify the Atlantic Large Whale Take Reduction Plan (ALWTRP).

The Commission urges NOAA Fisheries to work towards timely completion of the final rule for the ALWTRP. Complementary to the ongoing changes in the ALWTRP is a court ordered completion of a Biological Opinion under Section 7 of the ESA. In his August 19, 2020 ruling, U.S District Court Judge James E. Boasberg ordered NOAA Fisheries to issue a new Biological Opinion on federal fisheries no later than May 31, 2021. While the court order is not specific to the proposed rule, timely completion of changes to the ALWTRP is necessary so that the two documents move in parallel and these regulatory changes can be considered in the Biological Opinion. Delay of the Biological Opinion, or supporting documentation in this rule, has the potential for the court to intervene with a complete closure of the lobster and Jonah crab fisheries, which would have devastating impacts to the industry and the communities they support.

The proposed rule would reduce the number of vertical buoy lines fished outside of areas exempted under the ALWTRP by increasing the minimum number of traps required per trawl (known as trawling-up) based on area fished and distance from shore. As the purpose of these measures is to reduce the number of vertical buoy lines, the Commission requests the final rule allow for trawl equivalency within an area. Trawl equivalencies give the individual harvester the flexibility to adapt to new fishing practices while using configurations that achieve the intentions of the ALWTRP. The diversity of bottom habitat and the fishing fleet make one size fits all regulations difficult and dangerous for harvesters. Within a small area there can be significant variation in vessel size and configuration, with varying capacity for safely hauling and carrying traps. However, under the proposed rule, all vessels must follow the same trap per trawl requirement. Larger trap per trawl requirements pose safety concerns for smaller vessels, or vessels with less deck space, because they do not have the capacity to haul or hold the required trawls. The Commission is supportive of trawl equivalencies because they provide more flexibility for harvesters to use alternative configurations, and address logistic and safety concerns, while still accomplishing the required vertical line reductions. The Commission’s American Lobster Fishery Management Plan (FMP) does not specify the number of traps per trawl, therefore trawl equivalencies will not undermine the FMP.
The Commission is concerned that although the proposed rule includes provisions for “ropeless” fishing to occur within the seasonal restricted areas, it does not adequately address the costs of transitioning to ropeless gear. The DEIS estimates costs associated with suspending fishing or relocating effort during seasonal closures, but does not provide any analysis to estimate the costs of adopting ropeless gear. In addition, there is no discussion in the DEIS on the costs that ropeless fishing testing could incur on non-trap gear fisheries, such as the mobile gear fleet. Since the removal of surface systems would eliminate the visual signal of where traps are located, vessels operating in ALWTRP closed areas, including those who participate in mobile gear fisheries, would need to have an acoustic modem in order to locate submerged traps, or they may be shut out of fishing in certain areas if there is no way to detect ropeless fishing gear to avoid gear conflicts. Given the uncertainty in the vessels that would be impacted by the use of ropeless fishing in closed areas, the Commission requests a comprehensive cost analysis be conducted.

There is still significant uncertainty surrounding the enforceability of lobster resource management measures with ropeless fishing. Currently no state marine enforcement vessels are equipped with the appropriate technology to retrieve and return ropeless fishing devices. Without adequate resources to properly equip law enforcement vessels and train officers on the new equipment, the use of ropeless fishing in closed areas could result in incomplete enforcement of management measures within the lobster and Jonah crab fisheries. This challenge may be further complicated if multiple ropeless technologies with different retrieval mechanisms are tested within a state. The DEIS should analyze the impact of ropeless fishing testing on the ability to adequately enforce lobster management resource measures.

The ALWTRP measures must be enforceable in order to have positive impacts on whale populations. The Commission has previously expressed concern to NOAA Fisheries over the lack of offshore enforcement. Specifically, enforcement of regulations in the offshore portion of the lobster/crab pot/trap fishery is minimal and both the Commission and industry were concerned the incidence of non-compliance is rising. These concerns still hold true today. If the measures required by the ALWTRP cannot be enforced, the ALWTRP will not be successful. While the distance from shore and depth of water create unique challenges in monitoring the offshore lobster fishery, the Commission believes solutions exist to effectively enforce regulations throughout the management unit.

It is irrefutable that the impacts of the ALWTRP will be substantial and will result in negative economic and social impacts on the lobster and Jonah crab fisheries, as well as dependent communities. The DEIS estimates the total cost of the proposed rule over the first six years of implementation to be between $24.5 and $53.5 million, in 2020 dollars, with compliance costs per small business entity ranging from $1,900 to $4,100 per year for six years. Given the magnitude of the proposed changes, they will not only take time to implement, but will also impose significant costs to thousands of harvesters. It is vital the final rule take this into consideration and provide practical start dates for implementation of the proposed measures, such that the required changes can be achieved without severe economic consequences to the fisheries.

As proposed, the ALWTRP will require extensive changes to the operation of lobster and crab trap/pot fisheries in the Northeast region. To ensure the smoothest possible transition to the new requirements
across all affected states and areas, and minimize negative economic impacts to the fishery, coordination with state agencies, law enforcement, the Commission and the industry will be essential.

The Commission is prepared to provide support as NOAA Fisheries moves forward with the proposed modifications to the Plan to achieve a 60% risk reduction. We appreciate NOAA Fisheries support and collaboration on this important issue.

Sincerely,

Robert E. Beal

cc: American Lobster Management Board
    ISFMP Policy Board
Dear Dr. Doremus,

As a member of both the ASRG and the ALWTRP I sit in an interesting position to comment on the proposed rule implementing amendments to the Atlantic Large Whale Take Reduction Plan. In this joint capacity, I respectfully submit comments and recommendations with regards to the science and process for the development of the proposed rule:

1. **With respect to the 60% risk reduction target** – Updating M/SI estimates to include unobserved mortality indicates that Alternative 2 of the proposed rule’s 60% risk reduction would not reduce takes below PBR; however, Alternative 3 which achieves an estimated 70-86% risk reduction would have a better chance of reducing takes to below overall PBR:
   a. if 4.82 M/SI per year are from Federal trap/pot fisheries (as per BiOp, pg.227 and Table 59),
   b. A 60% reduction would allow 1.93 takes per year, but
   c. PBR is 0.8 (and 0.4 for US fisheries), and
   d. A 70 to 86% reduction would reduce takes to 1.45 to 0.67 per year in the Federal trap/pot fishery.

2. **Seasonal restricted area** alternatives are insufficiently broad in time and space –
   a. The “Massachusetts South Islands” seasonal gear closure area doesn’t take into consideration recent surveys which well document that many NARW foraging there through the winter and to the south of Martha’s Vineyard, so NOAA should consider expanding the proposed gear closure areas south of both Islands in time and space based on recent aerial and acoustic surveys. The preferred alternative relies too heavily on just the latest year or two of data available at the time, but NARWs have occurred throughout much of the larger rectangular area in Alternative 3 over the 2010–2020 period.
   b. BSIA also suggests that seasonal restricted area in LMA1 could be extended into LMA 3 for additional risk reduction, The Duke model, WHOI glider detections, and the co-occurrence model all suggest that any potential hot spot of right whales in this area extends beyond the LMA1 boundary into LMA 3. It is not clear why the restriction is only proposed for in LMA1. This is another place which could achieve significant risk reduction.

3. **Dynamic Area Closures could further reduce entanglement risk** - Given that the presence of NARWs in the Massachusetts South Island and LMA1 seasonal restricted areas are reflect a new phenomenon resulting from shifting distributions of NARW prey, it is likely that whales will continue to be found in areas and times which are not
protected by seasonal gear closures. For example, whales can occur in the South Island area in any month of the year, with an unusual peak (from summer) in July. Additionally, sightings of right whales in the proposed LMA1 closure are highly variable across time. As such, dynamic area closures to fixed gear should be reconsidered as a way to spatially protect ephemeral groupings of whales.

4. The reduction of M/Sl to NARW achieved from reliance on weak links and weak vertical lines with <1700# breaking strength may be less than estimated, because:
   a. The Knowlton et al (2015) analysis suggesting whales do not become entangled in lines with a breaking strength of less than 1700# line in use is biased in that very few vertical lines in the analysis period had breaking strengths < 1,700#;
   b. After the implementation of weak links, the frequency of whales being anchored by or dragging pots appears to have declined (no NARW have been found trailing pots or anchored to gear in the US during 2015-2019), as such further weakening vertical line strength may not significantly reduce this sort of interaction; and
   c. Entangling whales in lines < 1,700# may still lead to M/Sl and sublethal effects (leading to reduced reproduction).

5. The process by which the amendments to the ALWTRP were developed did not involve the entire ALWTTR? – the Take Reduction Team developed a consensus framework TRP in April 2019, but the states and industry fleshed out their individual area’s plans separately from the Team’s discussions. The TRP should then have come back to the full Team for final review; lacking that review, the final plan should not be considered to be a consensus plan.

6. A Final thought - These comments are all major revisions to the proposed rule, and given the timeline, it will be difficult to adequately consider them/analyze data, and then meet with the Team for consensus. As such, NOAA should consider developing a Supplemental Proposed Rule within a timeline sufficient to incorporate consideration of significant comments, and use the spring ALWTRT meeting to work towards a consensus on the final plan/rule.

Thanks for consideration of my comments!!

Sincerely,

Richard L Merrick

Richard L Merrick
fauvemarin@Msn.com
Overall view: The proposed plan seems to have largely disregarded the nearly unanimous recommendations of the TRT. It is my recollection that the main thrust of the TRT near-consensus recommendations hinged on reducing vertical lines, and since ropeless fishing technology and management of gear conflict seem to be a continuing challenge, that left the TRT with removal of vertical lines by reduction of effort as the best alternative. The rationale of this is that success of risk reduction from removal of vertical lines does not depend on co-occurrence modeling or the survey effort, data and time required to update such modeling. This brings me to my biggest concerns with the new plan, which are outlined below.

1) Perhaps most importantly, the risk reduction measures being proposed are based on a PBR for right whales of 0.9. Not only does this ignore the best available data which suggests a reduction in PBR is in order, but it also allocates the full PBR to the pot/trap fishery. Since gillnets and vessels also play sizable roles in the decline of NARW, meeting a 0.9 PBR with pot/trap gear, which I still don’t think this plan does, would still have cumulative mortalities above 0.9 PBR with combined vessel and gillnet mortalities. Using 0.9 PBR for pot/trap fishery alone would require that ALL other anthropogenic mortality be reduced to zero. Since I doubt there is a plan to do that, pot/trap fishery should not be allocated the full 0.9 PBR, but rather a percentage of that which correlates to the percentage of mortalities that fishery is estimated to be responsible for. I find this to be one of the greatest flaws in this plan, and one that will likely ensure continued cumulative mortality above PBR and therefore not meet the mortality reduction required by law.

2) Since management that is based on co-occurrence modeling depends on distribution of the gear and the whales, heavy dependence of static restricted areas (e.g. LMA1) to reduce risk seems flawed at best. The reason for this is twofold:

   A) Even though restricted areas may reduce some risk, it seems like a far more theoretical risk reduction measure than removal of vertical lines, which is a tangible risk reduction that provides protection to the whales throughout their movements. Afterall, whales do not miraculously arrive in restricted areas.

   B) There is no current mechanism I am aware of for real-time monitoring of whale distribution or modification of said distribution within the restricted areas in the event distribution shifts out of the restricted areas. Since any modification of restricted areas would require another very lengthy TRT process, it is an untenable mechanism for managing this species or the main threat to it, even if we had reliable real-time survey effort to support such a modification to the restricted area.

Even without the likely impending reduction of PBR, I have a hard time seeing how this measure would satisfy the management needs for these endangered whales.

3) Since the new population data suggests PBR should be lowered, how is it you are proceeding with the old risk reduction numbers? Would a drop in PBR not necessitate an increased risk
reduction required to meet sustainable numbers? I recognize the new numbers are not yet confirmed in the newest the Stock Assessment Report, but if we have knowledge of their existence and believe them to be credible, disregarding them in the formation of the required risk reduction and this DEIS seems negligent. The DEIS states that the TRT focused recommendations on the lower 60% risk reduction because of economic impacts to the fishery, among other things. Given the new population data and how long this process has taken (outside of the TRT process), I dare suggest several TRT members may have a different opinion. Therefore, this statement within the DEIS represents TRT comments and opinions that have not aged well with new information.

4) At first glance, the measures discussed in the preferred option for LMA3 seem woefully inadequate. Given line strengths, pot counts, etc., LMA3 arguably presents the most lethal interactions for NARWs due to both line strength and weight of the trawl of pots. The measures being taken do not, in my opinion, reduce this significant threat adequately. Since PBR is so low (and likely will fall lower), only a few interactions with this gear could easily exceed PBR. Due to the water depth, distance from shore, and weight of the gear, these mortalities will likely go undetected. Out of sight, out of mind but the population continues to decline.

5) LMA3 also presents a monitoring and enforcement challenge. Trawling up to 45 pots presents a challenge to agencies tasked with gear inspections. Are the vessels responsible for gear inspection capable of pulling up and inspecting such large pot strings? If the gear cannot be monitored/inspected, this measure is unenforceable, and therefore one of the largest risks in LMA3 remains.

6) State management credits: It is my understanding that several state credits are being added to the risk reduction estimates, yet I am not clear on how the credits are estimated. I also may have missed any discussion regarding how those states will be held accountable for those measures, other than vague statements about Plan modifications being made in response. As someone who has seen how our state manages the menhaden fishery within the Chesapeake Bay, I have serious concerns. At the TRT meeting NOAA leadership gave speeches about the urgency of the situation, and that drastic measures must be taken. The DEIS has language suggesting that further modifications to the Plan may be made if the identified state measures are not implemented. This suggests another possible source of significant delay, since even more time would be required to allow state implementation, evaluate state implementation, and enact additional measures to combat lack of state implementation. This strategy goes against the very urgency NOAA leadership expressed at the TRT meeting and adds additional time to what has already been significantly delayed.

7) Weak lines (breaking at 1,700 lbs) are not a clean answer. While the preferred option of the DEIS assigns 26% risk reduction to weak lines, it is not yet clear to me how that risk reduction is calculated, since lines can lead to different types of mortality, namely acute/peracute mortality through underwater entrapment, and chronic mortality or morbidity through gradual laceration, constriction, infection, amputation, etc. Never mind the fact that weak lines don’t
really address young whales, which I am unclear if counted in this particular risk reduction. The 1,700 lbs breaking strength likely only addresses acute mortalities. Without significant vertical line reductions, the threat is still considerable, and despite restricted areas, the whales must still travel through all the gear to get to those areas. Therefore, when estimates that all buoy lines (outside of ME exemption areas) would be "modified and more than 26% of the rope...would be weakened", this certainly does not translate into as large a risk reduction because even weaker lines are deadly. This is once again a strong argument for vertical line reduction.

8) Comments in the DEIS about the regional administrator determining whether frequency of entanglements has been reduced by 60% ring hollow to me. I do not pretend to know all the intricacies or data channels, but it is my understanding that the fidelity in data to make such a determination is questionable, at least on a short-term basis. Additionally, it is possible such determination depends on a few specific organizations obtaining such data, rather than inherent NOAA programs. If this is indeed the case, it remains unclear to me how this clause is very meaningful, or how such determinations will be made by the regional administrator.

Sincerely,

Alexander M. Costidis, Ph.D.
Senior Scientist
Stranding Response and Biomedical Research
Stranding Response Program
Virginia Aquarium & Marine Science Center

Additional affiliations:
NOAA Right whale necropsy team leader
NOAA Unusual Mortality Event working group member
Atlantic Large Whale Take Reduction Team member
Hi Colleen,

Thank you for giving us a synopsis of the proposed rule last week. I would like to start by saying that I do not envy your job. I wanted to follow up with some comments to you, though I plan to also submit public comments.

**Overall view:** As confirmed during the Q&A, the plan seems to have largely disregarded the nearly unanimous recommendations of the TRT. On a personal note, the whole process of the TRT and plan development has been very disappointing. While I recognize the TRT is supposed to serve an advisory role, the backroom dealings that transpired with only certain “team” members of the TRT go a long way toward jeopardizing any legitimacy the process has.

It is my recollection that the main thrust of the TRT near-consensus recommendations hinged on reducing vertical lines, and since ropeless fishing technology and management of gear conflict seem to be a continuing challenge, that left us with removal of vertical lines by reduction of effort as our best alternative. The rationale of this is that success of risk reduction from removal of vertical lines does not depend on co-occurrence modeling or the survey effort, data and time required to update such modeling. This brings me to my biggest concerns with the new plan.

1) Since management based on co-occurrence modeling depends on distribution of the gear and the whales, heavy dependence of static restricted areas (e.g. LMA1) to reduce risk seems flawed at best. The reason for this is twofold:

   A) Even though restricted areas may reduce some risk, it seems like a far more theoretical risk reduction measure than removal of vertical lines, which is a tangible risk reduction that provides protection to the whales throughout their movements. Afterall, whales do not miraculously arrive in restricted areas.

   B) There is no current mechanism I am aware of for real-time monitoring of whale distribution or modification of said distribution within the restricted areas in the event distribution shifts out of the restricted areas. Since any modification of restricted areas would require another very lengthy TRT process, it is an untenable mechanism for managing this species or the main threat to it, even if we had reliable real-time survey effort to support such a modification to the restricted area.

Even without the likely impending reduction of PBR, I have a hard time seeing how this measure would satisfy the management needs for these endangered whales.

2) Since the new population data suggests PBR should be lowered, how is it you are proceeding with the old risk reduction numbers? Would a drop in PBR not necessitate an increased risk reduction required to meet sustainable numbers? I recognize the new numbers are not yet confirmed in the newest the Stock Assessment Report, but if we have knowledge of their existence and believe them to be credible, disregarding them in the formation of the required
risk reduction and this DEIS seems negligent. The DEIS states that the TRT focused recommendations on the lower 60% risk reduction because of economic impacts to the fishery, among other things. Given the new population data and how long this process has taken (outside of the TRT process), I dare suggest several TRT members may have a different opinion. Therefore, this statement within the DEIS represents TRT comments and opinions that have not aged well with new information.

3) Perhaps most importantly, the risk reduction measures are being based on a PBR of 0.9. This allocates the full PBR to the pot/trap fishery. Since gillnets and vessels also play sizable roles in the decline of NARW, meeting a 0.9 PBR with pot/trap gear, which I still don’t think this plan does, would still have cumulative mortalities above 0.9 PBR with combined vessel and gillnet mortalities. Using 0.9 PBR for pot/trap fishery would require that ALL other anthropogenic mortality be reduced to zero. Since I doubt there is a plan to do that, pot/trap fishery should not be allocated the full 0.9 PBR, but rather a percentage of that which correlates to the percentage of mortalities that fishery is estimated to be responsible for. I find this to be one of the greatest flaws in this plan, and one that will likely ensure continued cumulative mortality above PBR.

4) At first glance, the measures discussed in the preferred option for LMA3 seem woefully inadequate. Given line strengths, pot counts, etc., LMA3 arguably presents the most lethal interactions for NARWs due to both line strength and weight of the trawl of pots. The measures being taken do not, in my opinion, reduce this significant threat adequately. Since PBR is so low (and likely will fall lower), only a few interactions with this gear could easily exceed PBR. Due to the water depth, distance from shore, and weight of the gear, these mortalities will likely go undetected. Out of sight, out of mind but the population continues to decline.

5) LMA3 also presents a monitoring and enforcement challenge. Trawling up to 45 pots presents a challenge to agencies tasked with gear inspections. Are the vessels responsible for gear inspection capable of pulling up and inspecting such large pot strings? If the gear cannot be monitored/inspected, this measure is unenforceable, and therefore one of the largest risks in LMA3 remains.

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ACostidis_Comments to Colleen regarding DEIS for ALWTRP_1-19-2021

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Sincerely,

Alex Costidis
Mr. Ben Friedman  
Deputy Under Secretary for Operations, performing the duties of Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator  
National Oceanic and Atmospheric Administration  

Re: Document ID NOAA-NMFS-2020-0031-0006 on the Proposed Rule Taking of Marine Mammals Incidental to Commercial Fishing Operations; Atlantic Large Whale Take Reduction Plan Regulations; Atlantic Coastal Fisheries Cooperative Management Act Provisions; American Lobster Fishery  

March 1, 2021  

Dear Mr. Friedman,  

In response to the National Oceanic and Atmospheric Administration’s (NOAA) Proposed Rule (Proposed Rule) to amend the regulations implementing the Atlantic Large Whale Take Reduction Plan to reduce the incidental mortality and serious injury to North Atlantic right whales (Eubalaena glacialis), fin whales (Balaenoptera physalus), and humpback whales (Megaptera novaeangliae) in northeast commercial lobster and crab trap/pot fisheries to meet the goals of the Marine Mammal Protection Act and the Endangered Species Act, the New England Aquarium (Aquarium) submits this comment to express our strong reservations that the measures outlined in the Proposed Rule and accompanying Draft Environmental Impact Statement (DEIS) are not nearly aggressive enough to change the fate of North Atlantic right whales (NARW) in U.S. waters. Based on our decades of NARW expertise, the Aquarium strongly urges NOAA to revise this Proposed Rule substantially before finalizing it.  

Founded in 1969, the Aquarium is a catalyst for global change through public engagement, commitment to marine animal conservation, leadership in education, innovative scientific research, and effective advocacy for a vital and vibrant ocean. For decades, the Aquarium has been working to protect marine and freshwater ecosystems from human impacts and conserve threatened and endangered animals and habitats. The Aquarium’s scientists conduct cutting-edge research to understand, quantify, and reduce the consequences of human activities on the health of marine species and ecosystems by developing science-based solutions and advocating for policies that balance human use of the ocean with the need for a healthy, thriving ocean now and in the future.  

Scientists at the Aquarium have been researching NARWs for more than 40 years with the express goal of preventing this species from going extinct. To that end, scientists from the Aquarium have served on the Atlantic Large Whale Take Reduction Team (ALWRT) since it was formed in 1996. While we are pleased to see that published research by our scientists was used to inform aspects of the Proposed Rule, our primary concern with the Proposed Rule is that it fails to utilize more recent scientific results and, as a result, the proposed measures will fail to reduce the risks to NARWs and other whales from entanglements in fixed fishing gear resulting in serious injuries and mortalities.  

The Aquarium’s detailed comments regarding the Proposed Rule and DEIS follow together with specific, scientifically-informed recommendations on how to strengthen the regulations before they becomes final. We trust these comments will be viewed as a constructive contribution to the ongoing deliberations, and we are pleased to elaborate or clarify further as needed.
North Atlantic right whales: Status and Overview of Risks

The population of NARWs has been in decline since 2010, and the best population estimates indicate that there are only 356 animals alive today. Given the small size of the population, this species does not have the capacity to sustain high death rates and unpredictable, but declining birth rates.

During the 2000s, calving rates averaged 24 calves per year, but over the past 12 years (2010-2021), calving rates have decreased to an average of 12 per year and, in 2018, no calves were born. Low calving rates, likely exacerbated by the deteriorating health of reproductive females (Christiansen et al. 2020) caused by prolonged stress from entanglements in fixed fishing gear and other stressors, make it less and less likely that the population will be able to recover unless changes are made to eliminate human-caused mortality and help this species survive.

Human-caused mortality and serious injury of NARWs has exceeded legal limits for the past 20 years and has increased in recent years (Sharp et al. 2019). Furthermore, recently published results show that for the period 2010-2017, the probability of detecting a whale carcass was just 29 percent, which means that for every observed death of a NARW, as many as three additional whales have likely died (Pace et al. 2021). This is particularly relevant to the Proposed Rule because, as the Pace et al. (2021) paper details, unobserved mortalities likely result from entanglements rather than vessel strikes.

Mortalities and serious injuries of NARWs from fishing gear entanglements have steadily increased from 2001 to the present (Pace et al. 2021; Sharp et al. 2019; and Knowlton et al. 2016). Changes in the fishing industry likely contributed to this increase. First, the annual number of trap tags documented by the Maine Department of Marine Resources has steadily increased over time, first exceeding one million traps in 1970, followed by two million traps in 1982, and three million traps in 1999. The number of trap tags sold has remained close to or over three million through 2019. Second, in the mid-1990s, rope manufacturing technology changed, which nearly doubled the strength of ropes used for fishing (McKenna et al. 2004). Finally, lobster distribution has shifted and more fishermen are choosing to fish offshore in more months of the year, which is resulting in greater and more unpredictable overlap with NARWs who are shifting their movements due to climate change (Record et al. 2019). An assessment of 30 years of entanglement data (1980-2009) showed a total of 83 percent of all NARWs had been entangled at least once in their lives, and 59 percent had been entangled more than once (Knowlton et al. 2012). Subsequent analyses that included data through 2018 showed that the number of NARWs that had been entangled at least once increased to 87 percent and that the frequency of moderate and severe injuries also increased. From 2010-2018, a total of 558 entanglements were documented, resulting in 112 moderate injuries and 84 severe injuries that had both lethal (Sharp et al. 2019) and sublethal effects (Robbins et al. 2015; Knowlton et al. 2016) on this species.

1 https://www.narwc.org/report-cards.html
2 https://www.narwc.org/report-cards.html
**Percent Risk Reduction**

*RECOMMENDATION 1: In its Final Rule, NOAA should implement measures that reduce the risk of entanglements of NARWs and other cetaceans in fixed fishing gear by at least 80 percent.*

North Atlantic right whales have been in decline for a decade after a slow documented recovery from the whaling era (Pace et al. 2017). In the absence of strong rules preventing entanglements and vessel strikes, the abundance of the species has declined at an unacceptable rate to the current number of 356 remaining animals. Recognizing the time required to finalize regulations that result in action on the water, we expect the species’ abundance will only continue to decline. The Proposed Rule was developed to reduce the risks of entanglements in fishing gear by a minimum of 60 percent, which may have been satisfactory when this process started in 2017, but is no longer sufficient now that that there are substantially fewer (16 percent) NARWs today than in 2017.

Because the Proposed Rule does not account for the most recent population number and the delays in finalizing regulations despite having this information available while the rule was being drafted (Pace et al. 2021), reducing the risk by at least 80 percent is now more appropriate. The Proposed Rule should be revised to reflect the best-available scientific data on the status of the population and to meet NOAA’s legal requirements under the Marine Mammal Protection Act and the Endangered Species Act.

The Proposed Rule’s accompanying DEIS states that “the immediate goal of a take reduction plan is to reduce the serious injury and mortality of strategic stocks being taken during U.S. commercial fishing operations to below PBR levels within six months of its implementation. The long-term goal of a take reduction plan is to reduce, within five years of its implementation, the incidental mortality and serious injury of strategic marine mammals taken in the course of commercial fishing operations to insignificant levels approaching a zero mortality and serious injury rate...” (p. 299); however, the Aquarium argues that reducing risk by 60 percent will not reduce mortalities and serious injuries to below the Potential Biological Removal (PBR) of 0.8 in a five-year timeframe.

The Aquarium would like to take this opportunity to address a common misinterpretation of the modeling results presented in Linden (2021) that suggested removing all mortality attributed to lobster fishing will not prevent the population from declining. This misinterpretation is used to argue that restrictions to the lobster fishery are not justified as they will not improve the conservation status of NARWs. This reasoning is fallacious. The matrix model used in Linden (2021) is the same one published in Corkeron et al. (2018), using the R code from that paper. What Linden (2021) does not provide is the estimates of annual survival and fecundity used to populate the model matrix. As Corkeron et al. (2018) demonstrate, using the upper estimates of survival that NARWs are capable of results in an annual population increase on the order of four percent. Corkeron et al. (2018) also demonstrate that the vast majority of NARW mortality is due to anthropogenic causes (including lobster fishing). Therefore, if all anthropogenic mortality were eliminated to allow NARWs to recover, their population should increase in abundance at about four percent per year. As entanglement in fishing gear accounts for a significant proportion of anthropogenic mortality and morbidity of NARWs (Sharp et al. 2019 and Pace et al. 2021), reducing the risks of mortality and serious injury from entanglements will have a conservation benefit.

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7 [https://www.narwc.org/report-cards.html](https://www.narwc.org/report-cards.html)
Closures

RECOMMENDATION 2: The Aquarium supports closures as a highly effective tool to reduce the risk of entanglements in fishing gear and is a proponent of ropeless gear. The Aquarium recommends that NOAA take following actions to reduce the risks even further:

a. Re-evaluate the closures in the Proposed Rule using a risk-reduction target of 80 percent rather than 60 percent.

b. Develop a mechanism that allows for expeditious adjustments to be made to the timing and spatial extent of the closures based on scientific observations that include visual and acoustic sighting detections and computer modeling confirming the absence or presence of NARWs.

c. Allow Exempted Fishing Permits (EFPs) in closed areas to evaluate the feasibility of ropeless gear and further assess potential risks posed by groundlines, early release of endlines, and increased fishing vessel traffic.

Eliminating vertical lines in the water column is the best tool for eliminating risk of entanglements of NARWs, and closures are an effective tool to accomplish that. Whales and other marine life in closed areas typically experience zero risk of becoming entangled in fishing gear, and the Aquarium supports implementing these measures as one of the methods NOAA can and should employ to reduce the risks of entanglements.

The distribution of NARWs has shifted dramatically over the past decade, and climate change has made their movements more difficult to predict. As new aggregation areas are identified from direct observations, acoustic detections, and/or modelling, it is important to have a rapid regulatory response method to change, expand, or extend closures as needed and to allow ropeless fishing in these closed areas. A network of closures should occur throughout the species’ range and protect a sufficiently large enough area to help the population recover (see “Scientist letter,” Appendix 1).

To ensure testing of ropeless gear is conducted as safely as possible, the Aquarium recommends the following:

1. A thorough evaluation and report by the National Marine Fisheries Service (NMFS) gear team to determine if sinking groundlines have been found on known U.S. gear entangling large whales since that regulation was implemented in 2009;

2. A mandate that endlines used in ropeless gear are 1700 pound of force (LBF) breaking strength through the entire length of the rope; and

3. A requirement that fishing vessels operate at less than ten knots in the EFP and the closed area regardless of their vessel length.
Allowing EFPs into existing closures (Massachusetts Restricted Area and Great South Channel Restricted Trap/Pot Area), where entanglement risk is currently zero, will inherently increase risk. Considerations of EFPs in these areas must be conservative and include both careful evaluation of this introduced risk as well as extensive monitoring. The Aquarium recommends EFPs be allowed in these presently closed areas only after careful review of testing being conducted elsewhere in the United States and Canada to understand how much risk might be introduced and whether or not that risk can be reduced.

With respect to the closures detailed in the Proposed Rule, the Aquarium supports maintaining the two existing closures (the Massachusetts Restricted Area and the Great South Channel Restricted Trap/Pot Area) as well as implementing the two new seasonal restricted areas (offshore of Maine along the LMA1 and LMA3 border and south of Cape Cod and Nantucket) with the caveat that the closed areas—including both existing and new closures—be reassessed for both spatial extent and timing using a risk reduction target of 80 percent to reduce mortalities and serious injuries below PBR and enable NARWs to recover.

The Aquarium is concerned that the restricted area offshore of Maine (LMA1 restricted area) is not large enough as the Northeast Fisheries Science Center model is based on outdated survey data that are only from summer months. In determining the boundaries and extent of the LMA 1 restricted area, the DEIS relies on its Decision Support Tool (DST), which the Aquarium believes does not consider uncertainty appropriately. For more information, please see the “Incorporating Uncertainty” section of the Aquarium’s recent comment on NOAA’s Biological Opinion (Appendix 2).

With respect to the proposed restricted area south of Nantucket and Martha’s Vineyard, aerial surveys show NARWs in the region most months of the year since 2017 (Quintana-Rizzo pers. comm., paper in review) with as much as 25 percent of the population present from December through May (Figure 1). Given these data, we argue that this region should be considered for a year-round closure and that the largest area proposed be implemented in the Final Rule. In the absence of a year-round closure south of Nantucket and Martha’s Vineyard, areas where 1700 lbf rope and/or contrivances can’t be used (i.e. offshore) should remain closed except for fishermen with permits to use ropeless gear.

Finally, according to recently published technical guidelines from the United Nations’ Food and Agriculture Organization, time-area or spatial closures can be effective when data about the marine mammals are known, such as distribution, abundance, survival rates, population viability, year-to-year variability, distribution of fishing effort, and level of bycatch (FAO 2021). Additionally, the guidelines state:

To be effective, spatial closures should have positive impacts not only within the areas themselves but also for the population as a whole. Only a few studies have quantified the effect of closures on the bycatch species or populations of marine mammals for which they were established. Gormley et al. (2012) used tag-recapture data of Hector’s dolphins in the vicinity of a small reserve in New Zealand that bans the use of gillnets: they found that the reserve increased the means of survival probability for the resident population, but the size of the reserve was in itself insufficient for the recovery of the overall population. Slooten (2013) modelled the potential for population recovery of this endangered species throughout its entire range under the existing spatial management system,
and concluded that the existing scheme (reserve locations, sizes and management regimes) was unlikely to lead to a recovery of the Hector’s dolphin population, and nor would it prevent the species from continuing its decline. Rojas-Bracho and Reeves (2013) concluded that protected areas needed to encompass the entire range of the critically endangered vaquita (Phocoena sinus) in order to eliminate bycatch completely and give the remaining population a higher probability of recovery. The consensus from these studies is that adopting spatial closures as a principal management response for the reduction of bycatch of marine mammals did not achieve adequate – or indeed measurable – population recovery. This does not mean that they cannot contribute to achieving population stabilization (FAO 2021).

Figure 1: Monthly sighting rates of NARWs and monthly aerial surveys conducted in the southern New England wind energy area. Sighting rate is defined as the number of NARWs per 1,000 km of survey (Quintana-Rizzo, pers. comm, paper in review).

While closures reduce the risk of entanglement in the closed areas for the duration of the closed period, the Aquarium notes that both fishing effort and the number of vertical lines outside the closed areas may increase and needs to be accounted for in NOAA’s calculations of risk reduction. The FAO also identifies the risk of pushing fishing effort into other areas where denser gear can lead to more entanglements, as noted by NMFS in the DEIS. This is a particular concern in areas where data on gear density and sightings are not robust due to low survey effort and lack of historical reporting.
Recognizing that the Proposed Rule only addresses the commercial lobster and crab fishery in New England, the Aquarium suggests that in subsequent rulemakings NOAA also consider and propose additional closures for other fisheries throughout the NARW’s entire U.S. range to bring the risk of mortalities and serious injuries below the PBR level.

**Weak Rope and Other Proposed Gear Modifications**

**RECOMMENDATION 3: The Aquarium supports implementing 1700 lbf weak rope and/or contrivances every 40 feet throughout the full length of an endline outside of closed areas as an interim measure to reduce the likelihood of sustained and chronic entanglements as well as severe and lethal injuries to whales until the industry transitions to ropeless gear. The Aquarium does not view weak rope and/or contrivances as a permanent solution to eliminate the risk from entanglement impacts.**

Recognizing that ropeless fishing gear is not yet ready for widespread commercial deployment in the fisheries subject to these regulations, the Aquarium realizes the need for interim measures that allow fishing to continue while also reducing the risk of mortality and serious injury to whales from entanglements in fixed fishing gear, which is why the Aquarium supports using weak ropes and/or contrivances outside of closed areas. If weak rope or contrivances can’t be implemented (e.g. offshore in water depths of more than 300 feet), then the Aquarium strongly recommends that those fisheries be closed except to ropeless fishing gear.

Applying weak rope and/or contrivances as described in NOAA’s Proposed Rule is unacceptable if the goal is to prevent serious injuries and mortalities to NARWs and other whale species.

Using weak rope or insertions at the top half or top third of the endline reduces risk less than the calculations suggest. In Howle et al. (2019), the authors conducted simulations using the Virtual Whale Entanglement Simulator and determined that, “*For these middle and lower water column interactions, we found that the encounter was more likely to result in a lasting entanglement.*” In these scenarios, if the rope does not part, the whale could potentially drown in the gear or develop a complex entanglement that is more likely to lead to death. Therefore, requiring that 1700 lbf rope be integrated throughout the entirety of an endline will provide the greatest benefit to reduce the severity of any entanglements.

To accommodate 1700 lbf breaking strength rope through the entire endline and not have it lead to greater gear loss, integrating a groundline extension between the first and second (or more) pots is an option. The Aquarium’s work with load cell testing compared the tensions when hauling the endline of a five-pot trawl with the groundline length between the first and second pot at 90 feet and 210 feet in 200-foot water depth. In these tests, the tension was reduced by more than half when the groundline extension was added (Knowlton et al. 2018).

South Shore Sleeves with 1700 lbf breaking strength have been tested successfully in waters up to 300 feet without reconfiguring gear. Based on the map below (Figure 2), this suggests that 1700 lbf breaking strength rope could be used out to at least 12 nautical miles (nm) offshore in Maine and New Hampshire and even further offshore in Massachusetts and Rhode Island. In deeper waters, a groundline extension
that reduces the number of pots in the water column until the first pot is brought on board could be used as an approach that supports using 1700 lbf breaking strength rope.

Because rope diameters greater than 7/16 inch represent the deadliest gear to NARWs of all ages and is typically used in offshore waters, wherever the industry is unable to use 1700 lbf breaking strength rope and/or approved contrivances, we strongly recommend that those fisheries be closed indefinitely except to ropeless fishing gear.

Knowlton et al. (2016) showed that the breaking strength of ropes between adult and young juvenile NARWs was significantly different with all adults found in ropes ranging from ~4,300 to 11,400 lbf breaking strength and between ~1/2-3/4 inch diameter and 0-2 year olds in ~1,900 to 4,100 lbf ropes between ~5/16-7/16 inch diameter. Deploying ropes with strengths at or below 1,700 lbf will help all age groups.

If a whale becomes entangled, 1700 lbf breaking strength rope and/or contrivances will help ensure that the heavy bottom gear parts from the endline before a complex entanglement develops. In their North Atlantic Right Whale Consortium presentation in October 2020, Knowlton et al. used OrcaFlex software simulations to show that tension on the endline near the seafloor will reach 1700 lbf the quickest. This is encouraging as it would reduce the risk of complex entanglements noted by Howle et al. (2018) if the entanglements occur at depth.

In addition, applying multiple weak insertions throughout an endline is likely to reduce the risk of trailing gear. Ocean engineers have noted that the endline reaches 1700 lbf tension closest to and below the point of impact as the whale starts towing the gear. If any remaining gear is below the point where the whale strikes, the buoy above the impact point should be able to pull the rope through the mouth or other part of the body involved in the entanglement and allow the whale to shed the gear more easily.

Using weak insertions may be a cheaper option for the fishery and could potentially be more effective than fully formed weak rope if breaks occur in a more predictable fashion, although this should be evaluated by reviewing all large whale entanglements as 1700 lbf ropes and/or contrivances are integrated into the fishery. To ensure that there is an understanding of what kind of rope remains on an entangled whale, fully formed 1700 lbf breaking strength ropes should be uniquely colored (as proposed by the Massachusetts Department of Marine Fisheries). If this Proposed Rule goes forward as is, which the Aquarium does not recommend or support, then any endline with one or two weak insertions at the top half or top third of an endline should be marked to show it is different than the lower part of the endline. Otherwise, it will be difficult to assess whether or not the modification has helped in the event of an entanglement.

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8 [https://drive.google.com/file/d/1IEF6w-4yGUGSEMTVQ02mquo8k5X8-UmC/view](https://drive.google.com/file/d/1IEF6w-4yGUGSEMTVQ02mquo8k5X8-UmC/view)
Additional benefits to using 1700 lbf breaking strength ropes and/or contrivances are that they may reduce the chance of a trawl being shifted by a whale or a vessel and they give the fisherman or woman a better chance of grappling for the trawl.

The intervals proposed in NOAA’s rules are inadequate to reduce serious injuries and mortality resulting from entanglements in 1700 lbf breaking strength rope in any meaningful way. For fishermen and women, law enforcement efforts, and the whales, it is critical that weak rope and/or insertions be used consistently, are easy to identify, and actually prevent lethal and sub-lethal entanglements. Because of this, the Aquarium strongly advocates that the insertions be required every 40 feet throughout the entirety of the endline.
In Knowlton et al.’s 2020 North Atlantic Right Whale Consortium presentation\textsuperscript{10}, collaborators showed that if weak links or weak rope weren’t used in an endline, seven out of 12 scenarios (58 percent) failed to reach the standard rope breaking strength of 3720 or 7950 lbf (inshore/offshore, respectively) when pulled at four or eight knots. With weak links, only two of 12 scenarios (17 percent) failed to reach the 1700 lbf breaking strength (five-pot trawl pulled at four knots). The time to line parting with weak links (1700 lbf) integrated every 40 feet was considerably lower (five to 72 seconds) than the time to parting the stronger rope with no weak links (12 to 94 seconds), but this threshold was only reached in five of the 12 scenarios indicating some bottom gear would likely remain attached in entanglements with no weak rope or insertions. Studies suggest that this will greatly increase drag and expedite a whale’s decline due to energetic impacts (van der Hoop et al. 2016 and 2017; Pettis et al. 2017). This type of scenario has been most recently observed with the entangled NARW Cottontail (Catalog No. 3920, an eleven-year-old male) who was first observed entangled in October 2020 off southern New England, resighted off the coast of Florida on February 18, 2021 in severely emaciated condition, and discovered dead off the coast of South Carolina on February 27, 2021. He apparently had weight attached to the entangling rope and was not able to be disentangled despite two attempts. It is not yet known where or in what kind of gear this entanglement occurred.

Although weak ropes and/or contrivances will not prevent entanglements from occurring, the reduced time to parting of the line and the increased likelihood that the line will part at all suggests that this is a viable interim option and should be used in all areas outside of closures and in water depths where it can be accommodated. Offshore waters where industry deems it infeasible to integrate weak rope and/or contrivances due to potential gear loss or safety concerns should be transitioned to ropeless fishing to ensure that the stronger ropes are removed from the fishery as quickly as possible.

The Aquarium notes that trailing gear even without attached bottom gear is a concern due to energetic impacts to NARWs. Maine’s Department of Marine Resources conservation equivalency proposal\textsuperscript{11} noted that line lengths ranging from 50-200 feet might be left on an entangled NARW, which they suggest that is not a concern. Research published by van der Hoop et al. (2016) demonstrates that rope drag itself has a significant effect on energetics. This impact also continues to be observed on the water. For example, NARW #2310 (a male more than 25-years old) was observed with a single line through the mouth and trailing one to two body lengths of line December 20, 2018. Subsequent sightings show the whale carrying this gear for at least 126 days while his condition continued to decline. Since he has been unable to be disentangled, he may very likely die from an entanglement that does not appear complex but is clearly being influenced by trailing gear.

**Gear Marking**

*RECOMMENDATION 4: While the Aquarium supports the Proposed Rule regarding gear marking, gear marking itself does not reduce the risk to NARWs of entanglements in fishing gear; however, in the rare case where gear is closely observed or retrieved, knowing the location and fishery that caused the entanglement will provide valuable information to managers.*

\textsuperscript{10} https://drive.google.com/file/d/1IEF6w-4yGUG5EMTVjQ2mqo8k5jX8-UmC/view
\textsuperscript{11} https://www.maine.gov/dmr/news-details.html?id=1933868
While marking gear in itself will not reduce the risk that whales will become entangled or reduce the severity of entanglements, as stated in the Proposed Rule, “…the markings would increase the information available regarding the fishery and state of origin of large whale entanglements to aid the efforts of NMFS and the ALWTRT…”

The Aquarium agrees that gear marking could provide some valuable information in the small subset of entanglement cases with attached gear, but not as currently proposed. Of the 1625 entanglement events documented since 1980, only 124 cases (7.6 percent) had attached gear and only a subset of those could be traced back to origin. Because such a small fraction of detected entanglements have gear closely observed or retrieved, it is likely that many serious injuries and mortalities resulting from entanglements will remain unattributed despite the new gear marking requirements.

Alternatively, if gear marking or rope coloration focused on showing whether a rope was 1700 lbf, this would help inform whether weaker ropes are showing up on entangled whales and having the intended benefit (i.e. resulting in a lower risk entanglement). If weak insertions are integrated into endlines, they could also serve as a weak rope gear mark.

Long-term entanglements can lead to weight and fat loss causing the animals to sink after death (any heavy gear being dragged by the whale can also cause it to sink). Reducing and eliminating the risk of entanglements to NARWs in fixed fishing gear must be NOAA’s priority so that identifying the origin of fishing gear becomes obsolete and unnecessary.

**Effort Reduction**

**RECOMMENDATION 5: While NOAA’s Proposed Rule does not address effort reduction as a potential tool to reduce risks of entanglements to NARWs, limiting the number of traps fished and reducing the number of licenses over time will help reduce the number of vertical lines in the water, which can decrease the likelihood of NARWs becoming entangled in fishing gear. The Aquarium encourages NOAA to include effort reduction as a tool to reduce risk in the Final Rule, including support for fishermen and women to transition out of the fishery if needed.**

The Aquarium was disappointed to see that the Proposed Rule did not include any measures to reduce effort in the fishery. Recently published research suggests that effort reduction will not necessarily have a negative economic impact and, in fact, is likely to generate higher profits while enabling the industry to operate with less gear in the water and over a shorter season (Myers and Moore 2020). The results from this work showed that, “The U.S. lobster fishery in Maine expends approximately 7.5 times as much effort as the Canadian fishery in Lobster Fishing Area 34, where Canadian fishers catch about 3.7 times more per trap than their counterparts in Maine.” In addition, “The state of Massachusetts has achieved record high landings since trap/pot seasonal closures have been implemented to protect right whales, especially within the Statistical Reporting Areas most affected by closures” (Myers and Moore 2020).

The Aquarium is also concerned that trawling up is not the best approach to achieving vertical line reduction as it introduces safety concerns and does not address gear conflicts that will likely arise from longer trawls. The DEIS also notes that potential catch reduction from trawling up is the main economic concern for Alternative 2, although when considering the variability of the lobster resource, this calculation seems hypothetical. Because fishing with less gear over a shorter season appears to
correspond with higher landings and higher profits while also reducing the risk of entanglements to NARWs by removing vertical lines from the water column, the Aquarium recommends that NOAA seriously consider including effort reduction measures in its Final Rule such as the 50 percent endline cap discussed in Alternative 3 to address safety concerns and potentially improve catch levels (Myers and Moore 2020).

The Aquarium also recommends that NOAA consider reducing the number of licenses it issues and offering support for fishermen and women to transition out of the fishery as another mechanism to reduce effort in the fishery.

**Economic Considerations**

**RECOMMENDATION 6: The Aquarium recommends that NOAA promulgate rules that reduce the risk of entanglements in fishing gear by 80 percent to prevent the fishery from incurring incremental effort and expense resulting from multiple rulemakings. In addition, the Aquarium recommends that NOAA’s economic analysis consider the economic benefits of protecting whales to other sectors of the economy.**

While the Aquarium recognizes the cost of complying with the Final Rule will not be insignificant for the fishery, after reviewing the Proposed Rule and DEIS, we are concerned that the least-cost alternative is being promoted at the expense of the long-term survival of NARWs. Rather than prioritizing a more conservative risk reduction target of 80 percent, which has a greater probability of conserving NARWs as required by law, the 60 percent target was chosen primarily due to economic considerations (as detailed on page 22 of the DEIS, Alternative 3, which also achieved the 60 percent target would be a more effective approach to reduce NARW mortality, but would cost two to three times more per unit of risk reduction than the preferred alternative).

We note that while NMFS must take economic considerations into account, the least-cost alternative is not required to be selected. Steps can and should be taken to reduce the cost burden on fishermen and women that would be affected, as well as to increase regulatory compliance, another stated concern (DEIS, p. 25). That said, promulgating stronger rules and measures now is not only necessary for the survival of the species, but may also serve as a future cost-saving measure: If the lesser risk reduction target (60 percent) does not sufficiently reduce take below PBR, both fishermen/women and NOAA will be forced to incur additional effort and expense to redo this same process. These incremental costs may potentially be avoided by applying a more aggressive risk reduction target of 80 percent in this rulemaking, which has the added benefit of preventing unnecessary deaths of NARWs in the interim. We also note in the Effort Reduction section of this comment that reducing effort is likely to have a positive economic impact on the industry as a whole in addition to individual fishermen and women.

Furthermore, the Aquarium notes that the economic analysis focuses on impacts to a single sector of the economy (fishing industry), without simultaneously considering the potential benefits of increased NARW protection to other sectors (these benefits are loosely discussed in the Initial Regulatory Flexibility Analysis section of the DEIS, but are not integrated into the main Economic and Social Impacts discussion). For example, in Hancock County, identified as one of the more vulnerable communities in Maine, living resources extraction, which includes commercial fisheries, fish hatcheries, seafood processing, and seafood markets, contributed $64.5 million in Gross Domestic Product (GDP) to the total ocean economy of the county in 2017. In contrast, ocean-based tourism and recreation, a sector likely to
benefit from an increased population of NARWs and other large whales through improved opportunities such as whale watching, contributed more than three times that amount—$211.6 million in GDP—for the same time period (NOAA 2017). These numbers are not unique to Maine. Similar trends are observed in Massachusetts and Rhode Island, as well.

The economic and social impact sections of the DEIS should explicitly consider the potential economic and social benefits of the Proposed Rule (e.g. by supporting an increase in the NARW population), including considering how these benefits may offset costs incurred through the proposed action (i.e. through economic diversification, opportunities for alternative livelihoods, etc.).

Finally, we note that the economic and social impacts analysis fails to consider the impact that the ongoing COVID-19 pandemic has had on demand for the fisheries impacted by this Proposed Rule; for example, in the first six months of 2020, U.S. exports of lobster declined by 44.6 percent (FAO Globefish 2021) and that significant uncertainty regarding the duration and extent of these impacts remains.

**Ropeless Fishing Gear**

**RECOMMENDATION 7:** The Aquarium considers ropeless fishing gear as the key to a future in which fishing and NARWs can coexist and recommends that NOAA should explore every opportunity to subsidize and otherwise reduce direct costs to fishermen and women related to this action, including increased funding and grant programs for industry-led trials of ropeless fishing gear.

As described in the Aquarium’s comment regarding closures, testing, evaluation, and deployment of ropeless gear should be permitted in closed areas (with caveats) and anywhere offshore where 1700 lbf breaking strength ropes can’t be used. NOAA should work closely with scientists, fishermen/women, and engineers who are presently developing and testing ropeless gear to develop a detailed timeline, strategy, and cost details for transitioning the fishery.

Furthermore, government investment to develop and evaluate ropeless fishing is urgently needed. Any federal investments must consider the use of subsidies to help shift all members of the industry affected by closures, and we encourage NOAA to work with Congress to request the needed appropriations to facilitate this transition as quickly as possible. These goals should be endorsed by NOAA to signal the agency’s support of ropeless fishing and to encourage investment and development by commercial manufacturers. Ropeless retrieval systems are functional today, but a universal solution to monitor a fishery without buoys marking endlines and address gear conflict issues does not yet exist and must be developed with the support of NOAA quickly. These investments will benefit fishermen/women and whales, and should be a top priority (modified from “Scientist Letter,” Appendix 1).

**Reporting, Monitoring, and Enforcement**

**RECOMMENDATION 8:** NOAA should work with states to continue improving compliance and reporting in the crab and lobster fisheries, including accurate trip reporting, and increased gear checks to ensure that the proposed gear changes are being enacted correctly and in a timely manner.
Specific to weak ropes, contrivances, and gear marking, the Aquarium recognizes that it is important to develop a monitoring strategy to inform managers whether or not regulations are benefitting NARWs. We suggest the following approaches:

1. Continue annual scar coding efforts (conducted by the New England Aquarium) to determine the frequency of events and the proportion of sighted individuals with scars. As closures, endline reductions, and ropeless fishing gear are implemented into the fishery, the frequency of entanglements needs to be quantified to assess how effective the rules are;

2. For a given year of entanglements documented from scarring assessments, determine the proportion resulting in minor, moderate, and severe injuries. If weak rope works as intended, entanglement scarring should be less severe but may not be less frequent;

3. For those cases where the gear can be observed, assess the number of whales with attached gear by year. Any entanglement configurations need to be evaluated carefully to determine if trailing line levels have been reduced, entanglement complexity is high or low risk, and gear marks are evident. In addition, the rope diameter, what part of the gear is involved in the entanglement, and if the gear on the whale is weak rope or used contrivances should also be evaluated. Case studies should continue to be created;

4. Entanglement events of each individual need to be reviewed to determine the timeframe and potential country of origin of entanglement.

The Aquarium notes that a lack of scientific certainty is sometimes used to suggest that more information is needed to inform decision making, which then causes further delays in needed action. We disagree with this. The body of scientific research on NARWs and entanglements is both established and clear in its conclusions: Entanglements in fixed fishing gear are causing serious injuries and mortalities to the critically endangered NARW at a rate that the species can’t sustain if it is to survive. While we encourage NOAA to invest in increasing surveillance and monitoring efforts throughout the U.S. range of the NARW, we recommend that those efforts be focused on assessing the health and well-being of the individuals and the population. As noted earlier, in the near-term, these efforts can and should be used to inform management decisions regarding the extent and timing of closures and provide information about any entanglements that do occur in weak rope, but once the fishery transitions to ropeless gear, surveillance and monitoring efforts for entanglements should no longer be necessary.

**Decision Support Tool**

In response to NOAA’s *Draft Biological Opinion on 10 Fishery Management Plans*, the Aquarium submitted an extensive comment regarding NOAA’s finding of no jeopardy for NARWs, which we disagreed with. As part of that comment, the Aquarium provided an extensive discussion about our concerns with the Decision Support Tool, including the appropriate use of uncertainty in models for conservation. The Aquarium’s comment on the Biological Opinion is provided as Appendix 2 of this document.

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12 [https://www.bycatch.org/project/case-studies-north-atlantic-right-whale-fishing-gear-entanglements](https://www.bycatch.org/project/case-studies-north-atlantic-right-whale-fishing-gear-entanglements)
Conclusion

The Aquarium thanks NOAA for the opportunity to comment on this Proposed Rule and DEIS. Our comments are provided with the intent that they be used to inform changes in the Final Rule that will significantly reduce the risk of entanglements in fixed gear to NARWs and other whales. As a member of the ALWTRT since its inception, the Aquarium has participated in the process in good faith that NOAA will take the necessary steps to manage this species as required by the Marine Mammal Protection Act and the Endangered Species Act. The Aquarium recognizes that all of the measures detailed in the Aquarium’s comments are just part of many that are needed to prevent this species from going extinct. In addition to making necessary changes to the fisheries where entanglement is a risk, other risks, including those from vessel strikes, ocean noise, pollution, and climate change must also be addressed aggressively and expeditiously. The Aquarium looks forward to continuing work in partnership with federal and state governments and other members of the ALWTRT to ensure the survival of this species.

The Aquarium’s scientists and experts are available to answer any questions or provide additional information should it be needed.

Sincerely,

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APPENDIX 1:
Scientist Letter
Docket No. 201221–0351
Proposed Rule: Taking of Marine Mammals Incidental to Commercial Fishing Operations; Atlantic Large Whale Take Reduction Plan Regulations; Atlantic Coastal Fisheries Cooperative Management Act Provisions; American Lobster Fishery

To: Mr. Ben Friedman (Deputy Under Secretary for Operations, performing the duties of Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator)

Cc: NOAA Fisheries - Paul Doremus (Acting Assistant Administrator for Fisheries), Sam Rauch (Deputy Assistant Administrator for Regulatory Programs), Cisco Werner (Director of Scientific Programs and Chief Science Advisor), Donna Wieting (Director of NOAA Fisheries Office of Protected Resources), Evan Howell (Director of NOAA Fisheries’ Office of Science and Technology), Karen Hyun (NOAA Chief of Staff), and Colleen Coogan (Marine Mammal and Sea Turtle Branch Chief, Greater Atlantic Regional Fisheries Office)

February 25, 2021

Dear Mr. Friedman:

We represent a group of scientists with extensive expertise in the biology of large whales, oceanography, and fisheries. We are writing to express our serious concerns about the proposed rule titled Taking of Marine Mammals Incidental to Commercial Fishing Operations; Atlantic Large Whale Take Reduction Plan Regulations; Atlantic Coastal Fisheries Cooperative Management Act Provisions; American Lobster Fishery put forward by NOAA Fisheries to reduce entanglement risk to North Atlantic right whales (NARW) caused by Northeast crab and lobster trap/pot fisheries (https://www.govinfo.gov/content/pkg/FR-2020-12-31/pdf/2020-28775.pdf). Whales continue to be impacted by entanglement and NARWs are known to be dying at an increasing and unsustainable rate. Just since October 2020 there have been three NARW observed in U.S. waters with serious entanglements - none could be disentangled, and all are likely to die. The proposed rule represents a dramatic weakening of the recommendations made by the Atlantic Large Whale Take Reduction Team (ALWTRT) in April 2019 as a path towards achieving reduction in entanglement risk.

This weakening of the proposed take reduction strategy runs counter to all scientific analysis, particularly in light of the well documented and ongoing reduction in the population size of this critically endangered species (https://www.narwc.org/report-cards.html). Furthermore, entanglement mortality continues at unsustainable levels and much of it goes undetected. For every right whale carcass observed, almost three more deaths go undocumented.
Finally, NOAA’s report on the increasing frequency of serious injuries from entanglements demonstrates that the problem is getting worse, not better. If the current rate of population decline does not change (approximately 20 whales per year over the last 5 years), the North Atlantic right whale will be functionally extinct in less than two decades. In light of this scientific information, we strongly urge NOAA leadership to revisit and considerably strengthen the proposed rule.

We specifically suggest the following:

1) **The 60% target of reduced risk outlined in the proposed rule should be increased to 80%**

Rapid and effective management action is critical to turn the trajectory of this species around. We recommend increasing the risk reduction in the U.S. lobster and crab fishery to 80%, applying additional measures in other U.S. fixed gear fisheries, and working closely with the Canadian government to implement similar risk reduction goals in their fisheries. These actions will provide the best chance of achieving the risk reduction targets mandated by the Endangered Species Act and the Marine Mammal Protection Act (MMPA). The recent Biological Opinion estimates the current proposed rule will not reduce U.S. entanglements below the Potential Biological Removal level of 0.8 individuals annually as mandated by the MMPA. Only rapid and sustained actions such as those described herein can change the trajectory of the NARW population.

2) **Endline reductions, closures, and 1700 lb ropes should be considered as interim measures as ropeless gear becomes a more viable option**

The concerns about ropes and entanglements of large whales is a long standing problem. As Johnson et al. stated in 2005, “…any line rising into the water column poses a significant entanglement risk” (https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1748-7692.2005.tb01256.x). In recent years, a tremendous amount of effort by engineers, fishers, and scientists has led to promising options to address this threat with gear technology. We ask NOAA leadership to acknowledge that ropeless gear may nearly eliminate the risk of large whale entanglements and support an economically viable fishing industry. Government investment to accelerate the development and evaluation of ropeless fishing is urgently needed, which should include plans for experimental fisheries in closed areas by January 2022. Support for these investments must consider the use of subsidies to help shift all members of the industry affected by closures to this option by January 2024. These goals should be endorsed by NOAA Fisheries
to signal the agency’s support of ropeless fishing and to encourage investment and development by commercial manufacturers. Ropeless retrieval systems are functional today, but a universal solution to monitor a fishery without buoys marking endlines and address gear conflict issues does not yet exist and must be developed with the support of NOAA Fisheries quickly. **These investments will benefit fishermen and whales, and should be a top priority.** In the meantime, scaled-up efforts to reduce the total number of endlines, to implement closures and to use 1700 lb ropes/weak insertions should be considered the best interim options for reducing risk and impact.

3) **Where vertical lines continue to be necessary, endline strength should be reduced to 1700 lbs throughout the entire length, not just the upper portion**

Rope strength plays a critical role in entanglement risk and injury severity (see [https://conbio.onlinelibrary.wiley.com/doi/10.1111/cobi.12590](https://conbio.onlinelibrary.wiley.com/doi/10.1111/cobi.12590)), and the ALWTRT came to near consensus in April 2019 in requesting that vertical lines with a breaking strength of 1700 lb, either entirely or with weak links inserted every 40 feet, be used throughout the lobster and crab industry to reduce risk. This recommendation has been weakened in the proposed rule such that weak rope/weak insertions are now only being proposed for the top half or top third of an endline with only one to two weak insertions required independent of endline length. The original ALWTRT agreement as it pertains to weakened vertical lines, which would require use of 1,700 lb rope or sleeves through the entire endline length, should be reinstated and applied throughout lobster and crab fisheries as a part of this rulemaking and expanded to other fixed gear fisheries in the near future.

4) **A mechanism should be developed to allow vertical line closures to expeditiously be extended spatially or temporally based on scientific observations that include computer modeling**

Fisheries closures that eliminate vertical lines in the water column are the most effective tool for mitigating risk of entanglements of right whales where the two overlap in space and time. Right whales have shifted their distribution dramatically in the past 10 years and their movements have become more difficult to predict as a result of climate change. As new aggregation areas are identified from direct observations, acoustic detections, and/or modelling, it is important to have a rapid regulatory response method to change, expand, or extend closures as needed and allow ropeless fishing in these closed areas. A network of closures should occur throughout the species range, and protect a sufficiently large enough area to help recover the population.
As academic members of the Atlantic Large Whale Take Reduction Team and scientists who study large whales, oceanography, and fisheries issues, we recognize the tremendous challenge facing NOAA Fisheries to prevent the extinction of the NARW while minimizing the economic impact upon fisheries. We believe that, for the fishing industry and NARWs to coexist, the transition to fully weak rope and ropeless gear requires immediate government support to help fishers procure new gear. No further delays or concessions that undermine the ability of proposed measures to prevent NARWs from going extinct should be allowed in implementing strong, effective and enforceable rules. If an 80% reduction in risk cannot be accomplished in this rulemaking effort, NOAA Fisheries should request the Atlantic Large Whale Take Reduction team to immediately consider additional measures for these fisheries during 2021 discussions.

Thank you for considering our request. We will each be providing more detailed comments to the proposed rule.

Sincerely,

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APPENDIX 2:

Re: Draft Biological Opinion on 10 Fishery Management Plans in the Greater Atlantic Region and the New England Fishery Management Council’s Omnibus Habitat Amendment 2

In response to the Draft Biological Opinion on 10 Fishery Management Plans, the New England Aquarium (Aquarium) submits this comment strongly urging the National Oceanic and Atmospheric Administration (NOAA) to reconsider its finding of no jeopardy for North Atlantic right whales (NARW).

Founded in 1969, the Aquarium is a global leader in marine conservation and a catalyst for global change through public engagement, commitment to marine animal conservation, leadership in education, innovative scientific research, and effective advocacy for vital and vibrant oceans. For decades, the Aquarium has been working to protect marine and freshwater ecosystems from human impacts and conserve threatened and endangered animals and habitats. The Aquarium’s scientists conduct cutting-edge research to understand, quantify, and reduce the consequences of human activities on the health of marine species and ecosystems by developing science-based solutions and advocating for policies that balance human use of the ocean with the need for a healthy, thriving ocean now and in the future.

Scientists at the Aquarium have been researching NARWs for more than 40 years with the goal of preventing this species from going extinct. In addition, representatives from the Aquarium have served on the Atlantic Large Whale Take Reduction Team since it was formed in 1996. The Aquarium is pleased to see that published research by our scientists was used to inform aspects of these measures.

Here we provide comments and recommendations on the Draft Biological Opinion (BiOp) and the Conservation Framework associated with it. This comment focuses on findings in the Draft BiOp pertaining to NARWs based on our long-standing scientific expertise and commitment to conserving this species. In addition, as the most endangered species reviewed in the Draft BiOp, it is critical to the conservation plan, pending rulemaking, and draft environmental impact statement that the findings in the Final BiOp are accurate and based on the best-available science.

First, we wish to compliment NOAA staff on aspects of this work. The review of the NARW in the Status of the Species section of the Draft BiOp is well written and cites the appropriate and best-available scientific literature. The modeling work conducted by Dr. Daniel Linden of Greater Atlantic Regional Fisheries Office (GARFO) presented in the document “Population projections of North Atlantic right whales under varying human-caused mortality risk and future uncertainty” (Appendix 3) is excellent, and we compliment his analysis. While it is possible to argue some of the detail of the models (as we do below), the work is of a very high standard. We see that the reviews of this work, conducted by expert reviewers for the Center for Independent Experts (CIE) were supportive, offering only a few suggestions for possible improvement to the science. We also note that, although it is not part of the Draft BiOp or Conservation Framework, the recent paper led by Dr. Richard Pace of the Northeast Fisheries Science Center (NEFSC), which we cite several times below, is a very important contribution that informs our

comments. Dr. Pace is to be complimented for his excellent analyses that have advanced our understanding of the current situation of NARWs.

Although we are impressed by these aspects of the work, we have significant concerns with other aspects of the Draft BiOp and Conservation Framework. While we concentrate our comment on the scientific content of the Draft BiOp, we also take this opportunity to raise one initial, yet critical, concern.

No Jeopardy Finding

The Draft BiOp finds no jeopardy based on the assumption that, in the first phase of the Conservation Framework, regulations still in draft form are sufficient enough to reduce fisheries-induced mortality and morbidity of NARWs to the extent that they will recover. As these regulations are still in draft form, there is no guarantee that they will be promulgated, implemented, and/or enforced. Whether or not they are sufficient is another question entirely, which the Aquarium will address in its response to the Proposed Rule to Amend the Atlantic Large Whale Take Reduction Plan to Reduce Risk of Serious Injury and Mortality to North Atlantic Right Whales Caused by Entanglement in Northeast Crab and Lobster Trap/Pot Fisheries and Draft Environmental Impact Statement.

Recommendation 1: In the absence of a final rule, the Aquarium does not think it is appropriate to make a “no jeopardy” finding.

Furthermore, as detailed below, the Aquarium has significant issues of concern with the Draft BiOp and Conservation Framework and strongly asserts that the science supports a jeopardy finding.

Risk reduction and the time required to implement changes

North Atlantic right whales have been in decline for a decade. In the absence of strong rules preventing entanglements and vessel strikes, we have come to expect the abundance of the species to continue to decline. Because it takes time to promulgate regulations (and Biological Opinions) and even longer for those to result in action on the water, we understand that while these processes are ongoing, it is likely that the species’ abundance will continue declining. The Draft BiOp does not account for this time delay, despite having a strong model that indicates the trajectory of the species’ abundance while the BiOp and regulations were being drafted (see also Meyer-Gutbrod et al. 2018 on this topic in the Canadian management setting). This is not well thought through and should be.

It was clear after the Atlantic Large Whale Take Reduction Team (ALWTRT) meeting in 2017 that NARW Serious Injury and Mortality (SI/M) had exceeded the “jeopardy” threshold identified, thus initiating the need for a new BiOp. Despite this, it took almost four years for this Draft BiOp to be released, during which time the number of NARWs kept declining. The redrafted BiOp needs to account for this continuing decline and must account for the time in which it takes NOAA to implement changes on the water. Corkeron et al.’s (2018) matrix model [disclosure: Aquarium employees are authors of Corkeron et al. 2018], as applied by Linden 2021 and suitably corrected for uncertainty (see below), can be used to project what the abundance of NARWs is likely to be, and from that, appropriate measures reconsidered.

To give a concrete example, the Draft BiOp and Conservation Framework are predicated on the idea that a 60% reduction in anthropogenic mortality will be sufficient to take NARWs from jeopardy. While 60% risk reduction may have been satisfactory when this process started in 2017, in 2021 60% risk reduction is
no longer sufficient as there are now substantially (16%) fewer NARWs than there were in 2017. An 80% risk reduction target initially is now more appropriate and should be used in the redrafted BiOp.

**Recommendation 2: We recommend that the redrafted BiOp be based on an 80% risk reduction target.**

**Incorporating Uncertainty**

There are several instances where the modeling that informs the Draft BiOp and Conservation Framework does not incorporate uncertainty in the data sufficiently, especially given the scale of the conservation challenges facing NARWs.

We note the significant paper on this topic by Dr. Barb Taylor and coauthors, *Incorporating Uncertainty into Management Models for Marine Mammals,* published in Conservation Biology in 2000 (Taylor et al. 2000). As Taylor et al. (2000) discuss in their paper, “The history of marine mammal management clearly demonstrates the need to incorporate uncertainty into management models” (p.1250); and “The simulations clearly show that accounting for uncertainty by using a lower percentile is precautionary, whereas the typical practice of the best estimate is not” (p.1248)—in this quote, the “best estimate” is generally considered the mean.

For example, the matrix modeling in Linden (2021) uses the mean estimates of posterior distributions of survival from the re-run mark-recapture model of Pace et al. 2017 as matrix model inputs. A more appropriate approach for conservation, following the findings of Taylor et al. (2000), would be to use the 80th percentile of these posterior distributions to account for the substantial uncertainty in them. To be clear, this is not a criticism of the model used, but of how the model is applied for conservation to inform a Section 7 decision under the Endangered Species Act. We note parenthetically that better allowing for uncertainty was raised as a concern by Dr. New in her CIE review of the Linden 2021 paper.

Likewise, the data used for the Decision Support Tool (DST, see, e.g., page 220 of the Draft BiOp) includes substantial uncertainties in both the models of whales’ distribution and the data on fisheries. The DST should be re-run using appropriate percentiles rather than means or medians to estimate overlap of fisheries and the whales’ distributions.

**Recommendation 3: We recommend that the redrafted BiOp re-run the analyses using appropriate uncertainty parameters and that the conservation implications of the revised models be reassessed in the revised Section 7 assessment.**

**Cryptic mortality and its implications**

A recent 2021 paper by Dr. Richard Pace and coauthors [disclosure: Aquarium employees are authors of this paper] estimates the unobserved (“cryptic”) mortality of NARWs (Pace et al. 2021). In this paper, the authors show that for the period 2010-2017 (which is most relevant to the Draft BiOp), the probability of detecting a whale carcass was 29% (with two standard errors of 2.8%). In addition, during the 2019 North Atlantic Right Whale Consortium meeting, Dr. Pace gave a talk entitled, “Estimating latent mortality of North Atlantic right whales” that summarized the earlier stages of this analysis. Because the manuscript was submitted on July 2, 2020, we presume that it was reviewed and cleared by NOAA’s NEFSC prior to submission based on Dr. Pace’s affiliation with NEFSC. As these scientific results were available to

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NOAA prior to publication of the paper, they should have been considered in the Draft BiOp. To ensure that the final BiOp findings are based on the best-available science, we contend that the results presented in Pace et al. 2021 should now be considered in the forthcoming redrafted BiOp.

Important inferences drawn from the work published in Pace et al. 2021 are summarized in the discussion including (1) “There is a striking mismatch between the causes of serious injuries observed in living whales and the causes of mortality revealed in necropsies of dead whales;” and (2) “…the disparity in observed rates of serious injury by cause suggests that cryptic deaths due to entanglements significantly outnumber cryptic deaths from vessel collisions or other causes.” The relevance of the analyses presented in section 7.2.1.3 (e.g., Table 56) needs to be revisited in the redraft of the BiOp.

We are gratified to see the Draft BiOp’s authors state “Although the observed entanglement data include non-SI/M events, these observed events are considered a minimum estimate, and the actual entanglement rate is likely higher. To account for this underrepresentation of non-SI/M events in the observed entanglement data, our annual entanglement estimate for this Opinion is based on the scarring analysis presented in Hamilton et al. (2019). We, however, suggest that the apportioning of SI/M proportions on pages 223-225 of the Draft BiOp needs to be reviewed in light of the findings of Pace et al. (2021).

**Recommendation 4: We recommend that the redrafted BiOp include this review of apportioning SI/M in light of the findings of Pace et al. (2021).**

**Timing of conservation actions and their evaluation**

The timeline for implementing the Conservation Framework (Table 2 of the Draft BiOp) is insufficient. For example, it is not clear if Phase 1 will even be fully implemented by the start of 2023. Since it has already been at least four years since the 2017 Atlantic Large Whale Take Reduction Team (ALWTRT) meeting during which it was determined that the number of deaths were over jeopardy to initiate Phase 1, we do not reasonably expect that an ALWTRT meeting in 2021 will result in implementation of Phase 2 by 2023.

In addition, the timing allowed to evaluate the efficacy of actions is inappropriately short. Although some evaluations can be based on analysis of scarring rates on individually identified whales, these analyses invariably have a lag of a year or so, as it takes time to obtain and process these data. As Pace et al. (2021) note in their Conclusion, “Annual counts of right whale carcasses do a poor job of indicating the total mortality for that year.” This demonstrates that it is inappropriate to use one or two years of SI/M observations to make a definitive inference on whether a management action (or actions) is (are) reducing deleterious anthropogenic impacts on NARWs.

**Recommendation 5: We recommend that the redrafted BiOp include a revised Section 10.3.1 Large Whale Monitoring that addresses the timeline of conservation actions and includes simulation modeling to demonstrate the efficacy of the monitoring program developed.**

**Reporting SI/M when there is an expectation that SI/M will fall to less than 0.2/year**

NOAA Fisheries reports SI/M data on rolling five-year averages, as discussed in Section 10.3.1 of the Draft BiOp. The expectation in the Draft BiOp is that Phase 4 of the Conservation Framework (p.232) will result in an average annual SI/M of 0.11/year. Assuming this optimistic projection is realized, for NOAA staff to calculate SI/M, NOAA will need to revise the timing over which SI/M is calculated. If the
expectation is that there will be one SI/M every nine years, then using rolling five-year averages is, from very basic mathematics, inappropriate. The rolling average will need to be longer. We note parenthetically that this is already a problem for the Gulf of Mexico Whale (*Balaenoptera ricei*)—another very-low abundance species managed by NOAA (also Red Listed as Critically Endangered).

**Recommendation 6:** We recommend that the redrafted BiOp discuss how NOAA will change its practices for reporting SI/M to account for low annual rates of this measure, should they arise.

**Essential physical or biological features**

There is a very salient point missing in the Draft BiOp discussion of “essential physical or biological features” of NARW Critical Habitat, Section 4.1.10 (pp. 83-88). Of the four physical states of matter (gas, liquid, solid, and plasma), both liquid and solid forms are relevant in this context. Seawater is a liquid and fishing gear is a solid. By introducing numerous solid objects (i.e. fishing gear) into seawater, it is inevitable that the physical features of NARW Critical Habitat (liquid) are fundamentally altered by those activities.

**Recommendation 7:** We recommend that the redrafted BiOp recognize that fishing using vertical lines alters the essential physical features of the ocean in areas where gear is introduced.

**Climate change**

Section 6.2. of the Draft BiOp, which addresses “Species Specific Information on Climate Change Effects,” for whales is weak. It glosses over the fact that NARWs are already impacted by climate change as demonstrated by recent literature cited in the Draft BiOp (e.g. Meyer-Gutbrod et al 2014 and 2017). It also fails to recognize the changes in distribution of other baleen whales from work led by NOAA’s NEFSC scientists (Davis et al. 2020 [disclosure: an Aquarium employee is an author on this paper]). Without argument, the current decline of NARWs is exacerbated by ecosystem changes driven by climate.

The Draft BiOp also lacks discussion of what can be done to ameliorate the impacts of climate change on NARWs despite a substantial body of literature focused on applying resilience-based management to address climate change in marine environments (for an introduction, see Bellwood et al. 2004; Hughes et al. 2005) and examples of using these approaches for on-water management (e.g., Fernandes 2005). There has not, to our knowledge, been any work that embeds managing climate impacts on a whale population explicitly into a resilience framework. We recommend that NOAA consider this approach in the revised BiOp as it offers a way forward for this challenging problem. Notwithstanding this existing body of research, all citations in the final paragraph of Section 6.2 on whales are based on NOAA’s work, much of which is not peer-reviewed, and should be remedied in subsequent versions.

Briefly, we suggest that managing for resilience, rather than managing to avoid extinction, will give greater likelihood that NARWs will avoid extinction in the face of our current climate emergency. For a whale species, managing for resilience would include ensuring that their abundance is sufficiently large to buffer against climate-induced deleterious changes, such as those we have seen in NARWs. Comparative work on other right whales that do have this buffer (Corkeron et al. 2018 [disclosure: Aquarium employees are authors of this paper]) shows that adult female mortality from anthropogenic sources has been the primary cause of NARW’s lack of recovery. Further, at an individual level, NARWs lack the energy buffer that other right whales have to increase calving rates (Christiansen et al. 2020 [disclosure:
an Aquarium employee is an author of this paper). For example, entanglements can have substantial impacts on individual NARW’s energy budgets (van der Hoop et al. 2017 [disclosure: an Aquarium employee is an author of this paper]), and the energy stores of NARWs can be measured reliably with drone-based photogrammetry (Christiansen et al. 2020). Monitoring the relationships between entanglement scarring and energy stores can provide a way to manage for resilience of individuals’ energy stores, as one example.

**Recommendation 8:** We recommend that the redrafted BiOp include a discussion of managing for resilience in the face of climate change and that that consideration is reflected throughout the redrafted document.

**Minor issues**

We raise a couple of minor points, one of which requires correction, and the other is a suggestion for further research.

First, on page 220 of the Draft BiOp, the statement “However, at this time, there is no further evidence to make the conclusion that sublethal effects from fishing gear entanglement alone causes a decline in large whale health” is incorrect. See van der Hoop’s work on morbidity from entanglement, particularly van der Hoop et al. 2017 where the models demonstrate that entanglement alone is sufficient to cause a decline in reproductive output.

Second, as a suggestion for an area of future research, we note that the mark-recapture model that NOAA is using for NARWs still defines adults as whales over five years of age. This was a reasonable assumption when the model was developed. Now, however, the age at first reproduction of female NARWs is substantially greater than five. This year’s calving cohort included five first-time mothers whose ages are 12, 12, 13, 14, and 19, respectively. The cutoff for adults in NOAA’s model should be revised to take into account recent changes in age at first reproduction.

The Aquarium thanks NOAA for the opportunity to review and comment on the Draft Biological Opinion. As part of the management strategy and conservation plan to recover NARWs, the Aquarium submits our recommendations to improve and strengthen the scientific basis under which NOAA determined a “no jeopardy” finding for this species and respectfully requests that this finding be revisited in light of information shared in this submission.

Our scientists are available to answer any questions or provide additional information.

Sincerely,

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References


20 January 2021

Colleen,

Please find below my comments on the proposed ALWTRP. They will be brief and as focused as I can make them.

When the ALWTRT met in Providence in 2019, we were tasked by senior NMFS management with reaching 80% reduction in risk to NARW mortalities as that would be the only way to stem the dramatic losses to this population/species. In the following 20 months, the status of the population has only declined to the extremely grim reality we face today. Despite this reality, the plan proposed in 2019 has been watered down, at a time that the population has reached the level it was when the ALWTRT was first opened twenty years ago. Simply stated, the ALWTRP needs to do more. My comments on portions on the plan are as follows.

It is unclear how modifications in LMA3 gear will significantly reduce risk. One line will remain as currently fished and one line will be “weakened” in some way, at some point along its length. It appears LMA3 fishers were asked how they could best implement the weak line- why was that not finalized prior to the release of “the plan”? Additionally, there is a vague ask of fishers operating in LMA3 if they can parse out the number of pots hauled by vessels so that, maybe, larger boats could haul trawls with more traps allowing smaller boats to fish the same trawls as they do now. That extremely weak solution, on an agreement among boats, does not seem possible to score for risk reduction. If asked, I couldn’t tell anyone how the riskiest gear being fished will be specifically modified under this plan!

We must remove all weak links that have been, or will be proposed, to allow buoys to part from vertical lines during entanglement. The buoys are the only guaranteed means of identifying the gear type and where it was fished, and could also work as a toggle producing drag to pull gear free from the whale. The buoys are more visible to survey teams and can facilitate disentanglement by teams more easily monitoring a whale. There are certainly entanglement scenarios where the buoy could increase line wrapping on an appendage but if all effort is made to part off the trawl with weak links the buoy remaining on could work to pull line free before it tightens around the rostrum or flippers.

Weak line has become the focus of much risk reduction. The work in our Lab has shown that whales do have upper limits to the force they produce while swimming, so completely agree with this risk reduction strategy. There appear to be several weak sleeves and/or other proposed modifications put in gear to weaken it. But the initial goal was to prompt line manufacturers to provide line that would achieve that reduction. During the plan roll out call there was a comment made by (I think) a MA fisher that the weak line they had purchased was not being recognized as meeting the goals of the plan. Moving to the actual line being weak along the entire length must be the goal of the plan. Inserting a weak sleeve, etc. along the line
does not provide full risk reduction. If weak line has already been manufactured it has to be acceptable to the plan.

A large component of the plan is the implementation of restricted areas. Opening these areas appears to be dependent on NARW sightings for the trigger. Tying any plan component to the distribution of NARWs conflicts with the development of coastwide management. If there were structured restrictions and even closures that were in place and could be implemented in near-real time after agreed upon triggers, I feel these management strategies would achieve required take reductions. As it is stated in the current plan, action is based on unaccountable decisions from GARFO management.

Now a note about process. It is unacceptable to the concept of a Take Reduction TEAM that a single entity represented on the team can act outside of the team meeting to stop the process. Being represented on the team, then acting outside of the team to alter the plan in their best interests, MUST STOP! Many are at risk of losing interest in being involved in any TRT if the real plan is developed outside of team input.

I understand the complexities of producing a plan (and this one is not even in the water) but the final results are far different from the meeting in Providence and, more importantly, I don’t see how they will reach the ever increasing need for serious injury and mortality reductions in this population.

I do appreciate all the effort you personally have expended to get us to this point!

Best

William McLellan

NC State Stranding Coordinator

Master Necropsy Team Leader

ALWTRT Member

University of North Carolina Wilmington
Docket No. 201221–0351

Proposed Rule: Taking of Marine Mammals Incidental to Commercial Fishing Operations; Atlantic Large Whale Take Reduction Plan Regulations; Atlantic Coastal Fisheries Cooperative Management Act Provisions; American Lobster Fishery

To: Mr. Ben Friedman (Deputy Under Secretary for Operations, performing the duties of Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator)

Cc: NOAA Fisheries - Paul Doremus (Acting Assistant Administrator for Fisheries), Sam Rauch (Deputy Assistant Administrator for Regulatory Programs), Cisco Werner (Director of Scientific Programs and Chief Science Advisor), Donna Wieting (Director of NOAA Fisheries Office of Protected Resources), Evan Howell (Director of NOAA Fisheries’ Office of Science and Technology), Karen Hyun (NOAA Chief of Staff), and Colleen Coogan (Marine Mammal and Sea Turtle Branch Chief, Greater Atlantic Regional Fisheries Office)

February 25, 2021

Dear Mr. Friedman:

We represent a group of scientists with extensive expertise in the biology of large whales, oceanography, and fisheries. We are writing to express our serious concerns about the proposed rule titled Taking of Marine Mammals Incidental to Commercial Fishing Operations; Atlantic Large Whale Take Reduction Plan Regulations; Atlantic Coastal Fisheries Cooperative Management Act Provisions; American Lobster Fishery put forward by NOAA Fisheries to reduce entanglement risk to North Atlantic right whales (NARW) caused by Northeast crab and lobster trap/pot fisheries (https://www.govinfo.gov/content/pkg/FR-2020-12-31/pdf/2020-28775.pdf). Whales continue to be impacted by entanglement and NARWs are known to be dying at an increasing and unsustainable rate. Just since October 2020 there have been three NARW observed in U.S. waters with serious entanglements - none could be disentangled, and all are likely to die. The proposed rule represents a dramatic weakening of the recommendations made by the Atlantic Large Whale Take Reduction Team (ALWTRT) in April 2019 as a path towards achieving reduction in entanglement risk.

This weakening of the proposed take reduction strategy runs counter to all scientific analysis, particularly in light of the well documented and ongoing reduction in the population size of this critically endangered species (https://www.narwc.org/report-cards.html). Furthermore, entanglement mortality continues at unsustainable levels and much of it goes undetected. For every right whale carcass observed, almost three more deaths go undocumented
Finally, NOAA’s report on the increasing frequency of serious injuries from entanglements demonstrates that the problem is getting worse, not better. If the current rate of population decline does not change (approximately 20 whales per year over the last 5 years), the North Atlantic right whale will be functionally extinct in less than two decades. In light of this scientific information, we strongly urge NOAA leadership to revisit and considerably strengthen the proposed rule.

We specifically suggest the following:

1) **The 60% target of reduced risk outlined in the proposed rule should be increased to 80%**

   Rapid and effective management action is critical to turn the trajectory of this species around. We recommend increasing the risk reduction in the U.S. lobster and crab fishery to 80%, applying additional measures in other U.S. fixed gear fisheries, and working closely with the Canadian government to implement similar risk reduction goals in their fisheries. These actions will provide the best chance of achieving the risk reduction targets mandated by the Endangered Species Act and the Marine Mammal Protection Act (MMPA). The recent Biological Opinion estimates the current proposed rule will not reduce U.S. entanglements below the Potential Biological Removal level of 0.8 individuals annually as mandated by the MMPA. Only rapid and sustained actions such as those described herein can change the trajectory of the NARW population.

2) **Endline reductions, closures, and 1700 lb ropes should be considered as interim measures as ropeless gear becomes a more viable option**

   The concerns about ropes and entanglements of large whales is a long standing problem. As Johnson et al. stated in 2005, “…any line rising into the water column poses a significant entanglement risk”. In recent years, a tremendous amount of effort by engineers, fishers, and scientists has led to promising options to address this threat with gear technology. We ask NOAA leadership to acknowledge that ropeless gear may nearly eliminate the risk of large whale entanglements and support an economically viable fishing industry. Government investment to accelerate the development and evaluation of ropeless fishing is urgently needed, which should include plans for experimental fisheries in closed areas by January 2022. Support for these investments must consider the use of subsidies to help shift all members of the industry affected by closures to this option by January 2024. These goals should be endorsed by NOAA Fisheries
to signal the agency’s support of ropeless fishing and to encourage investment and development by commercial manufacturers. Ropeless retrieval systems are functional today, but a universal solution to monitor a fishery without buoys marking endlines and address gear conflict issues does not yet exist and must be developed with the support of NOAA Fisheries quickly. **These investments will benefit fishermen and whales, and should be a top priority.** In the meantime, scaled-up efforts to reduce the total number of endlines, to implement closures and to use 1700 lb ropes/weak insertions should be considered the best interim options for reducing risk and impact.

3) **Where vertical lines continue to be necessary, endline strength should be reduced to 1700 lbs throughout the entire length, not just the upper portion**

Rope strength plays a critical role in entanglement risk and injury severity (see https://conbio.onlinelibrary.wiley.com/doi/10.1111/cobi.12590), and the ALWTRT came to near consensus in April 2019 in requesting that vertical lines with a breaking strength of 1700 lb, either entirely or with weak links inserted every 40 feet, be used throughout the lobster and crab industry to reduce risk. This recommendation has been weakened in the proposed rule such that weak rope/weak insertions are now only being proposed for the top half or top third of an endline with only one to two weak insertions required independent of endline length. The original ALWTRT agreement as it pertains to weakened vertical lines, which would require use of 1,700 lb rope or sleeves through the entire endline length, should be reinstated and applied throughout lobster and crab fisheries as a part of this rulemaking and expanded to other fixed gear fisheries in the near future.

4) **A mechanism should be developed to allow vertical line closures to expeditiously be extended spatially or temporally based on scientific observations that include computer modeling**

Fisheries closures that eliminate vertical lines in the water column are the most effective tool for mitigating risk of entanglements of right whales where the two overlap in space and time. Right whales have shifted their distribution dramatically in the past 10 years and their movements have become more difficult to predict as a result of climate change. As new aggregation areas are identified from direct observations, acoustic detections, and/or modelling, it is important to have a rapid regulatory response method to change, expand, or extend closures as needed and allow ropeless fishing in these closed areas. A network of closures should occur throughout the species range, and protect a sufficiently large enough area to help recover the population.
As academic members of the Atlantic Large Whale Take Reduction Team and scientists who study large whales, oceanography, and fisheries issues, we recognize the tremendous challenge facing NOAA Fisheries to prevent the extinction of the NARW while minimizing the economic impact upon fisheries. We believe that, for the fishing industry and NARWs to coexist, the transition to fully weak rope and ropeless gear requires immediate government support to help fishers procure new gear. No further delays or concessions that undermine the ability of proposed measures to prevent NARWs from going extinct should be allowed in implementing strong, effective and enforceable rules. If an 80% reduction in risk cannot be accomplished in this rulemaking effort, NOAA Fisheries should request the Atlantic Large Whale Take Reduction team to immediately consider additional measures for these fisheries during 2021 discussions.

Thank you for considering our request. We will each be providing more detailed comments to the proposed rule.

Sincerely,

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Appendix 7.3

Transcripts from Public Information Sessions and Public Hearings

In January 2021, we held four public information sessions and in February 2021, we held four public hearings, all virtual due to the global pandemic. The sessions were organized by region, though everyone was welcome to attend any session. Although the purpose of the January meetings was to provide information and answer questions, we accepted oral comments on the proposed rule and the Draft Environmental Impact Statement (DEIS) at all eight meetings. See Tables 1.5 and 1.6 for a breakdown of participants that attended the information sessions and public hearings.

Information Sessions
1. Rhode Island, Southern Massachusetts and LMA3, Tuesday, January 12, 2021, 6:30-8:30 pm
2. Massachusetts (Outer Cape and LMA1) and New Hampshire (LMA1), Wednesday, January 13, 2021, 6:30-8:30 pm
3. Southern Maine, Tuesday, January 19, 2021, 6:30-8:30 pm
4. Northern Maine, Wednesday, January 20, 2021, 6:30-8:30 pm

Public Hearings
1. Rhode Island, Southern Massachusetts and LMA3, Tuesday, February 16, 2021, 6:30-8:30 pm
2. Massachusetts (Outer Cape and LMA1) and New Hampshire (LMA1), Wednesday, February 17, 2021, 6:30-8:30 pm
3. Southern Maine, Tuesday, February 23, 2021, 6:30-8:30 pm
4. Northern Maine, Wednesday, February 24, 2021, 6:30-8:30 pm

A total of 211 people provided comments through these informational sessions and public hearings. Of these, at least 58 identified themselves as fishermen on the calls. About 77 commenters voiced support for this rule or strengthening this rule, while 44 generally opposed the rule or questioned the need for a rule. Many people had questions or wanted clarification on particular parts of the rule, but did not specifically voice either support or opposition.
Can you jump back to that slide and go through that for us? Oh, well, Kara will have to jump back to the slides.

Yeah, can you, Can you say which slide one more time for me?

The Trawl-up slide for preferred alternatives. So in LMA 2 between 3 and 12 nautical miles, it was 15 traps per trawl, I believe. And beyond 12 nautical miles, it's 25 traps per trawl. Yeah.

OK, you say that one more time for me?

So in LMA 2, between 3 and 12 nautical miles, it will be requiring 15 traps per trawl and beyond 12 nautical miles, 25 traps per trawl.

OK, thank you.

That was slide 20, for people who are following in the slide deck.

OK, Brian. I'm coming back to you. Let's try this again. You are unmuted, You'll have to unmute yourself.

OK, can we hear me now?

Yes.

Hey, Hello, everyone. Just the LMA2 question, also a conservation equivalency question. If we were able to get a proven 1700lb breaking strength for the top 75% of our vertical lines, joined with, uh, a knot at the 25% mark from the bottom, which would also weaken it, could that be considered a conservation equivalency to perhaps two installed weak links or breakaway insertions?

That is definitely a conservation equivalency to the weak insertions, because that's full, Weak rope what we consider to be full, weak rope. Scott has suggested that it gets equal, or greater risk reduction, if all of the LMA 2 boats did that then, then the trawling up suggestions that are in place right now, it's difficult for us to determine how much risk reduction we get if just the Rhode Island boats do that. I'm not sure if you're fishing from Rhode Island, but that's a proposal we've heard from Rhode Island. But that is something that we would look into trying to figure out how to analyze that, and consider that as an alternative. As a conservation equivalency alternative

OK, Yeah, now you, you stated that, that might actually give a greater conservation equivalency. so, ah, certainly not looking for more than the 1700, but maybe the percentage of the vertical line, you know, through it through a model, if it could be adjusted, where maybe it was, you know, 60%, instead of 75%, if that met the conservation equivalency barrier. Just, you know, I
know we have to find the exact rope that that is. And I know it's not a designated line diameter, but, you know, before the public comment period, even, we need to kind of diagnose what that might be for an option. For the industry, you know, in perhaps the 12 Mile and in industry of LMA 2. And I am fishing out of Rhode Island, so, I am speaking on behalf of them.

So, out of Rhode Island right now, what's proposed is a 15 trap trawl out to 12 miles?

Correct.

And that, that's not what you're fishing now?

And, but, I thought that also included two weak link insertions.

Yeah, as well as two weak insertions.

While also trawling up.

That's right.

Yeah, OK, All right. Yeah.

I just was looking at, you know, some of the discussions we've had through industry, um, and in some of the small boat size, obviously a 15 trap trawl, you know, as you've heard through, you know, from industry and through your meetings, 15 traps might be larger then, then a boat could handle. I've talked to several of them today, you know, they say, Obviously they'll do it, it needs to be done if it needs to be done, but wondering what risk reduction would get us to a 12 trap trawl and what another preferred possible alternative could be to allow them to maybe trawl up to just 12 traps. And just for the future, I know nobody's poised to answer that question right now, but if that could be a model run that gets done in the future.

Well, I'll tell you are well represented by a Scott O and also by the TRT members, including Peter, who's now an alternate. And I'm sure they're going to make us run those for you in the near future. So, we will work on that with them.

Yup, OK, yup, I, I have spoken with both of them also today. And was just bringing up, but it's a question at this point for the group. Just, you know, just so it didn't come from out of nowhere, wasn't a rug pulled out from under anybody's feet. So, I just wanted to have the potential of that proposal on the table. While we're formulating, you know, I've been involved in lots of processes. And, and, and once the modeling has done, a lot of times, there's no longer any input. We're just trying to adjust it. So, while we're still somewhat early, wanted to just get that on the table, please.

And, you know, it's difficult because I think in our in our data there aren't very many vessels, fishing are fewer than 12 trap trawls already. So, there wouldn't be much. There'll be no credit for the 12 trap trawl component of that. And all of the risk reduction would have to come from or
very little I should say I shouldn't say none. Maybe, maybe not enough to be calculated, actually, if it's only a couple of boats, Out of all the boats fishing there,

OK.

It will be tricky but will work with Scott and, and actually the analysts in Rhode Island also have a good understanding of your fishery, so we'll work with them to see.

Yeah, no, that's appreciated. I mean, I, I discussed it with 3, 3 individual people today that do that, so. So, the number zero is, is not, is not a number, you know, there is some percentage of it, and, you know, if the equivalency doesn't get met, I completely understand, I just, you know, as representing them a little bit, I wanted to make sure that they know their voice was heard to some extent, obviously, from a greater safety point. So. Yeah, I think, I think that was my main question, actually. What were those two things, the content, and, you know, how to achieve some potential different conservation equivalency. So, I appreciate your time. Hopefully, there'll be a few more questions from the gallery and informational session and people should not be shy to ask questions if they have them. So, thank you.

Thanks for your example, Brian.

Yep, and we have one Mark, I'm coming to you. You are unmuted, you can just unmute yourself and ask a question.

I had, uh, I think it's pertinent. Do the wind farm constructions continue in this proposed south of Martha's Vineyard closed area when we can't have access to it? Do they still continue to do their construction during this closure?

Um, Mark, that's a good question and I know I can contact you so I can get you information on what their plans are. I have not been involved in the wind farm Construction, Endangered Species Act consultations. What we do through our rulemaking, you know, under the Marine Mammal Protection Act, it's specific to commercial fishing. So our rulemaking, my team, does not affect what goes on in that area. Um, so I don't know what the construction restrictions are, what the seasonal component of that is or even what the status of that project is. But I work near people who do that so I can get that information for you and I'll see if I can get that before even our further are next public meeting tomorrow night.

OK, Thank you. I didn't know if this was within the realm, but thanks Colleen.

Yeah. It's outside of the scope of the Take Reduction Team, which is really specific to the US. Commercial fisheries,

OK.

There's a lot of recovery actions and other actions going on outside of the scope of this rule. That's one of them. Thanks, Mark.
Yes.

OK, Gary, I'm coming to you next. You are unmuted, you can ask your question.

Oh, yeah, you got me?

Yes we can hear you.

Ok, Yeah. I kind of agree with Brian, I fish out of Saconnet Point, Little Compton, Rhode Island Waters Lobster Management Area 2. I'm kind of getting long in the tooth. I've got a 40 footer I fish by myself and I don't lobster anymore, just Black sea bass, I use 10 trap trawls. There's another gentleman, Westport, I believe, he fishes 10 trap trawls also. That's what's safe for me to fish on my boat. So if there is a equivalency concern I think, that it should be brought in, because I start two miles off the beach in May, and by December, I'm 15 miles off the beach. So me, it would be a hardship, to keep adding onto that trawl all the time, so it would be an unsafe situation and 10 traps is what I fish without any safety concerns. So, I just wanted to make that comment.

OK, I will let you know that right now, these rules affect only Lobster and Jonah crab fishermen, but you know. It's smart to be paying attention now, because starting this Spring, we're going to be looking at all the other, um, at all the all the other regions down to Florida and all the other fisheries, Gill net and trap pots. So that's good to know and we'll know be talking about that soon with the Take reduction team. Also, if you're fishing out to 15 miles, that means as currently proposed that would include a 25 trap trawl area, which would sounds like it would be very burdensome for your vessel.

Yeah. That would be, uh, definitely unsafe, like I say, I fish by myself and I fish because I enjoy to fish. The only thing else I want to say is the Coast Guard sometimes gets a little anxious when they come aboard. And you try to tell them that it's a sea bass pot not a lobster pot. It doesn't seem to matter to them. It's a pot to them. A pot to some people is a pot, whether it's a sea bass pot or a lobster pot. And when you try to tell them, no, there's a sea bass pot and then maybe And they do catch lobsters, there is no doubt about it. So if it comes up and they're on board while you're hauling the gear and it's got a lobster in it, they're going to consider that a lobster pot. So I have that concern also.

All right. And from the, from the point of a whale, it doesn't matter what the pot is, it's the buoy line, and the configurations, that, that impact. So, um, so ultimately, we will be, including all those other fisheries in these rules as well within the next year or so. We'll be proposing new measures and they, and we would want them to be consistent. So Yep smart for you to kind of get in on these measures, because this would be your future too.

Thank you very much, I appreciate that.

Thank you for the comments.
Colleen, we have no more questions, but we have a comment from Russell, Russell, I'm coming to unmute you.

Do you want to jump to the comments slide? A couple of these questions have been more like comments, and we are recording all this, so. So, you know, we're documenting this, oh, it's very similar. Just put, comment in the, in the comment field, in the question field if you want to comment. And I'm sorry, Russell, your comment.

I was just following up with what they're both saying. He was saying he was representing three people he had spoken with today and I would be a fourth running 10 pot trawls in that same area.

OK, great. And are you targeting primarily black sea bass currently?

No lobster, crab.

Lobster, OK. And you fish out to 10 miles?

Yes.

OK, thanks. Yes. So unless we see a lot of questions put into the queue, we can, anyone who's interested in providing a public comment can comment at this time by putting “comment” into the question box.

Yeah. OK. Thomas, you are unmuted, and you may make your comment. I can see that you're unmuted, but we can't hear you.

That may appear.

Yeah, I could just hear you, Thomas. Oh, I'm so sorry wrong Thomas, everyone. Other Thomas', you just need to unmute yourself and make your comment. My apologies.

Hey, everybody, can you hear me? Very Good. Sorry about that. So this is just a comment. I just want to thank you all for inspiring people like myself, a marine science student, and your hard work and love of these whales is really inspiring, and it's been great just to sit in here and the recent Right Whale consortium. And just hear everybody talk about their passion for conservation and these Whales. So thank you.

Thanks for that comment. Any other comments tonight?

Not at this time. Do we have anyone else who would like to make a public comment? Or who has just thought about another question? OK, Brian, I'm coming back to you, Brian, has a question. Brian, you can unmute yourself and ask your question.

Hello, again. Hello, hello.

Coming across loud and clear, Brian.
OK, very good, thank you. I just actually, I wanted to, going to be more of an answer for Mark that had requested before. The COPs, the cops for all the wind farm vessels are allowing construction year round for all the wind farm fields. So there is year round construction going, they are all vessels are supposed to have during the migration, migration times are supposed to have biologists on the vessel's to do correct spotting, um, of migrating right whales and they are supposed to stop construction for as long as the vessels are in as long as the whales, sorry, as long as the whales are in view of the vessels. Um, it's, it's, you know, being involved both in whales, and wind farms it's, it's a pretty lousy hand for the fishermen to have to face year round, Year round: crisis and decisions that we're going to have to make, while these Wind Farm companies do have a hall pass, so when the opportunity does arrive, having the take reduction team hold them to that standard. At the very least, what I would ask you, you know, that they would hold them to the standard of having the proper observers on the boat and following the protocols that are set forth in their construction operation plan. That was about it. So, I guess that's more of a comment than a question.

It's a good comment. And we will take that to the folks we work with that are responsible for helping promote those measures with the wind farm, evaluate the wind farm, and identify those measures. So we'll make sure they're accountable and will pass on as we have in the past that the fishermen fishing in that area want to make sure there's equitable requirements.

Colleen at this time, there are no questions or comments left in the queue.

OK, so we'll go ahead and consider that a wrap of our first remote meeting. I really appreciate those of you that attended today, and, again, this was our first run. So, oh, you're sort of our guinea pigs, are not intentionally didn't put a lot of prep and really appreciate all the NOAA staff who are on helping maintain the queues and keep the call going, Marisa and Chao for helping present and Kara for helping us navigate GoTo Webinar generally. And, you know, get us through the queue as well. And thanks, Joanne Lorello for helping out with technical support. Thank you everybody and goodnight, and maybe see some of you on future meetings. Thanks.

Colleen I will leave the line open for just a couple more minutes in case anyone is. Furiously writing all of the information on the last slide.
So as Colleen mentioned, go ahead and type a question in the questions box. It's helpful for us to sort of lump the questions together by like-topics. If you know your topic or know your slide number, put that in there now.

First up, we have Gib Brogan. I am unmuting you, you may unmute yourself and ask your question.

Hi, Gib Brogan with Oceana. I've got a question you may give

you're, you're very faint. We can't hear you.

Sorry. Hold on. Or is that better?

A little bit.

OK, that's good if it's going to get. I'm, I'm afraid I'll speak up.

In the early in your presentation Colleen, you mentioned that the value of PBR is in flux and will be going down based on more updated stock assessments. Last week in the TRT information session, you mentioned that the agency has conducted an analysis that looks at the effect of a lower PBR on the risk reduction target. I'm just wondering, is there any analysis that's available that can support that? And, if not, then I'm just curious on the effect of a change in PBR on the risk reduction target.

So, thanks, Gib. We haven't made that available because there were so many preliminary data points in that normally before we make something public we wait till a lot of the information is peer reviewed. But to describe it to you, um, the what the main thing that happens when in our target, the way we formulate our target, the main thing that happens when the number of whales goes down is the PBR goes down. And, as you might recall, the way we developed our target was by assigning known US takes to the US, an estimated take level as well as 50% of the unknown. You know, we know it was an entanglement. It was seen in US waters, or, what we know is an entanglement. But, we don't know where the entanglement occurred. We didn't get the gear off it, so, we split up, there, was unattributed, serious injury and mortality is 50%, Canadian 50% US. And so we only assigned, you know, we assigned half of those in the US responsibility. So another thing that's happened in the last five years is that there are no over the most recent five years, there are no known US um, injuries and mortalities. Most of the whales that we've seen haven't had gear on them or we retrieve no gear. And so or we couldn't identify the gear. So as a result, the, the estimated take attributed to the US went down as did the potential biological removal level. So in the end, our estimates are similar, 60 to 80%, depending on the assumptions. We are considering whether or not, even though it's very preliminary, whether or not we can make that available and so, you know, keep looking at the TRT web page if we, if we put that, know that those calculations out there, that's where they'll show up.
And PBR is a formula that anyone can calculate themselves. And so you can sort of look at the new, some of the new numbers coming out. You use nMin, zero point zero four and zero point one times a half and you can calculate the PBR level yourself. And that's sort of the fundamental start of the analysis that was done that we showed at the or that was discussed at the meeting last week. OK, do we have any other questions, just type “question” in the chat. OK, excellent.

Marin. I'm coming to you. I have unmuted you. Yep.

I want to say thank you, guys, for the presentation. My question was I was looking at the website, and for the latest entanglement reports. You guys noted a male right whale entanglement off the Georgia Florida line, just in the last couple of weeks, January 2021. So I guess my question is, is that this proposed rule is to achieve a 60% reduction in risk to hit the zero point nine PBR. Why are not all other fisheries included in this proposed ruling south of Rhode Island? And it's not uncommon to have these entanglements. In, you know, Georgia, Virginia, Florida. And I also didn't see that in the north-east region. It seems like it's just Lobster and Gill net. But what about some of the other fisheries that are affected by ALWTRT regulations currently?

I'll try answering that one. So earlier when I identified the efforts for the April 2019 meeting, I indicated that we did. We did focus the scope of that meeting on the north-east Lobster and Jonah Crab Fisheries, because that's where 93% of the buoy lines are fished. Where right whales occur. Um, when we do coast wide, multi, many multi fishery rule, it can take even longer to get a proposed final rule that takes a lot longer to develop that. And so because we were in a hurry we wanted to focus and get, you know, the largest number of potential threats covered in the rule at one time. So that's why we focus on north-east lobster and Jonah crab.

We have notified the team and we are starting to make plans for a Spring 2021 meeting to look at all other lobster fisheries further south and all the other trap/pot and gillnet fisheries as well. So we're in the process of preparing materials to have the team start meeting on that. Um, that entanglement that was observed off of Georgia. I believe it was this week. Um, We don't. that, as I mentioned in the slide, showing Dragon, the picture of Dragon. Where we first see an entanglement is probably best correlated with where we have aerial surveys, or good opportunistic effort, like whale watching or other eyes on the water. It's not where the entanglement occurs. Right whales can drag these drag gear for miles and miles and for months and months. So first sighting, uh, often has nothing to do with the, the location of the entanglement. This is not a brand-new entanglement. This is the first sighting of entanglement. The Whale apparently has reportedly has cyamids on it, which suggests that the abrasions are not new, caused by the entanglement.

Thank you. I appreciate the response. It's just one of these overall things where you're putting such a big cost and burden on these two fisheries, when it's a shared responsibility. Because just as you say, you know, a lot of these entanglements haven't been identified by gear. Or by area. But yet, these two fisheries and this region is bearing the brunt right now.

So, you know, if you want to submit that as your comments, when the comment period, or during the public comment period, please do, that we do plan to regulate these other fisheries as well.
Yeah. No, I appreciate that. Thank you.

OK, Mike Walsh. I'm coming' to you. You are unmuted, you can unmute yourself and ask your question.

Yes. My question was I thought I might have heard somebody say that these implementations of the contrivances or gear markings would be pushed out a little further due to the length of these discussions and comment periods. You know? I know plan to start fishing hopefully back on May first, But, you know, Will be Will I need to have my gear ready by May first ready to go for this or will likely be pushed out?

Mike? Are you a Massachusetts fisherman?

I am yes. Marshfield, I'm in the closure.

So, do you fish primarily in State waters?

Yes, I do.

So this the State is on a parallel track to implement rules on well, I shouldn't say parallel, there. They're well ahead of us. So, I don't know what those final rules will look like. I think that there was recently an indication that that was going to be pushed back a few more weeks before they finalize those things. I do think probably by, I don't know, there's a delay in implementation, that's something you'll have to ask the state regulators.

Thank you.

OK, Kurt, Coming to you. All right. You are unmuted, you can unmute yourself, and I will head over to Slide 41 for you.

We're going to pass. We've figured it out.

Awesome. Thank you. OK, Mary Branch. You ask your question, and I will head over to slides 27 through 30.

Well, I'm just, I'm just been following this for a while. Can you hear me?

Yes.

Yep, OK. And I always get there. I'm just a regular citizen down in Texas and um just very concerned about the right whales, especially. And I noticed that and the answer is probably obvious. And I'm just trying to process all of this. But I noticed. And on those slides, the preferred and non-preferred, um, methods, and the non-preferred seem to have such a significant reduction in right whale, or all whale takes. And I know it's also a very significant increased cost. But to me, biologically, I mean, these whales are going extinct there. I think they're 1. 1 or 2
whales away from becoming critically endangered, or what you call the red, the red zone, where they may never recover. And less than 400 significantly less than 400 of them in known existence. So why wouldn't And maybe you're doing that in the Proposed Rule, but why wouldn't you at least take some non-preferred methods that have that 80% or 83% reduction in occurrence and mix some of those in with the preferred to achieve a better balance. But I don't know. Maybe you're doing that. I just don't know the entire rules. So that was just my question. And I know there's a cost. But wouldn't it be Great if the fishermen and everybody could agree to maybe the first couple of years trying at a higher cost or maybe a reduced catch just and making these changes. Just to see if it makes a difference. Then you'd have some really good data that Yes. This does make a difference. So, that's my question.

I'm not sure I can answer that to your satisfaction, but you can certainly comment. You know, in public comments that you think that our final rule should include measures from our non-preferred alternative. Um, the, the, the large, cost is a part of it. We were also working with a target of 60, well 60 to 80%, but 60% was really what the TRT was going with. There are a lot of uncertainties about where mortalities are coming from and the proportion for instance coming from Canada or other places. And Canada's recent in recent years taken a lot of steps to try and reduce takes. and they've reduced the obvious takes at least. And so we might see. We might see those benefits in changes in what we're seeing in our waters as well. But again, that's a You've got, you raise a valid point and that is a good public comment for you to make if, if you're you want us to look at finalizing something from our non-preferred alternative.

OK, Thank you.

OK? Let's see here. Gib I'm coming back to you. You are unmuted. You can unmute yourself and ask your question.

My question is about the proposed LMA1 restricted area and the Preferred Alternative. And they, too, I think, you call them co proposals. one of them relies on the regional administrator to make a call in the fall. And just wondering, could you describe how that would work? Are we looking at a situation where the regional administrator would have absolute discretion or would the EIS include a series of criteria? And then, my other, the other question on the same thing is, how does the agency propose to collect and process information in near real time to make any determination in season?

So, those details are not in there, in the DEIS currently, things, that, some conversations that were held during the TRT team meetings related to trying to develop more adaptive closures, that or based on evidence, it wouldn't, I don't think it would be something that the regional administrator would wait till October to do it. And I, and as we discuss it with the take reduction team, if we were able to prepare regulations to allow that, it would probably require consultation with the take reduction team. So I would envision something more like in, in July of every year. We would call the team together to look at information such as projections of where copepods are or the last year's aerial survey and other survey efforts to see what whales are doing, and the most recent time series we have available. Right now to get, to get data into models. It's always two years lag. Sometimes more. So we would be looking at the real data, rather than using the model, potentially, unless we develop a more agile model. But those details haven't been worked
out, Gib. I do think that anything we would do would require consultation with the team, not the regional administrator entirely by himself. Um, but, as I said, we haven't worked out all those details and they're not currently in the in the DEIS.

OK, thank you. That's very useful. I was trying to reconcile that process with the considered but rejected alternative of using dynamic management and that's also data dependent and happening in, in near real time. So just trying to make sense of that. Thank you.

Just one thing to add to that Gib. When we talked about dynamic management at the TRT meeting, well, we talked about, you know, it's a little easier to open something, to have it, to have it closed. But then, because of information collected in the months leading up to it, or the year before, including the year before it, too, to open it, then it would be to dynamically close it if it's not already a closure in US rulemaking procedures.

OK, Faye Anderson, you are unmuted, and you can ask your question. Faye, are you able to hear me? We can come back to you, if you're having trouble. You can also type your question into the questions box and I can read it for you, but we will come back to you. OK, next up, we have Max. Max, you are unmuted. You can unmute yourself and ask your questions.

Hear me?

Yes.

OK, so, as I'm a New Hampshire commercial lobster pot fisherman, and I'm wondering what why any state, New Hampshire, lobster pot fishermen has to comply with the take reduction plan rules because, obviously, we're not under Federal permit. So, I'd like to ask two quick questions to make sure we're on the same page, and I've not missed something in my wonderment. The first question, I just wanted to confirm that NOAA's never issued the required Marine Mammal Protection Act, Section 101 A 5 E permit to allow the incidental taking of an endangered marine mammal. I.E a right whale and the other whales meaning not even issuing a permit for a single entanglement they can't do under the MMPA. Is that true? That NMFS has not issued that permit and has no intention to which it will.

I won't speak to the intention of the agency, but we have not issued a permit under that.

OK, great. Alright, thank you. Alright. That can just make sure I'm on the same page with you is that the certification of authorization, that's comes with the take Reduction Plan regulations where fishermen are supposed to be immune. From any prosecution for a prohibited taking, which is just an entanglement, not a killing or an injury, does not apply to the right whales and the other endangered whales in the north-east. So is that true also?

I would have to get information on that from our attorneys.

So, it says: It's not really specific to the information in our DEIS and our proposed rule. If you want to keep your questions to those. I'd appreciate that.
No. I am keeping it to that, because the whole point of the rule, TRP rule is who you're going to affect. That's the whole point of the reduction. Who can you affect with these Take Reduction Plan measures? And so, my point is, now, I'll make my point since I know those two issues are, I was right correct on the observation, is that because, New Hampshire fishermen do not have immunity under the MMPA, which are the Which for right whales and specifically, and these other endangered whales we don't get the benefit of the bargain. And the take reduction plan can't possibly apply to us, because that I would be asking you about. And then the other thing is that Because you haven't, NOAA, has not issued, Erika, I'm sure you are interested in this question. And because NOAA was not issued that required permit, which was that issue was cited in the federal lawsuit in Washington, that it can't even issue these take reduction plan requirements. Because you allow entanglements to occur. And if you're allowing entanglements, you're violating the Endangered Species Act. So my I as a fisherman am caught in a rock, and a hard place. If I comply with the Take Reduction Plan regulations. I'm going to be violating this Endangered Species Act, and go to jail for that. And, so, ultimately, what I'm trying to ask here is, is that the real root to safety for a fishermen, so that if I entangle a whale, under take reduction plan that says I will entangle whales. Shouldn't I be getting an incidental take permit under Section 10 of the Endangered Species Act? Now I've tried to do this. I'm still trying, but NOAA resists. they just apparently have never issued that. But the only way I can see protecting myself and my fellow fishermen from when we entangle whales not to go to jail or not to be fined or whatever because we're violating the prohibitions, is to go the Incidental Take Permit route but I don't think that's even going to work. Because since you can't issue intent and incidental take statement, that would allow us,

I'm going to ask you to wrap this up. This sounds a lot more like a comment than a question and? Litigate mitigation on the poll. So, You don't have to do that, I understand. Your question.

Don't cut me off. That's why I'm suing you, you just don't listen to anybody. Just fishermen

Then you, please. Thank you. Thanks, Max. We would love to, not necessarily love to, but we anticipate getting those as comments. And we've recorded your comments today as well.

OK, we have Next, we have a question from Gib on State Management Components. Gib. You can unmute yourself and ask your question.

Yeah, First off, thank you for answering my questions. I've been reading these documents for two weeks and watched these presentations a couple of times. And I appreciate you making this makes sense for me.

Can you make this presentation for us next week Gib?

I think this is my fourth time through, so, yeah. Getting pretty close now. So, my question is that it seems that the plan and the proposed rule rely on two states, Maine and Massachusetts, to take regulatory action in their states. Is there any when or means for the Federal government to compel the states to finish those processes? I'm just wondering what effect, delay or heel dragging in those processes will have on the risk reduction, and the ability to meet the goals?
So, thanks for that question. First, the states are actually a lot more agile than the Feds are, as you know. Um, Massachusetts is working on rulemaking that they may have finalized for state waters. By the end of February or, you know, early this year, Maine has already implemented gear marking measures for all Maine permanent vessels. So, they're way ahead of us on gear marking, state specific gear marking modifications, um, we are likely to mirror states regs, as we identify them, or as they are implemented. So, if they haven't been done by the states yet, but they're in our proposed rule, will be implementing them through our rulemaking, or will be mirroring them if they have already implemented them, so that they are also in our rulemaking. With a couple of exceptions, we won't be implementing measures within Maine exempt waters. Which is much of but not all Maine State waters. And we are. We don't really have an easy ability to implement the, the, the dynamic closure extension that Massachusetts is proposing. So not exactly sure how that will end up being in our measures, but, you know, it will be reflected somewhere in our measures. But. I think, you know, in the case of both those states, they have done things already ahead of us. And, you know, every year, I think, for the past 4 or 5 years, Massachusetts has extended closures when whales have remained in the area.

So I think we can have some confidence that they'll continue to do that.

It was the Maine exempt waters that I was most concerned about. And, uh, yeah, just making sure that that element gets finished.

Yeah. I mean, they know. I think Maine is motivated to not have us regulate their exempt waters, and that motivation will ensure that they'll do that as well. Not necessarily sure, but pretty good prediction that they're probably likely to do that. And so far, they have, you know, as I said, they're ahead of us on the state specific gearmarking.

OK, Faye, we're going to come back to you. You're unmuted.

Oh, can you hear me?

Yes. Thank you.

How good. It says, under the Mass State Waters that the under the traps per trawl, there's 1 to 2 traps per trawl. Then you go on to say, no single's on vessels longer than 29 feet permits after 1/1/20. So, is that saying that you can fish singles if your boat is bigger than that? As long as your permit, you held it before 1/1/20?

So I'll try to answer that. That is a state that was in the state proposal that is not in our proposed rule. So that's not something that would be regulated by the Federal Proposed Rule. It's something that the State of Massachusetts is proposing. So I don't actually know how they would implement that. That might be something that's in the state's rulemaking that will be occurring, you know, early this this year.

OK, And does that also the States ruling that we are closed, the outer cape area in the state waters are also closed through May if there are more than three whales present.
So the state didn't actually propose a trigger for opening. That was an interpretation we made in their actual proposal. They indicated that they would close, extend the mass restricted area in state waters. If whales remain in the area, they do survey the outer cape. And I think in at least one year, in the last four, they did close portions of the outer cape because whales remained in the area. So it would be a continuation of that. Or perhaps we would be, it might be that the default. But what we're proposing is that the default would be closed, that they could open it early if they determine the whales have left. But, you know, again, as that's likely the State is likely to implement that before our rule is final, and so we would be mirroring or in some way supporting implementation of that in state waters:

OK, Thank you.

Are there any more questions? Colleen, there are, at this time, no more questions in the queue. If people have more questions, we can always come back.

So I think we received some public comments already tonight within the questions session, but if people are interested in Commenting, it's 803, We could probably take comments for 10 to 15 minutes. If you are interested in commenting, please type “comment” in the question box. Let us know. Can we see if there's anyone on the phone that has a question or a comment on a phone only? I don't think we've done that yet tonight.

I don't see anybody who is phone-only. Yeah, OK. But if somebody is having difficulty happening to them, well, I don't know. I guess we wouldn’t know. I don't think there's anybody who's just on, who's just on the phone.

So if anyone has a comment, you can type “comment” in the comment box.

Questions? Comments? Colleen I am seeing none, but we can leave the line open a couple more minutes.

OK, I'd like to, again, thank everybody for joining us tonight, and thanks a lot to lot of take reduction Team members who’ve joined us, and our regular visitors. You know where to find us. Our information is on, was presented tonight, and contact information, and it's also on the Atlantic Large Whale Take Reduction Plan webpage, which you can see the address here, honestly, if you do a Google search for us, you'll find us that way, as well.

So, one last question on gearmarking. Question: Comment: Marin excuse me, I'm sorry coming to you.

Yeah, that's OK. Hey, Colleen. And I just had a quick question. It might be more of a comment if you can't address it, But I know part of the purpose of this proposed ruling is to increase the gear marking to better identify the areas that need more risk reduction. And at what point do you think that will be achieved. So that you guys can stop assigning the 50% assumption from unknown incidents and entanglement.
I can't answer the question. In probably, I think, 60% of the entanglements over the last five years or so, There has been no gear retrieved. So even if either, in many cases, there's no gear remaining on the whale, but there's signs of acute entanglement-caused injuries. But in some cases, there is gear, But, you know, the Disentanglement team has a lot to worry about, their own lives, the whale’s life. They don't, they're not always able to bring gear in. So really, it's been about 60% of the time we have had no line in hand, which means that the other 40%, it's a pretty small sample size. And it, while, you know, if we find a mark, we can identify the general vicinity of where a take occurred, it doesn't really give us a lot of information about the 60% with no gear and the undocumented mortalities that occur. So you know, when will we have enough information? It's really hard to know. I can't give you a prediction on that.

Yeah, no I'm, a proponent of the increased gear marking I always have been, because I think part of this is, identifying those areas so that we can better direct our resources and the reduction measures for it. So, it's but it's one of the hard things where, there's only three markings on it on your, each state is trying to defend itself. But, um, you know, there's still the US. Canadian issue, that would be, helpful to identify.

Canada does have pretty extensive gear marking now. So that might increase our understanding of when it's coming from Canada. Um, so they, they have increased their gear marking substantially. I think almost all of their, I think all the snow crab vessel the snow crab lines are supposed to be marked and I think that most if not all of their lobster lines are now marked

Yeah. That's good. That's a good step forward, and thank you.

Yeah, that is.

There are no questions or comments in the box.

OK, thanks, everybody, for joining us tonight. We have two more meetings next week, focused, primarily towards Maine. For information sessions. And then join us, as well, in February, If you want to provide comments through these meetings, again, you don't have to come to meetings to provide comments. You can provide comments through the regulations dot gov portal, through midnight, March first. Thanks, everyone, for joining us. Appreciate it! And thanks, NOAA staff for helping me out tonight. I appreciate it goodnight, everybody!
Information Session 3
Southern Maine, Tuesday, January 19, 2021, 6:30-8:30 pm

You know, you kind of made it sound like the gear might move off to better fishing grounds somewhere else. But if you're restricted to the zone that you are able to fish and you shut off the furthest section of that zone, away from shore during a period of the year where that's where people want to be, then it would seem that guys would line right up along that area.

That's a really good question. I would have to check with a modeler, to check with them to see if that's something that he put into the model. I know it's come up in discussion, and I don't know what the final result was. I can try to check on that.

All right. Thank you. I appreciate it because it's just Yeah, I understand that, you know, that other, if you look at relocation from other closures that are currently happening The curtain effect might not really be a big deal, but this closure would be very different from anything that you guys have done before in that, you know, you can't simply just slide anywhere you want within the area.

Yeah. I really appreciate that comment and if it's not in there now, we'll try to make sure it is for the final.

All right. Thank you very much.

If we can have more information about the relocation that fishermen would like to do in that area. That will also help to estimate the costs for the fuel changes and landing changes. So we would strongly encourage fishermen and friends to provide us comments about those assumptions.

Thank you.

OK, Amy, you are unmuted, and you can unmute yourself and ask your question.

OK, Can you hear me Sorry.

Yes.

OK Um, I'm curious knowing that climate change is leading to a lot of distribution shifts and you know we've seen that in the past 10 years, is this proposed rule going to be able to consider future distribution shifts in thinking about closures If they should be shifted to new areas or um, or expanded or I just wonder if it can accommodate that sort of information that will be coming in, since the preferred alternative seems to rely on that a lot more than the non-preferred alternative.

I'll take a shot at that. I mean, as I said earlier, our ability to close areas is not very agile. But this is, you know, it is one of the most valuable thing that the Mass Restricted Area closure is
one of the most valuable things we've done, the team has done. And that that area has gotten increased use since that area was closed by Right Whales, there are more right whales there than there were originally estimated. Um, other areas like the Great South Channel are not getting much right whale use right now, compared to how they used to. And it's one of the reasons we have these larger area-wide permanent measures in weak rope and in Trawling Up to Reduce the Amount of rope. It's because we know that there can be shifts, and so we want to have precautionary measures and risk reduction measures across the whole area, and not just rely on the closed areas. There are multiple reasons, though, for example, for the offshore Maine closed area and one of them is, it's hard for us to predict what whales are going to do. They seem to be continuing to use area as, as you've told us, areas that they've always gone to there, At least visiting those areas. They may not be staying as long, and there may not be as many of them visiting. But, there's, they still seem to still be going back to areas where they were aggregating. And we don't know for sure how they're going to be doing that in the future, but one thing that we do have some predictions about is that that lobster are moving offshore. And that it's a good possibility that effort will move offshore. There is a lot of effort in, in Federal waters offshore of Maine that could continue to move offshore. There is increased capacity in the fleet, although we don't have evidence that they've moved off so far, but 5 or 10 years from now if they didn't move offshore and that area continued to be visited by right whales, That is something that would be much more difficult to regulate at that point and to get ahead. So we did try to at least anticipate fishery potential for fisheries shifts which might be a little more predictable today than anticipating where the whales will shift. But. Again, that's the reason we looked for, area-wide Precautionary Measures. Does that answer your question, Amy?

Yes, it sort of answers my question. I guess the other question I have is, just thinking about, down the road. Um, it seems like this proposed rule is sort of a, it's somewhat static and it's um, I just wonder, is there a way to phase in more broader restrictions? That, uh, we know in the ultimately that maybe if ropeless or fully-formed weak ropes are what might be the best for the whales. And if that can be proven to be effective for fishermen to do their to do their jobs, can it be, is there an opportunity to consider phasing in additional measures in the years ahead? Without going through a whole rulemaking process?

I think it would be difficult for us to act to do the NEPA and other analyzes required before we have some of that information. So I think it is more likely to be something that we would have to do through a rulemaking process. Because under NEPA we have to be able to analyze economic impacts, analyze, affect, you know, as well as we can, analyze the risk reduction. Um, those that requires an ability to describe what those impacts are. You know, phasing something in based on the possibility that we will have feasible ropeless technology that can be broadly used. Where we have surface marking and guessing what the cost of that will be in five years. It's, it's hard to do. It's hard to do it without doing it as a new rule making. We are some of the things that we are doing in this, like, changing all of our closed areas to buoy lineless areas would allow some of that to be implemented quickly, at least in those areas and as an alternative to closures. Hmm. So, I know that's not a very satisfactory answer.

OK, and moving on, Annie. You should be able to unmute yourself and ask your question. Annie, are you with us? Think your audio is off. Try unmuting yourself now.
There we go, OK. So this is Annie with the Maine Lobster Dealers Association in South Portland, Maine. So my question is, Does the model account for vessels outside of the closure that would be crowded and catch less when vessels inside to have to move out into the areas that are already in use?

I think for now, for the economic analysis now, we haven't accounted for the vessels outside. That's a really good comment. We should take a look at that. Also, we hear we need to more data about the vessel fishing around the closed area. So, what we can do now is we can have assumptions of also, like, uh, catch reduction at some rate 5, 5, to 10% of the catch reduction rate for vessels. But at the end, the catch reduction rate as fishermen adapt to that the rate won't be the same for every year. It should be at a decreasing rate, also when the areas close, the lobster within the area could have be like higher quality and they are also spillover effect to that in the long term. I think it will be like, it will reach a point that fishermen can be at the scene, it just seems as though, Sorry.

Go ahead.

It just seems that your the Economic Impact Study focuses so much on costs of actual adjustments of more focused on gear and changes along those lines rather than actual impact to individual fishermen from the perspective of the change and the impact on their: on their individual harvest and on the impact to the supply chain itself.

Yeah.

Rather than really paying attention to the individual impacts that fishermen are going to feel on the water and the impact that the supply chain is going to have to bear.

For this rulemaking we only consider the impact on the commercial fishery, I don't think we are including the impact to the supply chain, right? Colleen?

I think it I don't think it did. I think that that's a really good comment. And that's something we can work with Burton and others with, particularly if, as part of your comments, you can submit or direct us to some data as well.

Also, for the impact on individual vessels. Because the matter is each vessel, a different area, they have very different situation. So it's hard to estimate but we do have a general number of the economic impacts on the individual vessel OK.

Some of the information in the IEC line model is constrained by the way the permitting works within zones or within state and federal waters and things like that. So some of the data feeding into the model assumptions does have those constraints in it. I don't think that well, I'm not sure that that any model or the economic assessment looked at impacts to the fishermen that were being moved out of the area. Something we need to add to that analysis.
I think one challenge that you're going to run into in doing this is that, you know, you're not going to have the data to estimate the impact because, indeed, there is no data. But it should be considered and added to the error of your estimates and the assumptions that you're making.

Right. That's why we will like to require 100% VTR data in, like, (indecipherable) water, that will help. Because VTR data that they have location information that will help our estimates to be more accurate, we can have, as you said, we can. We can have information about fishermen in different areas. So we can have more like specific estimates.

Thank you.

Thank you.

Thank you. OK, Colleen, I think that we have gotten to the end of the questions so far that have been in the queue. Does anybody have any questions they'd like to get into the queue?

Is there anyone on the phone that would be able to type it into the question box that we can make sure we've heard from?

I'm not seeing any.

Yes. So, next slide is very similar. If I think a lot of what we heard tonight, some excellent questions, and also some good initial comments on things for us, to look at further, analyze, find information, and we're hoping that you will send us, some of you will send us some kind of granular information that we can use to support the analyzes, and maybe qualitative information to improve the DEIS. But if you're ready to actually provide public comments tonight, again, we'll have meetings in February, to take public comment, was a much shorter presentation from us, much more time devoted to accepting comments. But if you are interested in providing comments tonight, you can type comments in the question box now, to get in the queue. And, similar to what we just did, we can, we will unmute you, and may have to ask you to unmute yourself as well. Um, so, if anyone has any comments, type in “comment” into the question box.

No comments yet. But we do have another question. Alysia, you should be able to unmute yourself and ask your question.

Thank you. So my question relates to what seems to be a situation where you're somewhat relying on state measures to be implemented and enforced in state waters in order to get to the level of risk reduction that you're seeking. I'm wondering why you wouldn't want to just focus on what, you know, you can do in Federal waters and try to get the highest level of risk reduction in Federal waters?

We, under the Marine Mammal Protection Act, we can regulate to the beach. We don't have to confine our measures to federal waters. Um, there are things that states can do with more agility that we can do. For instance, the State of Massachusetts has an ability to keep their state waters closed into May without having to go through the kind of federal protracted rulemaking we go
through. So, that state measure is something that they would implement. Um, the state of Maine has asked us to allow them to continue to exempt the exemption area from the federal regulations. But, they have already taken steps to implement measures, for instance, particularly the gear marking measures, which they've already gotten in place well ahead of us, so they, it's clear that they're going to follow through on their measures when we were talking to the take and then additionally, the Atlantic states marine fisheries commission regulates the fishery in the state waters and we support their regulations by following through with consistent measures in Federal waters and they put in place a lot of gear, restrictions, trap reductions, that are, that are still going into place. They're being phased in over time. So there, compared to the 2017 baseline, they've reduced traps and With trawling up measures, there will be reduction in line numbers associated with the trap reduction. The TRT, when we were looking at the effort reduction I mean, the risk reduction measures, the TRT endorsed that concept, accepting ongoing and state risk reduction measures towards our 60% goal and that's why we're doing it that way: they're considering it towards a 60% goal. We're implementing much of it through the federal regs. In some cases we're mirroring what the states are already doing, and in other cases the state will be doing the rulemaking or the Atlantic States Marine Fisheries Commission.

Thank you for clarifying that. one more follow up question. So, how does enforcement of the proposed measure's work? How is that going to happen? Is it going to happen through federal and state enforcement? Coordination going to be going on? How does that work to ensure that the measures that will eventually be adopted or indeed enforced?

Yeah. We think that's a good question. And it's a question with our existing regs as well as any proposed regs. And we do have, particularly in New England, we have great partnerships in our, in between our enforcement agencies. Especially with the state of Maine, the State of Maine doesn't just enforce the state waters. They do go out. I think, at least through 12 miles, further, offshore you go, the harder it is to enforce. But we do have good partnerships and collaboration with the states. Those are done through their call JEA agreements. We provide some financial support to this.

It looks like we have lost Colleen.

Oh, no. I was hanging on her every word there.

I, we, if, when, if, and when we get her back, I will have her pickup where she left off in talking about the financial part unless Kristy or Kate, would either one of you like to jump in? OK, well, we will pick right back up. When Colleen, OK, yes, we have Christie, who is on the phone. Then, she's going to type it in chat, OK, excellent, we will get that answer to you.

Thank you so much.

No problem. Jack, I see that you have a comment. And I'm going to come right back to you. I had, one more enforcement question I'd like to get to. So Ira. You can go ahead and ask your question.

Can you hear me? All? right?
Yes.

My question is, as they were talking about enforcement, which one of the things I was trying to type both for the question was asked. You say you have partnerships and relationships, which I understand you do. What are the capabilities of those relationships? Anything that I can see, you Maine has some amount of abilities to enforce rules and regulations. But I see that sliding quite well in the other states and especially offshore. Is this something that one segment of the fisheries is going to bear the brunt of enforcement while other parts of the fisheries conduct business as usual?

I'm sorry. I was, I lost my Wi-Fi for a minute. I missed at least half of that question. You repeat that?

Yes. Listening to the enforcement question, it was along the lines of what I was asking you, say you have partnerships and whatever, which I know I realize you do. Uh, and I'm wondering, So, what's the capabilities of those partnerships? I got a good idea of what Maine’s Capability is. Don't really have a great idea what Massachusetts, New Hampshire have and especially Area three. Is this something that one area, one state is going to bear the brunt of enforcement while others continue to do business as usual? I mean, if we're going to go through something like this, it seems to me it's got to be fair across the board.

Well, yeah, I agree with you. This requires anticipated enforcement across the board. We do have those joint enforcement agreements with the other New England states not just Maine generally, Maine does patrol a larger area, and in some years, Maine gets more of the funding support to do that. I think New Hampshire and Massachusetts, Rhode Island, they do enforce within state waters. I'm not sure that they have that offshore capability. Some of that offshore effort is covered by our law enforcement in conjunction with the Coast Guard rather than with the States. So, that's another effort going on in Federal Waters. As you said, LMA three, that's the hardest area to enforce. And that is the pilot study that I was talking about using ROVs there. They're developing new technologies to improve enforcement offshore. And again, that offshore enforcement was a problem. It's a problem with our existing measures, Not just the proposed measures. We don't want to make it worse. And an Office of Law enforcement and Coast Guard, they're looking at ways to make it better offshore, um, better than what we've been able to do in recent years. Maine does do a lot more. But Maine also does have a lot more of the effort. So it may be in proportion to the amount of fishing that goes on.

Yeah. Kind of. Aye. I don't know. I could. Without, I understand what you're saying in proportion. If there's areas, there's relatively little to no enforcement, the proportion, there's no, it doesn't. Doesn't match up.

Yeah. Yeah.

And I'm not trying to shove something off on other areas, but, uh, you know, if we're responsible for doing something a certain way, then it can only be as effective as all of us together. Not just certain areas,
I agree, among the most aggressive people asking us to get additional enforcement. It's that offshore LMA three fleet, know, they want us out there, improving enforcement, too. So it's more about how hard it is enforce out there. And that's something we do have to improve and that we are working on.

Even with a ROV, they still need the capability to haul the gear.

Right. That's been a big challenge, right? Haul and reset if the gear is legal,

OK, Jack, I'm coming to unmute you. Thank you for your patience. You should be able to unmute yourself.

Yeah, can you hear me?

Yes,

Thank you. I needed my wife's help. So just quick comments tonight. I'll probably have more tomorrow. But. The first thing on the, the closed area, or I don't, I do not fish out there. I'm not sure that I know anybody that does, But I agree with comments earlier that the perimeter of that area will be a wall of traps during that closed season. And, and the one thing that people haven't brought up, that I will bring up is, once that is open, that there will be a gold rush mentality to get into that area. So, unless your timing is perfect, that might, it might not be the greatest thing for Whales. Um, so, other than that, I know. I apologize it Chao is that your first name is Chao how You pronounce it.

Yep, yep.

OK, you've mentioned 20 minutes to put the gear markings in as an estimate or your estimate, it took me, I spent most of the summer doing this year in Maine. And I estimate at least an hour per line.

So, yeah, I'm just telling you, it takes a lot longer than you think For a lot of reasons and it, you know, I don't need to get into here, but its, it's time consuming. That's a minor point, but I just thought I'd bring it up.

Very helpful. Yeah.

The third thing, um, I was just going to, say, give a shout out to Zach. Well, I know pretty well, and I, can't agree with him more about the trawling up. The numbers of traps being possible detriment to whales, I can see them, You know, a pair traps, three traps, they can probably swim free but when you're talking about 15, 25, 45 traps? I don't think they're going to get through that. So I'm not sure why we're even talking about trawling up, and I'll leave it to that here tonight.

Thank you.
Yep.

Kara, any other public comments in the queue?

It does not look like it.

Well, I'd like to thank everyone for joining us tonight. This was really, I think, our best, best night, so far of really great questions and really thoughtful comments. And I really appreciate you participating. I know life is really busy for everyone right now, and I appreciate that you took the time to help us try to implement the documents.

Yeah, Colleen, we have 1, 1, last one.

I take that all back.

Hi. Ira the line is open for you.

Jack just got me thinking about another comment around that cold area because it is in my back door. A lot of guys I know fish that area and there's a lot of guys fishing either side of that area. As you know, in Maine, especially, there's a lot of traditional fishing areas of the fish, traditionally by the same groups, township's areas, what have you, Uh, you'll be creating something there that's going to work. It's going to work against the way life has been for a long time, well forever, as far as people entering and exiting that area. You've also encouraged, uh, talking about encouraging ropeless fishing there. And if you go in there with ropeless fishing the way it is today, it's going to be an absolute nightmare. And it will be you might just as well call it a dumping ground, if you do it. If you use that for an incentive to stop for people to go in and fish, when it's closed, if that actually happens, I'm totally against that area, especially the way it's drawn out. There's, I. Guess I have other thoughts around closed areas, but. First one being that close areas aren't a good thing for us, probably, in the usage of our ocean, the way it is right now. And if we had to go to that, then there's, I think there's other ways to do it.

Thank you.

Thank you.

Appreciate that.

OK, we have 1 last 1, I'm going to put up a slide, and the LMA one proposed area, and, Jonathan, I'm going to unmute you. You are unmuted, I'm going to go put that slide up.

I will also mention that we will be adding this to our fact sheets, so you'll be able to download this in the future.

OK, and there's no question associated. Just wanted to see it. Thank you, Marissa.
So that fact sheet can be found on the Take Reduction Plan website. If you, actually, if you, if you just Google the Atlantic Large Take Reduction Plan Proposed Rule, it'll, it'll take you to the website, I believe, and this fact sheet is one of the documents on there.

Marissa, we will be updating it with this image, is that correct?

We will. I don't know exactly when. I’ll have to hear back on that from our comms team.

My guess is within 24 hours, they've been getting information out about, as fast as we can produce, some of them are on tonight, and I appreciate their help.

OK, I think we have one last question. Alicia, back to you.

Thank you and I hope I am not keeping everybody too late this evening. Just the last thing, of course, dynamic closures are something that I'm very interested in and I'm. I know that you're saying that perhaps the NEPA process might be somewhat of a barrier to creating those. I wonder if it might be possible to create a categorical exemption under NEPA, and maybe that's a question for attorneys there, but to allow for a quick creation of a dynamic closure, just an idea.

I don't exactly remember the requirements for categorical exemptions, but I believe that there are generally, uh, related to a lack of on the lack of impacts beyond things that have already been considered and analyzed. Or the lack of impacts altogether. So I not I mean that's something that we can pursue and talk to our NEPA experts and our attorneys about. But I'm not sure it would apply to this type of dynamic closure option. Let's look into that.

Thank you. Thank you for considering it, and thanks again for all the work you're doing. Much appreciate it.

OK, Colleen, I think we're at the bottom of the queue.

OK, again, thanks, everybody, for joining us. This was our best, the most people that joined us and some of the best input that we've gotten. And we really do appreciate it, especially in a busy and fairly dramatic week, potentially, really appreciate it, and perhaps see some of you tomorrow. So goodnight. Goodnight everybody.
First, 2021, either in writing or through public hearings that we'll be holding in February. After collecting comments, we'll analyze an as needed, update the analysis, and our environmental impact statement. Along with information from public comments, we'll consider any new data that has come in since the DEIS was written, including new stock assessment information, or newly published papers. We'll consider the updated information and complete the final environmental impact statement, and that will be available, followed by a 30 day cooling off period, which is a requirement of the National Environmental Policy Act. So, comments we received and the analyzes will also inform the final rule that will be completed and filed 30 days after the final environmental impact statements published. Note that we anticipate as usual there will be a delayed effective date for modifications to gear configuration and gear marking so that fishermen will be given time to modify their gear. Paralleling this Marine Mammal Protection Act process, there is an ongoing Endangered Species Act, action a Section seven consultation. On a number of federally managed fisheries. Last Friday the agency released a draft biological opinion. The address, the Web address for the information bulletin on that draft biological opinion is listed here. On that webpage you can find the opinion, a conservation framework, and an e-mail address where you can send questions or input. The deadline for providing input is February 19th. Note that there's a court order deadline to complete that Endangered Species Act consultation and to finalize the biological opinion by May 31, 2021. As noted in the draft opinion and in the Conservation framework, the consultation and the resulting biological opinion will be considering the impact of the fisheries as it would be modified by the final rule. Next slide, please. Again, the 60 day public comment period runs through midnight, March first, 2021, we will be holding remote public meetings to provide the opportunity to provide comments. This is our last, information Presentation Meeting. And, in February, we will be holding four public hearings where our presentations will be very brief, and the bulk of the time will be devoted to collecting public comments. You don't have to attend a meeting to provide comments, Written comments are welcome, and can be submitted through WWW dot regulations dot gov, search for the rule and the draft environmental impact statement on that website by using the identification number shown in this slide, and in the proposed rule, and the draft environmental impact statement. When you are at the rule, click on comment, now you submit your comments. The proposed rule, the draft environmental impact statement, the list of public meetings, including the links to get you into the meetings and other resource materials, can be found on the Take Reduction Plan Website, detailed on this slide. Fisheries dot NOAA dot gov backslash ALWTRP, If you have any questions, you can always send me an e-mail at the e-mail address identified here. And as a reminder, attendance at meetings isn't necessary to provide written comments, you send those through regs regulations dot gov. I want to thank the many collaborators and particularly the take reduction team members. There are a few on the phone tonight and particularly the fishermen that participate on the take reduction teams. Meetings are just not a natural environment for them, and they worked really hard with us over the last few years, And a number of meetings, and I'd also like to thank all of you for any comments you provide on this rulemaking effort. Next slide, please. So, we are going to now kick off the question and answer session, we will be taking questions specific to clarifying things in the proposed rule. And in the draft environmental impact statement. Please remember that we will be recording the question session, including information submitted in the question box. And we will
start recording, in a few minutes. Type “question” in the question box to convey that you would like to get in line, to ask a question and the slide number, if you remember where, which side that is on. And if you've already done this, you don't have to do that again. You can change your mind at any time by saying “pass”, when you're called on. Or by typing “take me off the question list” to the question box. And as we've mentioned earlier, you, Kara will unmute you, but you may also need to unmute yourself when you, your turn, is up at the queue. And, as always, please be respectful and direct questions to the presenters. And with that, I think we can start taking questions, Kara.

Yes, hi, everyone. I know that there are some people who are having issues typing into the questions box. You can also e-mail me. It's Kara, K A R A, dot S H E R V A N I C K. At NOAA dot gov. I put it into the chat box, and hoping it comes up. So, if you would like to get in the queue, and you are unable to enter that into the questions box, send us an e-mail, or if you know someone else who's on tonight, they can also get you in a queue. Thank you for bearing with our technical difficulties tonight. Um, so with that, I think we're going to go to our first question. Julie Eatan, I'm going to unmute you. I see you have multiple questions. If you will just ask one question, let our presenters respond and then ask your second question. You are unmuted, you should be able to unmute yourself and ask your first question.

Hi, Thank you very much for taking my question. I would like to know my first question is how many of these entanglements have been found to be involved with Maine Lobster gear? or have ah how many right whales have been seen in Maine waters in the last 10 years? Thank you.

Thanks for that question. I don't have the sightings data from Maine waters at this time. Um, we can see if we can find that for you. We don't have a formal sighting network in Maine and compared to some of the other New England states, there's not as many whale watch operations out of Maine, I do think Zach Kleiber's on here tonight if he asks the question. Later, he can also maybe let us know what he knows about sightings data in Maine. And we don't have any documented right whale entanglements, known to be in Maine gear. If you'll remember what I said earlier, we actually only know the set location of thirteen out of fourteen hundred entanglement incidents that have been investigated by New England Aquarium scientists. We almost never, what that means is we almost never know the location of the original entanglement. What we know generally is the location of first sightings of documented entangled right whales. And as I mentioned earlier, we know that right whales can take gear hundreds of miles, and can be entangled for many months before they're even first sighted. That answers your question?

Thank you very much for your answer. Thank you, very much, it does. My second question would be, what diameter of rope would be considered weak rope?

That's another really good question. Unfortunately, it's not. Uh, as, as diameter, there can be very low diameter line that's engineered to be very strong. There can also be large diameter lines that can be engineered to be weak. So, we can't really implement these regulations just by, by requiring a certain diameter of rope. It has to be either engineered to be weak. So rope that's made to be weak and demonstrated to break at 1700 pounds or less. Or, or weak insertions need
to be intentionally placed within the line every 40 feet to be considered equivalent to weak rope. Um, so weak insertion for instance, the weak sleeves, that the sleeves that are used by some of the Massachusetts fishermen are inserted at every 40 feet. Does that answer your question?

OK, so, to follow, to follow up on that question, I'm an inshore fishermen in Maine. I write about as does my husband. We fished single traps, we are in the exempted area. Ah we do, of course the weak Buoy deal. Um, if you are requiring me to put weak links in my rope, I fish all 5/16 rope because I don't need rope bigger than that. How am I supposed to know or any other fishermen supposed to know what's considered weak rope that would qualify as rope that we can install to make the requirement that you're asking us to do?

So, good question and first of all, we're not in our federal rulemaking. We're not going to be regulating Maine exempt waters. However, Maine is proposing to require a weak rope either weak rope or a weak insertion, 50% down your buoy line in the exemption area. So one weak insertion, 50% down. Again, that can be done with weak rope. And there, there is 5/16 rope That is engineered to be weak. We're going to be, we have started working with gear manufacturers and we're asking them, when they're, when they're creating the rope that's breaks at 1700lb or less. We're asking them to leave in one of the three strands, as an alternating color. So, that would be one way that someone purchasing it, or an enforcement officer looking at it, can tell that it that it was engineered to be a weak breaking rope. But again, in in exempt waters, this rulemaking won't be regulating you on that the regulation, to include one weak insert would be done by the State of Maine.

OK, thank you very much.

You're welcome.

OK, next we're going to Dustin Delano. I'm coming to unmute you. And I see you have multiple questions. If you'll just ask one, Let the presenters respond and then ask your second one. I can see you're unmuted, but I can't quite hear you yet.

OK, am I all good?

Yes, I can hear you now.

Um, I guess, I'm curious how the number of boats included in the closure were determined to be 45. It seems like it's much higher.

Right, So we got this question last night, too. So first of all, we get the number 40. This number 45 is the number of vessels in a month. This is the highest number of amounts during October to January through the month of January. So there might be there 100 or 150 different vessels fish through the whole restricted period. But from the industrial, industrial economics, research on the VTR data shows in January, that's the most vessel throughout that area, it's 45. So also, we all know the VTR data in Maine federal waters limited, because only 10% of vessels are required to submit VTR, right? So for the next step, we'll double check this number by using multiple years of data, like, 10 years, because I know, or the vessels, they don't do not overlaps
throughout the year. So maybe we can use 10, 15 years of data, like, from 2010 to 2000 to 2020, to see how many vessels actually showed up in that area. We also welcome fishermen to submit comments to us to reveal the actual number in that area. So, does that answer your question?

Yes, I think so. I guess I'm also curious, too, how. Yeah. You know, the economics were figured? that seems like a very, very low number, too. You know, the 100 and something to 300 and something thousand.

Right, because, yeah, only 45 vessel fish there. Oh. This number, the biggest cause for this restricted area. it's, uh, cost of assumption of landing reduction in this area. So first of all, we have to calculate, that's the total landings from the vessel in that area. We use the catch per trap data. We calculate that first. Using VTR data, we can then we estimate estimated the number of traps per vessel. Then we get the total number of catch per month for each vessel In that area, then we assumed 5%, to 10 percent reduction from relocation.

So why would you assume a five to 10% reduction? I mean, I fish all my gear in that area right now, if I was fishing somewhere else, those lobster would be caught up sooner. There was another 45 which is actually, It's definitely more than 45 but if we were all fishing in a different area, you're going to catch the lobsters up sooner. That is if you can even go to a different area, I mean, those spots are all, they're all taken. So, Or you stay up, you know, up, inside longer, and you catch those up sooner, or, while you're waiting for the area to open you know, or, you might not even be making any money, leaving your trap somewhere else.

So, yeah. You're more than welcome to submit all the comments to our e-mail and we will consider that. So, this, all these analysis we’ve done here, It's A Draft Economic Environmental Impact Statement. So we're asking for comments here, and to finalize this research and this analysis and to get to the FEIS. And until then you have you have the chance to comment. and after the FEIS you still have the chance to comment, we will incorporate it all the comments into our final analysis. So the assumption here we get is from the previous research including like a dynamic paper and our communication with fishermen. And our lobster biologists I know this is very, very general assumption and it varies from boats to boats and vary from area to area. But, for this analysis, we, so, the, the assumption here, is of 5 to 10 percent. So, if fisherman friends, you have more to say about this number, you can provide your estimation and your, you're like evidence or proof of your estimation, we can incorporate that into our final analysis. Thank you.

OK. Thank you.

Awesome. And, Dustin, you had one question earlier on about the LMA one, the length of the LMA1 closure. Do you still want to ask that one?

I think I saw it answered that in another slide that basically goes into February, and, and I think it's set a soft date. Is that right?

So, the preferred is from October to the end of January and the non-preferred to the end of February.
OK, and in did that have a soft date for opening, or?

I don't think, I mean.

Non preferred, alternative does have a soft open.

OK. All right, thank you.

Thank you. OK, I'm going to go to the phone. Christian Porter, I'm going to come unmute you. You should be able to unmute yourself.

Can you hear me now?

Yes.

Yeah. So, my question was on conservation equivalencies. Zones in the state of Maine, did their own equivalencies to see if they could change the change to be able to suit, you know, each individual zone, are those being considered to be added into this proposed rule?

Hi, Chris. And it's Colleen. Thanks for that question. We actually haven't yet received the list of potential conservation equivalencies. But we anticipate that Maine will be providing them with their comments. And I did sit in on at least one zone meeting, just to listen in on what kinds of things are being discussed. And, everything I heard was within the scope of the proposed rule that we propose, so, You know, we are we do have to get 60% risk reduction. But it looked like they were equivalent, they would get the same amount of risk reduction is what's being proposed, and they are within the scope of what's been proposed, I've heard mostly alternative risk reduction, or alternative trawling up measures, and things like that. So, we can be able to take a lot of those, perhaps all of them, again, I haven't seen the list, But that is something that could be incorporated into the final rule.

Great, Thank you.

OK, Jacob Thompson, you are next. You should be able to unmute yourself.

OK, I just had a question about when you when you were talking about the 45 guys and that would have to get relocated. Did you account for the loss of catch for everyone else? That they're going to go and set their traps by not just, I mean, they're not going to catch as much as they want but when they go and set their traps in a different area, it's got to reduce every fisherman around there’s catch to sell. Um, I think that number's kind of low.

Yes, I agree with you. We get the same comment last night. We haven't considered this in our DEIS we will consider it in the final draft. Thank you for your comments.

OK also, just one more thing. In Maine, we have, we have zones, so you can't just take all your traps and go wherever you want and you have to keep 51% in your home zone, is that gone into any of the calculations that you like in Massachusetts, you could take in LMA. You could take
all 800 of your traps and you could go right to the Canadian border, but I’m in Vinalhaven. I have to keep 51% of my traps in zone C, which if that area is closed, I could take some into 49 percent in Zone B, but I can't the other 51%, I have to bring back north. I can't just take all 800 trap's into, you know, another area, so I was just curious if that was any thought given?

Right. For the economic analysis, We haven't done that detail, but for the risk reduction, maybe Marisa or Colleen, you have some thoughts on that.

It's more of an economic question, not a risk reduction because I mean, like when the Massachusetts zones close, they can bring, (indecipherable) traps and go set them down in caches or somewhere where it's open. But for a Maine person, we can't just move our traps like they can to relocate as easy.

So for now our assumption is fishermen staying within their own zone then move that closer to shore, that’s all we have now.

OK, That's something you should probably look into.

Thank you.

OK, Next, I'm going to go back to the phone. I'm not sure if you have a question, but Harriot Train. I'm going to come unmute you. Just in case. You're unmuted, you should be able to unmute yourself. If you don't have a question, that's OK, I just want to make sure.

I don't have a question. I just didn't have the option to ask a question

OK, thank you. OK, Gregory Simmins, I'm coming to you, I see you have two questions and please just ask the first one. Let the presenters respond, and then ask your second one, You should be able to unmute yourself.

Can you hear me?

Yes.

It's actually his wife, Amy Simmons, I just signed in under him.

Hello, welcome.

Thank you. I guess I'm wondering who, when we have to do all the gear changes, and there was suggestions that there'll be ropeless gear. Is that going to be something that is going to be paid for, or is that something that's going to have to be covered by lobsterman themselves, and was that factored into everything that they're looking into?

Hi. This is Colleen, I'll take this one, or will give it a try, and the measures that we're proposing and would primarily be costs to fishermen that I'm talking about gearmarking and the restricted areas moving out of restricted areas there. There is some support was provided by Congress, they
re-appropriated funds, and they moved it to provide some support, aye. And some of that is being used really, primarily to work at finding weak insertions that can work so that fishermen don't have to replace their entire lines or, and getting gear specialists to help fishermen modify their gear according to the measures. So, those are funds that went to the States. It might be that Congress will appropriate more funds in past years. They've done things like buy bought back gear, and that that might happen as we move forward with the new Congress. We don't know regarding weak. I mean, regarding ropeless systems, right now, ropeless systems as you indicated or you know, inferred or they're pretty expensive. And the ropeless research that's going on right now in other areas, that is being supported by multiple partners. They are doing things like there's a cache of gear that the Northeast Science Center has out of Woods Hole, and they're lending the ropeless systems. So that people can improve how they're working in or under commercial fishing conditions. They don't have enough gear though to outfit the fishery, they just have some gear you really more for the purpose of accelerating, um, the, the evolution of this gear so that it's more usable by fishermen and honestly they are trying to develop it so that it's less expensive. I do think that even the environmental organizations that are hoping, that large areas can be ropeless fished in the future. They also believe that, if this is ever going to happen, it's going to require a lot of government support. So that's not funding that's currently available. There we are getting a support to from the government so that NMFS can help do the experimentation. But we don't have the kinds of funds that would be needed to transform large portions of the fishery to ropeless gear at this time.

OK. And I guess my second question would be, you know, my husband makes our livelihood pretty much in the months that will be closed down. So, will there be supplementing funding? I know like, Canada gets funding from their government that when they have shutdowns. Is that's something that's being looked at. For these lobstermen that are going to be losing so much money and that, you know, that's where we make our money, that we get to survive on for the year, And without that, you know, it's kind of a scary thought.

Yeah, I mean, at this and, again, NMFS has, we have not gotten that money from Congress, Congress is the one that appropriates funds, it's not something that the agency can do. Um, so, I really, I'm not sure. I mean, I know that the funds that they, that were, we, they were taken from, from one program, and they were put into an effort to send some funds to state to help them with this transition from these new rules, And I don't know if that will happen again. That's not something that our agency can make happen, um,

OK.

You know, in the past, I think the State of Maine, for instance, has been pretty successful at working with their legislators to try and get support for things like that.

All right, Well, thank you.

Welcome.

OK, Eben Wilson. You should, if you're unmuted, you should be able to ask your question.
Yes, Hi, I have two questions. First one is, Zone E Trawling up, we're currently a 600 traps zone we have been. So we're obviously 200 traps less than all the other zones, and I think part of this question may have already been answered. And I think our zone council submitted outside of 20 miles outside of 12 miles, if we go to 20 trap trawls, um, and in this area, I was hoping that maybe that was something that was going to go through because most guys have less than a 40 no smaller than 40 foot boats, that fish outside of 12 down at about 18 to 20 miles. So basically if we had to go to 25, guys would just shift up inside, and whatever, Whatever, vertical line reduction you thought you were going to get. Inside of 12, you would actually increase your vertical line, because guys are being hanging out up inside. So I think that's another thing that I look at, with the restricted area, is that you're going to restrict lines in one area, but you're going to double them in other areas. I don't know how that math works, If you can help me, I'd, I'd appreciate it.

OK, I'll, I'll try answering this one. This is Colleen again. So it sounds like Your Zone has come up with a conservation equivalency. That's within the scope of things that were considered in the rule and then and the draft environmental impact statement and so on, if that's submitted with the state and we analyze that and it has a conservation equivalency. It sounds like the kind of thing we probably could include in the final rule we just haven't received that list yet from the state. As far as your other question goes and Marisa and or Burton who are both on the phone might be able to help me answer this. But your other question was, have we considered? Or how is it that moving the lines into another area reduces the risk? And Marisa sort of described that the assessment is where the lines and right whales co-occur, There is more risk, and if lines our moved to another area where right whales are less likely to occur. Then than that, there's a reduction in the risk. So Marisa or Burton, I don't know if you want to add to that.

So that I can, if there's kind of a second part to my question on one of your slides, where you're talking about co-occurrence, And I'm looking at the Maine proposed restricted area, which is solely in Area one A, If you look at the co-occurrence on a slide, that has both red and blue in that area. Um, it seems to be relatively, there's a higher co-occurrence inside area 1A versus Area three, but it's basically split down the middle. If you look at the pink colored boxes, there's a lot more in that area three. So, why? Why wasn't the area 1 Restricted area split between the Area three and Area one.

Burton, can I ask you to have some input on? This is, I think, had to do with the size of some of the cells in the co-occurrence model, compared to the way it was smoothed in the decision support tool model, perhaps.

Um, concerning the why was closed area only on the LMA one side, we did run scenarios, where we extended it across the border into LMA three. So, we have those scenarios, and that analysis run. We have the results available for that. It's that to the resolution of data that we have, we can't tell that there's a large amount of gear on the LMA three side. So I think that that's why we assess that, but then didn't carry it through to the end. To address the earlier question about relocating gear. And changing trawl lengths, that is actually calculated and accounted for inside the decision support tool. So it assumes that if gear gets moved from one location to the next, that it assumes the local gear configuration. So if you move traps from a 25 trap trawl area to a 15 trap
trawl area, then those traps are assumed to be configured in 15 trap trawls and the lines are counted accordingly.

Coming out of the restricted area, guys aren't going to go back to a 15 trap trawl area because they're doing that to get away from those areas. So, you're going to go from 25 traps trawls to 25 trap trawls, because they're only going to move it as far as they need to get out of their restricted area. So, you're essentially doubling the lines outside of your restricted area.

That would be true if they're moving, moving them to a place where people are not fishing. I mean, if they're moved to a location where the local, the local gear configuration is different, and it's assumed that that gear is going to assume that configuration currently. And if that's an incorrect assumption, then we can look at addressing that in the model.

Yeah.

Yep, OK. Yeah. There's just so much fishable, there's only so much fishable bottom that people aren't going to move to where there's actually something to catch. So that means that if you're coming out of the restricted area, you're going to be going to somewhere, which you can just kind of shelter or fish until the restricted area opens. Again, so you're not going to reconfigure your gear offshore. So, you're going to be doubling the lines, vertical lines, and gear density in areas, just outside of that area. It's, that's, that's what's going to happen. It's not an assumption, and that's what will happen, so I, your logic doesn't either. I'm not understanding it correctly or it doesn't make sense. The way that is because no one's going to reconfigure 25 trap trawls offshore.

OK, I think perhaps I was misunderstanding your question. So I think, your concern is the increase in line density, in the areas outside of the closure. Not that They're changing configurations that need to be accounted for.

Exactly.

So in this case, that the if you sort of look at the maps here, you can see that that modeled whale density Is it in these areas there Are whales in areas adjacent to it There are not whales. And so under that circumstance, recognizing the gear it gets moved outside of that area means the gears moved to a location where there may be a high line density as a result, there is presumed to be a low whale presence, which is where the benefit comes from.

OK, so the fact that Area three has a high, high whale or co-occurrence baseline, but has no, has less gear density, means that that's why you didn't split the line. Split the area three, area, one line with. with, with the proposed closure restricted area, because there's just no gear there?

To a certain degree. Yes. And it's really difficult, because we don't have high resolution data on the distribution of gear. It's not reported.

Sure.
So, if we have VTR data, then we can make some assumptions around that. But otherwise, we often just have, you know, you're in this zone outside of 12 miles. We don't know exactly where that gear is, so the only thing we can do is assume it's spread homogeneously over that area, OK, there's a, there's a data limitation there that allows us to do this better.

OK, so, but the co-occurrence data that you have is that acoustic data?

This co-occurrence would be from aerial surveys.

OK, so here's the whale distribution.

Yeah, OK. But when were the last acoustic surveys done, that, you could use for co-occurrence data?

Colleen do you want to step in on acoustic?

I mean the last the last we, right now. Well, Burton, you can let me know if Jason has figured out a way to add acoustic data to the whale data model. But as far as a recent acoustic data for the area, the in the last, um, the last ROV, what do they call those the gliders that go through And are moving through areas, trying to detect whales The last one that I saw that detected a right whale was January in 2019, I think that they, the, there might be another one in that area in the general vicinity in the Gulf of Maine. Now, I haven't been, I haven't been checking the tracks on that. There is also work being done between our Science Center and the state of Maine with acoustics. They're like acoustic traps that are set, but they don't relay the information. They have to be taken out, and the data are uploaded somewhere. And then they're placed back in. And, and the data are analyzed. And I know that they have established those. And someone is actually currently analyzing the data now. So we may have those data soon, but I don't have those right now. Those I believe are from sometime in the last 6 or nine months,

OK? But the plane flights are something that's recent, that's been in the last couple of years?

Right. The way this, they're, they're getting ready to modify how they do their aerial surveys, but the way they've been done in recent years is really been focused on trying to get us good population estimates and to do that, they need to recapture the whale's they need to have. They need to see the whales frequently. So they've been concentrating the flights on where there are abundant whales so they can get the most identifications done in every flight. As a result, the broader surveys they used to do haven't been being done, though, They have sent some surveys into that area. I'm not sure what the sightings have been for that area. I know that they haven't triggered. they haven't had the kind of aggregations that would trigger voluntary vessel speed reductions, in recent months, at least.

Yeah, I guess I was just trying to get at the point of where, where, you know how the co-occurrence data, what the age of it is, and the frequency of those flights. You know, as you say or you know acoustic or whatever you know in that area. I mean, I know the one. I think it was WHOI did the one acoustic glider in 2019. But I think that was the first one that had been done in a decade. You know, I think that's where I kind of step off a little bit on with, you know,
looking at a restricted area, is that we're looking at data that's been, you know, we have one baseline for, for 10 years. and we know how much things have changed in the Gulf And so, look at displacing that many fishermen, out of a, you know, in a restricted area during the most profitable months I guess I would like to have a little bit more recent data and would feel more comfortable with that rather than taking a shot in the dark in a way. That's the way it feels to me, at a restricted area. I think that some, I think it's, just don't think it's fair.

And we can, we can record that as a comment. But know, that you're not the only one who's concerned, including some of the scientists on the take reduction team, that we need more data. But we really can't wait till we have all the data to do it. However, the other thing you mentioned that's right is, yeah. The whales have shifted a lot in their distribution since 2010. But although they've shifted a lot, they still seem to be visiting their previous places that they visited. Not as many whales are using in the Gulf of Maine, and in some places, like the Bay of Fundy, they don't visit for a long, they poke their noses in and then they leave out, leave, you know, right away. So that this was an important area at one time and we don't have a lot of recent data to know that it still is, doesn't let us know that they're not still going there. I do think, you know that Maine has been working pretty aggressively to try and get more information. And NMFS has as well, trying to increase the use of acoustic data, because we can't get flights there. But the acoustic data can give us all kind of a longer survey than we can do by setting flights up every day. So, you know, point taken we need more data. I'm yeah, I'm afraid point with the speed with which the population is declining. We can't wait till we have all the answers.

Sure. I mean, I understand that. I think that's one of the frustrating pieces about all of this is the fact that we're doing this, you know, without recent or, you know, there's some good data. There's some bad data. I'm not, I'm not denying the fact that they're, you know, not still in the Gulf of Maine, but I know what I see every day. And every other fishermen, I talked to sees every day and it's not, you know, we're not seeing them, It’s not a reason to not do something but it's also when you're looking at, you know, my bills don't stop every day. So at the end of the day, you know, I want to make sure that what we do actually works for whales and works for us.

All right. Yeah, thanks,

I'm all set, thank you.

Thank you. OK, I'm going to go to Nicholas Morely. Hmm, this lost you in my list. OK, you're unmuted, you should be able to ask your question. I see that you're unmuted, but we can't quite hear you yet.

Can you hear me now?

Yes.

My question is, now, with all the state markings, what if in like, 7 or 8 years or even, like, 2 or 3? What if there's no like entanglements, like from the State of Maine. Is some of this stuff going to be able to change, or?
I'll try this one as well. This is Colleen again. And no, we did mention there aren't that many whales that we're seeing that have gear still on them. So when there's so few incidents, and few have gear on them, not seeing a mark isn't the only data that we would be able to use to know that we can change the measures. But, there are a lot of other things we'll be looking at, You know, the more data we have on, whale distribution, as, as Maine, goes to 100% reporting. The more data we have on whether lines have been reduced from the trawling up, or where the effort actually is, the, possibly, the more we'll be able to, right scale the measures, or modify them. It does take up a couple of years for us to modify measures. And we do need a lot of information to do that. Our, our plan is to be trying to monitor as well as we can, including the whales and the fishery, and bringing that to the take reduction team annually. Uh, you know, while we're trying to figure out whether this is working, whether we need, whether we can move some of the measures in, some places remaining more measures. So that's something where we'll be continuing to look at what the take reduction team, probably through at least annual monitoring meetings. So again, it wouldn't only be the lack of gearmark found it would have to include a lot of other information too.

Thank you.

Andrew Hallinan, you are next. OK, you are unmuted.

OK, my question is, for the LMA one Zone, the Closure Zone, is there any amount of conservation equivalency that Zones in Maine could do to fish that zone?

Marisa, you had looked a little bit at this last night, and, and about 10% of the risk reduction, um, in this 60 something percent. That the decision support tool estimated was from the LMA one closure.

Right. So, we would have to find, you know, about that level of risk reduction across the region in order to, know, that we wouldn't need the LMA one closure.

It was 10.8% across the entire north-east.

Right. So, we would have to find, you know, about that level of risk reduction across the region in order to, know, that we wouldn't need the LMA one closure area.

OK. And also, on one of your last slides, you asked for comments about the weak point at the buoy. I, from a fisherman, myself, I don't think it's necessary if you're going to. And if you're going to implement other weak points with the tide boiling and stuff like that, buoys are going to be lost anyway, so you might as well, um, save what gear you can. And also, in the economic factor, I think things that should be considered is if you're going to make fishermen relocate in terms of north and south and not out of their zone, like Jacob Thompson talked about, I think Territory, guys, Cutting each other off should be considered. Trawls with one end when you're fishing 25 trap trawls with one end on them, The amount of gear lost from that should be considered. And also, in Zone E of Maine, the LMA one zone, a lot of guys, I personally don't fish it, but a lot of other guys do. So, I feel like I should talk on their behalf to go. Their lost income from that. I think that should also be considered, whether it has to be looking at slips or whatnot. I think all that should be considered when you're talking about economic consequences, when you're shutting down zones like that.
Thank you, we were recording those comments. Appreciate that.

That's, that's all I have.

Thank you. We had a question from someone who's unable to speak. The question is. I would like, Here we are. I want to know if there is a fisher-friendly version of the data presented in the DEIS and presentation?

Um hmm. The presentation, to some extent, was created to be accessible. I think from the comments that and questions that we're getting from fishermen, they're understanding it. Pretty dang. Well. There is also a 5 or 6 page summary of the measures in a, you know, an in more accessible format that's on our website that I don't think that has the analyzes summarized. But, it does have the measure summarized. But, but this presentation, one very similar to it, is posted as a slide deck, we can post this one, as well as a slide deck. And it does, I think, present the data in a fairly accessible form.

OK, thank you, see Jack Merrill, coming to you. You should be able to unmute yourself.

Hello.

Hi. Yes. We can hear you.

OK. Thanks. Yeah. Hello, again. I had some things on my mind when this conversation started, but a couple other things have come up in the meantime. So my first comment is, if you want to track whales, use drones, Um, That's all I have to say on that. It's new technology, I guess, but that's the way to do it. Um, and then last night, I pointed out that the parameters of the closed area will be, will become a wall of traps. And after it's open, there'll be a gold mine mentality into the zone. So I think a couple of guys had sort of brought up that point tonight. The parameters of, if any closed areas, are going to be, you know, littered with traps. So what I really wanted to bring up tonight, and I think Christian is, has talked about it a little bit. And other guys have too, equivalency possibilities. And that's one of your questions. Um, and that's extremely important, too, to us in Maine, because you're going to relocate a lot of people anyway. But if you're requiring guys, to fish 8 traps in an area where now they fish three as a way two end lines, versus four traps with one end line. There are some small differences and there are some large differences in those two configurations, it's the same amount of end lines, but two fours, I want to point out, will be further apart then end lines on a trawl of eight. So, I don't know if that's something you've considered. It's also be a little more rope, because in an eight than a two force because you've got to connect the two, so there's more rope in the water as well. Um, so, that's one thing I wanted to bring up. Then I think, I call it the Elephant in the room, both in the State of Maine and in federal waters. Lower Trap limits, Can you consider them as a way to reduce vertical lines?

Colleen here, um, first of all, the, the one buoy on the longer line is something that we can probably consider as a conservation equivalency, as you said. It would, it would result in the same number of end lines, it would probably have reduced economic impact, potentially. If those, um, those sets could be a little farther apart, they’d be less catch loss, potentially. So that's
something that we can try and figure out. As you move farther offshore, it might be harder to do. But I'll you know I'll be in contact with the ASMFC, because it would requires changing the lobster rules as well. So I can work with them and figure out how best to do that. Um, so that is something that would be within the Uh, the scope of what we propose, so it would be something that we could include as a conservation equivalency if I could figure that out. The second part about reducing the number of traps. I know the State of Maine did a lot of scoping with that as a possibility. I was also on a lobster/whale working group. I think Burton, you may have participated with us on that as well. Where we, ASMFC, it was for ASMFC and they were looking into whether or not they could propose an amendment that would, um, try for line reduction through trap reductions. And it was pretty complicated and, in part because Maine has a different level of data collected. So, um, you know, understanding how to do that across different states that have different levels of fishing history known for fishermen was really complicated. The whole fishery management regime trying to do is complicated. And in the end, that group was not able to propose an amendment to the ASFMC. So it was considered, and I know, it was considered at the, at the multi-state level, through the Atlantic States Marine fisheries commission and it was considered at the at the state level, through Maine DMR scoping.

Yeah, it's been an ongoing conversation in Maine for about 100 years now. Actually, there's an old video of the Korea Co-op in the 19 thirties that shows fishermen, debating trap limits back then aye. But I think the, you know, the dangers of trawling up, especially for smaller boats, older fishermen. And the displacement of boats from the areas where they would normally fish by these rules that you proposed right now. Um, the dangers far outweigh, you know what giving up, some traps would be, So.

Yeah

And I'm not going to get into it tonight, but I know there are economic benefits to trap reduction as well, and it's worked all around the world. But, yeah. Anyway.

I agree with you quite a bit. And, with herring where it is, right now. There's benefits to be, um, I know if that was proposed as a conservation equivalency, that would be something that would be pretty easy for us to include in the Final Rule. Halving the number of lines by halving the number of traps would be pretty effective.

Yeah, because you know, if I had to reduce my traps, and I think I speak in a general term, You're not going to start. You know, where you fish singles now you're not going to suddenly put pairs. If you have less traps, any. So, anyway. Yeah, I appreciate that. Thank you.

Thank you for your comments, OK.

OK, we are? Going to Kent. Oh. Maybe we've lost Kent. I will come back to Kent. Gregory Simmonds, I am coming. Maybe not Gregory, either. OK, let me, we will come back to this to John Tripp. You should be able to unmute yourself. I can see that you're unmuted, but we can't hear you yet. OK, John, we're going to come back to you. David Tarr. You should be able to unmute yourself.
Can you hear me?

Yes.

OK, my question, I guess I have a couple of questions, but primarily that, that restricted area that you're talking about, um, the model that came up with that, I mean, I think it's miraculous that it does just follow the, The area one, and area three lines right along and that, it's fine on one side, not on the other. I'd have a lot more faith in that model if it made a box that somehow crossed those magic lines we have out on the ocean, I'm wondering if it would be possible As you say, there's not much gear outside. Area one, in the area three box, maybe the guys could shift some gear over there. Just have some sort of an exemption for that time so they can fish outside a little further if they want to, to alleviate some of the gear stress from it being moved east, west, or, or north, give them a south option. And I'm also wondering, I don't believe that data, the data you're using, has much to do with aerial surveys, even in the last five years. But I would love to see, or have, Maine Lobstermen Association, or Downeast Lobstermen’s Association or the State of Maine have that data that you're using to plug into that model. To, at least give us some faith that, that, that isn't, just, uh, a number pulled miraculously out of the air, It just, it just doesn't pass the straight face test, I guess. And then I have a second question after that, you are trying to answer that one?

Oh, sorry. The whale data that were used that were available to us in early 2020 when this is being drafted are from a model created a whale habitat density model, was originally created for the Navy, and it was created down at Duke. And it actually used survey data from a couple of decades so it wasn't just the most recent years. And I believe at the time we were using it was data through 2016 and 2017. That model has been updated in 2010 and on has been broken out. So we are trying to update the decision support tool to include that newer period of time that's more relevant. I think and Burton, could you speak to the availability of the decision support tool for other people to try and use it to model alternatives? I think that there are future plans for making it available, and it's available in a form right now. I think Maine DMR has used in the past, is that right?

Yes, that's correct. So two things there. There's, so what the decision support tool uses is actually output from this whale habitat model. So Duke University is taking the raw whale sightings data and using that to produce a model where projects, where whales are at. And then that then gives us a complete map that we can then connect with gear densities and other things in the decision support tool to look at co-occurrence numbers and such. So there's the data that Duke is using to produce their whale habitat model. Then there's that model results, which are being used in this analysis to look at locations that we would consider that show up as being areas of concern. The output for the Duke model that we're using as an input for the Decision Support Tool has been supplied to Maine DMR and staff of Maine DMR and we've had some back and forth and discussions on what the whale habitat model looks like. And they've done some interesting and clever further analysis on that. That was an earlier version when the newer version came out that was based on only the most recent years. We were we're really looking closely to see if that spatial distribution changed. And what's come with the most recent data is not a suggestion that the spatial distribution of change, but simply that the number of whales in the Gulf of Maine has
gone down as a result. It doesn't seem to suggest that they're using a different spatial area portion of Maine. And I've just been able to get a hold of the final version of the updated habitat model, and I will be sending that the state of Maine, um, most anytime. There's a report that goes with the model that at least shows the raw data that went into that, and we can make sure that Maine DMR gets a copy of that as well.

OK, one of the other, I guess I still have two questions they're quick ones though. So, one, is this, all these slides? Are we going to have this accessible somewhere where we can look at this later on and study it, because as they were flashing through and people were talking, it really wasn't a chance to digest it. And I'm just wondering if I can have a hard copy of it, if I want to print it off myself.

Hi, Yes, there is a version available on the website, and I will post that into the chat, that does not have the Maine specific slides in it but we can work to get this version available as well. But I will put what is currently available right now on the chat.

Could you just say what the website is, and I'll just write it down.

Yes, it's fisheries dot NOAA dot gov. backslash ALWTRP, it's on the screen for reference to, and when you go to that website, it should be, at the top, it is current action, and then it says More Information, and it's one of the links listed. The more information.

OK, and the last thing, I didn't see, a slide go by that, that showed a map of what the exemption area was. But, I'd like to be able to pass that along what, where that exemption line is, do you have a map that shows that?

The, the restricted area?

No. No. The exemption line, you're talking about three trap. You know, three traps outside the exemption line I just would like to see where that exemption line is.

You can see it in either one of these maps. It's in red here, and then the next map, though. It'll be all the area in gray. In the next slide so, all the area in gray, you can see that line along there is the exemption line.

So, all of that area could still have pairs and single some, pretty much anything as long as they have the weak link and marked upright.

Yes, there will be no trawling up in those areas.

OK, they've answered my questions, Thank you.

OK, thank you, let's see. John Tripp. Let me, you should be able to unmute yourself. Yup.

Can you hear me?
Yes.

In the last webinar, I believe it was stated that the proposal achieved 64% risk reduction, but the LMA one closure, providing 10.8% risk reduction. Is it possible to achieve the 60% reduction of the closure area where split with area three and possibly stretched if necessary? I know Eban Wilson asked a similar question earlier, but I didn't know if you guys were able to run the numbers to still achieve 60% by, possibly making the area smaller for us, sharing the burden with Area three.

Colleen here, and, um, Burton, add to what I say if I don't provide enough information or Marisa. But when we were developing these areas, we were also following the instruction of getting risk reduction that was equivalent across states and jurisdictions. And so, LMA three proposed, or the Atlantic offshore guys is since don't have a state representative them. They identified one weak end and 45 trap trawls, as well as ongoing, There was ongoing and there's some imminent, trap reductions going on in LMA three, and with that combination LMA3 achieved pretty dang close to the 60% risk reduction. Then, the mass of the Maine LMA one, Measures did not, did not reach 60%.

And that was one of the reasons when we were writing those scenarios that included that closure area as an area to protect whales where there is relatively high co-occurrence for the Maine LMA1 area. We ran a number of other scenarios, including ones where it overlapped into three and had other closed areas within or restricted areas within LMA1 Did not include all alternatives. Burton what am I missing, anything? Or Marisa?

No, I think that's correct. You know that the key is that this closure area is what we would have considered last when everything else that had been proposed failed to reach 60%. So, and that was trying to get this minimum number, basically, by jurisdiction.

Does the, we get no credit. For the fact that we actually have enforcement in area one and Maine state waters versus zero enforcement in Area three?

No, I mean that. That would be part of the baseline since it's not much change since 2017, We, we are, NMFS, NOAA Office of Law Enforcement and the Coast Guard are working on improving the LMA three Enforcement. Um, so, hopefully, it will be improved compared to 2017 over time, But, right, that wasn't something that we included as risk reduction credit.

While you can know that a lot of the science is based on assumptions, but you can assume that the state of Maine is going to do their job with enforcing the risk reduction measures that we have to take. And the same assumption could be made that there, there's going to be zero enforcement of any risk reduction in Area three. So, considering there's zero enforcement out there now.

Will include to that as a comment, you know, agreed that we do need a lot more risk reduction in area three. That's something that, there are some pilots going on now, but it needs to be wholesale. one thing proposed by the Atlantic States Marine Fisheries Commission that's likely to occur within the next few years is vessel monitoring in federal waters. And if it can't be done and all federal waters right off, if it is, the kind of thing that would probably be started, in an
area three, and then when there's more capacity moved into other federal waters. So, that would help, that would help us with enforcement.

Thank you.

Welcome, thank you.

OK, Ira Miller, I'm coming to you. I see you have two accounts, So I'm going to try one, and let's see if this is the correct one. Can you unmute yourself? How about now, oh, I see you're unmuted.

Can you hear me?

Yes.

Uh, lot of the things I've talked about have already been touched upon. Certainly will enforcement, that was something I'd discuss last night. Just start off with that. So basically, unfortunately, this is going to turn to somewhat of a fight between the sectors because we're all fighting for our existence. That being said, you're depending on the honor system. Basically, New Hampshire, Massachusetts and area three, seems how Maine, has the only enforcement. Or realistically, they're the only ones that can enforce anything out there. So, great big gap right there to begin with. As John just talked about, lengthening the line if it comes to a closed area, I understand why you're saying by co-occurrence model, but it appears to me looking at that co-occurrence model run further the south-west along that line, there's quite a bit of co-occurrence, but you stopped it short of that. It seems to me, that could be narrowed up quite a lot. And it really should be a shared, a shared area. So if it was narrowed up a lot and lengthened. It seems to me that even though it's unpalatable, anyway, that that would make it a little bit better. Jack Merrill brought up the possibility of trap reductions. I'd like to also talk about the possibility although this is uh, very little benefit to it, but you're trying to achieve something that's fair across the board. Uh, you know, winter time closure, possibly in state waters, things like that. It's not that I'm in favor of that stuff, but you're trying to get where it's giving people across the board a fair chance to get things. I think you need to work those somehow into your calculations. I think people need to understand, if they have, for instance, a trap reduction, or what's what, I don't think that the best way to do it, as I think you, guys, do economic analysis, you should be throwing an economic analysis into that. How much change does it mean if there's a trap reduction, for instance, 200 traps or something like that? What's it mean across the board for everybody else? What how are they going to have to change the way they fish? My point being that is, it stands right now. We can all fish, we're all fishing right now. Old, young, everybody, everybody, is still able to make a living. We go to these types of things. You're going to impact some people, and you're going to make it extremely tough on them to make a living in the area that I fish. You move into triples a quarter mile outside the Islands. And I can tell you that I can fish, you'll be fishing triples in about some spots, probably about 6 or 8 fathoms of water, not very doable on hard bottom. So, I'm just wondering, I know this stuff is fast-tracked, but I think in the process as much information as you can on alternate scenarios, because it's pretty hard to make choices when you don't know what the impacts will be. At least you could maybe shine some light on it. I'm all set for now.
Hmm, We've taken that down, particularly as a comment. It would be hard for us to greatly modify the final rule with, with measures that we hadn't considered or didn't include in the analyzes, it's outside the scope of, of what's being considered, it is the kind of thing that we could potentially do through another proposed rule. But, as you indicated, this is somewhat on a fast track, partly based on litigation, greatly, based on the rapid decline in this whale population that's dropped by, oh, buy a quarter in just a couple of years. So we don't have a lot more years to take action. We, we looked at a lot of scenarios. The States did a lot of scoping as well. Some of the things being proposed tonight were not being proposed. By fishermen, when scoping of what's going on, or at least it didn't make it to us. But we'll, know, we'll start, will, as comments, come in when you sent, submit these as comments, and we've taken them as comments tonight as well. We will see where there is room for us to consider it within the analyzes and for the final rule. But some of it's quite outside the scope of what is in the proposed rule. So, if it would, if we changed it to this level, it would have to go out as another proposed rule, and that might be hard to do the time that we have.

When you spoke about, somebody brought this up, I believe, before, last night, And you spoke about proposed changes to the rules, how fast we could change things. Uh, just like to have you speak to that one more time and I'm wondering if there's things that the fishing fleet can do that would help you to be more responsive in in making changes to things. if we're implementing this stuff, you know, that reacts to data, as it comes in a more timely way, it allows us to fish the way that we need to fish.

So I think that came up last night when people asked us when we're putting closed area or restricted areas in place if the whales shifted. How quickly can we modify the restricted areas? And I think, I said it usually takes us about two years to do something through a new rulemaking. I mean, this, this rulemaking is an example of that, We, you know, we got proposals from the states early in, late in 20 19, early in 20 20, and now it's early 2021 as we're proposing the rule. We're hoping to have it in place, um, you know, probably by the end of the summer or something like that. Um. Um, so that's almost two years right there. And really, the TRT made their proposal in April 2019. So we're almost up to 2, 2 years from when the TRT proposed their framework measures. I think that a lot of the things that held things up, you know, we did a lot of scoping. The states did a lot of scoping so, between April 2019. And early, 2020, a lot of that was because of the amount of scoping that was done by the states and by NOAA fisheries. And then the other place it got held up was when the rule went into review for because it was considered significant and went into review in the Office of Management and Budget, which is a branch at the White House. And that review period was a lot longer than we anticipated. So, those, Some of those are scoping, doing a lot of scoping is important. But, um, So, you know, it doesn't necessarily need to be nine months long. Maybe that's something that could be shortened next time. It's always hard for us to know how long something is going to be in review inside the Beltway. And that's not something we control. And that's a hard thing for anyone to predict. So it's just not a very agile process.

Right. Is there just a question for you? I know that you're always clambering, Seems like for more information, all Federal vessels were to report, trip reports, maybe even the possibility of electronic monitors if that was implemented in the Federal waters. How, was there any chance
that that could implement that could impact that process, speed it up, whatever, To be more responsive to what's actually happening on the water?

I mean, I don't know if it would speed up the rulemaking, but the next rulemaking we do would be much better informed. And I think that it would probably improve, improve the measures and our ability to track the effectiveness of the measures. For instance, right now, we're proposing trawling up. It's hard for us to tell how much trawling up works. Unless we have 100% vessel trip reporting. And we can compare the number of lines being fished today with the number of lines being fished a year after the new measures are in place. So, um, so there are a lot of things that would be improved with that kind of reporting. I don't know that it would ensure we could do rulemaking in less than a couple of years.

Yeah, I mean, that's a benefit. I would hope that might come from that. I do have to do regular reporting. And, you know, it is I'm not sure that it's always finer scale that would that would really make a lot of difference. I mean, there is I think it could be improved, I guess, is what I'm trying to say.

Yeah. I agree. And I think Maine is also doing a lot of really targeted research that would also improve our ability to assess the area's better. For instance, the work that they're doing with the sound traps, to try and get more acoustic data, because there's not a lot of survey data for Maine waters. So yes, the more data we have, a bit, the better the measures would be, the more effective they'll be, and I can't guarantee it will come out faster, but, but it could, Measures that are better and more tailored and better supported often get less held up in review. So, that is the kind of thing that could make it faster.

Understood. Thank you.

Thank you.

OK, Zach, I'm coming to you and second. OK, you're unmuted, you'll be able to ask your question.

OK, thank you, my question has to do with slide 17. And before I ask the question, I just want to say, I'm with Blue Planet strategies out of Bar Harbor, Maine, but I grew up in Eastport in a fishing family. And then I became a whale watch naturalist for 30 years with thousands of trips off the coast of Maine. So I want to say thank you to all the fishermen on this call for all that you have done. And all that you continue to do too: look for solutions and find a way forward. I actually believe that the conservation community has a lot more in common with fishermen than different, including climate change, water quality, maintaining forage fish, um, ship strikes on whales. All those things are common cause for us. My question is with regard to the co-occurrence, if we look at the map for baseline co-occurrence on the left, there's a, there's a large area of red around Jeffrey's Ledge down around the New Hampshire, Maine border. And then also up between Eastport and Grand Manan. Just trying to understand if there were alternatives for closures where other areas are highlighted in red. Um, not that I'm trying to push more closures onto everybody but just trying to understand what, why, weren't alternatives given were considered for closures in those areas or how. How were those considered different? Thank you.
We, we ran a lot of scenarios actually, by we, I mean, Marisa and Burton ran hundreds of scenarios, including I don't know about that That small area off Grand Manan, but I know that I'm fairly certain we ran a few that included Jeffreys Ledge. And I don't remember why in the end those weren't in the preferred. Marisa and Burton, can you remember? I mean, I know this is about a year and a half ago, or a year ago, and hundreds of runs.

It's hard to remember all of the details, and this is something so when you're selecting measures for our preferred alternative, we were primarily using the decision support tool. And so this could have something to do with how we were approaching that and what is in the decision support tool versus what is in our co-occurrence model. So we didn't get these maps until kind of the end of the process, when we are doing our final biological analysis. And I think, when we ran things on the decision support tool, maybe, I don't think they were highlighted as major hotspots as much as the other area. Burton can may remember a little bit more about that. But I don't think, when we ran them through the decision support tool we had the same results as this map is showing. So, it's something that we might want to go back to and look at.

Yeah. I agree with what Marisa said. That one spot near the mouth of the Bay of Fundy did show up. It's sort of overemphasized because the value gets extrapolated out to a larger block in this case. So it showed up as a potential hotspot. But it was an extremely small one that didn't last across multiple months. And so creating a seasonal closure that was of a short time period in a very small area, I think that the people in law enforcement and others said the logistics of implementing something small, over a short period of time, that it had added up to relatively small benefit is not preferred the one over Jeffreys Ledge. I'd have to go back and look. I think that there was also a fairly brief period, maybe only one month or so that it showed up as a hotspot, but we'd have to look at that and see why it was at that and didn't make our final cut.

OK, thank you.

It's important to note that the modeling that we do happens on a monthly basis and we're looking at, sort of, one map out of one month for this.

Thanks. That's right. That was a good point Burton. That was a sample of a month versus the 12 months.

OK, the account of Nicholas Morely, I am coming to unmute you, you should be able to unmute yourself and ask your question.

I just got one more quick question. The state of Maine is proposing like a test, offshore wind turbine field. And it's right smack in the heart of like the closed area, cause like, when you compare the map for the closure and the wind turbines, right, in the exact same spot. So how can they have like, enough data to say it won't change anything like agriculturally. But you guys have enough evidence to shut it down all fishing because there's so many whales in that area, I just don't understand how they can like contradict each other so much.
Yeah. We've had similar questions about this, Off of Rhode Island, where they're struggling with some wind development conflicts as well. And it is really outside the scope of our actions. We are so specific to the take reduction process under the Marine Mammal Protection Act. Often, if our, It's also different federal agency. If they come to us for data, for tools, this is a kind of thing we could offer them. They could run the model as well. But as far as I know, we have not gotten involved in the, my, our team, the people who are here today have not been involved in their assessment and in their data sourcing. I can reach out to the folks that worked for NOAA fisheries that work with the wind energy companies and find out where they're getting their information and whether or not they are interested in using some of the information we have. The basic data, on whale distribution is coming almost all of us are using that Duke model that Burton described because that is currently the best available. But I don't know if that group hasn't yet used that. I can check into that to make sure they are using it.

All right.

OK, Colleen we have just a couple more questions. Jacob Thompson, you are next, you should be able to unmute yourself and ask your question.

Yes. I, I just wanted to know how come you guys didn't really stress that the whale migration pattern has changed as much? And climate change? I mean, everyone talks about it on TV all the time. Obviously, the warmer it gets, the whale's will be going further north, so, how come that wasn't talked about as much?

Yeah. Thanks, Jacob. That, that's a good question. And, um, know, honestly, we had, a slide in, in there, where we showed the trajectory of the population. And when we were presenting that, sort of a longer version. It's in the recorded version that's on our website, even, which is an even longer version of the presentation from tonight. We do point. We do state the problems. The whales are having the reason the population is declining is in, in large part or declining, faster, is in large part. Because since 2011, they shifted their distribution. As you said, they're spending probably less time in the Gulf of Maine, except in, you know, they're visiting some places fewer of them are, are staying residential in there. There are more of them in Cape Cod Bay, and sometime in the 20 low teens, a bunch of them went to other areas where there are no permanent protective measures in place, particularly the Gulf of Saint Lawrence in 2017, about 12 of those mortalities that occurred that year, occurred in the Gulf of Saint Lawrence because the shippers weren't looking for them. And the fishermen didn't have measures in place. So, those mortalities that shifted distribution, which may also have reduced the whales fitness and did reduce or the calving interval between when the moms were having calves increased, the number of calves being born a year decreased. So, climate change contributed a lot to that shift, that increased the speed with which this population has been declining in the last since 2010 or 2011. And I didn't mention tonight because we were trying to give a more targeted presentation of what we're doing versus all the many reasons for the challenge that the population has declined. Doesn't really explain why there's been an increase in entanglement, certainly some of that's Canada, and we do account for that, and how we apportion the undocumented takes. It takes where we don't know where they occur. We assume half of those are occurring in Canada. We don't blame those all on US. Fisheries as may have been done in the past. And you know, the smaller the population gets regardless, what causes it, the more important to them mortalities and serious injuries is. And So
it doesn't really reduce our need to continue to reduce the amount of human caused mortality in
the population. You're right, we didn't get into it tonight, and it's partly because we we're trying
to have a targeted, slightly shorter presentation.

one more question, but she might not be I'll answer but. Was there a reduce this year in the ship
strikes because cruise ships aren't going around because of covid 19 or is there? I mean, is there
any correlation to that because I've heard different stories about, you know, that a lot of cruise
ships, they go to eat bacteria that comes in the shipping lanes or whatever, and they get hit by a
lot of cruise ships. Is there any data from a lot from 20 20 that shows no less ship strikes, are: Is
it not available yet?

I don't, we don't have that analyzed right now. I don't think we did have two vessels strikes in
US waters, both small whales, calves from last year's counts um, and one of those I believe, was
a smaller vessel. And the other one, we don't know but so that is actually probably possibly even
an increase in US waters to have two in a year. I do think it is the case that there were fewer
vessels strikes in Canada this year and I believe the year before as well. Few of them that were
documented at least. And I don't know that, that has anything. I mean, there's so much shipping,
going through the Gulf Saint. Lawrence is the primary shipping lane into the Great Lakes, and
into the side of Canada. So I don't know that that has anything to do with cruise ships. I do
remember hearing about that theory. I don't know that I've seen that that theory was proved that
whales are changing their distribution because of the waste being dumped off of cruise ships. I'm
not sure that that was very convincing to me and to some other, to folks who are scientists and
study some of this. Um, so I would say, we don't have any evidence of that. In there, if anything,
there's been a slight uptick. Oh. But within the range of vessel strikes in US waters, there was a
reduction in Canadian waters, but I don't think anyone would be able to show that had anything
to do with cruise ship traffic.

OK, thank you.

OK, Dustin, Delano? It should be able to unmute yourself and ask.

I just have a question on implementation, When do you expect that these rules will be
implemented?

So, that's a good question, and I can't, I can't say for sure. I will say that the will be getting, you
know, finishing the comment period March first, I suspect, you know, 75% of the comments will
come in, Um, March first before midnight. And so, we'll be aggregating those and considering
you can, adding to the information that's in our Environmental Impact Statements. And, you
know, doing the analysis at all takes a lot of time, as we finalize the rule and finalize
environmental impact statements, so probably a couple of months to do that, a couple of months
in review. And, you know, we hope to at least have a firm idea before the end of May, at least an
internal final draft before the end of May. That can be good, can go into the biological opinion.
That needs to be done by the end of May, because of the litigation deadline. And when it is
finalized, and when it is published as a final rule, which hopefully would be shortly after May or
early in the summer, we would have a delayed effective date for any of those gear modifications.
And in the past, those have been anywhere from, you know, four months and up. I think in some
years, it was almost a year because of the extent of the gear modifications required. So, you
know, we'd probably be looking at a few months delayed actual implementation to give
fishermen, an opportunity, you know, some time to make the modifications. So it wouldn't be
effective immediately upon publication of the final rule.

OK, thanks.

OK, two more, Julie Eaton, you should be able to unmute yourself and ask your question.

Hi. My question is, I'd like to know if you guys have thought about or what actions you're
planning to take, um, to protect the right whales, from ship strikes. The reason I ask this is if
you're asking the Maine lobstermen to give up extremely productive bottom, that feed our
families by this closure area. It appears to me that ships coming into Maine to offload cargo, will
have to transit this closure area. So what you're expecting us to do should also affect the ships
coming in. I'd like to hear your comments on this, please. Thank you.

Thanks. And this is Colleen again. So this action that we're taking is under the Marine Mammal
Protection Act, take reduction requirements. So, it is very specific as you've noted to commercial
fisheries and ship vessel traffic is outside the scope of what this team works on, but the agency
under the Endangered Species Act does work on vessel strike measures. And those measures are
definitely due for modifications. I believe that probably within the next year will be people will
be out scoping on, the analysis that had been done recently for the purpose of determining
whether or not the rules that are in place right now, might need to be changed. So when they're
doing that, I'll make sure that they include in their outreach that they get to, I think it's Maine, I
think it'll be the whole coast, Maine through Florida. And there are measures in place and a
number of places, particularly near ports, near some of the larger ports. There are vessel speed
restricted areas that are seasonal, it's restricted when right whales are seasonally anticipated to
be in the area. But as we've all been discussing over the last few minutes, Right Whales
Distribution, have changed a lot. So some of those areas should probably be revisited and
considered for modifications. But that is outside the scope of what we are talking about.

Thank you very much, I appreciate it.

Thank you so much. OK, Oh. OK, we have 1 last 1, Colleen. And Eben Wilson, I'm coming to
you. You are unmuted, you'll be able to ask your question now.

Yeah. Yes. I just had one last question about enforcement in Area three and the difficulties that
Maine and New Hampshire have had. And I believe, Massachusetts, as well, about enforcement
in those areas, And it pertains mostly just to police unions and being able to access vessel vessels
and, you know, the ability to be able to haul gear out there because they haven't been, and a lot of
it pertains to 24-hour payment of wardens, and, and just the ability to be out there.

Thanks for that. I hadn't heard about the police union component of the difficulty enforcing in
the offshore. I know NOAA Fisheries provides joint enforcement agreements, so we provide
some funding support to enforce, to help with the enforcement of the rules in state waters. And I
know Maine extends out well beyond state waters. But I was under the I understood that the
offshore enforcement was done by our Office of Law Enforcement, but relying heavily on the US. Coast Guard. And I know that a couple of years ago, they looked into trying to haul gear they looked at like buoy tender is in some of the large vessels because it's they don't have capacity on most of the coast guard cutters and vessels like that to haul gear. And even more importantly, they don't have the skill to reset gear. They're not commercial fishermen, and they're not operating off of commercial fishing boats. So hauling gear, finding out its legal all they can do is take it in and they can probably only take one offshore, set in at a time. So it would also be pretty time consuming. So they have looked into that. They've also looked into the possibility of leasing a fishing vessel and a crew to help them do it. Um but would be pretty expensive. And also, not a lot of fishermen really want to enforce against other fishermen. And then they have considered getting a vessel capable of doing it. You know, they talked, I know with Maine and others about that. The cost of maintaining the vessel between trips, the, you know, the 365 day maintenance. And everything else was pretty prohibitive, I think in the end. And partly for those reasons, they're starting to look instead at, you know, the underwater version of someone suggesting we monitor whales with drones. So they're looking at ROV’s to do enforcement work and their preliminary efforts have been pretty positive. They've been able to see, weak insertions on buoy lines, I think they'd be able to count pots on bottom on the trawls on the bottom and things like that. Um. So their hope, I think, is that, as technology advances, they're going to be able to do more of this. And as I indicated, Atlantic States Marine Fisheries Commission has proposed that that NMFS require 100% vessel monitoring on the federal vessels, which I believe will be coming online shortly, 100% trip reporting. That will be coming online in Federal and in Maine Waters will also give us a lot more data and also help us direct enforcement efforts. So there are a lot of things going on to improve enforcement, in LMA three. They're not in place right now in any wholesale way. That's true. And that's been true for a long time that there hasn't been enough enforcement, but I hadn't heard about a police union component to that. I don't know much about that.

OK, yeah, I'm, maybe I'm off base for that, but I think the hard part. for me is the fact that, you know, area One we have, you know, we have Maine Marine Patrol and they've done a decent job at being able to manage all of area one, A and area three has been largely unmanaged to this point and I, the last thing that I want to do is to be able to try to pit one against the other. But the point is, is that there are people that are pushing up against area one, area, three line and, you know, we are we are being assessed at those marks in some way. You know, one side of the line to the other, and it's, it's very difficult. And, you know, we, we need just to see because we're looking at a closure in our area, to you know, to see that the balance fairly and I just, I just want to make sure that it's all being looked at.

I appreciate that. And I don't think it is really pinning a sector against another because among the main people, of the primary people who are coming to us and complaining about the lack of enforcement and enforceability offshore are the LMA three fishermen. So, there, the fishermen out there are also concerned about the lack of enforcement.

I'm sure they are working on it, but we're not there yet.
I’m sure they are. Thank you.

Thank you.

OK, Colleen. I think we did it. That's it for this evening.

Oh, yeah, I think it's so late that we're probably not going to have a comment session, But, we did really allow comments in with the questions tonight, which is one of the reasons, perhaps. The question session went fairly long. So, I hope that doesn't disappoint everyone. We will be having more public meetings in February, specifically for the purpose of collecting public comment. And also, looking at the slide that's up right now, or going onto our website, You can get information on how to provide us with those comments as written comments. And I really appreciate everyone's input tonight, really, some very sharp questions, some very thoughtful comments and input. And, you know, you're, you're identifying a lot of places where we still have a lot of work to do, and I really appreciate that input. And thanks to all the NOAA folks who have been helping support the webinar tonight. And the TRT folks who are online, appreciate everybody's help and perhaps talk to you all in February. Goodnight everybody.
During our informational sessions, for example, we got some great input that has caused us to revisit some of our economic analyzes, and may help us better understand and compare economic impacts. We hope to get more of that kind of input tonight and throughout our public comment period. Feedback suggesting we analyze the data differently, identifying new data sources, or explaining how the policy would positively or negatively affect your specific situation, will help us improve the final rule and the final environmental impact statement. These types of specifics are a little more useful than a simple Statement of Support, or opposition to a proposed rule and the environmental impact analysis. Also, we realize that NOAA fisheries currently has a number of other documents out for public feedback, including a report evaluating current vessel strike measures and the Biological Opinion that's on the batched fisheries that was mentioned earlier. These actions have separate feedback, processes, and fall outside of the scope of the documents we're discussing tonight, particularly given the size of our audience, we'd like you to please restrict your comments to the documents we're discussing tonight, within the scope of tonight's meeting.

Additionally, throughout the preamble and the rule of the rule and the Draft Environmental Impact Statement (DEIS), there are some places where we called out requests to reviewers specific requests, and I'm giving a handful of examples here. one is we would like comments regarding some of our assumptions on the time, and the associated costs related to the proposed gearmarking on the within the draft environmental impact statement. For the first time our cost estimates assume that fishermen remark their gear every year when they're doing maintenance. Therefore, the estimated cost in our analyzes are higher than previous gearmarking estimates. In addition to assuming annual remarking, we estimated that the gear marking portion of the annual line maintenance takes an additional 20 minutes per rope. And we'd like fishermen's input on how much time it takes them to mark each buoy line. Are we close? are we underestimating any specifics would be welcome. Another issue we asked for comments on Maine proposed to reduce the number of Buoy lines by either trawling up or by allowing a single buoy line on a longer multiple trap trawl. Both approaches would provide equal line reduction, so they are within the scope of the analysis. But in the proposed rule, we only provide the trawling up option. We're asking reviewers, especially fishermen, to comment on whether we should include both options in the final rule. In the past, offshore trawls with multiple traps in a single buoy were allowed as an option within the Take Reduction Plan. But it was rescinded because fishermen indicated they wouldn't use that option because of gear conflict concerns.

The DEIS also analyzes a couple of options related to the weak links that we'd like some input on, and this is specifically talking about the weak link at the buoy or in the Surface system. The weak link already required, We propose some options. A fisherman be allowed to choose the keep the weak link at the buoy or to put them at the base of the Surface system or multiple Surface system lines meet the main buoy rope. We also would like input on whether or not, at Surface System Weak link is required. If there are weak insertions or a weak buoy line below, Some take reduction members suggested that the buoy could actually provide resistance. So if a whale got entangled and broke free due to a lower weak insertion in the buoy line, the resistance of the buoy itself could pull the line away from the whale and possibly help the whale shed the gear. Finally, we're working with New England states to test weak rope and weak insertions, and
are continuing to invite ideas for fishermen to help us develop a list of options. Within the proposed regulations and consistent with the way that we currently regulate the weak links at the buoy.

We will identify the performance specification of the weak inserted rope, so we'll say it needs a break at 1700lbs or less. It needs to be able to be described and duplicated, and it needs to be able to be recognized by enforcement. And we may would probably include the location and the number of inserts. The regional administrator every year can approve weak insertions as they are demonstrated to meet these standards. And that allows this list to be adaptable, to grow as fishermen, learn more and bring us new ideas. At this time there are a few that we'll be adding on the list. There are a number still being tested in Maine and in Massachusetts as well, and we are really welcoming ideas from fishermen. Both Maine and Massachusetts have hired gear specialists that are working with fishermen to gather ideas and test them as and NMFS also has a couple of gear specialists, Rob Martin and John Higgins, who are doing this work as well. So, this work continues, we hope to have a list out well before the final rule.

But also at any time, if you have ideas, please get them to us and we will get them tested. And if they work, we'll be adding them to the list. We're hoping to have variety so that we can meet the conditions across the region. I do have one example here and that's been weak sleeve currently used by some Massachusetts fishermen. That has been proven to break at 1700lbs. And some fishermen have been using this in Massachusetts for the last couple of years. And we're also currently waiting on shipment of weak rope in larger diameters from India actually, that will be testing within the next few weeks. OK, next slide, please.

So, I wanted to quickly go over the next steps. As we are tonight, we're accepting comments on the proposed rule and the draft environmental impact statement, the comment period ends, March 1 2021. Comments can be accepted either in writing or tonight in these public hearings. After we get the comments, will be analyzing those, and, as needed, we'll be updating the analyzes in our environmental impact statement. And along with that information, we'll be looking at any new data that's come in, since we drafted the environmental impact statement, including new stock assessment information, as well as published papers. All that updated information will be considered to complete the final environmental impact statement. Your comments and the analysis will also inform the Final Rule, the final environmental impact statement. We hope to get that out this summer and a month after that comes out. We'll publish the final rule again, hopefully the summer of 2021. We anticipate that as usual, there'll be delayed effective date for modifications to gear configuration and gear marking requirements so that fishermen will have time to modify the gear. Paralleling this process is an ongoing Endangered Species Act section seven consultation, and a number of federally managed fisheries. This is outside the scope of tonight's meeting. But I'm mentioning it because many of you know the agency released a draft biological opinion, and is accepting feedback on that until February 19th. The address for the information bulletin is listed here on this slide. You can get more information, including the draft Opinion, the conservation framework, and an e-mail address for questions or feedback. We have inserted that e-mail address today in the answers, in the question box. Note that there is a court order deadline to complete ESA consultation and to finalize the biological opinion of May 20, May 31st, 2021. As noted in the draft biological Opinion and the Conservation framework, the consultation and the opinion are likely to consider...
the impact of the fisheries as they will be modified in the final rule. So that's the relationship to what we're doing today. The opinion is outside the scope of what we're discussing. But it, but what we're doing will influence the biological opinion. Next slide, please.

So we would now like to begin the public comment portion of our public hearing. If you have not already, please type comment in the question box to get in line. If you change your mind, if or if you wrote comment and you have changed your mind, you can type or say, pass when we call your name in the queue. If you're joining by phone only, there'll be a time set aside to take comments for those unable to see the slides and get in the queue. You must have entered your audio pin in order for us to unmute you to allow you to participate that way. For those of you that want to give your comments in writing, rather than speaking tonight, please see the blue box. On the bottom of this slide. Written comments will be accepted through March 1, 2021, following the directions listed in this text box.

If you've commented already, and you can't find your comment posted on regulations dot gov, please have patience with us. We have gotten over 15,000 comments about 260 or so of those are individual comments. We're not going to post every duplicative comment. We will tally those in that that's important to us. But we're only posting the individual comments. And when we have the full tallying, we'll also post the tally of each of the Dupe's. But as we're going through them to determine whether or not their individual comments, it takes us quite a bit of time. And then after we know they're individual, we are posting them. So I apologize. If you've posted in, you can't see it, You can, you can e-mail me to bring that to my attention, or, or if you're patient, it should get up within a couple of days when receiving them. Again, check the website on the bottom of this slide to get copies of all the documents, to get our recording with, more details, then, tonight's presentation, and to get details on additional public hearings tomorrow. And next week. For commenting tonight, we're going to call on each commenter, and we'll try to let you know who's up next in the queue. Remember that we're recording this public hearing. And, as always, please be respectful and direct comments at us, the presenters. And when you're called them, you'll be unmuted, and then you'll need to unmute yourself for the recording. If you can remember to please state your name before you comment. Tonight, we're limiting comments to three minutes. You'll be muted after three minutes. If you've already provided public comment but wish to give more, you'll be placed at the end of the queue so that everybody tonight has an opportunity to speak. But if we have time at the end, we will circle back to the ones at the end of the queue. With that, I'm going to turn the mic over to Kara, who's going to help us run through the comments.

Hello. Yes. Give me one second. Colleen, we do have a couple questions coming in. So I don't know. I'm going to just intersperse those in through the comments.

Why don't we take questions for about 10 minutes, and then turn it over to comments?

OK. Peter, I'm coming to unmute you. Peter Broder I've unmuted you, you can unmute your question. I know you also have a comment or we're just going to do questions right now and I'll come back to you for comments.

Yeah, I just wanted to make clear that the model that we used at the TRT in 2019 remains the same as the numbers are concerned as far as risk reduction is concerned. Have they changed
Any? Or are we still following up on that? And the proposals that are made today are they based on what that decision was for the risk reduction, according to the model in 19, or has anything changed Colleen?

Thanks, Peter, and I wish I could see you in person. Thanks for all your help as an original team member, I believe.

Yes. Thank you.

Currently an alternate, but one of our originals really appreciate it. So, there happen. So the draft Environmental Impact statement was drafted last year. Last spring using decision support tool, very similar to what was used at the October 2018 meeting. It did go through CIE review, I'm sorry, That was the October 2019 meeting. Sorry, April 2019 meeting, I'm getting my meetings mixed up. It went through CIE review, so it had some updates in late 2019, but it's very similar, and they improved the threat model, and also, well, that was the primary change that came after the CIE review.

Um, so they didn't cause any of the numbers that we achieved, by what we proposed at that meeting, to go down. Like, we did come up with a 60% reduction in our area. Those numbers didn't change from that time going forward?

So we analyze a lot of that in, I think it's chapter five of the environmental impact statement, Marisa, correct me if I'm wrong we, we talked about how we considered what the TRT gave us and analyzed it. And there were other things that we considered, including some of the information that came from the scoping Um, there were things done very simply at that meeting that that didn't entirely pan out when we put, I should let Marisa explain this, but when we put the model together, for instance, when you reduce the risk by changing, how strong the line is, and then reduce the number of lines, You know, it compounds, but it's not as additive as it appeared to be in the April 2019 meeting.

Thank you.

But if we're following a, similar tool with a similar concept for the final environmental impact, statement, will be probably using updated whale data, that we have now, that lets us split the data before and after 2010, And it allows us to use one whale model for the entire region. That was not available prior to drafting the environmental impact statement.

Thank you for your answer.

Thanks Peter.

OK, David, Nettie. Oh, I, you'll have yourself, I just unmuted you.

Oh, thank you. My question was, how was the 1700lb line break threshold determined, does it take into account juvenile whales and whale calves? Thank you.
So, it sounds like you may be familiar with the work that Amy Knowlton and other Scientists did out of the New England Aquarium. Um, where, um, they determine that it somewhere around 1700lbs or less is where they're not seeing serious injuries on right whales. It is not 100% effective. It's a precautionary approach rather than a full avoidance of injury, and that is primarily or that is partly because it isn't as effective on calves and young juveniles. So, in applying risk reduction measure, when we're doing the risk reduction assessment, that there's a weak line does not get 100% risk reduction. As a result. As a result of that fact. That it's not 100%.

So, what other line strengths were looked at?

We didn't propose anything less, since, I mean anything less than 1700 would be allowed. We didn't propose that. Part of that is because 1700 is also line strength that appears, to, reflect the actual forces needed to pull gear to pull the gear for a large portion of the fishery. Particularly if they're not hanging a lot of pots in the water at any one time. So, it was considered to be an operationally feasible line strength for a lot of the fishery and safe to some extent for whales. Some 70% safe for whales.

So it can be less than 1700 is that we are saying? It is permitted to be less. It can't be more than 1700, correct?

Yes.

OK, so sorry. I misunderstood. So, thank you very much.

OK.

I think we have time for one more question for now and John Swap. Forgive my pronunciation, you should be able to unmute yourself and ask your question.

Ok. My question was anything any consideration given after the last meeting to trawling up? I fish by myself in area two and a 25 pot trawl on my boat, is going to be, On a good, flat, calm day, it's going to be burdensome. On a on a rough day with an open stern It's going to be dangerous and it's going to prevent me, also from moving more than one trawl at a time when we moved to stay on the lobster's. So I'm curious as to what we can how we can work around it or what can be done.

Do you fish out of Rhode Island?

Yeah, out of Point Judith.

Yeah. I know. We talked to Scott O, and I and I know he is asking about whether or not we can consider as a conservation equivalency full weak line instead of trawling up. And that's something that. So that's something we can add. So, so I would like to take your question as a comment, because you've provided us with some good detail there and, and I believe we will be getting other comments, requesting that we consider it as a conservation equivalency. Because
we've looked at weak insertion and full weak line as an option, I believe that would fall within the scope of the analysis and the proposed rule. And that probably is something that we can consider towards the final rule.

We've been in touch very recently, you know, with Scott O, and he's, he's aware of what would, you know, talking about this. There's a number of men in the fleet now that are I'm the young guy at 67. And, uh, you know, it's going to have a bad impact. People our age having to go to 25 pot trawls.

Oh, well I think that weak line as an equivalent, because I don't think we're talking about a whole lot of vessels out of Rhode Island and Southern New England already had a bad hit, given the lobster fishery there. But, um, I think proposing that as an alternative, if we demonstrate equivalent or better risk reduction and providing us with the kind of details you're discussing, that, the age of the participants, vessel sizes, the lack of deck space to move multiple trawls, that's all good, granular information. That's exactly the kind of information we're hoping to get from the public comments.

Thank you. one more question, if I could, could ask it.

You got the mic.

OK. When you when we talk weak insertions or the whole line being weak, we've used a number 10 braid, that supposedly breaks somewhere 1700, 1650. We've been using it for years. And don't have any problems with it, but what I'm curious about is some places I fish. I am just on the edge at 12 miles outside the 12 miles. And my ends are in 180 feet of water. So I'm, I'm curious as to any thought been given to situations like that, too. I'm not trying to cherry pick my situation, but it, you know, you can be well within 12 miles of land and be hauling pots up from 200 feet if you're fishing in a hole. So, can we throw that into the mix?

I mean, if you have another risk reduction measure for using in deeper waters, it would be great. Let us know in your comments. We do assume that Well, first of all, the line that you're using, that I think some Rhode Island guys are using the top of their gear. Um, that that is one of the. So as I understand it, it's between 5/16 and ⅜ inch It's been tested in Maine, and it does break at 1700 or less fairly predictably and very predictably. And so, but it's not a three strands. And not every fisherman is going to want to use it, but Rhode Islanders seem to like it. If you use that down to the chafing gear at the maybe lowest 25%, then that is what we would consider to be probably reasonable if that's not something that can be done in the holes. I think that that's where trawling up might need to be considered.

OK, thank you.

OK, OK, we were able to come back to some questions. Can you see my screen, OK? Excellent, OK, so we're going to try this. We'll see if it works. There's a timer on the screen and I'm going to try to keep sort of who's up next in giving public comment on the screen and we'll see how this works. Thank you guys for being my guinea pigs. As Colleen said, we're going to be muting you at three minutes. Please keep your comments to the proposed rule. I put into the chat, the e-
mails, and the deadlines for the Batched BiOp comments and the vessel speed restriction comments as well. So, Brennan Strong, I know you had a couple comments. I just want to make sure that I'm going to come to you and make sure that you did not want to give public comment this time. You're unmuted, you can unmute yourself. I can see that you're unmuted, but I cannot hear you. We can come back to you. I will keep you on the list. Rachel Thompson. You are unmuted and you should be able to unmute yourself.

OK, can y'all hear me?

Yes.

Awesome. Thank you so much. I'll get right to it. My name is Rachel Thompson. Thank you for the opportunity to share comments with you on the proposed new rules for the US American Lobster and Jonah crab fishery to reduce the risk these fisheries pose to North Atlantic right Whales, the world's most endangered large whale species. My first experience with this magnificent species was while I was pursuing my Marine biology degree at the University of Rhode Island. As an undergraduate research assistant, I worked in doctor Robert Kenney's lab at the URI Graduate School of Oceanography, cross referencing, right whale sighting records in the right whale photo identification catalog, managed by the New England Aquarium and the Northern Atlantic Right Whale Consortium, one of the world's most successful collaborative long term studies of an endangered whale species. 10 years later And I now find myself in a position to advocate for the right whale, on behalf of coastal Georgia residents and visitors. Today I'm presenting comments as the Executive Director for the Glynn Environmental Coalition located in Brunswick, Georgia. We're a Georgia coastal advocacy organization whose mission is to ensure a clean environment and healthy economy for citizens of coastal Georgia. We work to navigate complicated task of protecting and preserving our environment and species that call them home while working to not hinder or stunt economic sustainability. The proposed measures are based on outdated information that will not protect right whales in the short term or long term. You stated: your risk reduction goal was between 60 and 80%, but the 64% falls too close to the lowest level of risk reduction and should be aiming for a minimum of at least 70%, If not closer to 80, Stronger protections must be developed to save right whales from extinction. Gear modifications that are proposed are economically burdensome to the industry and have not been proven to be effective in reducing entanglement. The proposed rule relies on the use of ineffective gear and modifications called weak rope to reduce risk, but weak rope has not been thoroughly evaluated and has not been proven to reduce risk. New technologies called ropeless or buoy less, fishing are an opportunity for lobster and crab fishermen to continue operating in areas where right whales are present without further endangering these mammals. NOAA fisheries must continue to test and foster a market for ropeless technologies by creating incentives for fishermen to try them. Measures will not be implemented for at least another year, and the right whale cannot sustain more deaths. While we wait for fishing gear changes on the water, while stronger rules are developed and implemented, NOAA fisheries must use its emergency authority to put vertical buoy line closures in place. I thought we had five minutes today, so I'm just going to stop there. But I thank you for letting me share some of that with you and we will also be submitting written comments for consideration as well. So, thank you so much.
OK, and do keep your place and if we have time at the end, you can finish providing comments

Thank you.

OK, Peter. Lost my place. OK, Peter, you should be able to unmute yourself and give your comment.

OK, fine, thank you. I want to address primarily the trawl up. Many of the lobster boats in the 20 to 30 foot size find themselves working their gear alone. And taking advantage of that 5 to 7 months, loiter wins to follow the lobster as they migrate to deeper water. Many of us have open stern boats that Don't require us to lift the traps off the deck, thank God anymore, to set them in (undecipherable) hauling. Having said this, if we must extend the number of traps we end up spending quite a bit of time at the stern of the boat like Jay referred to a second ago. Stacking the traps, this reduces safety of the operation, especially since there is no one to throw that life ring to us, if we fall off. Some days, the boats are a bit livelier than others. So now, if we are safety minded, and then we stop at 12 miles and let the lobsters go, and so goes 2 to 3 months of profitable fishing because we can't follow them. Even though the federal Permit allows us to continue as we have for years, therefore I am against trawling up above 15 traps from my operation. Of course we could make an exemption for age as Maine and Mass have for certain instances or perhaps by boat size. Whatever is done we must keep a fair degree of efficiency, and most importantly safety in the lobster fishery. A full weak line would be a good asset to go with, as Jay said previously. Also, I wanted to say, I do support the contrivance every time I see Dan’s face when I say contrivance or weaker up and down lines at 1700lbs, I support the code. Color coding change, thank goodness, took a long time to get here. I don't spend that much time because I spray paint, as many people do. And I've been on the phone with a few of the manufacturers of the 1700lb breaking top line that we put on having them put in a silver tracer in the length of the line. So that would help in identification as well. And just as a last little bit, I don't support any closed areas. Thank you for allowing me to speak.

Thanks Peter and boy, did you demonstrate how to hit three minutes. Nice.

Thank you.

Up next is David Dowe. I've unmuted you, you can go ahead and make your comment.

My name is David Dowe. You hear me?

Yes, David. Thanks.

OK. I'm a retired Marine scientists from the fisheries lab in Woods Hole and the grass roots, environmental activists living on Cape Cod. I submitted written comments and both MMPA, Risk Reduction Plan, and the biological opinion. So I was going to mention that the thing that initiated my comments was a Woods Hole Oceanographic institution ocean encounter program in saving North Atlantic Right whales. One of the things I described was the grit, that they have to develop ropeless fishing gear for lobsters. This involves both people in the industry, fishermen, scientists, NGOS, and I would feel that would be a good case study for NMFS support with
further grants. Because this grant was provided by SeaWorld and Busch Gardens and there was a private funded endeavor. The first thing I wanted to say about the biological opinion, was that we need to have an adaptive environmental management approach. And they were very vague about what kind of adaptive management they were going to use to develop a conservation frameworks that should be fleshed out. In regard to Atlantic large whale take reduction Teams management plan. We feel that they should conduct a cumulative environmental impact assessment which will allow people to examine the factors influencing the calving rate of female North Atlantic right Whales, and the effect of sublethal stresses from a variety of factors not just ship strikes and entanglements in Lobster pot and Jonah crab gear. This might include climate change, ocean noise, competing human activities, such as naval training, offshore windfarms. And also various things that are associated with the essential fish habitat. Species change, as species and their prey change, their positions in space and time has to be accommodated. Thank you.

Thanks, David. Also nice job getting in under three.

OK. Up next is Matthew. Be unmuted and able to make your comment now.

OK, can you all hear me?

Yes.

Oh, OK, well. Hello everyone. My name is Matt. Um, I've been listening to you guys, And, first of all, I would like to say, I would like to give all of you my blessings on what you guys have been doing. Um? And I was, I was wondering how I can help.

Sir. So joining in, public comment is a good way for us to get input from you tonight Or in writing.

OK, and I'm sorry. This is just, this is my first time doing this, so on. I'm getting used to everything.

That's great.

I definitely, I definitely think that we should, we should do everything that we can to make sure that, um, that these, that these whales don't get caught in, the nets, the fishing nets. I think one of the things that we should do is to, I think we should just keep the nets in one location. So you know, we don't. Where we should keep them away from where the whales are going to be so, that we don't, we shouldn't have to worry about that about, you know, where we should we should just keep the net's, they're like away from them.

Great. Thank you.

You're welcome.

Thank you.
Appreciate it.

OK, Deborah, Ashton? You should be able to unmute yourself. Deborah Ashton, can you hear me? She has written in an extensive comment indicating her mic isn't working.

Oh, perfect. And so she'll go to regs dot gov, but we also will be recording the information in the question box, so we'll be capturing that as well, Deborah, thank you.

Thank you, Colleen. I missed that, and that's OK. Next step, Patrick. I've unmuted you. You should be able to unmute yourself.

Can you hear me?

Yes.

Thanks for this opportunity to comment. And Colleen and Marisa, your introduction of this as usual has been very helpful and informative. My name is Patrick and I'm with the International Fund for Animal Welfare or IFAW and we've been pleased to be working with lobsterman for some years on the challenge of protecting right whales and protecting their livelihoods. Um, and it's not the focus of our work this evening, but a powerful reminder over the weekend with a calf mortality that of the wide variety of threats that these animals face, including, um, vessels, not just Lobster and crab gear. That said, our view, and we've participated closely, as you know, in the TRT process, and in a variety of different efforts aimed at the objectives that NOAA and NMFS share here. Um, our concern is that the proposed rule is not the solution needed to save right whales from extinction. Nor is it a solution that offers comfort, confidence, and continued prospects for our continued livelihood by Lobstermen. And those are reconciling those things is obviously a real challenge. But one that is not going to be achieved by using data that is, is not real time. That is essentially already out of date by the time of the most recent in person, TRT meeting. And is not real-time data. Second, as was already noted by an earlier speaker, going for this sort of lowest rung on the ladder, a 64% risk reduction in the face of continuing right whale mortality from various sources, including entanglement. Which we know as historically in recent years, been the main threat, shooting for 64%, doesn't, um, meaningfully or sufficiently reduce risk and in fact leads arguably to a more uncertain and risky environment both for right whales and for folks making their living on the water in terms of, you know, likely needing to move to more aggressive measures over time. And this is not the time to shoot for the lowest risk reduction target. Third has, as is also, I think, already been mentioned, and acknowledged, in fact.

Hi Patrick, I'm sorry to cut you off; Your three minutes is up. Please remember where you were, and then we'll put your name back at the end. And we can come back to you if there's time at the end.

I hope everyone waits. it'll be worth it.

Thank you. Yeah.
So you were on third. Just remember.

Brian, We are coming to you. You should be able to unmute yourself.

Yes. We are un muted. We are couple of quick comments. Just first and foremost on the list there. You know, that area I represent in Area 2 we are against the ropeless fishery. Just kind of wanted to get that on the record right off the bat. Um, also comments on the upcoming wind farm projects that are all approximately going to take up 37% of our area two lobster grounds. And it appears that the G and G work that has been going on is coming to a completion inside of area Two. The next step in the process, once finances are established for these wind farms, is got to be the construction variance. And I feel the group should be paying a lot of attention to the extra amount of large vessels in the working environment that they're going to be in. They're supposed to be under stringent laws and rules and have observers on the boats through the last couple of seasons while they're doing their G and G work. And I know they're not supposed to work at night and we know we witnessed them in transiting of our areas. Plenty of nighttime work still continuing. I hope that this does get enforced. I know that, you know, they got handed an exemption against the whales for the, you know, a whale exemption permit, But it should be higher enforced. For a quick comment, back to slide 13. I had not yet heard of the green marks on what would be what you labeled as a Federal, up and down line, or a Federal vertical line, The six inch green mark at the top, that was nothing that I had heard discussed as of yet and wondering how new that was in the presentation. Um, as far as the trawling up in area two and a lot of the fishermen that I do represent and speak for that may not be on here right now are of age and do fish by themselves, a large percentage of our fleet does. And I am quite compassionate to the smaller trawls that they need to fish safely by themselves. But, just wondering if these rules could end up being boat specific, instead of full weak lines, or full weak, Vertical lines, if we could, uh, try to implement boats specific regulations, whereas my larger boat or a full weak vertical line might not work for me. I could possibly handle the larger trawls outside of 12 miles. So wondering, again, you know, if it could be boat specific on the enforcement level. Um, I also heard a request for a quick comment on the vertical lines. It takes at least 20 minutes on land to modify a line with markings. With the additional markings, it might take a little bit longer. I know. I know. You would ask for comment on that, depending on what our ropes come out of my three minutes, depending on what our ropes come out at from new manufacturers. That 20 minutes could be a lot on fully permanent vessel. Roll my name to the end again, one more time, if possible, please. And if there's time, I'll come back and finish my comments. Thank you.

Great, Thank you. Robert Mcclean, I'm coming to you. You should be able to unmute yourself now. Hi, Robert, can you hear me, Robert McClean? We will come back to you. OK, next step, Greg M. OK, I've unmuted you, you should be able to unmute yourself.

Yep. Greg M. Thank you for the opportunity to comment. Like Brian said, I don't believe I've seen the green mark in addition for Federal waters. I'm for the fact that we're parsing out the different colors for the different states. But, you know, we're being asked to do a lot in terms of marking and adding the green mark for Federal waters versus the State waters mark is starting to get probably a little more complicated than it's actually going to be followed. We have to have enforcement for this, And it may make compliance a little more difficult. I'd also like to suggest there's a line, called #10 Neocorp braided ropes that I believe could work instead of some of the
weak line that's being suggested or these weak contrivances. So I'd like to put that in there. In terms of the time it takes, to do the markings. It takes a long time the line is seaweeded it up at the end of the year in the spring everything's wet when you're doing this work. So, you have to let the rope dry out before you can start to work with it and do these markings. So, 20 minutes per trawl is, is definitely not out of the question, especially with the additional marking requirements that we have to do. In terms of the trawl lengths, I'm very sympathetic to guys like Peter and J, they fish, a long, long time in this area and safety is a real issue. Fortunately, for Rhode Island, we have moved up to bigger boats and trawled up, whereas Maine has not, but it's still going to be an issue. So finding some sort of equivalency, like, full weak lines for guys that want to take advantage of that is probably preferable. And it may solve a lot of safety issues, operational issues, for guys like that. Also, I was pleased to hear that somebody finally has mentioned, an environmental advocate, has mentioned concern over windfarms. So a lot of this is based on co-occurrence of end lines and right whales, but If you look at the co-occurrence of, Right, whales and wind farms, they actually coincide with a lot of these closed areas. So a lot of this work that we're going to be putting in, may be for nothing in the end, when these wind farms come in and the additional noise and killing their food source all affects them. And their migratory route, If they have to go an additional 500 miles skipping this area because of this massive 1400 square mile wind farm development, they're going to be emaciated, you know, female reproductive issues are going to be exacerbated and things like that. Also, ropeless, I think, has a lot of issues. And we're a long way from away from that. Massachusetts is doing a study right now that's intended to be very comprehensive. And I'm thankful for that. It's going to take into account the opinions and operational factors of fishermen. And I'm looking forward to that before we just get told that we need to jump to that. Thank you for the time.

Whoop, all right good timing. Robert, OK, you're up next again, if you're on up on your computer, on the right hand side,

I see it. I found it. Appreciate it.

Excellent.

And this is a brand new format and that's actually one of the points I wanted to make, Kara if I'm pronouncing your name wrong, which is that this is an issue a number of people, will not get into the weeds like myself here on this. Cannot access due to due to some issues with, you know, it's being commonly available. But I just want to say, I can't get in the weeds too much I knew was proposed rule to be what I can do speak from the heart. Ocean swimmer. Studied past PADI Dive Master. OK, I've already made the first week. We got to make this more available. Particularly, if we aren't interested in comments to just want to listen. It's not about only 100 or so people here to I urge all. Here, to look up the book, Blue Mind, two words, Blue Mind. It's about the cognitive emotional benefits of being near in or underwater by a very smart and seedling accent or marine biologist by the name of Wallace Chain. And he's having a Blue Mind reading club daily now to beginning of April. We have got to get emotion into this conversation and cut out a micro picking up the rules. We have an endangered species here. And where it's a red line. And we're not addressing this really accurately, a film that I just researched online, recently stated by the name of Entangled, an hour and a half film has a Someone protesting a NOAA hearing saying this is ridiculous It's like having the fox guard the hen house. We've got to
get real about our connection to the ocean and how much it is intrinsic to our lives. Not just physically. But all those who live off the ocean, it's a global thing. But we've got to be real about how important it is not to let animals die on our watch. And we've got to stop cherry picking this. And it goes on both sides fishermen, NOAA. Division of Marine Fisheries Massachusetts. OK Third. Can we get real about ocean conservation and averting the tragedy of the commons? Creating more MPAs and let's face it marine sanctuaries. Our ocean protected laws had been gutted by the past administration. So we've got to get real on this to quote the Cousteau's, we protect what we love. So we're working backwards. We love what we understand and we understand only what we are taught and strive to learn. So we got to strive to learn how can NOAA how can you, how can the fishermen who are ecologically conscious and understand this teach us about the beauty and the fragility of our oceans. The beauty and the fragility of the right whale family. Thank you very much.

Thank you.

That's it.

OK, Thank you for those comments and, and, Robert, We've tried really hard to make it accessible, but I would be open, if you'd like. I can put my e-mail in the chat to talk to a little bit more about people who don't find this accessible so that we can make it more accessible. And, before I go to the next person, who's, who's able to type into the chatbox, I would like to go to anybody who might be joining us through the phone. Um. Colleen, though, we, they can't unmute themselves if they're joining us through the phone. If you are joining us through the phone and do not have the ability to type in the chat box, please send me an e-mail. My e-mail is Kara K a R A dot. Sure, vanoc, S H E R V As in Victor, A N I see Kay At NOAA NOAA dot gov, it's K A R A, dot, S H E R, V As in Victor, A N I C K at NOAA dot gov and I will be able to get you in to the queue that way. We will talk more about that Colleen, how to do that next time. Um, OK Quinn, I'm coming to you. Quinn, can you hear me? Quinn Josefine O'Connor. OK, we'll come back to you, Sarah, Austin. You should be able to unmute yourself.

Hi, everyone. Can you hear me?

Yes.

Thank you for this opportunity. My name is Sarah Austin, and I'm attending these meetings in order to show my support for a plan that will expedite the implementation of ropeless fishing gear in order to prevent further deaths to right whales and other marine life, with less than 360 remaining right whales in existence. This discussion is critical, and I'm encouraged to see NOAA addressing it. While alternative solutions exist, such as weaker links and seasonal closures, these implementations are not appropriate for all fisheries and will not prevent entanglements and the death of smaller whales, calves, and turtles. Ropeless fishing has been tested, and it has the potential to reduce and even eliminate entanglements to prevent further marine life death. I would like to see support for more permit programs that will allow ropeless fishing technology to be used more widely in fishing areas. Right whales are on the brink of extinction, but with the
right actions, NOAA can intervene while we still have the chance. Thank you for holding this meeting and allowing us to voice our comments.

Thank you. Alright, Quinn, I'm coming back to you. OK, you should be able to unmute yourself, excellent! Hey Quinn we can't hear you. In the Audio section, you just make sure that, if you're on your computer, if you click the little drop-down arrow next to Microphone Array, make sure that's the. Whether you're using your headphones or your computer, you should see several options there.

OK, can you hear me now?

Yes, perfect.

OK, thanks. Sorry about that. So, my name is Quinn O'Connor. I am a senior at Boston College. And for the past year, I've been paying attention to the decline of the North Atlantic right Whale population. So right Whales are in a steep decline, as there's only about 366 remaining in the world. And only one quarter of that number are females that are able to give birth. We know from scientific reports and data that entanglement in fishing gear is the leading cause of death for right whales. In fact, scientists estimate the 85% of right whales bear scars from entanglements, and over half have been entangled more than once in their lifetimes. This past year, I have read about at least three entangled right whales. I can't imagine the stress and pain, each one of them experienced, while trying to swim up, to breathe, or eat, and being unable to do so. I can't imagine being so stressed, unable to travel freely, because I have hundreds of pounds of fishing line and traps wrapped around my body. I can't imagine drowning and suffocating, because I am entangled in fishing rope. I can't imagine this, yet This is the fate that we have set up for right whales. If we don't change our actions fast, we're going to lose the species forever. We need to change current fishing practices. Ropeless gear can prevent right whale entanglements, while keeping fishermen on the water. Prioritizing safer gear in the water is what will change the fate of the right whales and fishermen for the better. Please implement a ropeless gear permit program. So we can make our oceans and seas safe for fishermen and save North Atlantic right Whales once and for all. Thank you.

Thank you. Paige. You should be able to unmute yourself. I can see that you're unmuted, but I can't hear you. You also might need to check your audio settings and make sure your microphone and speakers match up with that of your device. And well, we will come back to you after the next person. Jenna Stevens. You should be able to unmute yourself. Oh, yes,

Hi. Thank you so much for the opportunity to speak tonight, and thank you all for the work that you do and for taking the time to listen to us all. My name is Jenna Stevens. I'm the environment Florida research and policy center state director. Environment Florida Research and Policy Center is a statewide non-profit dedicated to protecting our air, water, and open spaces. And I'm here tonight on behalf of our membership to urge you to do everything you can to save our critically endangered North Atlantic Right Whales, as others have referenced for the last decade. The number of Right Whales has consistently declined. And today, only about 366 remain in our oceans. From sea to shining sea, the United States possesses an incredible legacy of natural beauty from Ice Capped Mountains, Plains where Bison Roam, and, of course, our oceans, where
sea turtles, dolphins, and whales swim, nurse and play. And our laws or reflect our collective value of the beautiful wildlife and wild places that surround us. In particular, the Marine Mammal Protection Act and the Endangered Species Act some of the world's strongest environmental legislative frameworks prioritize actions that prevent extinction and keep our wildlife safe and healthy. We are concerned that, as written, the proposed rule just does not live up to these bedrock environmental laws as it fails to protect right whales from one of the top causes of death, fishing gear entanglements. So I urge you to formulate a stronger final rule, taking into consideration the following factors: that the draft rule is based on outdated, outdated scientific data, as other speakers have referenced. Additionally, that the proposed seasonal habitat closures in the rule will not do enough to prevent right whale entanglement in fishing gear. And then that weak rope, another major tool used in the rule is not a proven effective solution to preventing fatal or seriously damaging entanglement events. We would urge that, NOAA should take emergency action now. The agency should close certain areas to the use of vertical buoy lines immediately. While a stronger package of rules is developed using updated science, We envision that that package would include a plan that closes right whale habitat towards this toward fishing and start to create a path towards the eventual broad scale implementation of ropeless fishing industry. Although the 15 right whale calves born this winter represent some hope for the species. We have already lost two and the number of calves born is still much lower than the number required to prevent the species from extinction. And since most deaths are caused by fishing gear entanglements and vessel strikes, human activity is driving this extinction. Losing the right whales because we failed to act boldly enough would be an unacceptable loss. And so I urge you to uphold our legacy of environmental protection and do everything you can to save the North Atlantic right whales. And thank you again for the time this evening.

Aye, thank you, Jenna. OK. Paige is offline for now. So, she comes back on, Michael Foley. I see that you have both a comment and a question. Let's stick to your comment right now, and then we'll circle back around on questions. You should be able to unmute yourself.

Hello?

Hi. Yep, we can hear you.

OK. Seasonal Migration of Whales, I am a Lobstermen. I have no objection to that. Figuring out when the whales are coming through Area two. And if it's not a profitable time for lobstermen, uh, I don't have any problem with seasonal closures. As long as it's when I think it's going to be. Um, I'd just like to comment that I've been lobstering in Area 2 since 1991. That's almost 31 years, and I've never been entangled with a right whale. I fish 15/16 line and I also would like to know some more about the reduction of lobster gear. We've had a 50% reduction in lobster gear. So there's a lot less lines in the water that they're used to being. Like. The other fellow was saying, Keeping up with it, You know, the information on real to date information on how many lines are actually out there. Let's see. Oh, as far as the trawl lengths. Um, yeah, I understand that some guys are worried about longer trawls. I noticed most of the time outside 12 miles, most of the boats are bigger. So if there's an exemption for the guys with smaller boats to keep it safe for them, That's fine. But I don't object to, the longer trawls either. And I'm just checking my notes. That's about it. Thank you.
Awesome thank you so much. OK, Paige, I see you're back online. Oh, yep, OK. You should be able to unmute yourself.

Can you hear me now?

Yes.

Oh, great. So I'm Paige McLaughlin, I am an art teacher, in Colorado. I live very far from the ocean, but I'm in love with the ocean. And one thing that worries me is that I'm going to die before I even get to see a right whale in the wild. And my husband works in geospatial industry. He has been working on trying to save the Vaquita, which is the endangered porpoise in the Gulf of Mexico. And that porpoise, they believe is now extinct. There was about 20 left in the wild and they've been unable to find them. Now, they have a different problem with fishing because the fishing is illegal, but the Mexican government has never really done anything to stop it. And I don't know anything about the fishing industry or fishing lines. And it concerns me when I hear these comments about the wind farms that could possibly be also endangering the whales. That's I think that's awful. So I'm a proponent of clean energy, but not if it's going to kill the last of our whales. So, I just wanted to go, on record, saying that whatever it takes to save these whales needs to be done, because once they're gone, they're not coming back. And the more species we lose out of our oceans. The more we as humans, lose our humanity. So I don't know how much time I have left, but I think that's about the end of my comment.

Thank you, and thank you for joining us all the way from Colorado. I just muted myself. OK. Rachel, Patrick and Brian, you guys are going to get an opportunity to finish up your comments. So, Rachel, I'm coming to you, if you are still online. Don't think Rachel is still here. Let's go to Patrick. Alright, Patrick, you should be able to unmute yourself, you are on number three.

Yeah, and again, there are only 4. Number 3 had to do with weak rope. Which makes for weak policy, I think. And we ourselves, have been champions of incremental gains toward conservation, including some more care in Massachusetts with the Massachusetts Lobstermen Association on ground line more than a decade ago. So you know, to the extent that there's content conservation contribution in these measures that's to be welcomed, but to continue to cling to vertical lines and sort of wish for the best in terms of juveniles, calves and not go after Solutions that address entanglement itself, um, seems consistent with the sort of low bar in terms of risk reduction. Um, and the blunt instrument of closures being applied rather than some innovative, fresh thinking and bold action in a different direction with respect to that. Finally, number four is ropeless fishing, and as a number of other people with varying degrees of familiarity with the lobster and fishing industry have noted ropeless fishing does seem to hold some promise. I don't say that as an advocate. I say that as a student learning from Lobstermen who are using it, and there's obviously some shifts in the way that fisheries are managed. That's not a small thing, there's, there's, a learning curve upfront for lobstermen, who were engaging in that technology, increasingly, that can be taught by others in an offshore and inshore environment, who've had positive experience with the gear. The rhetoric is very welcome in the proposed rule that there might eventually be a situation down the road in which there is access to closures, otherwise closed areas for lobsterman, that needs to be strengthened. And I think the,
the effort reframed, not going back to the drawing board, but reframed a bit. And the measures in terms of aggressively supporting solutions that offer the opportunity for saving right whales and lobstermen livelihoods. Like, ropeless gear need to be more than a rhetorical flourish in the final rule. We stand ready and we will continue to work with stakeholders across the spectrum and our hard-working government officials. And thanks, again, for the opportunity to comment. This evening. Will, will be submitted comments in writing as well. Thank you.

Thank you. Brian. I'm coming to you, Brian. It's almost like I'm running around the room with a microphone. As I scroll through the list of people, Brian, you should be able to unmute yourself.

Yep. We're all good, we're unmuted. Sorry. Sorry to make you run down to Southern Rhode Island. Um, just, unfortunately, some of that's going to come across more of the question, then that actually a comment. The implementation dates, and when they got, when they go in. I'm not sure if we're going to try and specifically stay on permit renewal times for implementation dates, or if we were going to go with seasons, you know, with a calendar year of January first, February first. You know, we're a slower season for the fishermen, just wasn't sure about that. And with a conservation equivalency with the: with the weak 1700 pound vertical line all the way to the first trap. Um, I know we've done some line work. Where maybe we extend, you extend the endline off the first trap, so you can have a stronger rope to get your gear up off the bottom And begin hauling your trawl. But a 1700lb vertical line, right, to the ground line. Would that not be required at this point in time then to have weak links installed in it? Could it maintain just the, the buoy weak link that we're currently using? So, kind of comment kind of question. And again, you know, the fishermen I hear a lot of comments. You know, there's, there's not a single lobsterman that leaves port in the entire north-east region. Certainly not in Southern New England, also that we're having the discussions with tonight Area three, southern Massachusetts area 2 Rhode Island. None of us leave the dock with the intentions of a whale entanglement or trying to kill a whale. You just kind of want that on the public record currently. Right now we are the low hanging fruit, that can get targeted and managed very easily. The ship strikes Need much more attention than they are given. I know they're well-funded group, and have very good policy setters, and good representation for speakers. But it's just as important that the ship strikes get taken into factoration, along with the wind farm work. Again, like I mentioned earlier. So that was about it. That was my list. Kind of scrambled. I had a couple of different articles in there, or numbers, in there written, but that sums it up for my comments. I appreciate you coming back. Thank you.

Thank you, Brian. If I could, answer, just two of those questions. We can't tell you, Well, our DEIS we wrote last spring and it ended up getting caught a really long time inside the beltway in a review process that we don't control. And so not having control, I can't tell you when our final rule will be published, we'll do our best to get it done this summer and published this summer. And depending on when it's published, there will be a multi month time period that will allow fishermen time to pull and reconfigure their gear, remark their gear. If it can coincide with wintertime or our normal maintenance time, we will probably consider that. But again, it depends on when it is actually finalized, so I can't really tell you when. My expectation is that it would be certainly, well, hopefully by at least early, gear configuration changes early in the new year. Um, something like a closure. We would want to give, you know, a month's notice for that to give people time to get their gear out of the water, but to modify gear takes longer. We know
that it takes sometimes buying new gear that that needs to get out on the shelves and things like that. So we're going to have to consider all that when we determine what the delay is an implementation. That depends on our final date. So I can't really tell you that. As far as weak and weak line, if you're using a fully weak line like that, braided rope that is used by some Rhode Island fishermen, now, down to your chafing line at about 75%. You wouldn't need a weak line and weak insertions need either weak line or weak insertions. And to be considered a fully weak line you need you need weak insertions at something like 40 to 60 foot intervals on your buoy line. OK, so I think the next commenter.

OK, awesome. Lise, I'm coming to you, You should be able to unmute yourself. Lise, if you can hear me, you are up next, You'll need to unmute yourself.

Oh, there we go!

Awesome.

Sorry about that. I don't know much about lobstering and in the deep sea fishing. But the closest I got to fishing was my father, who was a trout fishermen and my partner who was a trout fish fishermen of probably over 40 years. But my father, who was a biology teacher in Dearborn, Michigan, he did help save the Jordan Valley. Jordan River Valley, watershed, in his retirement. So, I know things are possible and that's why I'm on this call. I got a last-minute text today, which I appreciate was totally unexpected but I'm so glad I sat in tonight and it was very edifying and I'm glad to participate for whatever it's worth. I'm not a scientist and I'm not very well versed. I just know about the right Whale situation. So I'll just be brief and I'll say this; I agree with and applaud all the efforts by NOAA and various groups to create awareness of the right whale extinction crisis and the horrible existence they live due to human fishing gear, ship strikes and infrastructure such as wind farms. I support sustainable solutions that keep the species from extinction. That also includes fishing and livelihoods, but the Whale's must be emphasized. And this is because, in the end, our society will be defined not only by what we create, but by what we refuse to destroy. And that was spoken by John Sahil, the late President and CEO of the Nature Conservancy in 1999 through 2000. Thank you for letting me comment. I hope this has a positive effect on the situation.

Thank you. John.

Colleen, you mentioned earlier, and I wasn't able to latch onto it, but I want to comment that comment and comment on it, that when we start using weak rope, which we already are, when it becomes in the final rule, there will be a specific color scheme to that. Is it something that we can get approved? Um, you know, tracers in it so that when were boarded by enforcement officers of the Coast Guard at sea, we have a tangible thing to hand to them saying, Here we are in compliance. So, I feel really strongly about that being part of this situation now.

So, we are trying to determine, working with enforcement as well, how enforcement can recognize a weak rope or a three braided ropes. We're talking to the gear manufacturers, you know, three strand rope, about putting an alternating color in to show that it was intentionally created to break at 1700lbs or less. Um, you're using a weak rope that I know that our gear guys
can recognize that specific rope. It's kind of unique in the fishery that the one that the Rhode Island fishermen are using. We have not brought, We haven't taken that one, to enforcement. Peter suggested putting a silver trace or gray tracer to indicate that it's Rhode Island line, and I think that's a great idea if the gear manufacturers able to do that. That's something that should be in the proposed rule, because that's not the gear marking that we have in place. But we would prefer in our well, we would prefer a gear mark that goes throughout the line. So top 75% marked with a gray tracer would be a good recommend. Another good cut. You know, it doesn't reduce risk, but it gives us more detailed information than the gear marking that we're currently requiring.

Well, it's just a situation where the kid, that's, I say kid young Coast Guard person that's on your boat may have come from you know, growing corn. In the middle of the country, you know his family's farm and has no idea about Rope. Um, so if it's, if it's tangible, you know there's an orange and green whatever color is decided upon, but that we can have the manufacturers put into that. Weak rope to signify it, signify that it's weak, you know, it would make things a lot easier for everybody involved.

Yeah and I will tell you we have a gear specialist that has gotten a call at four in the morning from Coast Guard Board and boarding a boat and asking a question about Lobster Gear. Um, so, when they don't know, they do reach out to our gear specialists and us but this will also be accompanied by outreach that includes enforcement, you know, at the at the docks when we're doing the outreach.

Thank you.

Thank you.

OK, at this time, I just want to let anybody who's on the phone who might not be able to chat into the chat box my e-mail. if you want to get in line to ask a question or give a public comment, please send me an e-mail. My e-mail is K A R A, dot, S, H, E, R, V as in Victor, A N I C K at NOAA dot gov. Colleen, at this time, we don't have anybody else wants to give public comment. We do have two questions. We can take those now. They were from earlier on, so Robert Randle: are you still on? Hey Robert! If you can hear me, you should be able to unmute yourself.

Thank you very much Kara. Um I'm also in Brunswick Georgia, as well as Rachel Thompson, founding member of the Glen Environmental Coalition down here and I have a question for you though that's related to the fact that we're where the right whales do their calving and right in the middle of their calving grounds down here we have the Kingsbay Trident nuclear submarine base. I'm wondering if you know if anyone has done any research on the inter-relationship between sonar, contamination, and entanglement. Do we know whether or not the ability of the whales to see fishing vessels or possible entanglement threats is impacted in any way? By their Exposure to Sonar. Does the entanglement increase or decrease after Navy, use of sonar in training exercises or in wargames? Do you know if anybody is looking at this?

So I'm not the best person to answer this question partly because I'm not in the south-east. I know that there has been work done on the impacts of naval operations on marine mammals. I think it
is more often concentrated on toothed whale. Well, first of all, they're not. They're generally restricted from doing their operations. When, you know When right whales are around. And I don't know that they do any right there at that base, but I'm not familiar with that base and what they're doing right now. However, the Naval operations have impacted a number of toothed whales and some of the deep diving toothed whales. And those whales do more echo locating in order to eat and to find their way around. The baleen whales do less echolocating, they still need to keep their ears in good shape to survive. So I'm not saying they wouldn't be hurt by some of those ships testing and other naval operations. But, um, right now, usually that then the Navy would be required to consult on those under the Endangered Species Act, and they, I believe, would be dissuaded from doing anything like that in the breeding area when the right whales are down there and I can check with my colleagues in the south-east to make sure that's true Or to verify that, that's how they're still doing it.

Thank you, Colleen.

Thank you, Robert. OK, last step for this evening, it's a question from Michael. I actually think you potentially asked this question in your comment, and it might have been answered, but I just want to come to you to make sure.

Yeah. I was just wondering, what time of year the right whales are coming through Area two.

Area two is a tough one, that's a relatively new area for them, we have had. So, we have a program called dynamic management area. We do voluntary speed reduction requests when we know, when, we have seen whales or detected them acoustically in an area. And in Area two, over the last few years, there is very commonly within area two speed reduction request out Right whales, seem to be using that area of many months. It's a little bit different. Each year. They're shifting around It appears to be available Copepods are spilling out of the Bay. Um know, they're there in the same months that that the proposed area closure there. Also there in other months during in the year. And you know that the discussion of Right Whale migration, it's not like gray whales that go north and south on the California coast. It's more like if they need to breed, they go down to Georgia and Florida where there's lot less food. So, the so, the cows are there, they have their calves there and they're accompanied by a few maybe future moms and a few males, but if they don't need to go down there, they can stay where the food is and they're going to be where the food is as much to do the ecosystem changes and climate change, including a shift to Canada. But one of the areas in US waters where there is still food is that area in LMA2 south of the islands. And it is not, not necessarily year round, every year, not necessarily every month, every year, but much of the year. There were right whales in that area.

Thank you.

OK, Colleen. I think unless anybody has any last-minute questions that they would like to give, we are just about out. I'll take this opportunity to remind folks that at regulations dot gov, using the docket number, which is highlighted on the screen, it's NOAA dash NMFS dash 2020 dash 0031. You can search by the docket number, and that's how you can provide written public comment.
If there aren't any questions, I'd just like to thank everyone for joining us tonight, and for your comments tonight, or any written comments that you send, as well. I entirely agree. This is not the most accessible way for everybody. I wish we could also meet in person, I think in the future, we might do a combination of online, and in person when we're all allowed to be in person together. We have tried, as Kara pointed out, or mentioned earlier, we have tried to be as accessible as possible. There is a lot of material on our website, including information on how you can engage. There is, again, a lengthy recorded overview of the documents. And the documents themselves can be found there. There's also a seven, or eight page summary of what would be in the proposed rule, so please do take a look at that. And, I appreciate everyone's participation tonight. Thanks, everybody.

Thank you. Thank you, everyone for joining.
Public Hearing 2
Massachusetts (Outer Cape and LMA1) and New Hampshire (LMA1), Wednesday, February 17, 2021, 6:30-8:30 pm

If you want to provide comments tonight, as Kara’s already said, please type “comment” into the questions box. And if you change your mind at any time, you can say pass when we call your name, or you can write pass into the queue. If you're joining by phone only, we will ask you to e-mail Kara Shervanick so she can unmute your phone and allow you to participate, and Kara will provide you with her e-mail address shortly. For those of you that want to give your comments in writing, rather than speaking tonight, please see the blue box at the bottom of the slide. Written comments will be accepted through March first. Following the directions listed in this text box, we've already received nearly 15,000 comments, including primarily comments generated through environmental organization campaigns that are somewhat duplicative, but also including at least 260 individual comments. If you've commented and can't find your comments posted yet, please have patience, we'll tally duplicates but we're only posting one of each of the duplicate e-mails. And it takes us some time to go through all the mailings to identify which ones are individual comments and to post those. So we are sometimes a day or two behind. Again, check our website, the address given at the bottom of the slide, to get copies of all the documents. To get details on additional public hearing opportunities next week, and to get another opportunity to see these directions for how to provide public comments. To comment tonight, we're going to call on each Commenter, based on your indication of the comment box that you're interested in commenting. And we'll try to let you know who's up next in the queue. Remember, we are recording this public hearing, and, as always, please be respectful, direct comments at us the presenters. When you're called on, you'll be unmuted, and then you'll need to unmute yourself so that we can hear you. For the recording if you can remember to please state your name before your comment, comments will be limited to three minutes. You'll be muted after three minutes. And if there's time at the end, we will be able to go down the queue and give people a second opportunity to complete their comments. If you've already provided comments, but have an entirely another comment you want to add, you can also be placed at the end of the queue. That way, we can give as many individuals an opportunity to speak tonight as possible, with that, I'm going to turn the mic over to Kara to help us run through the comments.

Hello. Yes, so give me one second and I'll put the comment slide up. But on deck we have Eric Anderson, Christa Early, and Glenn Carol, so be prepared. OK, awesome, as Colleen said, we're going to be limiting comments tonight to three minutes. I'll try to keep an updated list of who's coming up to just give you an idea. Here on the screen, we're going to intersperse some questions in-between the comments. I know some of you have both questions and comments. We're going to start with comments, and then we can come back to you and take your questions. So, up first, we have Eric Anderson. When I unmute you, you may also have to unmute yourself. And Erik Anderson might play a little bit of phone chicken because I see you've joined from several devices. So I'm going to start with one of them. You're unmuted, you should be able to.

Yes, I think I am I unmuted

Yes, you are. I can hear you
Thank you very much and thank you for this opportunity. I'd, I've also submitted, you know, I've submitted some questions and I'm not sure which way to start here, some of them are clarity issues, clarity issues with regards to how the proposed rules of written are written.

Ok why don’t we start with those. Let's start with your clarifying questions.

Yeah, I, it was, it was any insertions, there is a insertion opportunity for a three foot, um, two loop two tuck insertion. It is, it probably has the probability of being very popular in New Hampshire. But there, we understand, when we question, why is written as being a length of three feet, is it 3, 4 is a three foot loop, or is it A, is it three feet from the second tuck? um, it's kind of a technical thing. And I just do want to say that it was a surprise to us. I represent the New Hampshire Commercial fishermen's Association. We have a lot of fishermen in a trip switching over now. It was. It was unknown to us. The potential implementation of these regulations will going to be all the way out to 2022 they started to complain like guys that are switching over the gear now without a lot of clarity. And what they can use for insertions are don't know if there is, if they're making these, these corrections in compliance with the Final Rule. So it's, it's caused a little bit disruption in the fact that people are trying to and to enter this process and comply, but they have very they have, There's some confusion in the direction that they're proceeding to know if it's the right direction or not. There's a lot there is some ambiguity in the way the rules are written.

So, Eric, if I could take a shot at answering that, and thanks for joining us tonight. Um, I think there is some confusing to some confusion because Massachusetts is implementing state regulations on a much faster timeline. There'll be finalized soon and that might be sweeping some New Hampshire fishermen along with them. But we do not yet have a final list of approved weak insertions. And the what our regulations is going to do is it's going to, um, identify the specifications that have to be met, not necessarily the list of approved regulation or approved insertions or, as Bob Glenn likes to call them Contrivances. So, you know, one insertion example that we know is working and would be acceptable is the sleeve that's used by some of the South Shore lobster fisherman that they that they invented. And the line that I described that some of the Rhode Island boats are using. I am not sure if the I know that we had some knots early on. In Maine DMR’s testing that looked good and more popular, we're not certain I don't have the list of knots that have passed the 10 test, um, average breaking strength, Yet, we're still working on developing that list. So I actually think that it might be best to tell the New Hampshire fisherman that they probably not going to need to do this right away, although, we would love weak insertions to be in place earlier if that's possible. But I am concerned that they might be using insertions, that aren't going to be on the final list. We're not sure yet. When we do have a list, we'll be preparing a lot of outreach, documentation, including videos, we hope, as well as illustrations So that each insertion that's approved will have some clear documentation of what is meant and that will help both enforcement and help fishermen when they're modifying their gear.

Yeah, that's appreciated, but I had to modify the at least, a newsletter or a news broadcast, to say, to these people that are very anxiously trying to participate, say, stop, and that's kind of a tough thing to do. It's always more often that it's hard to engage people. You have people I'm trying to engage right now, and it's almost wise to tell them to stop.
Wait, since you have, since you have them engaged. I mean, in a way, their field testing before they have to, we would love to hear about how it's going if they've already done it. And we also would love to make sure that we've tested the configuration that they're using. So I can have our gear specialists get in touch with you. So we can get an example of what's currently popular in New Hampshire, and we can work with Maine DMR to get that tested and see if we can get that added to the approved list.

Could I add while it is Fresh in my mind? The 0 to 3, 3 miles. The insertion is 1. 3 to 12 is 2. 12 and beyond is one. Why is it? What is the rationale? And in reducing the insertions from 12 to 12 to greater than only one insertion seems like there would be more, but especially since two insertions at 3 to 12.

That's an excellent question. And the more insertions and the lower they go on the line. The more protective they are to whales and the closer they come to being assessed as a weak rope. So the more conservation benefit is credited to them in the decision support tool. The configurations that were proposed initially, I think, that was in Maine DMR's proposal and it was based on. Actually, measured forces on line's at various depths and with various sized trawls and it. And so it includes, you know, those depths and number of insertions that they felt was most likely to be operationally feasible without parting more lines than fishermen were, felt safe, parting so due to reduced gear loss for safety reasons. That was proposed by the State of Maine. We did consider it in the decision support tool and with all the other measures that are in there for the region, we determined that we were getting at least a 60% risk reduction target. But as you're pointing out more insertions and insertions that go deeper would get a greater conservation benefit.

Thank you. I do have a couple more comments, but I've taken up. I'll go to the end of the queue again. So, let somebody else take a shot. Thank you.

Thank you for those questions, Eric. Next up, we have Christa Early

Can you guys hear me?

Yes, Christa, we can hear you.

Perfect, OK. So my name is Krista Early, and I'm an advocate with environment North Carolina. We're a state based non-profit dedicated to protecting our air, water, and open spaces. I'm testifying today because North Carolina has a special relationship with one of the impacted species, critically endangered North Atlantic right whales. Each year, expectant mothers migrate south to their calving ground, which extends from the coast of Cape Fear North Carolina to Southern Florida. This winter, we celebrated, as our scientists have spotted right whale calves off our coast. But we've also grieved as two of the calves have been found washed ashore on our beaches in North Carolina. For a species whose protection has continuously declined over the last decade to less than 370 whales. These deaths are especially heartbreaking. from our North Carolina Beaches and Ocean where these right whales swim to our mountains and plains we're blessed with an incredible legacy of natural beauty. Our legal framework featuring cornerstone, Environmental laws like the Marine Mammal Protection Act and the Endangered Species Act prioritize actions that prevent extinct extinction and keep our wildlife safe and healthy. As
written the proposed rule violates these bed rock environmental laws as it fails to protect right whales from one of their top causes of death, fishing, gear entanglement. I urge you to formulate a much stronger final rule keeping in mind the following consideration. The draft rule is based on an outdated population data. We need to use the most date most recent data available. Additionally, the proposed seasonal habitat closures and the rule will not do enough to prevent right whale entanglement in fishing gear. The proposed closures to vertical lines are too small and too short in duration. The third point is weak rope. Another major tool used in the rule is not a proven, effective solution to preventing fatal or seriously damaging entanglement events.

NOAA was petitioned twice, once by the conservation law firm, Foundation, and others, and one by the Pew Charitable Organization for Emergency Action in recent months to create closures. As the proposal recommended, NOAA should take emergency action now. The agency should close certain areas to the use a vertical buoy lines immediately, while a better package of rules is developed for are using updated science. We envision that this package would include a plan that closes certain right whale habitat toward fishing and starts to create a path for the eventual broad scale implementation of ropeless fishing industry. Today, I urge you to uphold our legacy of environmental protection and do everything you can to save our North Atlantic right whales.

Thank you, Krista. Glenn Carroll, you are up next.

Can you hear me?

Yes, Thank you.

My name is Glenn Carroll. I'm coordinator of Nuclear Watch South, and we're an environmental group in Georgia. And I'm appreciative of the scope of the EIS and to that, I would say, what a tall order, NOAA has such a big habitat, and such a dire situation. As you know, we lost one of our precious calves this week in Florida, um, to the scope. It is baffling how you describe very, um, well, how dangerous noise is to these creatures, and yet then decide that it has no impact. Um, and I'm frankly, I'm not positive how that intersects with the fishing gear as much as I think of how it intersects with the ship strikes, which are more the hazard in our region. I thank you for posting the link to that rule. Thank you very much. I want to share with you, we didn't know that the whales had habitat in Georgia until NOAA had already permitted the US Navy to build a massive submarine site and when a baby whale showed up on an island, there was a study and we found out for the first time in the mid-eighties. Right whales were visiting Georgia. We did not know that. It became our state mammal, Georgia's State Marine Mammal, is the North Atlantic right whale. And to my knowledge, NOAA has never analyzed the impacts of the U S Navy activities on the Whale. We, have not had hearing in Georgia since the original EIS in 19 79, which led to the permit for the king's base submarine base. So I'm here to appeal that we do be on NOAA’s mind as important, habitat concerned citizens. And for hearings, I thank you for doing the strongest measures you can. We've already made deep changes in our attitude toward the whales, and now it's the time to do that before it's too late. Thank you.

Thank you. OK, Max R, were e coming to you. Yeah.

Hi, can you hear me?
All right. Hi, my name is Max, and I'm a senior at Saint Anselm College in New Hampshire, two years ago. While attending a Right Whale event at the Massachusetts State House, I learned of the devastating reality that the North Atlantic right whale population faces. Right whales are in a steep decline, as there are only about 366 remaining in the world. Additionally, only one quarter of that number are females that are able to give birth. Since I started following this situation in 2019, the numbers have not only plummeted. But there has also been very little progress towards solving entanglements, the leading cause of death for right whales. It seems that every few months there is a report of a new Entangled whale off our coast. Just last month, there was a severely entangled right whale found off the coast of Georgia with blue fishing line trailing behind it. The photos are horrifically gruesome to see. And this poor whale has probably been trailing this gear around wrapped around its tail for months on end. When do we say enough is enough? Right now, there is more at stake here than just the safety of the whale's. We also need to consider the men and women who make their living on the water. The facts suggest the facts all suggest that the widespread implementation of ropeless fishing gear is a necessary step in preventing a huge amount of needless right whale deaths while also ensuring the safety of the fishing industry. The transition to ropeless gear is less of a matter of if but a matter of when, if our government does not properly lead and aid in the transition, to ropeless fishing gear in 2021, fishermen may ultimately be pushed out of further closure of New England waters. And right whales may continue to die off a tradition, a transition to ropeless and a federal funding program is needed now. We don't have time to waste. Thank you.

Thank you. All right, at this time, if there's anybody who is joining us by phone and has entered their audio pin, but cannot see this screen, or does not have a chat box, I'm going to say my e-mail. If you will just send me an e-mail, then I can find you and unmut your e-mail address is K a R A, dot, S, H, E R, V as in Victor, a N I C, K. At NOAA dot gov, K, A R A, dot, S, H, E R, V As in Victor, a N I C, K at NOAA dot gov and I'll also put that in the chat in case you know someone who's joined by phone but isn't able to use the questions box. Sheridan, I'm coming to you next. I've unmut your e-mail address, you should be able to unmut yourself. Sheridan, O'Connor, can you hear me? OK, no fear, we're going to come back to you. Colleen, we're going to take a couple questions now. Stuart Jones coming to you now. You should be able to unmut yourself Stuart Jones, and ask your question.

Yeah. Can you hear me OK?

Yes.

Yeah, I was just curious if there was any talk of the increase in the reduction by doing a buyback program, like you did with the Groundfish know a federal permit or a lobster license buyback to reduce the end lines. You Obviously, know, like in the state of Maine we have 800 trap limit so every endline out of water would probably add to their reduction and hopefully in the long term would increase that.

So that's a great question. Um, we did meet with the Atlantic States Marine Fisheries Commission they had a group that was whale. A whale/lobster working group that discussed a
number of possible ways to reduce the number of end lines through fishery management options. And I'm not positive that this specific one came up. But that's the kind of thing that we would consider doing if we had the funding to support that. It didn't get into rulemaking in the end. It didn't have a lot of support, and it was very complicated. Particularly in Maine, it's difficult because past buyback programs like in the ground fish fishery are based on fishing histories. And because of the size of the fishery in Maine, the reporting has been at about 10% of the fishing fishermen, fishing of the participating fishermen. Not 100%. So, we don't have as accurate histories in Maine as we have in some of the other states, where they have 100% reporting, particularly Massachusetts, where they have a detailed reporting. So, at this time, that's not that's something that's being done. I do think that and maybe Chao could have input. I think the Social Science branch at this north-east Science Center is looking at potential economic futures or social science choices that could lead towards less rope and buyback might be one of the things that they're considering. That's an ongoing study, so it's, you know, it's a year or so from being produced, I think. Chao I'm not sure if you're familiar with that work.

Well, thank you. Sheridan O’Conner. I'm going to come back um, Sheridan O’Connor if you can hear me. Oh yes I can see that you're unmuted. Can you hear me? We're not able to hear you. You might try to find your audio settings and make sure that your microphone is, is either your computer, if you're using your computer, or if it's your headphones if you're using your headphones. Well, we're closer were closer, Sheridan. I'll come back to you next, OK. All right. Brian Sharp, I'm coming to you. I see you have a question and a comment. So you. Just let me know which you are going to start with. You should be able to unmute yourself.

There we go, thank you Kara. I can start with the clarifying question first, if that's OK. In the economic analysis, for when considering the costs and gear conversion you mentioned in the presentation is going to be about $2 million, Does that? I apologize if I looked through and I could not find this in the document, but it may be there. Does that take into account the replacement savings of cure current gear that's increasing the end of its life span? The kind of depreciation cost?

We do, we, all the costs now are extra-long, so it does not include, like the normal use of the gear, if they need their gear annually right, or the ropes So we, we also do distribute the cost. So, our assumed, like life span of some ropes are like six years. We have, like, cost added to each year. The extra cost to they're like normal use of the ropes and other gear.

To clarify, are you mean that each in each year, you assume one sixth of the line is being replaced with new line?

Yes.

Brian, does that answer your question?

Yeah, thank you.

OK. Awesome. Are you ready to give you a comment now?
Yeah, absolutely.

OK. Awesome.

Good evening. My name is Brian Sharp, I direct the Marine Mammal Rescue and Research team for the International Fund for Animal Welfare. Like to begin by thanking Colleen, and the NOAA team for holding these meetings and allowing me the opportunity. And all of us to provide comment tonight. One of my responsibilities at all is to be their representative on the Take reduction team, and then reviewing the proposed rule. There are three areas that I'd like to briefly address number, one, the risk reduction goal itself. When the team met back in April 2019 in Providence, it was believed that 60% would be the best that we can hope for, and that that would be enough since said April meeting there have been 13, known right whale deaths and likely others proving this situation is even worse that we really realized, at the time, with the hindsight of almost two years of additional data and continued decline of the population, this risk reduction goal, 64%. That really does need to be increased to 80%. To ensure that the deaths and serious injuries do not push the species past an irrecoverable tipping point. The second is a 1700lb breaking strength of weak ropes should only be viewed as an interim step, not the Solution. Weak ropes do not remove the vertical lines from the water column and therefore, does not reduce the risk of the entanglement itself. We know that weak ropes will not protect calves or juveniles from lethal entanglements. Of all. You know, the study that was done showed sub adults and adults. It also does not protect adult whales with chronic entanglements from the long-term health impacts of those entanglements. And then, finally, the transition to ropeless; we urge the agency to increase the incentives and assistance to fishers transition to ropeless fishing. While we recognize that progress has occurred with the inclusion of ropeless in some areas of the plan, more needs to be done and fishers need to have a streamlined permitting process that allows them to thrive on ensuring the survival of the species. So again I want to thank you for the opportunity to comment, and we'll be providing more comprehensive written comments. Thank you.

Thank you. Sheridan, we're going to come back to you OK. Let's try again. I think we're close. All right, I've unmuted you. You unmuted you. OK, you're unmuted. Can you hear me? We're not able to hear you at this time. I see that you, why don't you try in your audio, the audio bar, click phone Call, then use the numbers. It gives you to dial in, making sure to enter your audio pin, then we'll come back to you. OK, let's see who's next on my list, Elizabeth Clemmie. You're unmuted.

OK, I'm all set?

Yes.

OK, so basically, I will be submitting comments that are a lot more detailed on the specifics and the science, if you want to call it that. But my basic comment tonight is, I've just been involved as a lay person, and a concerned citizen, my entire adult life. I'm 61 years old. Um, and it's the same rhetoric that's been going on for 20 years. I get the plight of the lobstermen and the fisherman but we have whale's that are not going to be here, potentially in five years, they can't come back. That's the, that's the prediction. We have technology that does amazing things all
over the world, out of space, on the ocean floor, why we cannot subsidized government. But with the government, with our tax dollars, cannot subsidize these fishermen, so they can afford to use ropeless gear. Immediately, this has been talked about in the ropeless gear has been talked about for 20 years. It just seems like it's just a lot of rhetoric, It keeps going on and on and nothing happens and the whale's keep dying and we just have less and less of them. And we keep having hearings and we keep meeting. And we keep talking about how we're going to save them. And we're not so I've read through a lot of this. I'll be more detailed in my, in my comments when I write in, but my we're just not doing the job. And these meetings aren't helping and nothing's getting accomplished except we're losing whales. So it's all very disappointing to me. Um, it's all very frustrating and for a lot of other people. And I don't think the fishermen need to suffer I think we can subsidize I think the government can subsidize and create and subsidize what they need to get started to stop being a problem for the whales. You also have ship strikes. I think we can do a much better job at monitoring where whales are and so that so they can avoid ship strikes. And I guess that's pretty much my comment.

Awesome, Thank you so much. OK Sheridan, I have a really good feeling about this.

Can you hear me?

Yes!

OK, great. Hi, my name is Sheridan O'Connor and I'm currently a vet student at Virginia Tech. I attended BC for undergrad Boston College, where I was lucky enough to spend time by the water, visit the New England Aquarium, and where I really solidified my dream of becoming a veterinarian. I've learned about different animal species, but my favorite are the different Whale species that inhabit our oceans and seas. We studied many over the course of vet school so far. But the one near and dear to my heart, definitely the North Atlantic right whale, because it desperately needs our help. Right whales are critically endangered. And soon could reach the point of no return from extinction. Scientists estimate that in five years, right whales could be functionally extinct, which means they could die off in our near future if we do not act fast and take swift conservation measures now. I have poured over the data from venerable scientists, marine biologists, and veterinarians. That show 86.1% of right whales have been entangled, at least one, and more than half of them entangled twice. Some right whales had been entangled in fishing lines as many as eight times over the course of their lives. We cannot keep letting this happen. We cannot fail right whales and have them continually become entangled in fishing gear, new technology, to prevent entanglement, ropeless gear, or pop up gear to prevent right whale entanglement, while still allowing fishermen to continue to harvest. There do not need to be closures up and down the Eastern seaboard. If we start to implement ropeless gear now, this gear is safe, it works. And it can help save both fishermen and whales. As a vet student, a biologist and as a human who cares about how our actions today have great consequences in the future. I'm asking you to please create a ropeless gear permit program now so we can get gear in the water before. it's too late. We owe it to the North Atlantic. Right Whales to do all we can. And this is the strongest start. Thank you.

Thank you.
OK, next is Nina. It should be unmuted.

Yes. Thank you very much for this opportunity to make a comment on this very important issue. I appreciate all of the information that has been developed thus far this evening regarding the North Atlantic, right whale. I represent the coastal black women's ocean memory and conservation Collective in the state of Georgia. As you all have so eloquently stated that Georgia, as one of the southeastern states, where these North Atlantic, these beautiful creatures calve each year. I also represent the faith community. This is a part of a larger question about the, biodiversity of life, but the vitality of this species. That is on the brink of extinction is deeply troublesome to us all. I believe one of your persons on the call attendees on the call this evening mentioned the King's Bay Naval Base in which the, whales have calved in this area for many decades now. I had the opportunity earlier today to read your DEIS and some parts of it was a very troubling regarding large whales, that anthropogenic noise can impact whales both physiologically and behaviorally. Physiologically, noise causes a stress response in the North Atlantic, right whale, over an extended period of time, physiological stress can impact marine mammal health by altering metabolism and energy stores. Decreasing immunity and impacting reproduction, noise can also impact behavior, including initiation of avoidance behavior in large whales, changing communication patterns that can reduce mating opportunities, and interrupting feeding behavior. The physiological impact of these behavioral changes is unclear but could impact nutritional health and reproductive success. Small populations with limited home ranges, may be more vulnerable to the physiological impact of noise. Given this information, impacts of noise on large whales is likely to be low, negative, to negative. I find this conclusion and this, this very small paragraph to just be incomprehensible and I just don't understand it. However, given that the Naval base is here, we know that the testing, the submarine testing that is done here on the Coast it does impact the whales. And I just implore you all to make a better decision in terms of the vitality and regeneration of the North Atlantic right whales. Thank you.

Thank you. OK. We'll take a question at this time, Marin. Marin, you should be able to ask your question now.

Yep. So those are the question, my husband's lobsterman. So in terms of the insertion points for the different, you know, three miles, and then what does it, I don't have in front of me that slide, six, and then out to 12, you have it ideally, with 50% in state waters although that will be different for Massachusetts, and then 25%, 50%, And then 35% outside, 12 miles. But I just wondered how strict the enforcement was, and I want to say that I am supportive of those measures, but in terms of picking up, you know, 6 to 8 trawls, and moving them from one spot to another. And you've got all that rope on deck. And you've got two blue lines per trawl, and now you're trying to measure out you know, 600 feet for the 25% mark. That 50% mark, and then even deeper for that 35% mark. I'm just curious what enforcement will look for that, because you don't want to make it too burdensome on these guys, but that's a lot of rope. And you've got 160 traps on board, and you're trying to offload them And you don't actually know where you're going to go. Know, you get out there, and you look at all the effort, so you can pick your spot. Um, so you know they have to It sounds easier than it is, but they're going to take out the sleeves or the weak rope points and then they have you know navigate back to that that marker. So how strict will enforcement be for these guys to give them a little leeway on that stuff?
So we don't have our enforcement plan completed yet, but I am if it's not operationally feasible, it's not going to be effective. This was developed partly because the feeling was that as fishermen move back and forth they could connect lengtheners using weak insertion points. I mean, we're not going to be measuring to feet or to inches, certainly. And maybe not to specific feet but I do think that we're going to want it to be defensively at those places. Right now, there's a pilot study being done by our enforcement program. And while piloting, they've already made some cases using ROV’s to do underwater enforcement rather than hauling gear, and I suspect that that's one of the ways they're going to try and enforce this aspect as well. Um so you know I'll work with the gear specialists that we have and have them work with fishermen to figure out how to make this as easy to implement as possible and include that direction in our outreach materials. But, you know it's us, the measures are being assessed with those insertion points and if that gets eroded it's going to erode the effectiveness of the measure's further. So, um, you know, we need to be as close as possible and, you know, Marin we'd love comments from you, your husband, other fishermen, on how they could try to do it. I do think that there are some places like we have heard from a couple of fishermen from Rhode Island that want to use weak rope because they don't want to have to worry about measurements. And they just want to use weak rope throughout or weak rope in their top half or third of their line. So, which would be easier for everyone to not have to put an insertions. But insertions allow fishermen to fish without replacing their entire blue line. So, there's some savings in that as well. Um, one of the reasons I think that 10 fathoms insertions were suggested as an option at some of our scoping meetings was that it's a fairly common lengthener apparently in some segments of the fishery. So, the states every 60 foot insertion requirement is similar to that. And, you know, we do have some fishermen without weak insertions being required. They're already fishing with them now, at every 40 foot. In Massachusetts, well just a handful, or maybe just two. But, um, no, they're able to do it moving back and forth. So, I think it's doable. Love your input and your comments on, you know, help us guide you, on how to do it, in a way that's operationally feasible.

Yeah, Can I, can I ask a follow up to that? So if he puts in just more weak insertion points to kind of cover himself, will you know they say anything to the 25% and 50%. if he's got maybe three within the top, 50% you know, and then he uses that as because he may use different toppers with different add ons because he tends to fish deeper. So if he has, sorry toddler.

That’s a comment we like.

He's actually got a baby shark costume on right now.

If I wasn't seen it, so if you, but if he is able to put in more, weak insertion points, then that may help cover him. Or you know, instead of the 25 and 50% Or is that 25 a magic number? If he's got something? Above and below it and then as 50%, you know, if there's some flexibility, there might be easier for him to move gear. Just because not like you said not that not everybody has the add ons at 60 feet. I know he does not, but I know a lot of other guys do.

So the lowest point is important because whales are using the entire water column. And so if a whale intersects the rope below the weak insertion, there is no risk reduction as far as we would know. So the lowest point is probably going to be important. But I think you bring up a good point and when we finalize the rule, I think we would say, you know, at least, one at 25%, but it
can be more and more is, is more is more risk reduction. Um. So it could, we can try and figure out how to write that to allow for more than one above but we still would probably stick with the lowest insertion as a requirement.

Yeah, no, I agree with it. Like I said, I'm in favor of this and just, know, especially this time of year they're out there, he's only fishing, maybe 2 or 3 days a week picking weather and is moving gear like crazy to, you know, chase what he can for the price. Yeah, that's 200 Traps on board and maxes out 'because he's only got two days to fish And all of a sudden is dealing with trying to re rig buoy lines with all that, You know, thousands of feet on board, so. It's just finding that balance of how to make this best work with whatever flexibility you can offer them. I guess. This is the point which sounds like you guys are doing so I appreciate that.

Yeah. And if you send written comments with specifics, you know, with input from him and other fishermen, on specifics on how to how to write it that way, that's exactly the kind of input we're looking for.

OK, I appreciate that. Thank you Colleen

Thank you.

So, thank you. OK, Eric Anderson, coming back to you to give, I believe you asked questions in the beginning, but did not have the opportunity to give your public comment. So, if you would like to, let me find the right one, if you'd like to give your public comment now. Oh, Yep. Can't Hear you.

Can you hear me?

Yes.

Thank you. A couple of things. You, you asked for comments on the weak link. Whether it's still appropriate or not. It's hard to it's hard to speak for the whole community, but at least they've been in practice for such a long time that it's not a new, it's not, it's not a new requirement. So, and we think that it has, it has it has a benefit in a multitude of ways. So, we probably want it to stay, say that, to keep them included, again, I represent the New Hampshire Commercial Fisheries Association and trying to, we're trying to get this, this thing resolved. There is one provision in there for the state waters in New Hampshire might be small, but it's still an important thing, five trap trawls were required to reduce down to one buoy line. Um, normally they had two. If anything is to be considered to reach and reduce it down to four traps, one buoy line. Um, These guys have used to buoy Lines, eliminating one, creates a lot of confusion operationally in knowing where the gear is and because two buoy lines always marked the both ends of the gear, if they have to go to one, we would like to see shorter trawls, um, be reduced to shorter trawls four trap trawls vs. five, it's a small matter, but it's a big matter for some of these fishermen here. Um, I know you are able to respond to the variety of comments that have, um, uh, promoted ropeless fishing gear. And they seem to come from, with no offense. The comments are legitimate, but they come from an aspect of the commenters that don't have a lot of experience in the fishery. Ropeless gear is just not as easily implemented. As saying some
words, it has some very, it's expensive. It has some operational difficulties that would upset the fishery, and cause more damage, or more, more of a chaotic condition as the fishery tries to promulgate itself. Um, that needs to be overcome. There is some technical aspects of it that have been accomplished but there's some operational aspects of it that have a long way to go before it can have some feasibility. And I think that has to be expressed from the industry or people that work with the gear. You just can't say this, a just have ropeless fishing gear in. It has the ability to solve some things. It has the ability to create tremendous problems in other aspects that have been discussed within the TRT. So I just want to get that that point for us. Anything else? Thank you very much for this time.

Thank you. Does anybody, I don't have any e-mails. Does anybody have any more public comment they would like to give? They're saying questions. Does anybody know any good jokes while we wait?

Kara did you get any e-mails for people on phones?


So it looks like we can probably wrap this up tonight.

Just a couple of things. One second.

One more scan? While we're scanning, I'd like to thank the take reduction team members that are on the phone tonight, including some of our original team members. I think there's about 15 team members and alternates on and, um, a, this has been a really, it's the most busy and most active of all the take reduction teams. They work really hard and it's a really hard job trying to come to consensus across such a large group of stakeholders. So I really appreciate their participation and their joining on the call tonight, as well. So maybe everyone's going to be sending their comments in writing, which would be great.

Colleen, I do have one comment somebody made. I will let them speak. Rain, You're unmuted, you can make your comment now.

Can you hear me?

Yes.

Yes.

Hello. I was just, you know, I've been following along with all of the webinars that you have had and you've put out and it's been going on for months. This has been going on and there hasn't been any real significant change. And I listened to the fishermen and they're trying but I feel like their Interests would be better served if the whole industry was shut down until they could figure out a way they could agree to get back out on the water in a safe fashion. I live on Nantucket, we're picking up fishing gear along. Every beach along every massive tangles of them. There has to be a better way.
Thanks, Rain.

OK, Colleen we have one more in the queue. OK, Jim, you should be able to unmute yourself. Hey, Jim, can you hear me?

Is that better now?

Yes, I can hear you.

I lost that screen for a moment. Yeah, I've got two comments I'd like to make. And some are relative to the last 2 that you had on. I've been a commercial fisherman for 32 years. And the last 25, I've served as either a representative or an advocate for the fishing industry. Including terms on a New England Fishery Management Council, I would like to caution you. And the people who are trying to help the right whales. That is not as easy as what it may seem. one of the questions had to do with enforcement. Enforcement at sea is basically relative to what's written on the paper. You have a lot of young coastguard men. Trying to enforce these regulations with probably not much of an understanding of what it takes to write these regulations so that they're enforceable and fair and workable. You want these to work for the whale but you need them to work for the fishermen as well. So the people that think that you can shut down a fishery, consider shutting down your own occupation while you fix a problem. It's not that easy. Let me say that I've never been a lobsterman, I've always been a commercial mobile gear guy. And there are several problems that come in with the mobile gear and the fixed gear. And that's being able to identify where that gear is. So, we don't have gear mishaps where we tow up their gear, tear up the gear, and we're both at a loss. At some point, you need to identify where this gear is being fished. Ropeless gear will not make that possible for the mobile fleet. There's been discussions about how one lobsterman can identify another one's area. I have yet to hear someone say, How does the mobile gear or, even someone with a trawl gear, touch trawl gear, Gillnets, In other words, identify these areas if they're not part of that program. When, when you have the unidentified areas or lost gear, and they're towed up by a mobile gear fishermen. I'm not sure if this rule still applies, but I believe it does. If I was to take up someone's mobile gear with ropeless gear at a tremendous cost, I can't even return it to him. I have to throw it back overboard and leave it where I found it. There's a lot more to this than what meets the eye. So while we're trying to save the whale, we do not want to lose the fishermen and I thank you.

Thank you. OK, we have 1 last 1, I believe, and I check my e-mail while we're on the last one, Joel, Erickson. Joel, you're unmuted.

Hello. Can you hear me?

Yes.

Great. Thank you. I'm pretty new to this whole situation with the right whales. And I was listening to the meeting last night, and tonight. And I'm wondering if any consideration has been given to trying some method. Somehow, letting the right whales themselves know of the presence of ropes in the water column. Where they're visually or probably more acoustically with
some sort of pinger or something attached to the line to just basically say, hey, danger. There's a something in the water that you can't see, but you can swim into and get entangled with and stay away and swim around us. Um, you know. It seems that there's sort of an assumption that the right whales may not be as intelligent as, as they may be and we really don't know. Um, and I'm wondering if there's been any research or any thought given to that, you know, allowing them to sort of see the lines or know about the lines. Similar, for instance, to signs on a freeway or a highway that alerts drivers to you know, upcoming invisible danger. Um, so that they don't because those lines are pretty thin, you know. They can't see them and they just swim into them. So if there's some way that we could communicate to them, hey danger, stay away, swim around us. Because the lines to them, the lines just must appear randomly and sort of Ah. Yeah. They're in their normal course of Migration. And, you know, if, if we could somehow shift the burden and rely upon their intelligence, maybe we could shift the burden away from the humans and the fishermen, um, to allow them to know of the danger and avoid it. Thank you. This has been really great, really, educational. And I really appreciate all the effort that's gone into this. Thank you.

OK, and I can actually take a shot at answering your question a little bit. New England Aquarium has done some studies that indicate that, right whales may be able to see red line, at least near the surface column and that's one of the reasons some fishermen in Massachusetts try using a red line. We don't really have enough information to know, for sure. And we don't know how far down in the water column, color would be visible to the right whales. Sound does not work with baleen whales. We do use pingers on gillnets, to alert Harbor Porpoise, that the nets are there, it makes the nets visible to the porpoise, or alert them that there's something there, But sound doesn't work as well on baleen whales we have trouble using sound, even trying to herd whales When they're up in dangerous locations, the baleen whales themselves, they react unpredictably to sound if at all, a feeding right whale probably wouldn't react at all. And, I mean, you have heard some people talk about a calf, that was struck, um, recently off of Florida, right whales are not on, you know, periodically, hit by vessels. And the vessels are making noise and the whales, if they're reacting to the noise, might be coming up under the vessel. They're not reacting in a way that lets them avoid being hit. We have seen a couple of videos of right whales encountering line, not necessarily getting entangled. Recently, a crab pot, a right whale, in the South, came along a crab pot and it almost circled there, their eyes, you know, not looking frontwards like ours they're sort of looking to the side and down which is where their food would be. And it sort of circled that pot or that line, as if it was trying to figure out what the heck did I just bump into. And that kind of behavior, if it actually gets entangled, and then starts thrashing, is probably what would create what creates these complicated entanglements. So at this point, from what we do know and have observed, they're not able to detect and avoid, on their own.

Thank you.

OK, Colleen, I, There's nothing left in my e-mail. We have one more person with someone who has commented previously, that had another comment, And I think that's probably the last one. Let's see. Hi Rain,

Hi, Thank you for letting me speak again, and thank you for all the hard work that you're doing and, to the fishing community. I'm not cold and heartless. You know, and I don't remember the
gentleman's name. That said like, if my industry was in trouble and being regulated like this, how
would I react? But my response to that is, like, any other industry that was causing so much harm
would have been shut down long ago. You know, like, we know the migratory paths of the right
whale, we know where they are. But yet, we're still killing them. Like, it's just, it's unacceptable.
Like, we just have to do more. And I know the fishing community are really ingenuitive people.
Like, if we leave it up to them, to maybe figure out a way they can get back safely out onto the
water, we might have new technologies that, none of the scientists could have come up with.
You know? Because, we're not fishermen, and I think it should be shut down, shut down until
they can come back out safely. What, 366 whales left? We don't have time to do this anymore.
Thank you. That's all I have to say.

OK, let me just check on my list of things Colleen you're on mute.

I was just saying I don't see anyone in the queue at this point.

Erik Anderson has one more comment.

OK, and I would like to say please remember direct your comments to us and not at each other.
I'd appreciate that. That was one of our operating protocols. And I let that slip a couple of times.
So, um. Eric?

Eric I might need to come unmute you, hold on one second. OK, you're unmuted.

Yes I am? All right. Thank you. I think I've thoroughly worn out my welcome and, you know,
with comments, but thank you for the final opportunity. I just want to say that, you know, this
has been a as far as a TRT, it's been a long, long journey to try and come up with some solutions
here, and I think there is a prospect of them. This, this plan has to have a chance to work, and in
a way that works for both um, interests here. But I know whether the complete knowledge of
everybody that's listening in is, unless our Canadian counterparts, come to the table with the
same sincerity as we have this, we're going to have some problems. It upsets this community or
our domestic fishing community to see that they're putting in such a variety of effort are sincere
effort to try and, you know, take this issue on and in come to resolution with it. When we see that
there's probably been a lack of response from the Canadian, um, government to take it on as
seriously as we have. There is just far, far more, the majority of the mortality and serious injury
that has recently taking place in use. It's caused the device or the downfall of that part of the right
whale population is taking place in Canada. And until that is also addressed, anything that we do
here is not is it not for not, it will always help. But if it's not equally taken under consideration,
we're not going to have the progress that people expect out of this. And, um, that just has to be
recognized. These whales don't understand domestic boundaries or international boundaries, and,
um, would just hope that the Canadian government could come to the table with equal sincerity
on this issue, or there's going to be a lot more frustration. Thank you.

Thank you.

OK, Joel, uh nope, Yes, Joel Cohan. So I've unmuted. You yell. You'll have to unmute yourself.
Yes. Oh,

OK.

OK, hi. I'm Joe Cohen. I'm from Florida, I'm a wildlife photographer. And my comment is basically I get to watch the moms come down and give birth with their calves and I get to take pictures of them. And I really can't stand to watch any more come down with scarring all over them. The majority of the Whale's I've seen over the last three years all have scarring all over them. It's from the ropes and gear being entangled around them. It's really hard to stomach it. And so, yeah. I want I want something to change, I don't want to hurt the fishermen. I understand that it's a livelihood. It's uh, it's a tough thing. I do believe ropeless, I've gotten into this a lot recently. The last year I spent the summer and the fall, trialing ropeless gear with commercial fishermen and a few different states that so much. I just I want to want to get involved with this and ropeless gear does work for sure. It. It has potential to solve many issues. Of course, it's not an absolute perfect system yet. It's not completely done, but it certainly has great potential and the trials, I did it. It absolutely works. And, and from my perspective, there's even a chance that there's a financial part of this that the fisheries side has or the fishers side hasn't realized and that is that you may not lose as much gear. There's a possibility where you won't lose as much gear where people won't mess with your gear as much. Um, so, I know there's a lot of concern about ropeless and all that, but I do believe it's, it's very close and, and should be very, strongly considered. So, also, as far as some of the other concerns, the Canadian thing, you know, we have to lead by doing the right thing. We can't worry about other, You know, if we do the right thing, other people will follow other countries and follow, So. Yeah, that's, that's most of my comment. It's, I can't stomach watching. Another whale come down here with scarring. And knowing that 86% of the population has been entangled, and 50% of that has been entangled more than more than once. And that the female population is 85 or less and that they're not reproducing at the same rates they used to because they're not as healthy. So, there's all these things. It's just, it's so, it's very hard and maybe I'm over my three minutes, but anyway, yeah, thank you. And that's my comment.

You could not see the timer that was going, but you left 3 seconds on the table. So, nice job staying under three minutes.

OK, Pete, Peter. You should be able to unmute yourself, Peter, and make your comment. Well, Peter, OK, I see you're unmuted, but I can't hear you.

Hi is this all right now?

Yes. I can hear you now.

It is part question. Having listened to this, I'm a member of the Marine mammals on Nantucket Island. And my question is this more of a I'm just wondering how much will be available. I mean I have an opinion a feeling that there shouldn't be anything available to the fishermen and we should really get into the tech of this ropeless technology. We don't have any more time with the whales, that's moved. But we also don't have any I don't think we're you guys have a lot of responsibility. We can't leave the fishermen hanging either and I think that's the bigger fear. So
you definitely have to, you know, work that out. But bottom line is that we don't need any more
of this entanglement. And I think that the ropeless will work. There are situations. The fishermen
will report and what will happen is after they report, they're going to want to make some
changes, and we have to make sure that our subsidy will change with them so they can improve
the ropeless, so it's not a negative thing anymore. It becomes much larger, positive. So, and I
think generally, the group our group out here, agrees with this. But there are other officers that
may want to talk, and they would add to that. And thank you for what you do. Thank you for if
you all lived for five years through the government. Thanks for still being here at the end. And
have a good night.

Thank you for that comment, Peter. OK, up next we have Tessa. Tessa Brown. Tessa, you, I’ve
unmuted you. You can just unmute yourself.

I just had a question sort of, for other people listening, or because I'm more of a stakeholder in
this, about what sort of development you guys have, or data you have with the ropeless fishing so
far at the point were at. Because so many people are asking questions and want that to come into
play so much sooner. Where we're sort of not even at that point, and have other regulations that
have already been put forth. But just sort of what hurdles and status the ropeless fishing data is at
this point?

I'll, I'll try this one Tessa, so we don't have our ropeless gear specialists on with us today, as far
as I know. But we have NOAA, First of all, we don't appropriate funds. So I can't develop
subsidies by myself or through rulemaking. That's done by Congress. Congress has appropriated
over a million dollars a year, the last two years for us to engage in ropeless research. And there's
also been a lot of private funds and NGO's developing funds, some of whom are on the phone
with us now or listening in now. And this is a partnership between NOAA, fishermen, I would
say fishermen are more or less lead and many of these projects. I believe there are about 14
fishermen participating right now in New England. And I know there is another project going on
in the south-east their offshore, their near shore there, inshore their fishing in various habitats.
NOAA has developed gear cache or a gear library and can lend gear out to fishermen. There are
a number of organizations that are developing this equipment, which is most commonly, it's
remotely uh, the fisherman goes to where their gear is. And they remotely release the buoy. So it
comes to the surface and then they can pull up the gear. The buoy doesn't persist. The buoy line
doesn't persist in the water column. It is retrieved with an acoustic retrieval system. They are also
working on an ability to mark. For vessels, at the surface mark, where the gear is, down below
the space, to Jim Candles point, that a really big problem is gear conflict if mobile If other
mariners, mobile gear users and others don't know, the gear is down there, it can cause a lot of
problems including safety concerns when there's a gear conflict. Recently, the people doing
research at NOAA and others are reaching out to the mobile gear fleet to get them involved in
the research to improve the ability to detect the gear from the surface. So that work is being
done. It's advanced a lot in the last couple of years and particularly over the last year, as
fishermen have been more engaged in doing it, it is still a requirement that they get an exempted
fishing permit. And we're working on making that easier by doing the environmental assessment
work for them, if they follow certain conditions under their permit, they won't have to go through
the whole NEPA compliance and ESA compliance. Those would be conditions that would
prevent, um, prevent risk from the efforts that they're that they're taking. So, it is progressing
very quickly, it is, it has attracted a lot of public and private funding, you know, Congress, the, the, the Congressional representatives, particularly in New England, particularly Massachusetts, have been very supportive of this. And they have funded some gear research. There's now some social science research being done. And the State of Massachusetts has just initiated a study where they'll be working with fishermen to consider attitudes and all of all kinds of social science and other information to determine how to make ropeless more operationally feasible and more acceptable across the industry. So, it's, it's developing, um, there are still problems. There are, there, there are still problems under certain fishing conditions. So it's, I would say it's not fully baked. Operationally yet, but, um, it is something that's progressing and it's progressing fairly quickly, with the input of fishermen. This is not something that can be done without fishermen participating.

No, I agree, and I think it's sort of important to have, like, you're saying, the Mobile Gear, people involved. Because I know it's, like, has a direct impact on lobsterman, and people that are going to have to consider taking this on, but it's really the whole entire fishery. And people that are involved that it's going to affect just as much, that might not have, right now, any clue of what's going on, or how it might impact them. But I think it would be important to get more stakeholders involved in what's actually going on and how the implementation would actually take place.

Thanks for the question.

Thank you, Tessa. OK, Colleen, I don't have any e-mails. There's nobody left in the questions or comment queue. So, I think, um, for folks who are still with us, I put up on the slide, the instructions for providing written comment. As Colleen mentioned, you know, we sort of specific details on how we can make this rule better, We'd love to get that in written comment as well. All of your comments that you've given tonight have been captured, and thank you for attending.

Yes, thank you very much, everybody, for attending. We have two more public hearings next week. There was one question about whether or not this webinar will be available. I don't think we'll be posting this entire audio webinar. We are recording this primarily to make sure we get all the public comments. But there is a longer presentation on our website at the address shown here at Fisheries dot NOAA dot gov backslash ALW TRP, where you can also find the documents and these directions for commenting as well. Thanks very much, everybody. Have a good night.

Sorry. I was just trying to put the link in the chat, and it started playing.

Goodnight all.
Public Hearing 3  
_Southern Maine, Tuesday, February 23, 2021, 6:30-8:30 pm_

As Kara has already said, If you're interested in providing public comments tonight, please, type “comment” into the question box to get in the queue. Um. We will call your name in somewhat in order. If you change your mind and no longer want to comment, you can type “Pass”, or you can say Pass when we call your name in the queue. If, if you're joining by phone only, Kara will be letting you know how you can also provide comments. We'll call on each commenter, will try to let you know who's up next in the queue. And please remember, we are recording this public hearing. As always, We'd like you to be respectful and direct your comments at us, the presenters, and not at each other. When you're called on, you'll be unmuted, and then you'll need to unmute yourself. Comments will be limited to three minutes. You'll be muted after three minutes because of the large crowd. If you've already provided comment but want to give another comment, or if we had to cut you off, we will place you at the end of the queue, and if there's time, at the end of the night, you might get enough at another opportunity to provide your comments. If you do not want to come back at the end tonight, or if we can't get to, because of the number of people here tonight, please do submit your comments in writing. We do want all your comments. And at this point, I'm going to, shortly, I'm going to turn the mic over to Kara to help us run through the comment queue. I understand Commissioner Kelleher is with us tonight, and he would like to thank you all for attending and open public comment session with comments of his own Kara?

Yes, hi. Commissioner Kelliher I am going to unmute you. Give me one second. I've unmuted you. You should be able to unmute yourself.

Great. Thank you. Can you hear me?

Yes.

Great. Thank you. For the record. my name is Patrick Kelliher, I’m the Commissioner to the Maine department Marine resources. And I'm here tonight also speaking on behalf of Governor Mills directly related to our deep concerns in the direction we seem to be going with protection of North Atlantic Right whales. The lobster Fishery is the most single. The most valuable single species fishery in the country. In Maine it comprises one point five billion in economic activity and touches thousands and thousands of families. While we understand and even support some additional levels of protection being put in place for north Atlantic right whales, it seems the agency is moving in the direction of species protection with no care about collateral damage. I know we're here to focus on the proposal, but I do have to say that the BiOp itself has the potential to drastically change the Maine Lobster fishery and worse, has the potential to see it close. I just also want to just raise the fact for the record. It's a very troubling that the biological opinion hinges on the Canadian Government. For the National Marine Fisheries Service to move forward with implementation. Excuse me. The national marine fisheries service needs to move forward the implementation of the marine mammal protection fishing court rules and finally puts a meaningful pressure on Canada to implement measures that are comparable to the significant measures already put in place by the United States. The focus more specifically on the rule as it pertains to conservation equivalency to trawling up Keystone, part of the Department's proposal.
in conservation equivalencies, and it seems to have been somewhat ignored by the service. One area in particular was that a trawl with two end lines is equivalent to a trawl with half the traps and one endline. Again, this type of flexibility is paramount. And we need that type of flexibility in order for the safety. It's interesting that the agency is cited fishermen safety and gear conflict for a reason for not implementing this type of equivalency, ironically, it's the reason that it is needed. Specifically to the closed area, I'd like the first point out, the fact that your decision support tool indicates the only one closure, if, if to be implemented, will become the most important conservation area to right whales along the coast. But it doesn't say, however, is the support supporting that it supports the findings. When DMR mapped out the right whale, detections against the boundaries of the closure.Always 70%, 73% of the detections were outside the area. I can see I've got 10 seconds left Colleen, and I don't know if I'm going to get some leeway from the state perspective here on that timeframe, um, the agency continues to feel Excuse me, Maine DMR would also like to reiterate, as we did, during the hearing, some of the phased closures, gear will just move outside of the boundary and you need it really need to take a look at that about the kind of the collateral damage it could be. It could be more harmful to the right whales, not to mention gear conflicts. Um, the state is really willing to work with the agency on a trigger mechanism as it pertains to the closed areas. We have some ideas and thoughts on that, and we will make sure that we address those directly if you are looking for comments. The preferred alternatives, for the sake of expediency will state that there are areas that you have accepted to the Maine plan when we submitted over a year ago. We do appreciate that. We'd like to speak directly to the issue, of weak point. So, you know, we support the configurations. We will be submitting and believe that the agency must strongly consider weak points. They're very practical, given the diverse conditions along the coast. Weak points are a common thread throughout the zone specific conservation equivalencies that we will be submitting as part of our written proposals. And again, I want to stress that a one size fits all does not, does not work along on the coast of Maine. Quickly, I want to thank you for the issue, the recognition of the gear marking work we've done. It’s troubling though that the economic impact from the DEIS did not include any the cost associated with that we've done directly and in anticipation of the rule. So we would ask for that to be corrected. Also, I would, I implore you to take the time to listen to the industry about implementation days. That is a critical factor here and we need to make sure that anything that is done is done with the idea of the operation of the industry in mind. And changing mid-stream will be very difficult. Specifically, I'd want to comment about Ropeless. Based on the proposed rule, and especially the BiOp the agency is attempting to move the US lobster fishery in the direction of ropeless. Maine DMR intends to continue working with, NOAA on the development of this technology, but we all need to work within the operational realities, and acknowledge that this technology is years away from use at any meaningful scale. Need to deal with these real challenges before the technology can be a reliable tool to protect whales. Gear laid down on the bottom, without end lines, must still be, quote, seen by mobile gear fleet. And others within the fixed gear fleet and ropeless gear must also be able to be retrieved, inspected, and reset by law enforcement agencies who enforce the lobster regulations. Let's not drive this issue of ropeless just to try to deal with the right whale issue when we also have to clearly manage sustainably the lobster resource. In closing I just want to reiterate a one size fits all managing approach will not work in Maine. it's difficult for Maine fishermen to see themselves as part of the problem when we have not seen any entangled right whales for more than a decade. It's time for the agency to finally recognize Maine’s risk to right Whales is very low compared to other areas. The agency knows this yet, based on your proposed
rule, compared to the BiOp, the economic harm, is far and away, greater domain, than in any other jurisdiction. Well, thank you very much, Colleen and staff, for the time this evening, we will be submitting, written, detailed comments, prior to the deadline. Thank you to the indulgence on the extra time.

Thank you Commissioner Kelliher. At this time, we're going to move on to comments from the public. If we have time at the end, we will get to questions but that's only if time allows depending on how many people are in the queue. So I see that people do have questions and we are getting them in the questions box. Just know that we may not get to them. OK, up next is Bill Mcqueeney. I've unmuted you, Bill, so you'll just need to unmute yourself.

Can you hear me, Kara?

Yes. I can.

Thank you. My name is Bill Mcqueeney and I live in Brooksville, Maine. I have been a volunteer, right whale scientists for more than 20 years. For the past 16 years, I have directed a school club called the Calvineers that studies the North Atlantic, right Whale. Each calvineer has submitted a comment letter to you. Tonight, I speak for another group I am part of. And it's called Mainers Guarding Right Whales. Mainers Guarding Right Whales Is Formed. Was formed by a group of concerned Maine citizens wishing to ensure the recovery of the critically endangered right whale. Mainers Guarding right whales supports both short term and long term initiatives to reduce the impact of the Maine lobster industry on the recovery of the North Atlantic right Whale. In the short term, we support the implementation of weak insertions throughout the entire vertical lines. We also support time area closures that reduce the risk of entanglements, substantially. Therefore, we support Alternative three of the proposed rule with a 50% reduction of vertical lines in Federal waters. And the three closures, Georges basin, LMA one, and Massachusetts south to the islands where a year round closure, makes sense. Finally, we support weak rope insertions, be included, every 40 feet in all end lines, in all areas Maine fishermen used, which is the way they were designed, tested and currently are being used. 1 or two weak insertions in an end line will not reduce the risk of serious entanglement. In the long term, Mainers Guarding right whales supports the reduction of gear in the water both through sustainable effort reduction and ultimately the complete conversion of the industry to Ropeless fishing. We also support the Maine Lobster fishery regaining its Maine Stewardship Council certification by adopting the innovations just noted. The Maine fishing industry have proved themselves to be incredibly resourceful and had tremendous success as stewards of the lobster resource. Over the last 10 years, 682 whale entanglements were documented on the East Coast in US waters that includes at least 25 serious or lethal and entanglements of right whales. A recent study has concluded that, for every documented right whale death, there are almost three more deaths not documented. Most likely, they are actually 2 or 3 times more right whales killed each year in the United States waters than we know. We believe this is both a moral and humane issue that the fishing industry needs to take responsibility for and work to change. Some fishermen are already working to change and help solve the problem. Mainers Guarding right whales, looks forward to the day where, fishermen could fish without harming right whales And the right whales can thrive in their natural environment. We believe both scenarios are necessary and possible.
Thank you. Next, Cindy. OK, Cindy, it looks like you're unmuted.

Hi. My name is Cindy Dawn. I am the wife and mother of three fishermen and a daughter that has a retail lobster business. We will be terribly impacted along with all the other men, women, and children in the industry. And future fishermen, my grandsons are planning on growing up as lobstermen as well. Is there any concern for human casualty you are creating? Is this small number of whales' more important than humans? The Maine lobstermen have always been conservation-minded dating back to the late 18 hundreds. We have repeatedly been told to and complied with, painting ropes, which requires months to do and then they asked us to do it again and again, changing colors and how many spots they want painted. It has been very difficult, watching my sons and husbands bring all their gear in to comply with these requests over and over. They also changed ropes, biodegradable bends, put in weak links over and over You have asked them to modify their gear and they did it. Are you taking into consideration the loss of income when you pull all of our gear out of the water for repeatedly for God knows how long it takes. These men do not catch whales. Why are you after them? So intensely with all that has gone on in the past couple of years. I have watched many, many fishermen's whose families depend on them to become depressed and unable to handle all that you throw at them. It brings me to tears just talking about it. What is wrong with a society that cares more about a pod of whales that are doomed to extinction due to inbreeding then a whole band of fishermen that are struggling and have no way to feed their families. These men and women, all and all of the big companies, wholesale companies, boat builders, trap builders, and many, many other companies depend, dependent on the industry are hurting both financially and emotionally. I think it is time for you to consider the loss of humans rather than whales. I am sorry, but the children in the State of Maine deserve your consideration of them. Their fathers are ready to jump off a bridge and who will care for their families. I am sick and tired of the very men and women who go out in the cold and risk their lives every day to never be considered in this formula. These men and women are hard-working Americans that deserve the right to lobster in peace. This industry has coexisted with Nature Forever. Leave them alone. They are participating in the most sustainable fishery in the world. They have historically fished these waters. The American Indians have had their fishing industry protected as should these men and women. It is time to stop this nonsense and think about human casualties and in closing, I just want to bring up that the ropeless fishing is never going to work. How are they going to know where everybody's gear or they don't tell each other where they're fishing. That's a very private thing in their industry And weak links you're going to end up with more rope in the water tangling up whales than you ever thought of. Thank you for your time and consideration.

Thank you for your comment. Up next is Sarah Stewart.

Hi.

Hi. Um. I feel very much for people who are having to change their lives because they are fishermen or related to fishing in this industry. And I can really appreciate how hard that is. Both personally and well in a bunch of ways. But I also do want to speak up for I have a place in Maine. I'm also in Massachusetts. And I love whales as do a whole group of people who I go watching doing Whale watching with. And really, I'm holding the perspective of that. Whales are
incredibly precious to our planet, and that human beings do have the extraordinary capacity as a
group to grow and change. And I'm a therapist by profession, so I know how difficult it is for
individuals to have to grow and change. But in fact, we can shift into doing different things if we
have to. And the extinction of these incredible mammals who can't actually speak up for
themselves would be forever and an enormous human loss like the many other extinctions that
we cause. Unless we change our ways. So I want to support all being done for the right whales as
much as possible. And, um, and I actually would support whatever is most going to protect them
and trust that human beings will find a way to sort this out over time. Because we are intrepid
and are able to do that. And that's all I have to say. Thank you.

Thank you. Up next we have Maya. Made this joke the other night, but it's not imagine that I'm
running around a crowded auditorium with a microphone. That's, that's me finding you guys in
the attendees list, So it might take me a second, so just bear with me. Maya, you should be able
to unmute yourself.

Can you hear me?

Yes.

OK, great. My name is Maya and I'm an Oceans Intern with Environment America. We are a
nationwide network of state based non-profits dedicated to protecting our air, water, and open
spaces. We have a chapter in Maine called Environment Maine. I'm testing, I'm testifying at
today's hearing, because I like many environment America members love our oceans and wants
to do everything we can to keep our ocean wildlife safe, and healthy. When I was a child, one of
my most memorable experiences was going on a SCUBA diving trip in the ocean. Only a small
distance from off shore. The amount of life was astounding, filled with sea stars, and colorful
small fish. The bountiful life held underneath the surface is one of my favorite aspects about the
ocean. And this memory always comes to mind and people ask why I care so much about
protecting the life, the ocean holds. North Atlantic right Whales, which swim right off the Maine
Coast are one of these animals that call our oceans home. Tragically, this species only numbers
at less than 360 whales. If we don't create strong policies to protect them, this species could
vanish from our ocean forever. We want to create a healthy future for our oceans, where future
generations can continue to wonder at all the treasures our oceans hold. as I did when I was little.
We have to start by standing up for our most vulnerable species, like the North Atlantic right
Whales, as written in the proposed rule fail fails to give right whales the protections they need, as
it doesn't do enough to prevent one of their top causes of death. I urge you to formulate a much
stronger rule, keeping in mind the following considerations. one, the draft rule is based on
outdated population data. To best protect the species, you must use the best available science,
and this means using updated population counts. Two, additionally, the proposed seasonal
habitat closures in the rule will not do enough to prevent right, right whale entanglement in
fishing gear. The proposed closures to vertical buoy lines are too small and too short and
durations. Three, weak rope, another major tool used in the rule is not a proven effective solution
to preventing fatal or seriously damaging entanglement events. Organizations, including Pew and
the Conservation Law Foundation, have recently petitioned NOAA to take emergency action.
And we at Environment America echo those words. The agency should close certain areas to the
use of vertical buoy lines immediately until a better set of rules is proposed using the best
available science. We think this set of rules should include larger and longer plan closures for right whale habitats that prohibit commercial fishing. We also would like to see this rule take concrete steps towards creating a pathway for the eventual widespread adoption of ropeless fishing gear. I urge you to do everything you can to save our right whales. We can't let the species disappear on our watch. Thank you.

Thank you. What's next is. Brennan strong, Brennan, you should be able to unmute yourself.

Yeah. Can you hear me?

Yes.

Hey, thank you, everyone, For your time and consideration tonight. My name is Brennan Strong, Lobstermen Entrepreneur and Nature lover from Yarmouth, Maine. Can we please have a serious discussion about pausing the new vertical line, process, immediately, in light of Maine, Department of Marine Resources, comments? On the biological opinion, the Department of Marine Resources Comments prove beyond a doubt that the biological opinion is both inaccurate and incomplete. In the meantime, NOAA and NMFS need to do a study specifically on the decline in ocean going vessels in 20 20, due to covid 19 and the positive effect that had on the population of the North Atlantic right whale. The CDC issued a no sail order for cruise ships in 20 20. Almost all Maine lobsterman, however, deployed a normal number of traps. Two right whales died in 20 20, neither from entanglement. How can I willingly sacrifice my operation to accept deadly regulation changes, when there's no proof that the regulation changes will help right whales? NOAA own suggestions in their Vessel Speed report plus other evidence backed vessel regulation, suggestions should be fast, tracked immediately to protect whales from vessel strikes. The North Atlantic right Whale deserves 100% compliance on vessels, speed, and route regulations. NOAA has the power to demand 100% compliance. Current compliance is far below that. We cannot have a legitimate discussion about new risk reduction regulations for fishermen, when it has been proven by the Department of Marine Resources in their comments that the risk assessment calculations are flawed. How can you propose a closed area without giving State and area specific gear marking a few years to create legitimate data? Any closed areas at all will cause extreme financial stress as well as gear conflicts for fishermen. What is the latest data on whale's being able to see? Potentially red or orange end lines. Has that been studied? I watch healthy whales, porpoises and seals navigate dense vertical lines every day with ease. They are very intelligent creatures. What is the optimum line scope to avoid entanglements? What is the most whale safe way to use a tide buoy? It sounds like you are unsure if buoy breakaways even work. How can this be when we have been using them for years with positive results? Why are some of these more common sense solutions being skipped over in pursuit of ropeless gear that will never work? Ropeless gear would be a disaster for everyone. The cost alone would put me and most others out of business, as well as it being unenforceable for marine patrol. Why are there no offers from our government to pay for whale safe endlines and buoys? We truly want the whales and all sea life to prosper. And I mean that, but we also need our coastal communities to prosper too. Thank you.

Thank you. Brennan.
Next up we have, Erica, Fuller. Erica?

Thanks, Kara. Can you hear me?

Yes.

Thank you, I'm Erica Fuller and I represent the Conservation Law Foundation. I also serve as an alternate on the take reduction team. Starting in 2017, scientists unanimously agreed that right whales are dying at unsustainable rates and that immediate action to address entanglements and ship strikes is necessary in both the US and Canada. For several reasons, CLF cannot support this proposal, or the deeply flawed framework that presumes to take another 10 years to comply with the Marine Mammal Protection Act. It is destined for failure and it needs to be redone. First, the risk reduction target of 60% needs to be revised. It is based on outdated population estimates, outdated mortality estimates, and then outdated PBR zero point nine. Using NMFS's own data and methodology in the DEIS, new population estimates, the current PBR and estimated annual deaths in this gear including undocumented deaths. Risk must be reduced by more than 80%, given that no alternatives in the DEIS achieve such reductions, additional and more protective alternatives need to be identified. Second, the rule relies far too heavily on weak rope and weak insertions. Weak rope does not prevent entanglements. It does not reduce sublethal impacts. It does not protect the most vulnerable animals, and it is not a viable option in the offshore fishery. It is unfair to ask fishermen to invest in gear modifications now that they will later be told, we're never enough to save the species. Third it’s not clear that the seasonal closures proposal would result in the risk reduction predicted. Some segments of the industry will be unable to remove their gear and will ultimately redirect this effort somewhere else. The proposed rule does not appear to analyze this redirected effort or the associated risks. Fourth, the efficacy of any new rule requires a well-established monitoring and enforcement plan which this proposal currently lacks. As part of this rule, NMFS should require 100% harvester reporting. And vessel tracking systems on all federally permitted boats. NMFS should also significantly increase its aerial survey effort in order to better understand, right whale, location and behavior. We appreciate that this rule incentivizes ropeless fishing, but acknowledge the need for additional input from industry before this technology is commercially operational. We urge NMFS to prioritize this transition and seek additional funding from Congress immediately. In the meantime, for those areas that pose the highest risk outside of the closures, NMFS should require a single vertical buoy line on all trawls, CLF, urges the agency to revise this proposal. Implement the emergency measures requested in our MMPA petition submitted with partners on December second, 2020. Expedite the rulemaking requested in our vessels strike petition submitted on August 6, 2020, and aggressively engage in open and transparent process with Canada to ensure that appropriate risk reduction measures are implemented bilaterally. Thank you.

Thank you. Eben? You should be able to unmute yourself.

Yeah. Hello, This is Eben I’m a Monk fishermen, Ground fishermen and Lobstermen out of Kennebunkport and Portland, Maine. Um, I guess I am opposed to running ropeless buoys and whatnot. I feel like the whales have been safe from us for many of years, and I've been able to fish around them with Gillnets, as well as lobster traps and not had any issues ever. Never have I ever had a whale entanglement And that I feel like that $15,000 a buoy is kind of ridiculous and
absolutely unacceptable to expect small boat fishermen to be able to afford. At 1 buoy for $15,000 like a lot of guys, they're string of gear cost, them than 60,000 So four buoys, a lot of guys run, triples, doubles, singles fish up inside. I don't really see where that would work out all too well unless the government was to pay for it and I don't see how the government could ever cough up that kind of money, and a lot of the buoys are really, really heavy. I am actually working with a group of people to try to, I was working on an EFP to get into closed areas, to fish monkfish gear. And it was, that is $15,000 a buoy. I don't see how the Maine lobstermen can afford that. And it'll drive all the small boats out. I am now 1 of 12 ground fishermen left because of what national marine fisheries has done with the PTMS program. That was an absolute failure. It drove all the small boats out of the fishery and is now 12 small boat gillnetters left in the northeast. That is a very small number, it is very sad it came to that. All it is a big boat fishery now. Uh I. Don't want to see that happen to lobstering, and price guys right out of it, end up like deadliest catch where those 15 boats own all the quota and all big boats. It should be for a young people that want to work hard and make a buck. They should have the opportunity to be able to do it and having really expensive gear will price, all of the young people out of it. It is absolutely unacceptable. That's all I have to say. Thank you very much.

Thank you. Madison Lynch, coming to you next, You should be able to unmute yourself.

Hi, can you hear me?

Yes.

OK, great, yeah. So my name is Maddie, and I'm a college student from Dartmouth. And over the past few years, I've spent a lot of time studying right whales and all the different threats facing the population. So if things continue the way they're going, right whales will become extinct. NOAA’s own scientists recognize that right whales are dying at a rate that's very concerning and attempts to blame, to ship this blame to Canada. It does nothing to help the whales. Really, the fact is that their entire migration path is cluttered with millions of vertical lines and that does include the Gulf of Maine. So I understand that Maine lobstermen and have been working to modify their gear over the past few years in an effort to save the whales. But we need to keep moving forward. There are solutions that can benefit both right whales and the fishing industry. And most importantly, ropeless fishing gear is that option. So NOAA scientists have been studying ropeless gear for over 20 years. And we need to act now to move ropeless gear forward. The proposed rule change, needs to fast track permits for ropeless gear and also provide a funding mechanism so that this technology can be widely accessible to fishermen. Thank you.

Thank you, Gib Brogan coming to you next. Just Sang the ABC song in my head to get to the Gs. You're unmuted, you can make your comment.

I'm unmuted there. There I am. Good Evening. My name's Gib Brogan. I'm a campaign manager at Oceana. Oceana is the largest international conservation organization solely focused on protecting the world's oceans. With one point two million members around the world and over 340,000 members in the US Atlantic seaboard, We appreciate the opportunity to comment on the risk reduction rule that's proposed by the agency. The rule as currently proposed is inadequate
for the job. First off, it aims at a target. That is outdated. The 60 to 80% reduction is based on outdated information, and needs to be updated with current estimates and current information and then revised based on that target. The tools that are proposed are also inadequate. Time area management is a good first step, but needs to be expanded to include both seasonal closures in known aggregation areas and the authority of the fishery service to react with dynamic management to respond to unexpected aggregations of right whales. The primary weakness of this proposal is the reliance on weak rope. Weak rope, as discussed in the EIS, relies on two scientific papers, both of them are theoretical. And both of them are focused on adult right whales. The weak rope. If in fact it does work as proposed, will only protect adults, provides very little protection for juveniles and calves, and doesn't reduce takes under the ESA, will only reduce, in theory, reduce the lethality of the takes. Finally, the range of alternatives that are included in the EIS is incomplete and inappropriately rejects a number of proposals and ideas that were put forth during stakeholder scoping process. The agency should revise the EIS and properly analyze and consider those alternatives. Going forward, what should the agency do here? The agency needs to significantly improve the document and strengthen the conservation measures that are included in this to provide a clear path to protection of right whales from this known risk. If the agency doesn't approve or improve the proposed rule at this time to offer this protection, we suggest that the agency revoke this rule and go back to the drawing board and put interim rules in place that will offer immediate protection. Not in that 10 year timeframe. But this summer, right whales don't have time to wait. Oceana, Thanks you, for the opportunity to comment, will be submitting written comments before the deadline. Thanks very much.

Thank you. Matt, Gilly, you are up. Next. You are unmuted. You should be able to unmute yourself.

Hello. My name's Matt Gilly, Lobster Boat Captain up in Harpswell Maine, and I just wanted to start off and reiterate what Brennan said Earlier, he hit a lot of major points that I was going to hit, so I'm going to try not to repeat anything. Um, I think one thing that I've heard so far is both parties, whether we're fisherman or on the environmental, the environmental side. We all agree on one thing, and that is that the data is flawed, in what direction that remains to be seen. But, when you have two groups, that, both are telling you the data is flawed. It might be time to look and say maybe the data is wrong, or even your own data says that if we remove all end lines out of the water, the population of whales is still going to plummet. So I guess, why are we taking these efforts? It's not going to help, even if we removed everything. I was at a NOAA meeting early or late last week, where it was said that NOAA has difficulty enforcing vessel speed. Because of the transit between state and federal waters and everything like that. I find it ironic that they have a difficult time enforcing vessel speed because of where the vessel may be, but they can seem to enforce regulations on us. Ah. Who's going to tell my family when I don't come home that the reason I didn't come home is to save a whale that nobody's ever seen? There's been no risk assessment done on the risk that the fishermen are taking it. It's all about a whale that none of us have ever seen by. No means do. We want to injure this whale when we would love to see it flourish. But this is a whale that nobody, I know has ever seen. And I'm going to end with, I guess, a rhetorical question. Is there anything that any of us fishermen could say that would change anyone's mind or is this just merely a process that is being done because that's the legal way it has to be done? I’ve gone through this before. It's rare that anything happens. I feel like I'm wasting my breath. Thank you.
Thank you, Matt. Next step is CT Harry.

Can you hear me Kara?

Yes, I can.

Great, thank you. Um, my name is CT Harry. I represent the International Fund for Animal Welfare. I'm a Marine campaigner. I’d like to start off by thanking Colleen and the NOAA team for, for holding these meetings and allowing me the opportunity to provide comments tonight on an extremely complex problem. But, one that I feel has an answer, I'm an alternative member to the Take Reduction Team with IFAW and reviewing this proposed rule. I think there's three areas that I'd like to briefly address. We've heard it tonight, The risk reduction goal. back in April of 2019, it was believed that approximately 60% would be the best that we could hope for. That would be enough for risk reduction. Well there has been 13 deaths since that time period and the situation is even worse than we realize. With the hindsight of almost two years of additional data and continued decline of the population, that risk reduction needs to be increased to 80% to ensure that the deaths and serious injuries do not push the species, past, an Irrecoverable tipping point. Second regarding, uh, 1700lb breaking strength, breaking strength line. Weak rope. Weak ropes, are an interim solution. And they're an interim step at best. Weak ropes do not not remove the vertical lines from the water column and therefore do not reduce the risk of entanglement. We know that weak ropes will not protect calves or juveniles from lethal entanglements. It does not protect adults with chronic entanglements, from the long term health impacts. The burden of proof shouldn't be a dead carcass. It should also be the sub lethal effects of entanglement. And if weak ropes are used, the entanglement threat is still there. And finally, regarding ropeless, we urge the agency to increase incentives. And assistance to fisherman to transition to this technology, moving forward. We recognize that this process has occurred with the inclusion of ropeless in some areas and particularly some of the closed areas. But more needs to be done particularly over for a streamlined permitting process that allows fishermen to use 21st century technology to harness their innovation. And for them to be part of this solution of removing the of the removing, the vertical line threat and saving the species. This is the solution. This is a solution that can keep fishermen on the water and keep right whales alive. My colleagues at IFAW and our partners, including leaders in the fishing community, are resolved that the right whale cannot go extinct on our watch. State and federal officials and regulators should reflect that same resolve. I think more reflection and attention is needed to improve this proposed rule. We Welcome. We would be submitting further comment in written form later on, and thank you again for chance to speak.

Thank you CT. Star Scott. I've unmuted you. You'll also need to unmute yourself.

Thank you. Can you hear me?

Yes.

Great. Thanks so much for this opportunity to speak with you today, and thanks for having this hearing. I just wanted to say that fewer. So I work at a I'm a scientist and wildlife biologist, and I
work at an R one research institution. I'm in Georgia. Fewer than 375 right whales currently exist on the entire planet. And since 2017, at least 46 right whales have died because of boat strikes and entanglement in fishing rope. So most right whales migrate over a thousand miles each year, traveling from their feeding grounds off of Canada and New England to the warm shallow coastal waters of South Carolina, Georgia, and Florida’s coast. So right whales first give birth at an average, age of about 9 or 10, and they have a gestation period of almost a whole year. And what this means is it impacts to right whale populations take a long time to recover from. We have to be very mindful when we're, when we're determining what to do here. So I know, according to NOAA the proposed changes are going to reduce, right whales encounters with fishing rope in gear by 60%. I wanted to request that NOAA recalculate the risk reduction with up to date data, and publish a rule that achieves a minimum of 80% risk reduction. So I want to support what's going to most protect right whales, knowing that humans are resilient and will adapt. So right whales have a right to live. I have a deep compassion for the fishermen and lobstermen and the families impacted by these efforts. I do feel that we need to find solutions, which will work for both whales and people. The fishermen and the lobstermen don't own the right whales. They don't own the oceans and they don't get to make decisions for an entire future, for the future of an entire species. So scientists should be making these decisions. And I would humbly request that you don't show favor to industry or state agencies, such as not even having to adhere to communication standards and time limits of this very hearing. Preference should be given to right whales. They don't have social safety nets, people do. They don't have voices, but we do, and the loss of a species, the loss of biodiversity not only impacts those of us who love whales. It impacts the entire planet by creating an ecosystem imbalance, and would also contribute to climate change which impacts communities all over the planet, especially marginalized and minority communities. So according to an analysis by the International Monetary Fund, whales provide the critical ecosystem service sequestering carbon in the ocean, and this service is estimated to be worth millions of dollars per whale. I know a lot goes into this. I just want to thank all of you for your time, and consideration, and Thank you very much.

Thank you. Dustin Delano. You should be able to unmute yourself.

All right, thanks. Good evening, my name is Dustin. Lobster fisherman from Friendship ME. First of all, I'm commenting to urge you to accept the conservation equivalencies provided to you by the Maine Department of Marine Resources. It would give each zone the flexibility to comply with the percentage of risk reduction in their own abilities. Second, I’m urging knots being available source for weak rope links rather than sleeves and whatnot. Third, national marine fisheries has drastically underestimated the amount of fishermen actively fishing in the LMA one closure. I do not support closures in the Gulf of Maine. There a slippery slope. And as we can see from Massachusetts, they get larger, and they stay closed for longer. Fourth, fishermen need an appropriate timeline for gear reconfiguration. I urge you to implement the new regulation between seasons or the downtime in fishing. Fifth, I want to emphasize that environmentalists' know nothing about fishing. They know nothing about our lives, about our communities and what we strive to take care of every day. They do not have the right to tell us how to fish and they do not have the right to think that they are better people than us. Fourth, the future for all Lobsterman is at stake. Maine Lobstermen have created themselves one of the most sustainable fisheries in the world. We have coexisted with marine mammals for decades and the health of the ocean ecosystem is one of the most important things to us all. Maine lobstermen are real people.
As some commenters have inaccurately stated we can't just do something different. Our entire life savings are tied up in this industry along with the blood, sweat, and tears associated. There is no way all Maine lobstermen can accomplish having a ropeless fishery which would appear to be the 10 year goal. 90% of us will have to find something else to do. If that's the case, who will buy our mortgaged boats, our homes our wharves our trucks? who will help us feed our families and help send kids to college, will there be a buyout for fishermen if the livelihoods are destroyed by their own government? Before government interference based off bias, inaccurate information and false right whale counts, fishermen wouldn't need help but if our government is going to destroy us. We're at least owed a way out if we can't survive. Thank you.

Thank you. Renee, Renee. You should be able to unmute yourself.

Thank you. Just because these mammals do not look like us, just because they do not need opposable thumbs just because they have evolved to live seamlessly and harmoniously in their environments such that they don't need buildings for shelter or infrastructure for transportation. Does not mean that they are not otherwise just like us. They have complex and immense feelings, love, fear, compassion, sadness, the sense of loss of a loved one. With this in mind, I want to appeal to your sense of right and wrong. Your morals and ethics. if these proposed measures would not be enough for humans, they are not enough for whales. If doing too little would feel wrong to you. In the case of saving humans, it should feel wrong to you in this case of right whales. So, please do what is right.

Thank you. Next, we have William Clayton. Hello, William you are unmuted can you hear me? I can see you are unmuted.

OK, can you hear me now?

Yes, I can.

So I just swapped to a Chromebook I'm getting used to it. My name is, Will Clayton I'm a sternmen for my father-in-law on a family owned island called Green Island here in Maine. I'd like to start saying with the Onset of covid and the reduction in shipping traffic. And near complete stoppage of cruise lines, it has proved undoubtedly what the precipitating factor in right whale deaths are. And that's ship strikes. Can you please explain to all Maine fishermen and families how you continually push the theory of entanglement deaths while not having the gusto to rail against shipping and the cruise lines? I referenced RW, SAS, which is NOAA’s own, personally, developed right Whale sighting advisory system. And I always look at that constantly to see where the migratory patterns develop. In fact, I keep it on my cell phone at all times to show people. And year after year, you can clearly see once again through NOAAs own application, that the right whales do not come close to the coast of Maine. How on Earth you continue to push lobster line entanglement when the real cause is as blatant as the propeller marks on a whales back. We are sick, think of, continually bending over backwards to incorporate time consuming and costly, quote unquote upgrades to the gear. Now we can fully understand why the real cause is not being addressed. It's big money. It's politics. We get it. You referenced it today when you said just how many thousands of comments came in from conservation groups and a few from fishermen. We get that it's an uphill battle for your agencies
to fight them, But someone needs to step up and they need to do so now, If you continue down the same path and bleed us all dry, and lobster fishing is gone, you will still have ship strikes being the cause of right whale deaths. Will everybody fight them at that point? And I got to say, in closing, I find it ironic that every single previous commenter tonight, that was part of a conservation, didn't mention cruise lines, shipping, nor did they mention Whale watch agencies. I find it extremely ironic that there's a love affair with an entity which is whale watching that actually takes money from patrons and goes out multiple times a day on multiple vessel's owned by multiple companies to find and harass whales. When Lobsterman do everything they can to stay away from them, including the right whales, which we don't ever see anyway. So, where are the hearts of the conservation agencies, when are they going to rail against shipping, cruise lines, and whale watch agencies, thank you, everybody for your time tonight.

Thank you Jarod Bray, you're up next I’ve unmuted you, you can go ahead and unmute yourself.

Can you hear me?

Yes.

OK, I'll try to make this short and sweet. So really what it needs to come down to is, we really need to start tracking the whale's. I know people have brought it up plenty of times, but it's really frustrating that I think we can all get on that page. You know, lobstersmen, scientists, environmentalists, I think we just need real data. Not educated guesses, it's I mean, we just put a rover on Mars. Why can't we tag a whale? I just, I don't know why we haven't gotten to that point yet. Getting off that, I was curious to why we ended up with a October to January Closure. That impacts a rough guess would be 75 to 80% of, you know, our lobster season out in that area. Realistically, a spring closure would be a lot easier on us. And I would assume that whales migrating, coming and going, that would pose the same risk? I'm not really sure. But that would that would really help out the fishermen, if there was a closure, if we could move it into the spring fishery, I believe. Also, I'd like to say that if ropeless was implemented, I don't believe there would be any change in whale deaths at all. Because realistically, we're not a big enough threat that's been said a lot of times. And I know, I know scientists and environmentalists really don't want to believe that. And I don't know how to make them see that. That's the truth, but it's, you know, it's hard for them. In other states, You know, reading the report isn't really the same thing as being on the boat, and seeing it with your own eyes. They're just aren't right whales around in our area, I'm I fished in that closed area. for 5 to 10 years. I've literally never seen a right whale. So, you know, lack of understanding, shouldn't lead to policy making is, you know, it's just very frustrating on our end. But the other part is, the whale population has increased in the last 20 years, if I'm not mistaken. And our fishery has stayed the same. So it just, it doesn't seem to make sense to all the blame should fall on to us, or really any of the blame actually. But thank you for allowing me to make a comment, Have a good night.

Thank you Jarod. Douglas Mcclennan? Oh, yes you were just unmuted. There you go.

Can you hear me?

Yes I can.
My name is Douglas, I'm commercial fisherman from Spruce Head Maine. I'd just like to go on the record as agreeing about everything that Pat said. And a lot of everything else the fisherman said against this modification for us. And I would even go on to say, I agree with most of the environmental groups that have spoken tonight that the data is outdated. It's just not good data that we're getting regulated by, not going to spend a lot of time here I didn't prepare a speech, like a lot of these people did. I just was listening to all the opposition to the fisherman, and I figured I ought to just get my word and say something. So, basically, what Pat said and what Dustin said. What Will said, What Jarod said is how I feel, you'll find that if you could question, lobstermen on the coast of Maine We all pretty much have the same outlook on this. We never see these whales. You could get rid of us. The whales are still going to be killed by ship strikes. Their own model that they use is flawed. It even shows if you took every endline out of the water, the whales are still going to decline. So I don't think we're at a problem. I guess that's all I got to say. Thank you for letting me speak.

Thank you. Zach Klyver, you are. Next. You just unmuted, you just muted yourself again. I can see you're unmuted, Zach, but I can't hear you if you're speaking.

You hear me now?

Yes, I can.

OK, thank you. I'm Zach with Blue Planet Strategies. I grew up in a Maine fishing family in East Port and fell in love with the ocean and became a whale watch Naturalist, and did that for 30 years from Bar Harbor. I've been on over 3000 trips, in the Gulf of Maine, I saw on those trips dozens of times. Right whales on one trip in August. We saw seven right whales on a trip. I've also helped in leading winter surveys for Right Whales in 2010, 11. We did a number of them out off the Coast of Maine. And Jordan Basin. And we saw a 35 right whales on one trip. I've also over my career encountered dozens of whales, entangled, humpback, finback, and minke. And I've spent many necropsies and seen whales those whale species entangled in Maine lobster gear. And those were the most of those entanglements I just mentioned were: Maine gear. Um, I want to say that on page 10 of the DEIS The numbers of known entanglements during the time period between 2010 and 2018 in the waters between Canada and the US are given. And over that nine year period. The document points out There's 267 minke whale entanglements 264 Humpbacks 89 right whales and 62 finbacks For a total of 682 entanglements. That's an average of 75 whales per year, and it points to the crisis situation that we're in and that we've been in for a long time. So I do not support any of the trawling up provisions in this DEIS Because they add more traps in weight to each endline. And I believe they make them more lethal. I hope the agency will conduct additional analysis of the risks to pose to whales from adding more weight to the trawls. I do support Alternative three, um, to reduce endlines by 50% per month. For 15 years, there's been a serious discussion among fishermen and I have a lot of really great lobster fisherman friends that I value. Some of my best friends are lobster fisherman and I've heard the discussions about Trap reductions and about entry into the fishery. There are numerous studies that show that reducing effort will not equal necessarily or poor proportional reduction in catch. The research that Carl Wilson conducted showed around Monhegan in the closed area that when you went from 800 traps to 600, 600 caught almost as much as the 800. And there's been
research done in Nova Scotia, the Myerson/Moore paper that showed that with 300 traps the fishermen had very high catch rates. That trap reduction will also dramatically reduce costs, and fuel, bait, wear and tear on the boats and gear. Additional conservation risk is still needed, so I support Alternative three provisions for closures and weak rope with these caveats. I support the three Area closures and the one.

So, sorry to interrupt you. Your three minutes is up but we can put you at the end of the list and if there's time, we can circle back to you.

OK, Thank you.

Thank you so much for your comment. Gina, I'm coming to you. Next. You should be able to unmute yourself.

I think I just did that. Can you hear me?

Yes. We can.

Hi. Hi. Good evening. Thank you for giving me a moment to support some of the comments that we've already heard. My name is Gina, Gary. I've already submitted written comments to the website. However, I did want to weigh in this evening specifically, um, and note, many of the comments made by the fishermen here in Maine, I reside in Portland, Maine. I'm the State Director for Animal Wellness Action, and I'd like to support the comments made by my friend and colleague, Zach Klyver, who just spoke before me. Also, the, the emphasis placed on updating data by Erica Fuller at Conservation Law, Gib from Oceana, as mister Scott from IFAW And to all of the fishermen, I will I just want you to know, I was pulling up traps at the age of 11 with my brother in Massachusetts Bay. So, I do understand the need to maintain their fisheries and healthy fisheries. So I want to reference my comments of the August ninth, 2019 scoping hearing that you held in South Portland, Maine, in which I commented on. As one of our scientists did this evening from Georgia, the importance of the whales presence, all of the whales, all species of whales to the Gulf of Maine, to the health of their fisheries in the long term health of their families in the fishing industry here in the great state of Maine. And I know that all of the fishermen want to make sure that these animals are looked after, but Zach is, right. The truth is 83% of the right whale population show, entanglement scars and that's been documented. So that's not a false approach. We do at animal wellness action support a revision to your rulemaking effort to increase what we find the level of reduction of risk, to from 60 to 80%. We do support further research. And we do support in terms of the use of weak rope. But we do support. We do not support the trawling up of additional traps as a danger to the fishermen. And we do support, um, bilateral work from the Congress and appropriate funding vehicles for these fishermen. And their families to make whatever changes they need to make to come into compliance with protecting. Um, all of the whales in the Gulf of Maine, all of whom are currently listed by Maine statute as endangered species here in their own state. So, with that, I will say thank you for the time to speak with you this evening. I do really want to also add that, as Canada has done, could we consider funding a funding vehicle for observation of whale migration and population patterns in the Gulf of Maine? And bring that up to speed with what Canada has already been doing. Thank you.
Thank you, Caroline Coburn, you're next, you should be able to unmute yourself.

Hi, my name is Caroline. I grew up in Portland, Maine, and I'm currently a senior at Boston College. Some of my favorite memories of home include sitting by the water and visiting the lobster shack. I've even had the pleasure of learning how to lobster on a commercial fishing boat. I'm studying to become an elementary school teacher, and worry that my students will not have the chance to ever know the majesty of the North Atlantic, right whale. North Atlantic right whales are one of the most endangered species on the planet. And if we don't act fast, they could be extinct in my lifetime. What's worse is that the young children I want to teach may only ever see a right whale in a history book because they could be extinct fast. That disturbs me, how can we let a beautiful species die off when we know that there are stronger solutions out there to save them, the modifications in your plan don't do enough to help save young right whales and calves. The new generation of whales desperately needed to bring the population away from the brink of extinction. Weak rope and links are not a long term solution, but ropeless gear is. Ropeless gear devices have been created specifically to prevent marine life entanglements for mammals like the North Atlantic Right Whale. ropeless gear is real. And it works. Period. Fishermen are using it on the West Coast, in South Africa and in the UK and Australia. Why can't we be doing the same thing over here? Ropeless gear will help us save the livelihood of the men and women in our coastal communities that harvest lobster while also ensuring right whales can remain safe and most importantly alive. NOAA, please implement, implement ropeless gear in your plan to save right whales. Thank you.

Thank you, Hayden. Hayden Brewer. You are unmuted, you should be able to make your comment.

My name is Hayden Brewer, Can you? Can everyone hear me?

Yes, we can hear you.

Um, one thing that I'm going to comment on that I have not heard so far. I came in a little late, so I don't know if it's been talked about. My question is we are focusing on Lobstermen, but there is something that is going to very in the near future, going into Maine's waters, and that is the wind turbines that are going to be out at sea, and unlike the breakaway lines that we already have on our lobster traps, I'm also a 9th generation Lobstermen for the record, um, unlike the Breakaway lines that they have. I don't believe that lines on the wind turbines are going to have breakaway lines, because then, that wind turbine is going to go away or the power line that brings the power back to the mainland is going to go away and that renders it useless. So while Lobstermen are being looked at and I hope the cruise ships will be looked at as well, because they are going to be lines heavily placed in the water. And that's what I have to say.

Thank you so much, David. Not going to pronounce your last name, I have a hard one to that if it makes you feel any better.
Don't try. It took my classes until third grade were able to. I want to point out that my background is my 53rd year, lobstering. Prior to that, I was in pre-med. I did four years on my doctorate, Marine bacteriology, and taught chemistry for 13 years. So, my background is scientific but this is my 53rd year lobstering. And I raised a family of three daughters doing it. What I've seen and don't think that I'm not a part to it. Tree hugging, granola, eater, I love nature. I love the water. I sympathize with everybody that's spoken tonight. But what we have to look at here is data. What I see and reading and reading the publication that you put out, NOAA put out, it's quite evident that there is no empirical data that supports what we're asking fisherman to do. And until we get that empirical data, we're not going to have any direction. We're not going to, we're not going to know where we're going. So I strongly urge to regroup, get some data on where these whales are, what they're doing, don't impose, rules and regulations on fishermen that are not going to be impacted by the whale's presence. Only subject these areas where the whales are known to be, but it's obvious that we don't know where they all are and when they're going to be there. So you have to go back, regroup, and then come up with another program. Breakaways not the answer. Well, we're not going to get into it. But anyhow, you need your data. And it's very important that you put it all together and then we come up with a brand-new program. So I sympathize with everyone, all sides. So, thank you for your time and we'll go from there.

Thank you. Chris Smith. I'm coming to you. I'm not sure if you have a comment, but I just want to make sure.

Yeah, can you hear me?

Yes, I can hear you.

OK, thank you, so my name is Chris Smith, I'm a 30 year old 30 year Lobsterman from Monhegan Island. And I would really urge NOAA to listen to the comments by Commissioner Kelliher with Maine DMR There is no one size fits all solution. Um, I'll also echo what David just said, the data is flawed here. Folks. It's very, very flawed it uses data from, you know, a decade ago. And I really would hope that some credence would be given to the fact that we've had very few entanglements this year. And it's been said, many times tonight, that the lack of cruise ships in the Gulf of Maine this year have a big part in that. And I really would hope that that gets looked at closely. And I would also encourage NOAA to really step up surveillance of where the right whales are that seems to be also flawed. So I know there's others that want to talk, so I'll sign off, And I thank you for your time tonight.

Thank you, Chris. Jack. You should be able to unmute yourself.

Yeah, can you hear me?

Yes.

Alright, so, I'm a 19 year old lobstermen out of Yarmouth Maine. I would just like to comment that this these, when you're making these trawl regulations, you have to come into account a lot of people. My age who come into this industry We don't can't afford a 40, 45 foot boat, you know, even a 35 foot boat. I was just fishing out of a 22 foot Eastern. And I was, and I had to
fish inshore, which was good out of that size boat, but if I were to upgrade to something like 25 or 35, but that wouldn't be big enough for me to fish. Fish off by you know 3-6 mile, so there has to be a way for, for lobstermen like me to be able to get into this industry. Now, I'm lucky enough that I was able to make enough money beforehand to get in, get into this and get a bigger boat. But a lot of people are not, a lot of people, are going into this. They don't have they don't have a financial backing that I do. They don't have when they try to go into this. They don't they just can't afford that big boat And as a result they are forced to only the fish in the summer and it's hard to make money if you only fish in the summer. So you got to keep that in account as well for the financial costs for the younger fishermen, for the rules. Thank you.

Thank you so much. OK Troy plumber. You're unmuted.

There we go, I think I'm unmuted now, I’m a lobstermen, from Boothbay Harbor just going to run through a quick list. A few things here. Where a right whale isn't there zero risk imposing restrictions where a whale isn't makes no sense it has no benefit to a whale, And only affects fishermen. Canada's been flying flights, spot whales. It seems like to me, the tagging whales are spotting whales is the best way to both protect whales. Allow our fishery to continue. It's been awhile. But I seem to remember in a meeting a long time ago, that 90% or more of the rope taken off the Entangled Whales has been large rope 6-7/16 or larger. You don't know where Maine fishermen fish. You don't know how we fish. We haven't been doing 100% reporting. And that's probably hurt us in the long run. A lot of this is just guesses. I've heard the population in this meeting at the beginning, NMFS was talking about around 400 whales. Some of the eco groups are saying around 365 whales. It seems like a lot of this data. It just seems to be incomplete, and there's just not enough data out there. We sit there and watch the PR from the media Against Us. They show a picture of an entangled whale and we're looking at it, it's like inch thick rope. with these Massive Polly balls, nothing that you know, Maine near shore fishermen use. And we know that, the public doesn't, I'm not sure these eco groups do, I'm not sure NMFS does because there's no concrete data on how Maine fishermen, fish and where they fish. The population of these right whales was somewhere around 250 you know years ago. Some around 2000 and it rebounded all the way up to 500 whales. While our industry was moving right along with a lot less restrictions than we have now. Apparently, there's a lot of other fact factors affecting these whales. I'm not sure if a whale gets bumped on the head by a ship's, more likely, or not to swim into a rope and get entangled. And in the end, the NMFS and the agency has no accountability. If you're wrong, this round and the whales keep going down, you can say, Well, we didn't do enough, and you can do more. We have everything to lose. And in the Eco groups, non-profits, and the federal government, you have nothing to lose, you know, just keep regulating, see what happens, keep, keep finding out. We're sitting here, paying the cost, means very beginning of this meeting, and I think it'd be interesting to talk about it more, the idea that our 600lb Breakaways on our buoys may actually be hindering the Whale's ability to snap the rope if they are entangled in it, because there's less drag against it. That was pretty interesting, we've been buying these 600lb links now for years, and we're just throwing out there casually to know, maybe that wasn't right, know, if it wasn't right, are we going to get our money back and all the 600lb links and all the buoys we’ve lost because of the 600lb links. Of course, not. It's just incomplete data, incomplete idea of the picture. And really whales need to be tracked or spotted because it's completely pointless to regulate somewhere where there isn't a right whale because there's not going to help the right whale. It makes no sense at all. So that's about all I got to say tonight.
Thank you for your comment, OK, Chris MacIntyre. You're next. You are unmuted, you should be able to unmute yourself.

Hey, can you hear me?

Yes.

Hi, my name's Chris MacIntyre, federally and State permitted Lobstermen from Harpswell Maine, I'd like to comment tonight against the use of the LMA one closure mainly do, because of the lack of data around the usage of the area. I know that, you know, what's helpful to you guys is, you know, specific data around, you know, from fishermen who do use the area I do not. So I can't provide you with that. But what's obvious to me and it should be obvious to you, is that the financial cost of that proposed closure is laughable. It's. And, NOAA should wait until, you know, there's better data about usage of the area by lobsterman and by whales, before considering such a closure. Um, and when it comes to ropeless fishing being allowed within the closed area, I mean, you're, you're proposing something that's against the law. You know fishing, fixed gear, without end lines is illegal. It's illegal for very good reasons. You're proposing something and without answering any of the questions around how would mobile gear fleet be able to fish around the fixed gear? How would other fixed gear fishermen be able to fish around the fixed gear? How would NOAA, Coast Guard, the State of Maine anybody be able to enforce any of the regulations around the lobster fishery if they can't find or haul the gear to check for compliance? The, the big push towards ropeless fishing makes absolutely no sense because NOAA’s own model used in the biological opinion shows that even if you take all the fixed gear rope fisheries out of the water, the right whale population is still going to decline. So there's no doubt that you know the question. What can we do to save right Whales is an important question. But the answer of destroying the lobster fishery to do it it's just completely backwards, you know, why do we need to go to all ropeless fishing? If even if we go to all ropeless fishing, the whales are still going to decline, it shows the models. If run with us not taking any more risk reduction currently shows only a difference of five breeding females over the next 50 years. So I mean, that proves that we do not interact with these whales in a way that will determine whether the species survives or doesn't survive. I'd also like to comment that NOAA should take the conservation equivalencies that will be provided by the Maine DMR into consideration in order for individuals’ areas of the coast of Maine to be able to comply with the risk reduction targets.

Thank you very much.

Thank you. Joshua. Just got to get to the J’s. I know, Josh, that you are back online. You should be able to unmute yourself.

Can you hear me?

Yes, I can.

My name is Josh I fish out of Spruce Head. I'd just like to start off by saying that none of us fisherman are interested in harming any whales and we, we have complied with everything that's been thrown our way. We, I mean, there's, there's a lot of questions with, with what's going on.
And, and one of the big issues like Jarod had Explained is about tracking whales. Um, like he said, if we can land a rover on Mars, we should be able to track the whale's. That's something that I realize that some of the conservationists have said. It's been very difficult to do that because the trackers won't stick in the whales. Um, that's, I mean, we can, we can track everything else, it just seems impossible that we couldn't track the whales. Also, in regards to Zac Klyver speaking, and he has seen all these right whales and seeing them entangled, and he knows it was Maine fishing gear. Last year was the first year that Maine specifically had their own marking system. So, if that was other than last year, how would it be known that it was Maine fishing gear? Um, the number of documented deaths for vs. births and undocumented, that goes hand in hand. They don't know how many actually died, but you don't know how many actually, have been born. There's just so many questions. And as everybody has stated, that the data is flawed. There needs to be more research done before anything can effectively be done. Um, there's just too many questions. And especially for Maine where, I mean, nobody that I have heard of has ever seen a Right Whale. It's going to affect far too many people. For, as other people have said, something that that's never existed. Never, never been, Never been an issue before that we've seen. Also, as far as the shipping industry, if we're going to have all these regulations put on us, how I realize that they are a huge part of import export or cruise ships. It just doesn't seem fair that that something that size is not going to be affected. Like, we are, we, we may be something smaller, but we are big, big part of the north-east. And it's just, it's tragic that that they're above all the other regulations that we're going to deal with. I think that's all I've got for tonight. Thank you very much.

Thank you. John Tripp.

Can you hear me?

Yes.

Thank you, my name is John Tripp. I'm a fisherman in the Mid Coast. Um, I would just like to speak against the LMA one closure. I do not believe that establishing a closure based on assumptions of congregations in the future is an acceptable management tool.

I feel like it'll cause a gold rush mentality. You guys seem to think that only 45 guys might fish over there out there right now but If you put in a closure, I think you need to worry about when it reopens having 90 guys in there and just the fact that you'll have gear stacked up outside of the closure waiting to get in. Um, and I'm also worried that what may start as a three month closure could turn into a dynamic closure, dynamic area management didn't work in the past and I don't think without tracking the whale's and, uh, tracking the boat's and it will work in the future. Another big fear is that it could turn into a permanent closure. I believe management should be based on facts and hard evidence. I agree with what Jared said, whales need to be tagged and tracked. And that information needs to be available to The fishermen on a live basis. We need to know where they are. Um, I have no issue in doing things that will actually help save a species, my issue comes with guess and check management. I urge you to listen to the fishing organizations, in particular, the MLA, which I am a board member of. The MLAs worked tirelessly on this and I believe they have the best input. I echo Dustin and Jared’s comments they hit the nail on the head, same with Troy. And I would I would also urge you to consider the conservation equivalencies from the Maine DMR. Thank you.
Thank you. Ryder, we're coming to you. Next. You're unmuted.

OK. My name is Ryder Noyse, and not this really matters much, But I actually went to the University of Maine and I minored in environmental studies. So you know, I do understand where everyone's coming from as far as, you know, saving the right whales and can strongly say that every fisherman agrees with that. We're not out here in the middle of the ocean trying to endanger these whales or hurt them or anything of that precedent. That being said, we rarely come into contact with these whales to begin with. And it's really difficult for me as a fisherman to support these rules, regulations being put in place that are designed to save whales, I understand, However, they're not designed to save fishermen. I guess what I'm getting at is if we're doing you know 20 trap and 30 trap trawls, even the trawl increase, that's a danger to every person on the boat. You're adding more rope. You're adding more traps. You're putting guys in situations that they don't need to be in necessarily and at what cost? The other one I wanted to mention was as far as an area being closed, I'd like to know how DMR would even be able to enforce the fishing, as has been stated before. Um, it doesn't really seem to me like that's something that's even possible for them to maintain. It was also stated, I believe that there would also just be a wall around that closed area. Um, the other one that also was mentioned earlier and I'm going to mention that again is the windmills, there's windmills being put out. That's the whole goal coming out here. There's, you know, the efficiency Maine That's just going to create issues. If you're worried about 600lb breakaway, imagine three inch chain, also agreeing with David from earlier, we need more accurate data. We need to find what the direct correlation is to the right whales deaths. There's plenty of graphs and plots out there that are available. And it shouldn't be that difficult to find the correlation coefficient or Value R Seems to me that there is no direct correlation from lobster fishery to right whale deaths. And it does seem like it more not just, but more so leans towards ship strikes. Um, we all do care about the ocean, and all the creatures that inhabit it. We treat the ocean as if it were our home, mainly because it is. We treat it with respect, we take care of it, and we maintain. So anyways, that's all I've got. Thank you very much.

Thank you. Ira Miller?

Hello! Can you hear me?

Yes. I can.

I'd just like to start by saying that fishermen were the stewards of this ocean for 100s years long before it was cool. They were the environmentalists out there. That doesn't mean all, most fishermen. Uh, we all have impacts. I don't think that the impacts are anywhere near understood on this species. There's a lot of knee jerk science going on has been brought up. I like David's comments to that. I think, really the crux of the problem. You don't have good data. We're being persecuted by that because we can be, Uh, this wouldn't fly. I don't think in a lot of situations, it's only, because we don't have something to refute it. Our job is going out on the ocean, making a living. We're not lawyers, we're not, paper writers were not academia. So were taking time out of our day to try and fight a battle that's way out of our league. Um. I Like Commissioner Kelliher’s comments, I think they were to the point I think a lot of the fishermen, Troy Plumber was
definitely to the point where a lot of others I think tagging needs to happen or tracking. You Know, there's ways to prosecute this fishery. I've been fishing out all over the Gulf of Maine for over 50 years. And I can tell you right now, that ropeless fishing, no matter what these people speaking to it think, they don't live in our world. They don't understand. They're making comments, being very uneducated. They don't understand what it takes to accomplish that in our area of the world. Yes. It goes on in some other areas of the world, West Coast of Australia or something like that, where there's a minimum number of fishermen. If they think that that's going to take place in our area without having a massive impact, they'd be wrong, they are way off base. I think enforcement is going to be a problem. You have area closures that don't make sense. Uh, I think that Jarod’s point transiting animals back and forth through there a Spring closure, if you got to, have a closure, which I don't support at all, doesn't make sense. I think that, you know, the gear marking estimate times was way under done. You know, the cost involved to the fishermen. I think a lot of these people, a lot of these environmental groups instead of working with us to try and make things better, all they've done is try and pit us against each other. And, uh, they haven't made a situation that we could actually work together on a solution. Haven't come to the industry that I've ever seen and I’ve been pretty involved. come to the industry offering much in the way of solutions. Anyway. Thank you for allowing me to comment. Have a good night.

Thank you, Ira.

Judith Howard. I'm not sure if you have a comment, but I just wanted to double check. You should be able to unmute yourself. Judith Howard, Not sure if you can hear me.

I can hear you. I didn't really have a comment. I wrote you a bunch of questions, but, um, so I guess my one comment listening as a, as an open minded listeners, how different the data are interpreted and I think our job as scientists, is to find out what the true data are. That's what worries me right now.

Thank you OK, Cindy Donnell Coming back to you, you're unmuted.

I find it interesting that the conservationist that have spoken tonight are going back to years previous for the whale entanglements, previous to all the trap modifications that have been made over the past 10 years. And the past 10 years have been very successful. And the fishermen are not getting any credit for the whales that have not been entangled in the past 10 years in the Gulf of Maine because of their gear modifications, perhaps, who knows what it was. But it's been very successful that we haven't entangled any and that Canada has entangled whales, and they are not doing even what we're doing. And nobody does anything about that. And we're asked to do more. And they are the ones catching the whales, it makes no sense. And Then, you know. They talked about that whale down South, that was killed the baby whale that was a ship strike. I mean, it had nothing to do with gear. And I just don't understand why they've not caught up with us in the Northeastern United States. And Canada has started a program of following the whales, why aren't we doing that? There they are talking about if the whales come into a certain area, closing it, we don't even talk about that. Now, we're just going to close an area, just a random area that the whales may not even be and it makes absolutely no sense. My husband has been a fisherman for over 45 years. And my sons are both fishermen and none of them and none of the fishermen

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in York, have ever seen a right whale. So they're out there every day. They're out there today. I mean, you conservationists aren't out in the water and the guy that said that he saw the entanglements. He was going back, years ago, Before, we had the gear modifications and the teacher that talked about the kids, you know, not being able to see the whales, the right whales someday. Well, it's darn good possibility with the number of whales that are left that they probably aren't going to be here, reality is they're not going to be here and they're going to be talking about them like they talk about dinosaurs. I mean, it's sad, but we get along without dinosaurs. We talk about them all the time. And Troy, I like what Troy said, is correct about Canada, you know, they're, they're doing some things right and they're doing some things wrong and maybe we ought to take the things that they are doing that are right and track the whales. that's all I have to say.

Thank you, Cindy. Zach, I'm coming to you to give you time to finish up your comment.

OK, thank you Kara. Yes, I will say a few follow up comments. To the question about risk. Whether right whales are in Maine waters we, we collected all right, whale sightings and we have over 100 from whale watching trips in the 30 year period. And the majority of those sightings I think 85 to 90% or more are in 300 feet of water or more. So, out 15 to 20 miles offshore. That's what we found. So that's where co-occurrence is. I sit in on the take reduction team when I had a chance to speak, last meeting two years ago. And I think that's where we get our greatest conservation effort. Um, also, I wanted to say that we looked at the sighting data from Mount Desert Rock, the Lighthouse tower data, there was a long term watch by Allied whale researchers counting whales from Mount Desert Rock, which, I think most of you know, is 25 miles off the coast of Maine. And in a 18 year period between 1976-92 there were 59 days when right whales were seen. So if we add that all together, that's a 50 year set of sighting data. Right Whales are in Maine waters and I'm not surprised that a lot of fishermen haven't seen them. If you're working, I've worked on boats, your head down. But right Whales dive, they spent 10 or 20 minutes underwater, they come up with good distance away. They're not, they're not the easiest, whale to see. Um, but fishermen have reported them to us. Many times. We had a trip on July fifth, 1991 that I remember vividly, where a couple of fishing boats off of Jones port reported five right whales when we got there. It was five right whales. I do want to say that I support the EFP proposal for ropeless and allowing testing and I and I heard the comments tonight and I'm really surprised that so many are full of fear and concern about ropeless. No. No. None of us that are working in this area to develop it, want to put a technology on your boat that doesn't work, that's not, That isn't subsidized and supported by Federal funding. We aren't, we don't want you to pay for all of it, the transition. We want it, it has to work on every level. But just like the comment was made about the rover going to Mars, we use technology to solve human problems Here. We have an opportunity to have a win-win solution. The fishermen could be the heroes of the whales. And we're trying to develop it, so, So just come with me, or let me come with you, and you can see, and I hope that you'll keep an open mind. Thank you.

Thank you, we have two last commenters, and just a reminder, please direct your comments at the presenters at us. Eben. Eben do you have another comment, Or was the entry into new to the questions?

I do have another comment. Ah.
It's quite hard to hear.

This is about the windmills and a lot of the scientists are in favor of the windmills. I do want it be known that 5 thousand whales have been killed, for the green energy. Because of the windmills are wiping out the sonar, these scientists all for it, they will shut us down. They will successfully kill the last right whales. What is happening over 220 decibels loud and the brain can only tolerate 150 before it kills us. So the whale Doesn't know, left right up from down and end up beaching. So this energy that All these centers are all about that are so for saving the planet. In which you're going to have these floating mills off of Maine with floating, cable, it is inches thick, it's going to be hanging in between each windmill, that is absolutely 100% against everything that they want to save the whales. A great big cable drooping in between miles becomes a wall that whales will not cross from the sounds. Also, the clanging of the chains and multiple, 7 to 12 anchors of huge Chain. Nowhere whale safe. So I want it to be known. They’d be the death of the whales by being clean energy, that is 6x more expensive. Or else, it's saying clean energy. That'll do OK.

Thank you. OK, and last up Douglas, you should be able to unmute. You are unmuted.

Yeah I just wanted to point out that what everybody has said earlier from the fishing side of this of what Zach was just saying all the data that he gave us is 30 years old. He just said, he saw all these right Whales around Mount Desert, we all know Mount Desert is a hotspot for whales. He's given 30 year old data. Every scientific thing I read now, is about how the Gulf of Maine is warming faster than any ocean on the planet. With that said, the copepods, the right whales Feed on just do not come in the Gulf of Maine, anymore. So I just wanted to point out the kind of data that were living with on this side, is from people Like him saying, all this stuff about all these right whales being seen is 30 year old information. That's all I had to say. Thank you.

Thank you. Colleen?

Yeah, I'd like to thank everyone for coming tonight. It's nearly nine o'clock. Thanks for all of you. Quite a few of you who stuck with us all night. Um, this is a public hearing session. We really were interested in getting public comments, And that's what we prioritized tonight. But if you have questions that can also be turned into comments, please include those in comments that you can submit in writing in our in our final documents. In our final rule, we will be responding to comments, and a lot of those questions would be answered there, or well, and or incorporated into the final documents. So, thanks, everyone, for your interest tonight. I'd like to thank Commissioner Kelliher for joining us and for his comments tonight. As well as I saw a number of take reduction team members and alternates on thank you as well and everyone else. And I really appreciate the number of fishermen who spoke up tonight. We were concerned that our remote meeting would make it harder for us to provide access for you. And your active participation is really appreciated. So, thank you, everybody. Goodnight.
The of the meeting. If you have not already, but want to provide comments tonight, please go ahead and type “comment” into the questions box. We've already got quite a queue going. If you change your mind, you can type or say, Pass when we call your name in the queue. We'll call on each commenter and we'll try to let you know who's up next in the queue by showing the next few names. Remember, we are recording this public hearing. As always, we ask you to please be respectful, and please direct your comments to us, the presenters, and not to each other. When you're called on, you will be unmuted, and then you'll need to unmute yourself for the recording tonight. Please state your name before your comment. Comments will be limited to three minutes, given the size of our audience tonight. You will be muted after three minutes if you've already provided comments. But wish to give another one tonight. So if you've come up, we called your name. You provided comments, you don't finish, or you wish to give another comment, you'll be placed at the end of the queue to give everyone an opportunity to speak. If there is still time at the end of the night, you may get that other opportunity to complete comments. If not, please provide your additional comments to us in writing. This is a public hearing. We want to maximize the opportunity for you to provide comments. If we wrap comments up very early tonight, we may have time to answer clarifying questions. If we don't, you can please send in questions as comments. As written comments, we are required to respond to comments, and the answers will be in the documents in the preamble to the rule. In a minute, I'm going to turn the mic over to Kara to help us run through the comment queue, But I'd like to welcome and thank the many state representatives and staff from Senators King and Collins offices tonight that we've seen in the queue tonight. I'd like to thank as well, a special thanks to Representative Golden, who's on tonight as we'll for joining us. Commissioner Kelliher is also with us. And we're going to start out introducing allowing him to introduce representative Golden and inviting Representative Golden to make some remarks tonight. So with that, I'm going to turn the mic over to Kara to unmute as needed.

Yes, Commissioner Kelleher, you should be able to unmute yourself and Congressman Golden, I'm going to unmute you, as well, So you'll be able to unmute yourself when the time comes.

OK, thank you Kara, and thank you, Colleen, and your staff, for, again, hosting another meeting. As you said, it's too bad, I think we probably would have filled the Civic Center tonight. So, but I am very pleased to see the number of participants. I want to thank all the staff that are here from all of the Congressional offices, Collins, King and Congresswoman Pingree's office. And I'm very pleased to now introduce Congressmen, Jared Golden. Jarod has been very active in these discussions. And we appreciate him taking the time this evening to address the agency. So, Congressman, the floor is yours.

Thank you, You hear me all right?

Yeah.

Very well.
Thank you for that. I appreciate it very much. And I also want to thank everyone who joined tonight as well as all the folks that are presenting and everyone at NOAA. I do appreciate the opportunity. I did want to start by acknowledging to the folks on the line tonight that the delegation has sent a letter just today to the President, to the President, the United States, to President Biden asking him to pay attention to what's going on here, as we did with the last administration. And I think that the delegation is united, continuing to push to represent the lobster community in Maine. But I'm not going to read the letter. I'll spare you all that. But I did think it was worth repeating a couple of key points, which I know you're all familiar with. I know the folks at NOAA recognize the importance of this fishery to the state of Maine and to the country really financially. It's incredibly important to these communities. It's everything. I also wanted to point out, I know, you know, as well how hard they have strived through many years now to work with you on risk reduction related to right whales. Quickly, I'll go through it. Implementing weak links in 97, gear marking in 2002. Sinking ground lines in 2009 reduced vertical lines in 2014. Working with you most recently on trying to come up with a plan working with Maine DMR and NOAA on further potential rope reductions. I think that this community has bent over backwards. But at the same time, I think they have some really valid questions of NOAA about the evidence that is out there that they are, in fact, part of the problem because they very strongly and passionately believe that they are not and the data seems to back that up. It seems very problematic from their perspective, from my perspective and from the entire congressional delegations. As NOAA has pointed out, out of 10, right whale entanglements in US Lobster Gear from 1997 through 2017, 8 occurred before 2009. I'm sure we can tie that to the move to go to sinking ground Lines. Made a big difference. In addition, the other two involve gear from another state successfully removed, neither of which cause serious injury or mortality to a whale. It has been since 2002 since there was a right whale serious injury or mortality attributed to the Gulf of Maine or Georges Bank Lobster fishery. One of the points we made to the president was that this fishing community, these families, and really the state I think, deserves an understanding of how what they're being asked to do in regards to further regulations is going to have any positive impact upon the whales whatsoever. If NOAA had data showing that this fishery was at fault for serious injury and mortality, you surely would have presented it in court. Uh, you know, We have, we have a common set of data here to look at, in regards to what's happening, to right whales in the Gulf of Maine, you know, I guess what I would ask tonight is, do you have documentation? Do you have some kind of set of best practices? What evidence are you, are you using to inform the regulations that you've proposed, and how can you show us the kind of agency, you know, best practices for how this is going to make a difference? If any? one thing we pointed out was that the draft, BiOps projections said even if all 10 federal fisheries that you covered were completely shut down, the North Atlantic right Whale population would still decline at the same rate as it would under the 98% risk reduction is currently pending finalization. I think this raises big questions about whether or not this is really going to have the desired effect. And the outcome for the right whales but it is going to come at a very high cost for these fishing communities. So now I think it's important that they have the opportunity to provide feedback and be heard, but also I think they need to hear an explanation about what impact this is going to have. On the right whale population. I'm sure you're going to hear a lot of testimony tonight about how hard of an impact it's going to have on them and on their ability to make a living. Very concerning. And I'm sure you don't want to move forward with regulations that the data wouldn't back up. I know that's not why you do your jobs. I know that certainly you can point to laws like the Endangered Species Act but would you move forward with these
regulations, absent lawsuits, and in some ways, it looks given the lack of data that there's a problem that's being solved here, it looks like this is regulation of the fishery by non-governmental organizations through a strategy of lawsuits. Oh, And it's just that is not the spirit of the law as far as, as far as I can see it. You know, this fishery wants to be helpful. They want to make a difference. But they don't want to be regulated out of work, especially when they suspect they're going to sit back and see that it won't actually have any positive outcome for this whale population. We continue to see the focus of the problem up and up in Canada, as you've heard repeatedly, I guess with that I would turn it back over to you so that the community can weigh in on and I'm sure that they've got a lot to say and plenty for you to learn, but I suspect you've heard a lot of it are already. So we're looking for a proactive and productive working relationship as we have here and hopefully the best outcome for these lobster communities, as well as for the whales.

Thank you very much.

Yeah, thank you, Congressman. And I appreciate, again, and appreciate your support and the support of Senator Collins, Senator King, Senator Pingree on this important matter. I'll go right into my comments, and knowing the knowing the large crowd, I will try to keep them brief and try to also help focus some comments from the industry here tonight. And for the record, my name is Patrick Kelliher, I'm the Commissioner at the Maine Department of Marine Resources. I'd like to highlight a few of the comments from the Department. First around conservation equivalencies, Trawling up. A key part of DMR's proposal is trawl length equivalencies, whereby a trawl with two end lines is equivalent to a trawl, with half the traps, and only one endline. This type of flexibility is paramount. A one size fits all approach in the State of Maine will not work. Our coast is too large, and it has too much geographic and oceanographic diversity to make it work. DMR will also be recommending the inclusion of conservation equivalency proposals that have been developed by our zone councils. Throughout 2020, the Zone councils worked with the department to develop conservation equivalencies that would work better for their individual zones. The proposed closed area, the Agency Decision Support tool indicates the LMA one closure if it was to be implemented, would become the most important conservation area to right whales along the coast. There is very little data supporting this finding when DMR mapped out the right whale detections from the Acoustical gliders mentioned in the DEIS against the boundaries of the closure, 73% of the detections were outside of that area. If the agency continues to feel that that area must be defined and in some way used for management in the protection of right whales, we strongly urge you to consider a trigger approach. With the trigger approach, the agency must also avoid creating a scenario where actions by a fisherman licensed outside of Maine would trigger a closure that would only impact Maine fishermen.

Implementation date. And again, I would ask you to take the time to listen closely to the industry members as it pertains to the implementation date. We think a reasonable timeline based on the operational reality of the fishery will be needed. Ropeless fishing. Based on the proposed rule, and especially the biological opinion, the agency is attempting to move the US lobster fishery, in the direction of ropeless fishing. Maine DMR will continue to work with NOAA on the development of this technology. But we must need to work within the operational realities and acknowledge that technology is years away from this use at a meaningful scale. Gear laid out on the bottom, without end lines, must still be, quote seen, by mobile gear, fleets, and others within the fixed gear fleet. Ropeless gear must also be retrieved, inspected and reset by law enforcement.
agencies to enforce lobster regulations, not just whales rules. Again in your race to protect right 
whales we must also manage sustainably manage the lobster fishery. Our next comments are 
directed to the industry itself. I would ask the industry tonight please focus your comments on 
some key areas that's very important for the the National Marine Fisheries Service folks to 
hear these comments. They are looking for feedback on whether you support trawl length 
equivalencies, like the ones who included in Maine’s proposals and the zone. And the zone 
conservation equivalency proposals that were created by the industry. They also need to know 
the LMA one closure, how it would impact you, particularly the economic impacts, and where 
you would move your gear. And please also comment on the time it takes to mark your gear, as 
well as how long it takes to implement these measures and the best time of year to do it. It's very 
important that they hear from you tonight on those matters. In closing, I would like to highlight 
the Maine lobster fishery is the most valuable single species in the country. In Maine it 
comprises over one point five billion dollars in economic activity. And touches thousands and 
thousands of families. In the background of this proposed rule is a draft biological opinion. That 
could very well be very devastating to this fishery and to the people who depend on it. We look 
forward to trying to work with this agency and navigate through this very difficult time. Thank 
you for your time. And as stated yesterday, the department will be submitting very detailed 
comments on the proposed rule. Thank you very much.

Thanks. Commissioner Kelliher.

Thank you. OK, so now, as you can see on the screen, and people who have been put in the 
queue so far, there are there are more, but as we go through the queue, I'll add them on. At the 
end, the timer on the screen is three minutes. We ask that you keep your comments to three 
minutes. I will let you know when you're over time. And as Colleen mentioned, we may be able 
to come back to you at the end, but there are quite a few people in the queue tonight. So, as I call 
on you, I will unmute you, and you will also need to unmute yourself. So to start us off for 
tonight is Micheala. Yes. You are unmuted. Michaela, I can see that you're unmuted, but I can't 
hear you. You'll need to make sure your audio settings OK. We can come back to you. Oh, 
thanks. Thank you. OK, next up, we have Shayne Mcfarland. Shayne, you should be able to 
unmute yourself. OK, Jim, O'Connell coming to you. OK, Jim, you should be able to 
unmute yourself.

One second. Hang on.

I can hear you.

OK. I'm looking for my name. There it is, Hi. Can you hear me?

Yes. I can hear you.

My question. So how did you get 411 that's the amount of whales that you think are out there, 
minus the 47 of the ones who had died. In that period of time, and 14, a serious injury decided to 
call dead. So that comes. That means about 366 whales, is what you're saying, is out there. But 
how did you get the number 411 to start with? And why does F, the one that looks like a 
mountain, that, that shows the 411, Why does that graph go down, suddenly, in 2010, at the peak
of a baby boom, from 481 to 411. That means, while the whale's, we're actually increasing, you guys were killing off 27 per year on paper. That is the whole crux of this. I'm afraid the whole thing is based on a terrible graph. Error. We're not going into extinction. We that. only for three years, did we lose a population And that was 2017, 18, and 19. The rest of the time we're gaining, and apparently, according to the math, we should be, we should be looking at 702 whales, not 366. So it seems like you're rationalizing a whole bunch of ways of cutting down on the population, and none of it is needed. We would, we should go to status quo. We're on the, we're in the beginning of a baby boom right now. The were came out of the boom from 2010. The females are ready to give birth now. And they're starting to go for quite a while. Because 200 whales of sudden pop up, around 2000 to 2010, I mean, in 2010, there was 20 whales. Then the follow, 2011 was another 20. Meanwhile, you, guys, just subtract 27 whales per year on paper. It's just doesn't make any sense. There's so much more to look at here. Like the whales. The Whale's that there was seven unknown whales found in Canada, in the Gulf of saint Lawrence, there was 33 deaths, That's 21%, we don't know out there. For forever, we haven't been able to count all the whales. And they're not marked and not registered. And they weren't in so bad shape, you couldn't identify him. These were kind of fresh whales, just see killed by a ship. And that was their guidance, whole fruit and critical, is the explosion in saint Lawrence. Approach per year, tips per year? That it's been fixed. We're on the way up. We're into the second baby. Boom. It's going to be a boom. Boom. Didn't mean I'm exponential, it seems. So that's where I'd say just leave everything don’t make these lobstermen paint all these ropes, that's a heck of a job. They don't even know how to paint. Probably can't hold the paintbrush. I'm sorry. I'm getting carried away. There's so much more, uh, that we don't know about these whales. Why haven't we seen these 10%? Where are they hanging out? I would suggest that you, next time you see an unknown Whale, to actually put a tag on and track a couple of them. Just a couple of me not going to harm the whole thing. And satellite for, do, are they going, why haven't you gotten them.

Hi Jim Thank you so much for your comment.

OK, thank you for listening.

Thank you. Hey, John Emerson. You are unmuted.

OK, Thank you. I have a very short comment. And it is as follows, I don't have confidence in the low number of right whales being used as the premise for adopting more strict measures such as more traps on a line, more weak links, closures. And perhaps most troubling of all to me, adopting ropeless fishing. I do think more work needs to be going into identifying the number of whales and having that be accurate. And in addition to that, the collisions with the ships from what I can tell, are doing way more damage to the whales than ropes from, especially from Maine fishermen. So, that's my comment. Thank you.

Thank you. Bill McWeeney, coming to you, you're unmuted.

You hear me, Kara?

Yes, I can, Bill.
OK, my name is Bill McWeeney. I live and work on the Blue Hill Peninsula. Contrary to what some people think, entanglements have continued to happen in US Waters. Three right whale entanglements have been found in US Waters just since October. As usual, no gear was retrieved, nor were any of the whales disentangled. Two are presumed dead, and one is probably dying. As I speak, 86% of right whales have been entangled, and 60% have been entangled more than once. There have been more than 1500 documented entanglements of right whales and only 16 of them have been traced back to the source. That means 99% of entanglement will not be traced back to the point of origin. It is not so easy to find a smoking gun, like King Fisher in 2004 that actually had Maine gear on him. By the way, Kingfishers Flipper was wrapped with rope so bad, his flipper turned white. That was just before he was last seen in 2015. He suffered for over a decade with that entanglement. With 87% of the pot trap gear on the East Coast of the United States, it is extremely likely that Maine Lobster gear is responsible for many of the 1500 entanglements of unknown origin. Some people, misinterpreted the 1700lb breaking strength research. I heard people saying last night that weak ropes will not help young and juvenile right whales. That these weak ropes will entangle those whales. This is a direct contradiction to the research that was done showing that no young or juvenile right whales were caught in ropes with a breaking strength of less than 1700lb. That is why the Recommendation for weak ropes is 1700lb and those ropes let young whales get free. There's been a lot of talk about ropeless fishing. This current rule does not rely on ropeless fishing to reduce risk. That is something for the future. If fishermen think they're going to be forced to use ropeless in the near future, they are not. The current rule uses weak ropes and line number reductions. And closures to lower risk. Finally, I agree that fishermen should not have to trawl up any more than they are doing. It is dangerous, fishermen and regulators should look closely at the research done showing the trap reduction will not hurt the bottom line when fishing and the Gulf of Maine lobsters. There are three peer reviewed papers showing that less traps in a given area will catch just about as many lobsters as the full complement of traps. Thank you.

Thank you, Bill. OK, Jason, Joyce, coming to you. You should be able to unmute yourself Jason.

OK, Yeah, just came off can you hear me fine?

Yes I can.

Yep. OK, Jason Joyce Lobster fishermen of Swans Island. Um, my family goes back here over 200 years fishing in this area. Um, I appreciate what Jared Golden said. I appreciate the well thought comments that the Congressional delegation has put forth. I appreciate Commissioner Kelleher’s comments on some of the things I'll try to hit on. I made a note here, obviously, at first, they said, Not to just have a gripe session. I don't want anybody to say, Would you like to have some cheese with that wine? But in my opinion, ropeless will not work. The technology is not there, so I don't even, really want to talk about it because that will put us completely out of business. I don't feel like there's enough data to support this plan or the closures. If the data supported the closures in zones C, D, and E, then the proposed windfarm by the Governor should not be allowed to be introduced near that area. Because if it was, it would likely change the whale's migration pattern. The negative effects of this plan on Maine’s economy and my Island's economy will be catastrophic. We have 370 year round residents. If, as I look at, not just this
year's plan, but the extended plan for 10 years, what the reductions are going to be, it will make us into a seasonal community and my family has been here since 1806. It doesn't make any sense. We are small boat fishery as well. So the trawling up is difficult. If we have to do it, we will, I do support Zone B's Request. To be able to split the trawls so they can have one end line. Lot of the boats are smaller where they've traditionally fish. If they have to go in with two lines, it's very difficult. And some guys fish by themselves. This is going to be very difficult on them because they're going to have to come up with some crew. We don't have that many people on the island. So, I'd have to dig up somebody. one thing I'd like to mention, I'm good friends with the fellow down in Chatham Masters name is Billy Chaparralus, he worked tagging great whites when they first showed up 6, eight years ago down in Massachusetts. And he was telling me when they watch the tagging of those great whites, they end up down off of that. I think it's south of Carolina's maybe off of the Florida coast where the right whale birthing areas and his theory is a great whites are down there for cheap meal. And I've never heard that studied to check if that's where maybe some of these low birth rates come from, but I think that's a possibility. He's a fisherman. And he has worked on a lot of these projects, and he studies it. And that is his theory for the low birth rate, low birthing success because the great whites are down there having a snack. Other than that, I appreciate the time to speak out and again, I agree with that the Commissioner's comments as well as Jared Golden and our Congressional delegation. Thank you.

Thank you, Jason. Gina, you are next. OK, Gina, you should be able to unmute yourself.

Can you hear me?

Yes, I can.

Hi, good evening. My name is Gina Gary. Thank you very much for the opportunity to speak with you this evening. I wanted to add some comments to what I had to say last night. I'm in Portland, Maine. I am the Maine State Director for Animal Wellness action. And although I have spent my entire life on the New England Coast and understand the delicate balance of healthy fisheries and environmental obstacles in particular, those related to driving the potential extinction of a keystone species such as the North Atlantic right Whale. I'm going to leave specific comment on the gear, and the recommendations surrounding gear to the experts and the fishermen that you have on the line tonight. But I will say that we believe at animal wellness action and the Center for Humane Economy that resolving the fisherman's dilemma and the lobstering industry's dilemma in terms of their wish to also protect the marine mammals in their waters and saving the North Atlantic right whale. That those propositions are not mutually exclusive. But we do have no time to waste with less than 85 breeding females, and in excess of 80% of the population documented with scars and injuries from entanglement from fishing gear. So, more needs to be done, and while the rule proposal is a good first step, it does not go far enough. I will say that what we support, Well, sorry. What we do not support is the trawling up proposal, as has been mentioned, as it increases the risk of lethal threat to whales and increases the risk to the fishermen. We do request and support longer and larger feeding habitat closures through the northeastern fisheries, especially in the Gulf of Maine. And we do support an increase to the proposed risk reduction measures from 60% to 80% given the updated numbers on the population counts. We'd also like to add that Commerce needs to create financial
incentives around this proposal for fisheries to offset the anytime off the water to our local fishermen and any reduce catches that evolve from being off the water to their practices. And also to cover the cost of any gear changes. And we also recommend further that this proposal consider creating a funding mechanism for a state-of-the-art tracking monitoring system. As Canada has done using drones with live feeds, accessible to the fishermen, 24/7 on the location of feeding whale pods and to substantiate the necessity of the closures that are proposed in summary with so few animals left in our waters. We need to get this right the first time, and I appreciate your consideration. And we at Animal Wellness action and the Center for Humane Economy, hope you will amend your rule to consider the request. Thank you.

Thank you, Gina. Hey Jack, Merrill. Coming to you. OK, Jack, you should be able to unmute yourself. Yep you're unmuted.

I’m on?

Yes, I can hear you.

I’ve got a degree in Marine biology, and I’ve done oceanographic work, but I chose, Instead a 45 year old year career as a Lobstermen. After spending the last month researching the scientific data, there's clearly a disconnect between what it says and what NMFS is proposing, even a further disconnect between what the data and what environmental corporations are alleging. The fact is that no, right whale death or serious injury event has been attributed to Maine lobster gear ever. The fact is, there is only one documented entanglement in Maine gear in the last 20 years. And that whale was disentangled 9 years ago. I sent NMFS 20 reasons I found fault with the bio opinion. And here's a few of those. It assumes mortality and serious injury of unknown origin occurs equally in the US and Canadian waters while acknowledging that the overwhelming number of entanglements and ships strikes have been happening in Canadian waters in recent years. It assumes no future reduction in mortality and significant injury from ship strikes or entanglements in Canadian waters, despite the most recent evidence to the contrary. It acknowledges that entanglement rates have been markedly less since 2010, but fails to recognize the importance of the significant gear reconfiguration. It fails to evaluate the most significant threats, disease, toxins, pollutants, and the overriding factor of global warming. It fails to evaluate pollutions effects on feed health, birth rate, and survival. The absorption of plastic by all levels of sea life, for example. It acknowledges, but fails to calculate the drop in surveillance and the parallel relationship to less whales seen and counted. It fails to recognize the importance of co-occurrence information, which shows a change in right whale travel patterns, taking them to the outer boundaries of Maine’s possible, lobster efforts. It gives very little recognition to scarring caused by ship strikes, natural scarring caused by the attack from other marine animals or their own attempts to rid themselves of predator sea lice. It fails to acknowledge that while attempting to calculate minimum population numbers and incorporating the unusual losses from 2015 through 2018, the right whale population has increased over the last 40 years by 56% when most other animal species have significantly declined. It fails to consider that since serious known entanglements in US Lobster Gear remain Minimal, or Non-existent, Other factors must be the primary causes of population threats. And three final comments: Trawling up is dangerous for both Whales and humans. Random seasonal closed areas, is a bad scenario for both whales and humans. Conditions, right whales are now facing are
changing rapidly. We're looking at a no analog future predicting right whale populations one year ahead is hard enough, but making 10 to 50 year projections impossible. Everyone seems to be ignoring 2020, was on all accounts a good year for right whales. Thank you.

Thank you. OK, Karen. All right. OK, Karen. You're unmuted.

Hi. Thank you for this opportunity. I've attended all three of the previous sessions on right whales. I'm an ordinary citizen living in Florida. And I'm an advocate for the environment and all creatures living in it. While, I'm not unsympathetic with the plight of the people whose incomes depend on fishing, lobstering, crabbing, shipping and cruising. I'd like to send out a reminder that there are alternatives as unpleasant as they might seem for some. If jobs are impacted, or even end, there are other options. In contrast, if right whales are killed off, or if their numbers dwindled to the point of no return. That's it. It's over. There are no second chances. Whales are an important part of the ecosystem that we all depend on for life. Scientific data shows that they even affect climate, without whales, all life would be negatively impacted. There are complaints that data is old and more research is needed. But no more research is needed to demonstrate that right whales are in extreme danger of extinction, and that there is a dire emergency. Now, According to the Marine Mammal Commission, which is part of the US government, there used to be a minimum of 10,000 right whales. Some who work at sea say that whales aren't where they work, they never see them. Well, maybe they never see them because they're almost all dead. So as the situation of the right whale is urgent, I urge that every measure possible will be taken to save the species and prevent the suffering of whales who are victims of human activity, fishing, crabbing, lobstering, shipping, and cruising. Thank you.

Thank you. OK, Russel, Wray. OK, you should be unmuted.

Yep. Can you hear me?

Yes, Russel  I can hear you.

Good evening, I’m Russel Wray and I'm providing comments for Citizens Opposing Active Sonar Threats or COAST. The proposed rule states alternative 2 was selected as the preferred alternative quote. With extensive input from fishing industry stakeholders who will be directly affected by the measures unquote. COAST acknowledges fishermen in their communities will be affected. Firmly believes that state and federal government must financially assist them in making any required changes. This statement and the proposed rule on the whole implies others will not be affected, which is far from the truth, especially seen as some measures proposed, most likely will not prevent right whales To be injured and killed at rates exceeding your PBR. Thus moving a species closer to extinction. This negatively affects the ecological community in which the right whale plays a vital role like the whales themselves, these community members are also stakeholders. The draft EIS did not properly consider ecological impacts. In addition, a great many people care about the well-being of our oceans, whales, in particular, for some they are a source of awe and wonder and mystery. I'm one of those people having been totally fascinated by whales and dolphins as a young kid. To this day as a professional artist, their beauty inspires much of my work. So while we may not be directly affected economically, we are stakeholders all the same who are directly impacted by the inadequacy of the proposed
protections. News of the whales' impending extinction has caused people across the globe to show sadness, anxiety, depression, and anger. Given the fact we are already facing multiple environmental disasters. Looming extinction of this iconic animal further drains people's hopes for the future, no doubt hitting young people, particularly hard. NMFS gave these widespread, direct effects. Little consideration and No, real wait. A few lines included in Draft EIS were lip service and nothing more, this heavy bias on the part of NMFS decision makers in favor of those economic interests. It's not fair or justified. Any final rule must consider and give due weight, All impacted stakeholders not just those affected economically, the protective measures must be made effective in the real world, not just on paper. Thank you.

Thank you. OK, Katherine Deuel

Can you hear me?

Yes, I can.

OK, Great. This is Katherine Deuel with the Pew Charitable Trusts. Pew agrees with others that the proposed rule is fatally flawed and needs to be significantly revised. The data and analysis used to develop the risk reduction target is based on an outdated understanding of both documented and undocumented deaths and serious injuries. NOAA has also failed to apportion PBR for right whales between US and Canada and between entanglement and ship strikes, even though there is ample scientific basis for doing so. If this were done, it would clearly show that NOAA needs to bring the level of mortality and serious injury in this fishery to effectively zero. Unfortunately, the situation for right whales has only gotten worse during the three years it has taken NOAA to develop these proposed rules. NOAA should take immediate action and implement several temporary closures to vertical lines, while working to revise and propose a new set of alternatives. We'll have more details in our written comment, but I wanted to make a few more key points tonight. First, I want to emphasize that public comment from all stakeholders, similar to what Russell just mentioned, should be considered, including those who sign onto group letters that are submitted into the online portal. Many Americans across the country have weighed in on this issue already because they don't want whale species to go extinct. And they care deeply about the status of an endangered whale. Even if most of them will never get to see a right whale in person, please ensure all comments are counted no matter how they are submitted. Next, on ropeless Gear Pew's glad to see that NOAA has proposed allowing ropeless fishing in areas that would be closed to vertical lines. But NOAA can and should do more to advance ropeless gear beyond these areas and work to solve the legitimate economic technical and logistical issues with ropeless that are being raised by the fishing industry. These issues are not impossible to solve. People are working towards solutions already, and the issues can be overcome within the next year or two if all stakeholders work together and keep an open mind. NOAA should keep ropeless moving forward, by demonstrating leadership and tackling challenges and providing funding opportunities. Finally, it has been mentioned by different stakeholders. And I agree that NOAA should more fully explore the concept of dynamic management. Closing some areas to vertical lines when right whales are spotted, and then re-opening if there are no additional sightings. NOAA has not recently analyzed or explored dynamic management and should consider that there have been advances in technology since this
system was last used in the US 15 years ago. And NOAA can look to similar programs in Canada. Just last week, Canada announced their plans for 2021 to once again, use real-time detections to close areas. to vertical lines when right whales are present and then re-open them if no whales are detected again. The US should follow suit. The decline of the right whale population requires all options to be on the table. And unfortunately, this proposed rule only offers a narrow set of measures that will not do enough to reduce risk of entanglement in US waters. Thank you for the opportunity to comment tonight.

Thank you. Michaela Morris, You should be able to unmute yourself.

Great. Are you able to hear me?

Yes. I can hear you.

Great. Thank you Also, like everyone else, has said for the opportunity to speak tonight, my name is Michaela Morris and I'm an Oceans associate with Environment America Research and Policy Center. We are a nationwide non-profit that works to protect clean air, water, and open spaces. We are fortunate in the United States, and that the United States has a rich natural legacy. oceans, where whales dolphins, and sea turtles thrive, forests where families hike together like I grew up doing I’m from New Hampshire. And mountain ranges that stretch into the distance, right whales are a part of this natural legacy of natural beauty. And in sharing that future generations are able to experience the beauty of our wildlife and wild places, starts with standing up for our most vulnerable species like these whales. A framework of strong environmental protection laws, like the National Environmental Policy Act, Marine Mammal Protection Act, and the Endangered Species Act, codify this set of values. It is in this spirit today that I testify tonight with grave concern for the future of our north Atlantic right whale. Scientists estimate that we can lose less than one right whale per year, but since 2017, we have had over 30 documented, right whales deaths most caused by human activity. And as we all know, Entanglement in Fishing gear accounts for at least eight of these deaths, and has caused at least 13 more serious injury. At Environment America, we believe that the current draft of the risk reduction rule to modify the Atlantic large whale take reduction plan, as proposed by the agency, does not uphold the American legacy of environmental protection and will not do enough to protect right whales from one of their top threats. I will submit more comments through the portal, officially from our organization, but I would like say a couple of key points. First, I encourage the agency to formulate a much stronger rule, taking into account the input of all stakeholders, like Katherine and Russel, just mentioned. I'll also say that we need more and longer habitat closures. To truly save the species, we need to dramatically reduce the amount of vertical lines in the water. And the proposed closures are too short in duration and not large enough to protect these whales. Looking in the long term, we also believe that ropeless fishing gear is the best path forward. We know the best way to prevent entanglement is by removing vertical lines from the water and in the long term. This means ropeless fishing gear and forging a path for the widespread adoption of such technology. NOAA Fisheries must continue efforts to test, and foster a market for ropeless technologies. Um, NOAA was petitioned. Actually, I'm not going to. Finally, we encourage the agency to rewrite the rule according to updated right whale population data. The risk reduction measures in place aimed at achieving a significant sufficient level of risk reduction to prevent seriously damaging and fatal fishing equipment, entanglement
so that the population, can avoid extinction are based upon an outdated right whale population estimate. Today, I urge you ultimately to uphold our legacy of environmental protection and do everything you can to save the North Atlantic right whales. Thank you.

Thank you. Robert Simmons, I’m coming to you next. I'm not sure which one to unmute, so, you should be able to, unmute yourself. Robert, Simmons, you should be able to unmute yourself, if you can hear me. Oh, I'm so sorry. Yes, you did. I apologize. Yes, thank you. Thank you for that reminder. OK, Christian Porter, I'm coming to you next. Sorry The list is so long. Imagine me running around the auditorium, bringing you a mic OK, I'm in the K’s now, Kristin Porter. There you are, OK, you're unmuted.

Can you hear me?

Yes, I can.

OK, thank you. My name is Kristin Porter and I'm president of the Maine Lobstermen’s Association. I'm here tonight just to give a few comments from the association, but we will be submitting lengthy written testimony. So I'm going to be here too long. But I just wanted to say that this plan has to be based on sound science, lobstermen want to do our share, but we can't prevent whales from dying in Canada. Just a few facts from National Marine Fisheries Service data. From 2016 to 2019, 39% of the right, right whales serious, injury and death, we're in Canadian fishing gear, and that was 0% from US fishing gear. And because there was so much prevalent gear, there was, there was a, a person testifying earlier said that 90% of the gear was unknown, that rate went down to 61%, because there was so much Canadian gear on from that time period. So, and 10 of the deaths are in Canada in 2019. So, but yet the US fishery is supposed to take 50% of the unknowns. Which means that we are, we're at 60% risk reduction. And that just doesn't pass the straight face test. And MLA has been saying that since day one of this process. And we continue to say that, um, your data shows that right whales are rare in Maine, and it seems it seems pointless. For us to be doing all of this with no sound data, there are thousands of families and dozens of communities that are being affected by this. Please consider the cost of these regulations compared to the little real benefit it has to the right whales. And I also want to comment on a couple of things as a fisherman, that I do support the trawl up equivalencies. If you think about if you have a 20 trap trawl rate requirement. And so that would be two lines for 20 traps, But if you, if somebody wanted to fish 15 traps with a single end, they wouldn't be able to do that. And that would be a lot less lines in the water. So just. And so just so it could be a chance to have less lines in the water by those equivalencies. And also, I support the conservation equivalencies because Maine is such a big state and the zones are so different. that as long as they meet, that the threshold for the, for the 60% or whatever percent that we have to use. I support those. So thank you.

Thank you. OK, Brian Tripp, you are up. next. You should be able to unmute yourself. I can see that you're unmuted, but I can't hear you yet. If you have headphones in, then just make sure on your audio settings that then your microphone and speaker settings match whatever device you're using. We're going to, we're going to go to Jacob, and then we'll come back to you. So, you'll be up next. OK, Jacob Thompson, coming to you next. OK, Jacob, you should be able to unmute yourself.
Yes. Can you hear me now?

Yes. I can hear you.

OK. I just had a few things. We've heard from a lot of people that are paid employees of non-profits. And you have to realize that a lot of the fishermen aren't comfortable commenting on these forums. So that kind of goes by that but also you guys have a whale sighting app on the iPhone iPad. And I don't see where in January there have been any whales in that area one closure that you guys are talking about. And it also seems pretty convenient that it follows the Area three line. When, I mean, obviously, whales don't know where these arbitrary lines that you guys draw on the water are. And all these people that don't know anything about fishing are talking about this ropeless, ropeless fishing, I would like to see them have to do their jobs with no internet, That would be comparable of us doing our jobs with No rope in the water. Maybe that would get them thinking about how hard, uh, of a job that would be, too, for us to do. Also, Since we started doing all of our things that you've mandated. We've gone from 200 to less than 300 whales to over 500 whales before climate change in feed sources. And God knows what changed to make all the whales die in the last 4 or 5 years. And the last thing I'll speak on is I am in favor of the conservation equivalencies. Some boats in Maine are 30 feet, some boats are 50 feet. You can't have a one size fits all rule. And with the area one closure, I think there if it has to go through. there should be some kind of a mechanism. But we shouldn't be lumped in with the all area one fishermen, because down in Massachusetts, obviously they've had a closed area for years. So they obviously have a problem. So it shouldn't be if so many whales are entangled in area one that we get closed out, it should be just in the zone around where they are, which I know will be hard since you don't fly any planes or know where any of the whales really are. Then, the last thing was about the how we didn't get any credit on how much money we spent for the gear marking because that was the big, big time suck for me last year, that probably cost me a lot of money that you guys didn't include. And I know my three minutes is up, so thank you.

Thank. You, Jacob. Thank you so much for your comment. OK, Brian, I'm going to come back to you. Oh, OK, we're going to come back to Brian. After that, he looks like he’s fixing audio, OK? Max Strahan I'm coming to you next. OK, Max, you should be able to unmute yourself.

All right. Can you hear me?

Yes, I can.

All right, so my name is Richard Maximus Strahan, I’m with Whale Safe USA. And I'm the whale guy. I started I am the responsible for most of this stuff going on. I'm a scientist and also a commercial fisherman in New Hampshire and Massachusetts, a green fisherman. The problem here started when Congress handed the right whales and all endangered marine wildlife over to NOAA. NOAA is corrupt and has had corruption and fraud since day one, because all NOAA wants to do is support the small, insignificant, commercial fishing community in New England in the north-east. We have 350 million Americans want right whales to survive, but it has this forum today shows. We only have a handful. A teeny percentage of people who actually want to kill the right whales off so that they can make their cheap profit of destroying ocean wildlife.
Instead of having real jobs, they make things like farmers do, instead of just ripping off the ocean for all its biomass? All of this is actually illegal that NOAA’s brigade is spent most of its time trying to evade the Endangered species act enforcement, and it's done that till this day. The Atlantic large whale take reduction plan, as it's now operate is completely illegal. NOAA can't make that negligible impact determination required under the Act. And it's formed this Atlantic Take Reduction Team of commercial fisherman in their support WINGO or get your supporting whale interested NGO's, despite the fact that they can't allow a single take of any northern right whale or any other endangered whale in mass in the New England area. And despite that, they're going forward with this plan. And they ignore the number one alternative they should have put in the plan, which is to ban all vertical buoy, ropes. But because they're controlled by the commercial fishing industry, they ignore this obvious thing that would stop the killing the whales. They claim the right whales are going extinct even if they stop fishing because they don't want to recognize after decades of driving the whale population down, just like the codfish. The right whales are so few in number. They can't bounce back if they wanted to. And that's the problem. Right whales are gone. They're extinctions inevitable, and it's caused by NOAA And now as a green fishermen, the problem is we need to fire all these lobster pot fisherman and open up the fisheries to green fishermen who can't even get a permit now and go fishing. And that's what is going to be decided in the Federal courts in Washington and in Massachusetts and Maine, because state federal judges or rule states have to get incidental take permits under the ESA that Marine Protection Act Regulations do not work, are invalid and illegal. And I personally well not obey these regulations because they're in violation of the Endangered Species Act and killing whales. CLF and other WNGOs have only backed up now, NOAA and prevented the protection of these whales, and if there's one agent in the world that's responsible for their extinction would be the Conservation Law Foundation, which told the federal judge after reordered.

Hey, Brian, have you oh no Don't worry. We're going to keep you on the list and come back to when your audio is connected again. OK, Richard Howeland. I am coming to you, Richard.

I'm going to just jump in, while Kara’s looking.

Yeah, yeah, I'm right here. Can you hear me?

Yes, OK, hold on one second, Richard, and I'll come back.

Sorry Richard, we won't start the timer until I'm done. Colleen again. I want to remind everyone, Max was directing most of those comments at us, and so we did let him finish. But we, yes, we do ask that people be respectful and do please direct comments at us, and we will limit folks to three minutes. If we had heard foul language or any kind of threats or anything like that, We certainly would have cut him off. So, thank you for the chats in the question boxes.

Great. Can you hear me?

Yes, I can hear you.
OK great, I'm Richard Howland and I'm a lobster fisherman from Little Cranberry Island. I guess, I'd like to offer the previous speaker an opportunity to come on the boat with me and actually see the operation I'm running and see the modifications I've made to protect whales. You know, We really I think we probably have more in common than then we Don't, but he sounded pretty negative. That's too bad for him, but I've heard a lot of people on this call thanking the politicians and the government officials. I want to thank the lobster fisherman for being on here. We're actually the ones that have something to lose, the politicians, the scientists. And the government officials are still going to have a job after this is over. I really understand this process pretty well. I've been involved in the industry for a number of years. I've always been willing to compromise, but I'm actually starting to question, is this really about saving the whales. Or is this about the environmental groups that are pushing a radical agenda to have something to hold up to their donors so they can say, look, we put lobstermen out of business, could be saving whales, please donate money. When the honest truth is, after you guys have cut us back by 98% by the year 2030, similar to what representative Golden said, ships are going to continue to strike whales and kill them. And all you're going to have left is it decimated coastal economy on the coast of Maine, a coast of full of hard-working, honest guys. That just want to earn a living, have never hurt whales in the first place. Please think about that. What is this all about, and what will this actually accomplish? Thank you.

Thank you. OK, we're going to go to Barry. All right, Barry, you're unmuted.

Hi Barry had to step away, so this is Gretchen Catlin his wife, I'm speaking on his behalf.

OK When he gets back we can put him back on the list as well, but.

OK thank you. So Barry has been a lobstermen since he was eight years old, he's never seen a North Atlantic, right Whale in the Gulf of Maine, he was also in the merchant Marines for over eight years and has been in every ocean except the Antarctic during that time. He’d only seen right whales on the East Coast of Florida. While he was on a 700 foot break bulk shifts doing 19 knots, and the vessel never slowed down, through that pod of whales in the wintering grounds. So that's a concern that we have is regarding the ships. And the negative impact they're having on the whales, down, off the coast of Florida. The amount of shipping traffic in the Gulf of Maine has been reduced. But we encourage further reduction, of the nautical speeds for the shipping vessels to help protect the whales. Thirdly the economic impact of closing Area one would not only put Barry out of business, but it would put several other lobstermen out of business without sound data to support these measures. So we encourage further research to be conducted before we implement, further changes that will negatively impact all of the lobsterman, not only in Maine, but Massachusetts, New Hampshire, as well. Thank you.

Thank you. OK, Darren Turner, Brian. I will come back to you, we are so close. Darren Turner, you're next. I'm not sure which account. You should be able to unmute.

Hi can you hear me?

Yes. I can hear you.
OK I’m a fishermen, Maine fishermen, lobster fisherman, and other fisheries. I've had 25 years on the water. I love all ocean life. Um, but while I'm fishing, I've never seen a right whale or an Entangled Whale of any species. With that said, I'm focusing on science here. The ocean is really big. And it's really big for fine-tuned science, that we're trying to achieve. With all due respect, very intelligent people doing the best they can with, with what resources they have but, science is repeatable and peer reviewed, and it just seems like there's a lot of holes in it. I just ask that, we put data before agenda, and if we don't have the data, that's solid, and we really are going down the wrong road. Um, moving forward with questionable data, it ruins the National Marine Fisheries Service’s credibility, that's just the road that we're all heading down. With that said, I just disagree with the whole proposal based on the premise of the, of the of the holes in the data. So, but specifically, the 1700lb breakaway will cause me to lose extensive amounts of gear, I fish, weigh up in the Bay of Fundy. And the tides are enormous, and we have tangles in. Anytime there's a storm that blows through, and we get a big sea, we have our gear our trawls tangled together. And, I'm telling you it is heavy when you try to pick them up and untangle them, and the breakaways are going to cause us to lose a large amount of gear and there's going to be huge costs, not just the gear lost. Um, and if you lose a couple of trawls right during the run, we have like 5, 6 week season where we make most of our money if you lose trawls you're losing a huge amount of your income percentage, so the costs will be enormous, not to mention, it's going to leave a mess on bottom. So, that's all I have to say. Thank you.

Thank you. OK, Brian, I think we're there. Brian, you should be able to unmute yourself. I can see that you're unmuted, but we can't hear you yet. OK, we'll come back to you, I promise. We will not give up tonight, OK, Matt Gilley, you're next.

OK, Can you hear me?

Yes.

Alright. I spoke last night and I'm a lobstermen I'll try to keep it short. I'm not very good speaker. I spent most of my time on a boat not most my time, speaking to different groups, like a lot of the people that have spoken before me. one thing I will comment on is I think the whole way that this has been done with the Zoom meetings is unfair to fishermen. We have an industry we're averaging 58 years old. A lot of these guys don't understand how to use the technology that has come out within the last year or two. We've just started using since the pandemic began. And we have environmentalist who this is. Their whole job is to go to Zoom meetings and make presentations and stuff like that. As lobstermen our job is to lobster. We don't understand how a lot of this works and we're doing, the best we can to make an effort to make our voice heard. Following that up, the few points I do have is I want to reiterate something I heard last night last year is a prime example that we're not the problem. There was no reduction in effort or by the lobstering community in Maine, and the only thing that's stopped happening during the pandemic with cruise ship, the amount of right whales that were hit last year, and killed were two, none were entangled, so that right there shows that we're not the problem. There was no reduction in effort or by the lobstering community in Maine, and the only thing that's stopped happening during the pandemic with cruise ship, the amount of right whales that were hit last year, and killed were two, none were entangled, so that right there shows that we're not the problem. It is the shipping industry 56% of deaths NOAA themselves has contributed to the shipping industry. So, even if you take all of our line out of the water, the population is still going to decline. Last year, I was at one of these meetings, and a ship came into Portsmouth. With a whale draped over its bow. We're not the problem. Furthermore, ropeless fishing, It isn't feasible financially, safety-wise or anything.
Let's say we sent out a string and my crew get snagged in the rope in the string goes over. What do I do to haul him back, I can grab the rope now and throw it in the hull, and get my crew back but if its ropeless what buoy do I grab to pull my crew back? You're asking me to put my life. My crews life, Anybody else, life at risk for a whale that we've never seen? Let's just call this what this is. And this is just a way to get us out the way so they can put the windfarms out there. You have to follow the money. The money is coming from the environmentalists groups, funneling into a wind farm. And they can't put their wind farm in If our gear is there. This is a direct way to get us out of the way. So they can put windmills in. And windmills have been shown to cause whale deaths between the electrical signal that they omit and the sound from them spinning, they screw up their sonar and the whales beach themselves. We are not the problem, and Max Strahan can go back to the street. I’ll end it on that.

OK, Tyler, well, Brian, let's come back to you real quick. OK, Brian. You should be able to unmute yourself. Brian If you wouldn't mind calling our Help desk number. I've put the number in a private chat to you. We should be able to figure this out for you. OK, Tyler Bemis and coming to you next. OK, Tyler, you should be able to unmute yourself.

Can you hear me?

Yes.

Alright, I'd like to thank everybody on this meeting for letting me speak. I'd like to start off by saying I agree with Commissioner Kelliher and Jared Golden and I thank them for speaking as well. I'm a lobstermen from Matinicus Maine and I fish in Area one as well as inside the three Mile line. And I disagree with just having a one size fit all plan just because, where we fish, the majority of boats are under 35 feet and you can't, not going to be able to fish trawls and stuff with these small boats. And another thing with putting more traps on one line with, uh, with weaker rope is you're going to have more gear, parted, you're going to have more snarl ups with the gear that's in there because guys aren't used to setting that many traps in an area. On one line. So with a weaker rope, you're going to have risk of parting with your hands in there. It can rip you overboard, you know you lose limbs, rip you overboard, cause a lot of damage and I just don't agree with that at all. Also, with that, you're going to have a lot more ghost gear. You're going to have a lot more rope in the water column. And, you're going to have seabed pollution from the ghost gear rope, et cetera, which isn't good for anything. And then with more rope, when you fishback ghost gear, you're more likely to part and lose more, which is just a revolving door. And it's the same deal with that, add, more traps, to a trawl line. You know, and with that, it's increases the size of the boat that you're going to need. And a lot of guys, then, they can't make that financial burden. So, it's pretty much just going to force them out of area one, which I don't think is fair at all. And then the zone closure For area one that you guys are talking about from October till January, I don't think that very just either, just because that's during their southern migration. And that's when the whales are the strongest. I think that if there was to be an Area one closure it should be during the spring migration when the calves are the weakest. That way they'll have a free path to get up there which I don't think that there should be a closure without some satellite surveillance or flyovers, which there are none in Maine right now. If they were flyovers and stuff and you to pinpoint where they were close down that one area and then you could leave the rest of the area one open, until they're no longer there. But we don't do any
of that. Instead, we're just going to blanket everything over and just say, Yeah, you guys are screwed, and, uh, we're going to just close you down which is, which is crazy, because from October until January is our most profitable time of the year. Thank you. That's all I got.

Thank you. Julie Rabinowitz you are next you should be yep, you're unmuted, can you hear me?

Yes. Good evening. Julie Rabinowitz with Maine people before politics I live in Falmouth, Maine. And we echo the comments made tonight that the prior forms made by Maine's lobster industry, have had a tremendous positive effect in the rebound of the right whale population up to the 2017 mortality event. However, the data surrounding the recent decline in the right whale population does not support these new regulations to the lobster fishery in the Gulf of Maine. We continue to see mortality is tied to ship strikes. Many in Canadian waters, which these regulations do not prevent 2020’s decline in shipping due to the Pandemic correlated with a sharp decline in ship Strike, right whale deaths in the North Atlantic. A study published in June 2019 into Journal Diseases of Aquatic organisms, reviewed all 70 right whale deaths from 2003 to 2018. Entanglement was identified as the cause of death in 22 cases, of which 14 involved Canadian snow crab fishing gear, one involved US gear and the remainder were unidentified since the period of that study. Here are the facts. The 2019 deaths in Canadian waters were either ship strikes or undetermined. The single 2019 death in US. Waters was an entanglement off the coast of New York, that whale snake eyes had been seen gear free in the Gulf of saint Lawrence on July 16th, just a few weeks earlier than the entanglement when he was seen entangled in the Gulf of saint Lawrence on August six. Excuse me. The deaths in 2020 were in the Mid and South Atlantic. Both calves, one killed by a vessel strike, and the other was determined to have died during or shortly after birth. The sole death this year is a calf from a ship strike off the coast of Florida. We should save these whales, however, the regulations under discussion tonight would not have saved a single one of them and long after the rules are in effect. Right whales will continue to die in Canadian waters and by ship strikes. Reducing risk on a computer model is not the same as saving whales. Regulating Maine’s lobstersmen do not stop deaths by ship strikes in Canadian Waters, Studies also indicate ocean noise. such as that from ships or energy generation could be a significant source of whales stress possibly causing both increased ship strikes and fewer calves. Maine’s lobster fishery is unfairly bearing the brunt of the risk reduction yet NOAA continues to grant right whales Incidental take authorizations for offshore wind turbine development, which pose a significant risk to right whales and other marine mammals, because of the interference with the sonar and may be it may also be affecting the birth birth rates. Before implementing regulations. We ask NOAA to further investigate the dangers posed right whales and other endangered marine mammals by the incidental take authorizations and the development of wind energy in the region under discussion. Thank you.

Thank you. OK, we have Rebecca Johns, next, I’ve unmuted you. You should be able to unmute yourself.

Thank you. Can you hear me?

Yes, I can.
Thanks. So I guess I'm one of the few people on the call who has seen a right whale, which is, which is one of my obviously many, many, many years ago, I came here from the UK. Must be 23 years ago, I drove down to the Sagamore Bridge because a friend called me and said a right whale was coming through the canal, went down and watched a right whale swim through the canal and under more underneath the second one bridge got a photograph of it. But clearly, I'm one of a really small percentage of people on the planet. With that, I'm a marine biologist, originally by training. Had a different career since, and I now live and work on the coast. And in Maine there is a, and I, I haven't got prepared. I'm not reading a prepared statement. I've been listening to what has happened tonight. Big believer in multi stakeholder groups. And there is huge expertise in the take reduction team. And you've done amazing work over many decades now. But it's really clear that the work of the team has been completely overtaken by the speed of the decline in the population. And we can talk about 20 whales up, 20, whales down in the population. Data. But we're talking about a small, a small potential percentage, and a really, really small population. We're talking in a way, we're looking at a classic running to catch up in the situation facing our proposals on science. But the nature of a good science is that results of peer reviewed publications. We just can't keep up with the speed of the situation that we're dealing with were nickel and diming the population estimates. Uh, and we really need to be, if we're going to work with this narrow a margin for the survival of a species, we absolutely have to be working with the latest population estimates, and it doesn't seem to me that we are. on top of that. In terms of last year's numbers, the latest numbers were just not, our margin is not big enough to be making the plans that we're making. With the estimates that we have, So, I would really, really encourage the team to work with absolutely the latest. If we're going on the latest data, if we're going to work with such small margins of error in terms of survival of the species, the, the second piece is about the ropeless gear. My, my neighbors are lobstermen, wonderful, wonderful people that I live and work alongside. But it's clear, if you, if you talk to my neighbors, and, to, the kids in the elementary schools, along the coast here, that the only sustainable, long-term future for the marine environment is ropeless gear if we want to everything to survive. And we need a pathway to that. And it's not that we need everybody to switch overnight. But we need an ability to have some piloting and some granting and financing programs and none of that can happen without permitting scale. Thank you very much for your time.

Hi, thank you. I wanted to thank Commissioner Kelliher, and Senator Golden. I agree with them completely. Um, a few things I wanted to point out: I think that it is vital that NOAA looks at Maine’s conservation equivalency on our zone proposals. That's what our trawl lines are very important to our zones. The Closure and LMA one. I think that it is very important that to have any sort of closure that NOAA has got to be able to show some sort of data that has is showing that we have whales in some sort of seasonal aggression across multiple years in LMA one in Zone C, D, and E, for this Closure to be an effect because we don't have whales there. And having a closure on LMA one would hurt us considerably, ropeless fishing. It's not ready. It would not be good to put ropeless fishing in any capacity in LMA one for a seasonal closure, or in a future. Looking at a fishery at 98% risk reduction to a ropeless fishery. I think that is a very scary future for Maine. And we need better science. If we're looking to save whales, we can go on a satellite and look at my eight foot skiff on the dock, but we cannot tell where a whale is, the
size of my house. I think that it's not feasible. We need to be able to tell where the whales are, to be able to save whales. If that's where we're going, then let's let Max be a hero again, maybe he can fix that for us. And I think that's all I have right now. Thank you for the time.

Thank you. OK, Jan. I'm coming to you, lots of Js on here tonight, OK Jan, you should be able to unmute yourself.

Yes, hello. So first of all, I'd just like to say how much I respect, lobsterman and their lifestyle. I just have a comment, and kind of a question: The density of lobster traps in some offshore areas are so dense. It's hard to negotiate a boat through the maze. No less the skill a whale would have to master to do so. So I'm, I'm just wondering if NMS has considered limiting the amount of gear in given areas And maintaining wide unhindered corridors for whale-safe travel. That's my question. Thank you so much, everybody. Goodnight.

Thank you. OK, next we have John. OK, John.

Do you hear me OK?

Yes. I can hear you.

Great. Thank you. Thank you very much. My name is John Drouin and I’m a lobster fishermen, Cutler Maine. I've been lobster fishing for 42 years. Cutler is in the mouth of the Bay of Fundy and we'll bring that up in a minute here. I have a couple comments and questions about your data. And then I'll have a couple comments about your proposed rules. Looking at your marine mammals Stock assessment, which was written dated April of 2020. You folks state that there are 270 whales that were in 1990. And there were 481 in 2011. And currently, your estimates are that there's 428.

And yet, this is out of your report. And yet at the beginning of the presentation, Colleen states that there are below 400 whales. I've seen other people report, since these webinars are taking place, numbers of like 366. It baffles me the inaccurate data that you're basing people's livelihoods on and communities in. Anyways, it also continues on in your report that's in from 1990 to 2017 447 calves were born into the population all while you're claiming a decline. To me that shows that we existed with the whales and a lot while they were rebounding. What happened in 2011 is The Gulf of Maine warmed, the food sources had shifted again, I fish in the mouth of the Bay of Fundy and I've never seen a right whale even though that's where the Right whales summer for decades. They don't come through the Grand Manan channel. They go around the other way. Um, what took place in 2017? Oh, back to 2011. So climate change, and the food source shifted. So now, whales are stressed, they have no feed. And that's what, in my opinion, attributed to the low birth rates. In 2017, what took place up in the Gulf of saint Lawrence? Oh, that's right. Whale showed up there now because they found feed So they're now feeding. And in the last year, the birth rates have gone back up, um, doesn't seem to me that the problem with things were with the Maine fishery. According to your proposed plan. I support no closures anywhere in the Gulf of Maine, along the Maine coast. The trawling Up scenario that Maine has provided for you. We feel will work for most. It doesn't work for everybody, but nothing does. If we're trying to work and trying to help, to save something that, again, we're not the problem of, we will do our part. Give time for the gear markings to work. We've only implemented them last
year, this is the second year. As with any regulation, you need to give time to work. The weak links, again in the Bay of Fundy. They do not work. And I also fish in the gray zone, which is disputed Waters with Canada. I would be put out of business sooner than the BiOp is suggesting because Canadians will sit on top of us and we have no way of retrieving our gear. Thank you.

Thank you. OK, let me go. Michael Myers. You should be able to unmute yourself now, Michael.

Hello?

Hi.

I'm Michael Myers. I've been lobstering out of Tenants Harbor and the surrounding area as a kid my whole life. Ah, this whole right whale thing is, it's really got a bunch of us in, shaken us up. I've been fishing my whole life, I've. I've traveled pretty much every inch of the, oh, this ocean on the East Coast between Georges Bank to Massachusetts. And I mean, I've never seen a right whale, I've been lobstering my whole life as a child, my grandfather was a lobstermen. we're, we've been we've always advocated for wildlife, we're, you know, we're not, we're not this. We're not a whale fleet out there trying to rid the ocean of these creatures, because we think they're there just as beautiful, domestic, as anyone does. And we've gone through great lengths. I think we've proven it with our efforts to just, you know, to, to keep up with you, guys. And not only keep up with you, but do stuff on our own to, to implement, you know, on our own. You know, our own regulations. And in order to keep the resource alive that's what it's all about. We want to keep it alive for everybody, not just for us. And we want to keep whales alive. We want to keep the ocean alive. And that's what we're there for. We were not there, too So, I don't approve of the traps and I don't approve of the closures. Um, I think, it all needs to go to the data and the Science. And I think if this is what you guys are implementing on us, this is a big hit. I mean, we've took hit after hit after hit. This is, I mean, this is, this is really food out of our mouths, our families mouths, not only our families, I mean it, trickles all the way all the way down the line. Car salesman's, auto insurance. I mean, it's not just us, its everybody I mean, we're all going to pay for it if this is, if this is the way life is really going to be. So I think we've done enough, I think, but if we can't back this up with science, then I think this is a raw deal, And I don't think we're think we're getting this **** end of it. I don't really have much more to say. And I hope, I hope everybody can see it through. You know, if you can prove the science that we're killing whales, I think, you know. We will. we will gladly go out of our way to change anything we can. But I don't think the science will prove that it's the Maine fisherman. Or any fishermen harm at that mount so that I will leave my time. Thank you.

Hi. Thank you. OK, Julie Eaton. Julie you should be able to unmute yourself.

Can you hear me?

Yes, I can hear you.

Can you hear me?
Yes.

Oh, yeah. Hi, my name is Julie. I'm a Maine lobstermen I've been fishing for 37 years. And I have over 10,000 hours commercially diving underwater. I've never seen a right whale. As a matter of fact, I've never seen any kind of whale. Maine lobstermen want to protect all marine mammals. We don't just fish, because it's what we do to feed our families. But rather, it's who we are. It's our calling. Most fishermen, in Maine live in small coastal communities or islands with no other job opportunities. We don't have a Wal-Mart, a McDonalds, or even traffic lights. Communities, our schools, and our way of life will die without the support of the Maine Lobstering industry. We've worked hard to protect our ocean and our fishery. We have a sustainable fishery. Maine should never be lumped in together with states that have actual whale issues. The copepods, which are the preferred food source for the right whales, is no longer in Maine water due to climate change, right whales do not come to Maine on vacation. Please address the issue where it exists. Blaming Maine lobstermen for the decline in right whales is comparable to blaming Mexico for the polar bear decline. They just don't have them and neither do we. NOAA has stated. It doesn't fly over Maine looking for whales. Why is that? Because there are no right whales are not here. We welcome NOAA to start flying over our waters, please. We'd like to have some proof. If you intend on closing an area, give us documentation that that area actually is a problem. We're willing to do whatever we can to save these animals. They are amazing majestic creatures. But if they're not in our waters, we can't do that. I want to thank Jared Golden and our commissioner and I entire federal delegation for going to bat for us. I think that if you're going to close an area. Why isn't it in area three? Why does it have to be all in Maine when Maine isn't a problem? I guess I guess I have to say I'm very concerned about the safety of our fishermen, ah, Who already take huge risks, fishing offshore and uh, I'm very concerned about increased trawl lengths and at what cost, if the whales aren't here, It's not going to save anybody but could really cost our fishermen, their lives and their lives that has to be of value too. Thank you.

Thank you. OK Hannah. You should be able to unmute yourself, Hannah.

OK, Can you hear me now?

Yes. I can hear you.

OK, great. Thank you. My name is Hannah McGowan. I am a Native Mainer. I'm not a fisherman. I have done some work, documenting the lives and work of our fishermen here in the state. I'm a photographer. I wanted to speak mainly about two things and it feels like we're looking to implement a lot of really massive changes here based on incomplete data that ultimately is pointing to entanglement happening elsewhere. Um, now, my first big point here, as we're talking about all of this stuff, really casual, really casually, We keep saying implementing measures and just throwing all this, really great environmentalist, talk around, but like, let's talk, like we're real people who aren't just paid by environmental agencies. I want to urge every single one of you listening tonight, to consider that the actual implementation will be done by real people, like Real Mainers who every day, get up before the Sun comes up, and they risk their lives to feed their families. And ultimately, they feed all of us. You know surf and turf doesn't happen without these guys. These guys feed us, giving over, the human element of all of that is a
huge error. We need to not villainize our fishermen. They are some of our best conservationists
And they care so much about our oceans and our marine life being on the water as not just a job.
I mean, the time I've spent with, all of these fishermen, its who they are. It's the blood their
blood. It's their heritage, it's everything about who they are, and, skipping over that, in my
opinion, a massive error. Then, regarding trawling up, how do we really expect our fishermen to
trawl up? I've been on mostly small boats, and it would be extremely dangerous. Also, you need
to think about our older fisherman. Our older population, I mean, I spent time at Virginia Max
Oliver down in Spruce Head All and Miss Virginia as 100 years old, and her son. Is elderly as
well, sorry Max! They could not safely trawl up. They absolutely could not do that. They not
only do not have the deckhands to be able to handle that but their boat is small. I know several
other fishermen who will also have small boats, and that would be really dangerous. This is
something that we need to not forget about. We shouldn't be imposing costly and under
researched regulations on these guys, their jobs are dangerous enough as it is. And, you know, if
you think about what I'm saying here and you think, Oh she's just waxing poetic about fishing
because she's a Mainer and she’s a photographer and blah, blah blah. Call up a lobstermen and
go Out for a haul for a day. It's grueling. And we really need to respect that when we start
making them bear the brunt of all of these changes. Um, yeah, I just really want you guys to
think about the human element of that these guys care about our oceans and We need to care
about them, too. Thank you.

Thank you. OK, Brian, let's give it a go. You should be able to unmute yourself. Oh, I'm sorry, I
muted you. OK, try again.

Am I really unmuted now?

Yes!

Haha, that's crazy. All right,

Thank you for hanging in there with us.

Yeah, well, thank you. Alright, I'm not I'm not paid to speak to anybody. Pretty much keep to
myself like most fisherman. I go to work. And I come home and I live in a small world and I'm
an old fashioned type person. So bear with me. My name is Brian Tripp I’m a lobstermen and I
live in Sedgwick Maine, I fish offshore area one year round and I've done that for the past three
years. Before that I fished inshore for nine years I've got a 38 foot boat. It's a pretty, pretty small
38 foot boat, actually the way it's rigged. I employ a single stern man, and our, our boat, I say
ours, because he's just as much a part of the operation as I am, our boat earns a modest income,
and that provides for 4 adults and 8 children all under the age of 12. Maine's fishing fleet is, is
diverse. And I think that needs to be taken into account, and I appreciate Commissioner Keliliehrs
bringing that up because that's what makes Maine special. We're all different and there's a place
here for everybody. I went to Prince Edward Island with Maine Lobstermen's Association. I saw
how they operate. It's just a cookie cutter fishery. They're all the same size boats. They only have
enough berths for the number of permits. There's no room for anybody to be any different.
Everything's 45 feet long, 15 feet wide. And it's got to fit in in a certain box. What makes Maine
special is is my wife fishes a 20 foot boat. She fishes 180 traps, not that that matters to anybody.
But that's what fits her. I've got an eight year old and an 11 year old. They both fish out of a flat bottom skiff and, and they certainly aren't going to trawl up and neither is my wife, but, but I fish 10 trap trawls right now. I don't fish anchors because it's just Matt and I and we're not going to lug 75lb anchors down to the stern. It's just not how we're going to work. We fish a single end line, and we do that, basically, just voluntarily, it works best for us, because there's less rope on the platform in this. We can turn and set them back quicker, and we can get home to our families quicker. We fish. Like I said, 10 trap trawls single ends we haul 440 a day. We leave at Whatever, four, 4:15 every morning. When we get back. It's usually after 5 or 6 o’clock, if things don't go well. So, I just think it's important to take into account who we are, real people, and what we actually go through, and what we do. I think single endline equivalency is important trawl equivalencies. I think gearmarking it's way more time consuming than you give it credit for because I have to change that, endline out that takes a lot longer throughout the day. And closed areas create a gear curtain, which is way more dangerous for whales that we obviously don't want to harm. Thank you, I know my time's up, and I appreciate you guys all waiting, working with me to be able to hear what I had to say.

Thank you, Brian. That was really helpful and, and anything like that, if you'd like to type that into the chat, if you have anything else to say, type it in the chat, we can come back to you or submit it as a written comment. That was really helpful. OK, next we have Dwight. Dwight?

Can you hear me?

Yes.

Very good. Thank you, guys for having this meeting tonight. And all the fishermen that have come on tonight to share their thoughts and questions and comments. Not so much of a fan of the environmentalists that have come on with their some derogatory. I could care less about that. It's not their industry that's at jeopardy. My first comment and question would be what other industry has had a 60 to 80% reduction and made out, OK? Oh, you said, Colleen, that we had to be resilient to change, 80% of anything in a reduction is quite a change. And you'd have to be nothing but resilient in order to change and adapt to that. So I'd be curious to know if, if, maybe you could even answer it, if there's time left. What other industry has had that type of reduction? Even 60% reduction and not had a monumental effect on really their way of living. Everyone on, probably this meeting tonight is established with a financial burden based on an income that they've generated. Even myself, I make X amount a year. I base my bills off that you dropped that reduction to 60 to 80%, that's less income. Now, someone said that if you take the, everyone fishes 600 traps, well, yes, you're going to be close to the same amount of pounds per year. Maybe you'll have more pounds per trap. But that does not mean that the price is going to be there for us. So that, I mean, you guys say, OK, let's reduce that but you don't control the price. Actually matter of fact and I'm sure you all know this is that there's big businesses buying up waterfront properties that are selling these lobsters premium brands. one of them that's another factor fishermen have to fight with is the price of a lobster. pretty soon that's going to be controlled and dictated just like this type of the end of the industry is. My other comment and question is, we talked about the gear marking up and down the state of the coast and in Canada, what's to say? And who's to say that those other states don't throw some purple tracer on their rope down the line up in Canada? There's nothing saying that. And I'm sure that they're not going
to comply with that, They're going to throw every color on that rope. But it seems to me, if I was them, I would too. It looked like Maine did it and Massachusetts as well. I mean, what's And you guys can say, well, that's the job of Maine Marine Patrol. And I think that you're exactly right, but I got to be honest, the turnaround on Maine Marine Patrol is incredible. And, I think it's because of the low pay and the what, not that has to do with it. And I know my time's running short, but please don't shut me off. Um, I've always been feeling like this has been an argument going on for several years. Why is it that we still don't have a solution to the problem? but we just keep chipping away at this block? It seems as though all the money that these environmental groups and NOAA and whoever else has had, invested in this time and energy would have had the solution that would have compromised this whole problem so that we wouldn't even be having this meeting. And the last thing I have to say is if and when as our good buddy Max said, the whales are going to die, does that mean our fishery can go back to what it was before? Or is it going to just be reduced and restricted again even more even if the whales aren't there? So I'm just, those are my comments. And those are my questions is what other industry has had that reduction. And survived? that the whales aren't the only ones that are going to, fishermen are the stewards of the sea. We love all that. We're out there, because we love the ocean and everything that's in it. And I am a resilient person. I'm Young. I can go through some change. I, I feel like there's already Been. It's going to happen.

Thank you, Dwight OK, Krista Tripp. 

Hi. Can you hear me?

Yes, I can hear you.

Hi, my name is Krista Tripp. I am a Lobster woman. Out of Maine. I am third generation. Um, and I, um, finally, just got my Lobstering captain's license, just five years ago. I was on the waiting list for 12 years, and I grew up fishing. I grew up going fishing with my dad. My uncle, my brother, I've been on several different boats. And I have never, in my life ever seen a whale offshore and definitely not inside fishing. Where I fish is within the three mile line. And there is just, it is, is just baffling to me that we are all having to do these gear modifications. I could understand the offshore fishery you know Area one having to do some of these regulations with weak links and their ropes. But for me, who have just gotten into the fishery, all of my ropes are old ropes that I fish. I have all of my grandfather's gear and I have traps that break all the time when I'm hauling my gear because I've tried to keep costs down in order to be able to get into this fishery. So for me, to put weak links in already old gear is going to be extremely cost. It's costly to me, because I'm going to have to buy all new rope. And last year, in just doing the gear marking, I mean, it took me a month to go through all of the gear that I already had. This is going to take me months, and it is going to cost me tens of thousands of dollars and is, I'm going to make nothing this year, and I mean, I can't even fathom the thought of trawling up. I'm going to have to hire another crewmember it's going to be extremely dangerous for, for me to put more traps on my very small boat. And I just, I am just completely baffled that this is happening right now. My dad was on the Atlantic Take Reduction Team when it first started to come out years ago, because we care so much about the ocean, the marine creatures, the whales and we have done everything in our power. And since we've put gear model modified our gear since then, years ago, I mean, I think the last whale death in Maine was seven years ago. And I mean, we
haven't even heard of an entanglement in our area for, for, for many years. So I don't know why Maine is being bundled up with Canada and with the ship strikes that have killed the whales. Because we're definitely not the ones to blame. And you guys are going to be just cutting a lifeline to Maine's economy, our fishery, um, my time is up so I'll end it there. Thank you for letting me speak.

Thank you Krista. OK, Blake,

I'm going to jump in while we're waiting. Thank you, Krista saying the three minutes, and sorry, that we sometimes have to cut people off on a breath, but it is late, and there are still at least three more people who are interested in speaking tonight. Thank you.

OK, Blake, You are not connected to audio. So, if you are using your computer, you'll get, you're going to want to, under audio settings, either choose computer or off, or use phone for audio. If you're on your phone, you're going to want to connect to your audio, and won't be able to unmute you, if you are not connected to audio, so I'll keep you on the oh, OK. Excellent. Can you hear me Blake? I believe that you have not entered your audio pin.

NOAA?

Excellent! Yes Blake, I can hear you.

Hello There.

Yes.

My name's Blake Alley. I'm 37 years old. I fish out of Steuben. So in Washington County, the poorest, most uneducated county in our great state of Maine. I just wanted to say a couple of things and I'll answer your, actual questions at the end of it here but I mean it's pretty obvious everybody. I'm not going to keep going over what's already been said but it's pretty obvious that there's a line in the sand here, there's two sides being taken and both saying facts saying what we think is right up X or whatever. one of us has to be right. one of us has to be wrong. So if all the data, a lack of data, no news is good news kind of thing. There's zero whale deaths. How can who is the one collecting the data? How are they coming up with these numbers? Who's supposed to be the? The actual one. Who's like the official data? I mean I would almost think it would be like the National Oceanic Atmospheric Administration. I mean, you guys should have this data. I mean, you guys are the ones paid hundreds of millions, Probably billions. I don't even know what your budget is, to find all this stuff out. And here we are, where we border another country. We're putting these regulations in, Canada, Doesn't have to do the same things we do, They're going to have a whole nother set of rules, They're not all packaged together. I mean, this is complete insanity. And I'm glad that everybody's getting involved in everything, but at the end of the day, this is a total manipulation of the Endangered Species Act. People are worried about dangerous trawls endangering species. I call it completely dangerous at one man with little man syndrome, can completely control a group of people? I mean, it doesn't even, How can you manipulate the law and you favor that way? That's what these Congressmen should be looking at. And everybody else, we can, obviously, it's going to be economic. We know what's going to
happen at all bad things that are going to come with it. But isn't that insane that one man can, basically, with zero data, no facts whatsoever, completely wipe out an industry? It doesn't make any sense. It's a complete failure of our laws and our government to let it happen. I mean, where does it end? So, I don't know, I wasn't going to say anything, but my buddy, Max just has a way to motivate people. Everybody's awful mad at him, but I feel bad for the poor bugger. Somebody really needs to give them a hug. I don't like you got enough money you get. But anyway, so, and to actually comment real quick on things that you wanted to actually comment, I disagree with every regulation, the trawling up, everybody should be able to fish just as we’re fishing, its’ not a problem, we cannot find a solution. When there is no problem, there cannot be a reduction to zero, we can artificially inseminate Whales and get negative numbers. It doesn't work that way. Were at zero, we can't get any less. So I can't speak for Canada, I can't speak for Area 3. The state of Maine, that’s where we're at. Thanks everybody for listening. Please write your opinions. Write where you can.

Thank you OK, Joel Cohen, I'm coming to you. OK, Joel, you should be able to unmute.

OK, hi, can you hear me?

Yes.

OK, thank you for letting me speak. Yeah, my name is Joel Cohen And I am in Florida. I have no, like chips in this game. I'm not a commercial fisherman, I'm not a government official. I'm not an environmental person. As far as with a group, I'm a wildlife photographer. Now, I was the automotive parts distributor for the majority of my life, so I kind of have a unique perspective on this. And the last speaker, I agree, we have two sides that, that, there's not much budging going on. So I want to give my perspective real quick. I'm not paid by anyone, I'm a volunteer to go out. I do, I do have a lot of experience. Because I watch the moms come down here to Florida in my backyard. I've lived on the beach for 34 years or five years and 34 years. I'm on the B, I'm not a commercial fishermen, but I fish and I surf, and I'm on the beaches and I've seen plenty of right whales. Because they all come down here. The reproductive mothers come down here to give birth, and because I'm a photographer, I like to take pictures of them and I've volunteered with groups to go out and, and, uh, help monitor them. I'm not a scientist, but I take pictures. I look at the whales, and I see these white marks down their body or all around their tail and I asked the people, what does this? Those are scars, OK, That's interesting. I also see a lot of Manatees in Florida and almost eight out of ten Manatees have propeller scars down their back. And when I see a right whale, it's I see both propeller scars and entanglement scars. And it does bother me very much to say that the entanglement issue is not happening or that. It's mostly boat strikes is just patently false. I mean, I see it with my own eyes through my own pictures. I can see the scars on these whales. Real fast story of my last seven days. I did get to see the calf that was run over by a vessel. We I also saw the pictures of the mom that was also hit by that same vessel. And then a few days later, I was on a boat with researchers as a photographer volunteer, using my own time, my own money, my own gear, because I love being out on the ocean just like you guys, the fishers. And I watched a whale named Cottontail, who's 11 year old male, 11 year old, boy whale. It was down here in Florida now. Who just swam past my house and we went out on a boat and I got to get close to cottontail and see how horrible how horrible condition. His body is in. Extremely emaciated that there's a rope wrapped around it, is through
his jaw, wrapped around his head, and seems to be hanging straight down with something very heavy. Pulling down them and I just, I can't stomach to see that anymore. Real fast, please don't cut me off I have one more comment Real quick comment. On the entanglement deaths versus ship strike death's, ship strike death is many times more obvious, Especially when they wash up with the ship when the ship come in or when they just wash up next morning just like this calf did. Entanglements are much more difficult to see them, because they get entangled as they. They swim. They get entangled, and they slowly die. Like, is what's happening to cottontail right now that, whale to me, has days left? So anyway, I applaud the measure to allow fishers to get a exempted permit to try ropeless and to get fishing with it. I got to fish with it all last summer with commercial,

I'm so sorry Joel Thank you so much for your comments. Thank you. Well, if you can put your name back in the queue we can we can come back to you. But thank you so much. OK, Genevieve! Yeah. OK Genevieve. You should be able to unmute yourself.

Thank you. I'm Representative Genevieve McDonald, Lobstermen out of Stonington Maine and a member of the Maine House of Representatives. As fishermen we take great pride in our heritage and our relationship with the sea. Few people are fortunate to have an intimate connection with the changes of the seasons, the weather, and the tides. We're stewards of the sea and depend on a vibrant and thriving marine ecosystem for our success. The current regulatory argument over North Atlantic right whale protections is not between lobstermen and whales. The question is how to move forward with regulations that will best protect the struggling species and the fishery. Reducing vertical lines in areas of the Gulf of Maine where North Atlantic right whales are visiting less frequently. And for shorter durations, due to the shift of their primary platonic food source, is not an effective solution To protect the right whales. We need by- national policy. And research collaborations focused on learning the North Atlantic Right Whales Adaptive Migration patterns, based on oceanographic conditions that best support their primary prey. Reducing the potential of a right whale being entangled based on where they were instead of where they are, will not save any whales, but will inflict grave damage on the Maine lobster fishery and the coastal communities that depend on it. Instead of dedicating resources to crafting effective regulations that would help protect right whales. The National Oceanic and Atmospheric Administration is demanding arbitrary restrictions that will benefit neither right whales nor Maine Lobstermen. These regulations would check a box in Washington DC. and temporarily appease the special interest groups who neither understand nor care about what lobster means to the people of Maine. It's hard to draw a direct line between these developing rules and actual remedy or relief for right whales. There's time for us to demand peer reviewed science, dedicated resources and effective, rather than arbitrary regulations. The value of the people who contribute to one of Maine’s most iconic industries. And I will be submitting written comments, as well. Thank you.

Thank you Representative McDonald. OK, Gabe Shadis, you are next. Ok Gabe?

Yes, hello.

Hi.
Hi, just a quick analogy, kind of from the perspective of what most of the fishermen in Maine here, view this as. So you're on a Boeing 747 max, It is doomed to crash. So, what's the solution? The solution is to lower the speed limit on the turnpike. Um, really, there are so many entities involved in this. And it looks like this is the weakest member. And the easiest really with the least defense to defend itself against what really appears to be an effort to, you know knock this fishery down a peg. You've got the Department of Defense, doing sonar testing. You've got the shipping industry. And I know people are arguing about ship strikes versus entanglements whatnot. It's all bad. Whales in Maine, If there are whale's passing through the Gulf of Maine, certainly in the last decade, they've seem to fare pretty well. In this day of, like, everybody's got their own set of facts, it's a, it's a pretty hard thing to defend. Um, you know, and you've got, you've got powers to be with the money making the choices. Um, anyway, it's not just the Maine Lobster and it's not just the coastal communities. It's the state of Maine. It's New England as a whole. Um, this is going to have impact far, far, reaching. I guess that's about all I have to say. Thank you for listening.

Thank you, Gabe. OK, Corey. You should be able to unmute yourself.

You're asking an awful lot, can you hear me?

Yes, I can.

OK, actually, my name's Matt Samuels I'm using Corey’s iPad. I’m a fishermen, out of Rockport Maine. And couple of things I just wanted to throw in everybody has pretty much answered everything: Um, I think a young lady put an important point out earlier, and the whole human element of this. Fishing really isn't what we do. It's really who we are. And that's really different from most other jobs. Whoever was saying that earlier, there are scientists, they go home. They get to go do what they do. We go home, We go to sleep. We dream about fishing, we think about fishing. it's in our blood. It is what we do. My daughters has been on my boat since they were toddlers and fish. Now they're fishing, commercially on their own, it's a big deal. The next would be it's really important. if we haven't learned anything over the last few years, facts matter. We talk about it all the time. And this is a great example of that. All the facts that we have, all the data that we have, shows that the whales are not being impacted by our fishing gear. And I guess I'm really kind of stunned as to why as soon as we say that there's just a silence. Um, that should really end the discussion. We should then be doing whatever it takes to be able to prove where the whales are, what they're doing, where they're eating. And, you know, maybe we should be putting the same amount of effort to regulate shipping, the cruise ships, the wind power industry. It seems kind of silly to be putting the most draconian measures, the group least, responsible for the whale interaction. Uh, hopefully, that's it. I'm going to mute myself again. Thanks a lot, bye.

Thank you. Let's take Jennifer Johnson. OK, Jennifer, You should be able to unmute yourself.

Awesome. Can you hear me?

Yes. I can hear you.
Awesome. Hi. My name is Jennifer. I'm a trained anthropologist with a background in, Environmental Science. I teach high school history right here in Maine, as well as climate policy, and on top of that, I'm also a photographer working with fishermen off the coast of Maine. I'm typically considered the hippie teacher, the granola crunching, sort of environmentalist, but, um, I really take issue with the proposed regulation for a few reasons. I've been using this as a case study in my environmental policy class, and I've had to pause because, I have students with unanswered questions, and the biggest one has been, Why is this being based off data that doesn't seem to support the policy? And I have had to stop talking about crafting policy and switch gears to talk more about lobbyists and politics. It's really difficult to help my students understand the way this is happening when I myself am baffled. I guess that's my first point. My second issue is that I worry about the future for these students, a worry about the lack of jobs for young people in Maine as of right now, and how our young people are leaving the state already. It would seem we continue to narrow down options for the future of our state. I don't need to restate the data issue, everyone else has spoken to, but I need to speak for the coming generations of young people in Maine. Our economy based on tourism is already suffering seriously. And when you rip out the fishing industry, the whole thing, Crumbles. And I could explain the chain of jobs and economics that's been off this industry, but we already know. And lastly, I just want to say that good, solid Policy is based on excellent data, as well as an analysis of environment economy, and the human element. It would seem as though this policy is either not based on those things, or it's not doing a good job of presenting whatever data does exist. I would ask that if you have crafted this regulation, that you can stand behind, that you present it in a way that is more easily digestible, and to the point and explanatory, I suggest that if this regulation is inevitable, it's accompanied by funding for fishermen to be able to pivot more easily while continuing to support Maine, economy. And I will be writing this all out, and thank you for your time.

Thank you. OK, Lee Watkinson, you are next. Lee.

Kara, thanks, Appreciate your hard work tonight and shout out to Brian Tripp for holding on. and that was the hour and a half of, uh, good for him. I wouldn't have done it, but I've listened to some of the data And I've looked at NOAA’s website and compiled some figures. And some of the stats kind of, uh, I don't know, they alarm me, I guess, because when you look at what went on, when I was a, I was a senior in high school, in 98. And my father encouraged me to go to college, because he was worried about the initial right whale rules, and to see that we've grown the population by almost 50% since then. Um, since I've come back home to fish for last, you know, 20 years on my own as a captain, and probably since the age of five, it's a little, it's a little hard to take for me just to say that we're the problem where we've actually grown that population that much. I mean, if you compare every other whale that's in the Gulf of Maine, that are living in the same environmental conditions that that the right whales are in, I mean, the Humpbacks have grown from the Endangered Species List to over 35,000. The pilot whales have grown 71%, up to almost 40,000 whales. And the blue whales, you know, they're at 308 in 1995 to 402 that gives you 31%. So the right whales are actually doing better than the blue whales. And you know, it's hard for me to sit here. And you know, I've listened to the environmentalists, and I get it were the first persons on the scene when there's an Entangled Whale which it does happen. I don't deny that. But we're the ones that take care of the ocean. Um, the Stock Assessment Data on NOAA webpage alone, I don't get how we dropped from 408 to 366, So quick, I guess the 2019 one was 422. But we just had a birth in the Canary Islands, which is off Europe. two years
ago we had a whale, a male whale documented there. So that is the population migrating back to Europe is the loss of whales that you guys aren't documenting because of that? I mean, it just, it causes alarm for me. I went to college for education in math mathematics, because you can't lie about math and the numbers that you guys are presenting. Just kind of worry me, I mean, how, how are the whales shifting back to Europe. And how do we have births going over there from North Atlantic, Right whales. And you're, you're, you're saying that the population here is shifting that you've subtracted 90 whales. I just don't get the math. I think the current fishery that we're doing now, it's where we're working together to grow. I mean, any species that you're growing by 50% over 30 years isn't a negative thing. Are there ways that we could tweak it? Yes. But we should get a pat on the back that we're trying. I just want to say that, thanks.

Thank you, Lee. OK, Michael Stone, next. You should be able to unmute yourself.

Hear me?

Yes.

All right, first. First, I would like to thank you for the chance to speak tonight. I'd also like to thank Jared Golden, Commissioner Kelliher, for their support and comments tonight. My name is Michael Stone. I'm a commercial lobster license holder and a student at Maine Maritime Academy. Lobstering is my passion. But I went to school because policies like this make the industry uncertain. I'm sorry if I repeat some, I've been doing my homework, and listening to this webinar. In my short time, in the merchant marine industry, I've heard of more whale deaths from ship strikes than from fishermen. A training ship, which only sails for three months a year, if that, has killed more whales than anyone I know in the lobstering industry. My second question is I want to ask why we the small business owners who are fighting with each other most of the time, are subjects, to spend our money on speculative, speculative, tactics, why can't the costs that we will be subjected to in this policy will be put into research specimens? Would this not be the most logical approach? Thank you for your time.

Thank you, OK? Zach Klyver You're up Next?

Can you hear me?

Yes Zach I can hear you.

OK. Thank you for the opportunity to speak. I believe fishermen are marine mammals. They spend half their life on the ocean. Conservation and fishermen have common cause in protecting the oceans. We have way more in common with fishermen and I grew up in a fishing family. So I consider myself in love with fishermen and with the with protecting the oceans. I want to thank all my great fishermen friends that are on this call tonight and say I look forward to working with you. I believe this isn't fishermen versus whales or a win lose situation. There is a win-win option and fishermen are going to solve this. Last night I presented 160 right whale sightings of between 1 to 7 whales from Whale Watch tours and from sighting data at Mount Desert Rock since 19 76 up to the present. I was on 30 or 40 of those tours that saw right whales off the coast of Maine. The vast majority of those sightings are offshore in 300 feet of water or more and 15 to
25 miles offshore. Now, that's important. That's where the co-occurrence is happening primarily. And secondly, this also points to the fact that we have 50 years of right whales showing up off the coast of Maine. Even this past year in 2020, 2 were photographed from whale watching tours from Bar Harbor at a very limited season. And right whales were also photographed, off of Eastport, and Frenchboro, and there was a report from Skutik that was very detailed. There are absolutely right whales in Maine Waters, they've been here for a long time. And they will continue to come through here. This is their habitat. For that reason, I presently support trap reductions offshore to reduce risk. I believe less traps can catch more lobster or a lot of lobster and reduce fuel bait and boat wear. For now, I think that's our best alternative to reduce risk. I support increased surveys, acoustic, boats and planes that I hope NOAA will invest more, and I hope the State of Maine will invest more in that. I support evolving the fishery to overcome all entanglements of whales not just right whales. I have personally seen dozens of whales entangled in Maine lobster gear. That's why I'm but I'm involved in developing ropeless fishing gear to allow fishermen and whales to both win in the long run. We can do it. We can do it in the next 10, 20, 30 years. Whatever it is, we can do it. We do know that from the DEIS there, there's 700 entanglement reported in nine years in that document: 89 of those were right whales. That's from Canada, to Florida. That's 75 whales per year. That's a crisis. These are the animals that are entangled, 75 a year. They're scared. They're in pain. And we can't say that we don't have culpability. The lobster and crab industry is 93% of line

Hey Zach I’m so sorry. Your three minutes is up.

OK, thank you very much.

Thank you, Zach. OK?

Hey guys can you hear me alright? Thanks for giving me a chance to speak. My name is Julie Albert.

It just sounds very faint.

I just wanted to put out some clarifying remarks that a lot of people have reported. As far as differences in the populations sizes that are out there and people are referencing or whales just drop off paper and aren’t accounted for anymore. I want to make sure people understand that sometime models change from year to year. But helps us with what the size of the population is. The north Atlantic right whale Consortium puts out a report card with multiple numbers in it from best case scenarios to worst case scenarios. Its available to everybody on Consortium website. I highly suggest everybody that thinks the data is flawed, or inconsistent, or does not exist, to go look at those reports. For those people who say they've been on the water a lot and don't see whales, and I don't mean for this comment to sound snarky, but I’m guessing you're not on the water 24/7 so I’m just wondering how many of you considered that maybe the whales go by when you're not out there or at night when you can’t see. A right whale was discovered off of Georgia in December trailing a trap and entanglements do happen and for those animals that we never see again, never rescue, and never recover gear from, there is no way to prove what kind of gear it is. So even though we can’t prove how much Maine gear specifically is on the whales, there's also no way to prove it's not Maine gear. So I want to make sure people understand that as well. If anyone has questions I want to refer you to
the right whale report cards on the Right Whale Consortium website that are put out annually. That’s where the information is.

Thank you, Julie. I think you're done. You sound it. OK, so, we have three last comments, People who, um, just need a little bit more time and want to wrap up. You'll be given 90 seconds Oh, Oh, boy. You'll be given nanana seconds just singing to us. Oh, oh. Oh, oh. Excellent. The night is young, OK, Ooh! Michael Myers. I'm coming back to you. Oh, boy. Oh, boy. OK, Michael.

Mike stepped away for a minute, but my name is Noah Mank and I'm from Midcoast Maine, Saint George. I've had the pleasure of fishing on many boats over the years in the Mid Coast region as long as from as well as from here to Portsmouth, New Bedford. Um. And I've seen a lot of whales I'm not going to say I'm, I'm not a Scientist of whales by any means. But I'm pretty well versed in in what whales are which the Humpbacks, finbacks and stuff like that. And I've never specifically seen a right whale. To answer the lady before, I don't know that the whales they could be there when I'm not there. But I spend just about 24/7 on the water, and I know quite a few other people who do, and I've never heard them talk about right whales either. So. Ah. It's a sensitive subject for everyone, no doubt. It's the question I really have about the regulations and the proposals is that, uh, those are all fine for operations that are up and running. And stuff like that. But I, you know, I just had my second daughter, I delivered her in my house, in the town in which I have grown up, and I fish in, and I sterned in for 15 plus years. I'm also just getting my Maine state license for myself to go out. How does someone, like my daughters or anyone's children, for that matter, how does the future expect to have a chance to thrive? Not every one of them is going to be born with a captain for a father or mother, and I was always under the impression part of the beauty and the tradition of this business in this lifestyle was to hand it down to someone else, to hand it to another generation. That's part of the beauty of growing up in Maine is that that's what we do here. Even if you're not a fisherman. You know, people are third generation farmers. Um, so, I think you would, honestly, if these things are to go through, for me to just actually weigh in on it, I think you would actually be destroying a way of life. And it would be really unfortunate. So, I don't support closures. I don't support any of it. Thank you.

Thank you, Did you say your name was Noelle?

Noah N O, AH, Like the guy who built the boat.

Awesome, thank you so much, Noah. OK Dwight, you'll be able to unmute yourself.

I'm all set here. It's late. Thank you.

OK Thank you Dwight. OK Joel give me one second.

OK. Can you hear me?

Yes.
Yeah. My name's Joel Cohen and I mentioned before Wildlife photographer from Florida photograph the whales, at least, eight out of ten of the whales I've seen each year are show entanglement scars. But anyway, I wanted to comment on the regulation about allowing ropeless with the exempted fishing permits. So if that passes, I applaude that very much. I know other states didn't really include that. So I think that's great. I think it's a great opportunity for the fishers to get their hands on this stuff and get it. See that it really does work. I spent last year last summer and the fall with commercial fishers in Florida, Georgia, North Carolina, on the water with them active fishing side-by-side. We use six different manufacturers, gear, and different alterations of there of each one. It absolutely works. I don't agree with the claims of it being once it's adapted, I don't believe it's going to be making it less safe. There's definitely concerns and things to work out, like the overboard concern. But that's, uh, that that can be easily solved in the technology. So anyway, the ropeless gear I believe, has been pushed on the fishermen and there's been articles written that give it an incorrect assessment in everyone's eyes. I am really hope that some guys that are really doing is the Maine fishers can use this stuff and play with it and see that it's not, as some of those Articles, claim it does work and I also argue that there's a financial case for fishermen because there's a very good chance you'll lose less gear.

And my time is up.

Your time is up. Yes. Thank you.

No one wants to hear from you.

Oh. So, sorry. Please keep yourselves muted unless I've called on you. OK, Jack Merrill Coming to you next. OK, Jack.

OK, thanks. Yes. So I wanted to respond to Julie's comment about not being not knowing where the entanglements come from. You can definitely tell where they come from, by the rope that's taken, off of them. And I had the opportunity years ago to be at a meeting with TRT meeting. And we had a pile of rope on the floor, hotel in Massachusetts. It was a huge pile of rope, it was taken off whales that were entangled, not right whales, necessarily, but whales. We were asked if any of it looked like our gear where we fished, and I was, did not anticipate that opportunity. But I was pleasantly surprised that absolutely none of it even remotely resembled Maine gear. It was much larger, and I don't know where it came from, I can't say, but it was much larger than anything we fish. So you can identify that. I also want to urge NOAA and environmental groups, or anybody else that concerned, to seriously consider the use of drones for surveillance. Canada just invested in a drone. They have, it's unbelievable, the technology they have. I'm pretty sure we can track right whales with drones. Um, so, and my final comment is, to you guys, please pay attention to the data, because it's not the Gulf of Maine, that's the problem. Thank you.

Thank you. OK, we have two last comments, Sam Rosen, you should be able to unmute yourself? Sam, let me send you a unmute request. OK? OK, Brian. OK, Brian, you should be able to unmute yourself.

Yeah, I am. Can you hear me?

Yes, I can hear you.
It's was so good The first time I couldn't help but come back. The ropeless thing it's easy to say that that would work great when you aren't a fisherman in the Gulf of Maine. We have so much gear and so much tide. And the bottom is jagged. It's not like Florida. Those people that believe that this is a solution they need to come and see for themselves. We are not stupid. Maine fishermen know what works. We have had to adapt for hundreds of years and we simply do what works. It's a financial thing. It's how to keep it. I have $80,000 in lobster traps. If you think I'm going to throw $80,000 overboard without a way to get it back, you're crazy. That's all I have to say.

Thank you, Brian. OK, OK, Sam, I'll come back to you. Really quickly give me one second. try one more time. Ok Sam you're unmuted.

Can you hear me?

Yes, I can hear you,

Yeah. I just wanted to say, I'm a lobstermen in Maine, fish offshore. Lot of things I could talk about. But I just wanted to specifically address the ropeless fishing. I've actually fished in Australia, New Zealand at high school and in New South Wales, and I've seen ropeless in action. And I can say the technology is not to a point where we could use it. It's not even close. There are a number of reasons why I say that. First, they're fishing single traps or pairs and they're only fishing about 50 to 200 traps and their price per kilos, like 100 to upwards of that per kilo. So, there it's a lot more valuable fishery. And there, we would have to contend with lines of gear. I mean, trawls that are actually covering more area than just a single point. So, the gear conflict between our gear and then, mobile, gear, like, like, Drags and whatnot. They'd have to be able to see our gear and avoid it. And in order to see it, or, sorry, in order to avoid it, they'd be able to see it long in advance. I mean, upwards of probably a mile or something like that if they're towing or dragging in deep water. And I don't, I don't really know what technology, where the technology is at right now, but I know it's quite a ways from being able to avoid our gear a mile in advance, so, that’s all I have to say.

Thank you, everyone, for your participation this evening.

I just quickly wanted to show you guys, again, maybe what slide can you see?

We can see the written comments slide.

You can see that, comments, Excellent.

That's right.

OK, so just a reminder, and if you guys have any comments after this evening, you can go to regulations dot gov, It will be a blue page like this. You'll be able to search by the docket number, which is NOAA Dash NMFS dash 2020 dash 0031. It'll come up with a list of documents. Under the Proposed Rule, you should see a comment button, and if you click
Comment, you'll be able to type or attach any written comments that you might have. So if you have any anything else you'd like to tell us after this evening, you can submit written comments. Everything that you have typed to us and said to us tonight was recorded as a comment, as well. Colleen I think that's it.

Yeah, people are leaving quickly, but I'd like to thank the last 150 hanging around, that that's a marathon meeting over three hours. I'd like to thank all the NOAA staff that helped and Marissa, great job tonight presenting. And I'd really like to shout out Kara today and our other calls. Today was like, you know, like running, like, landing planes. She was looking at so many screens at once. So thanks, Kara. You made it pretty smooth and I appreciate the help. And thanks everyone, especially all the TRT members that were on and all the fishermen and others that commented tonight really appreciate it. Hopefully next time we'll see you in person.

Thank you all. And I will just leave this slide up as people and in case they would like to write anything down. Have a great evening.
Form Letter A

**Total matches 70-100%: 22,933**

***Right whales are intelligent, sentient beings that have a right to an ocean not overrun with lethal hazards of ship hulls and propeller blades ready to kill any whale unfortunate enough to collide with them. These intelligent, sentient animals have inhabited the Atlantic for vastly longer than humans have exercised their covetous jurisdiction over it. There is no amount of cost avoidance or convenience for the shipping and groundfish industries that can justify the gross violation of the rights of whales to existence, to not suffer torturous deaths at human hands, or justify industry's reappropriation of their oceans. The North Atlantic Right Whales are out of time and out of space in their struggle to stay biologically and demographically ahead of the human assault upon their bodies and their homes. These precious animals desperately need expansive, robust, legally enforceable shields against fishing rope ensnarement, reckless shipping vessel strikes, and the acoustic warfare of seismic oil exploration. The striking and killing of whales with ships and fishing gear, even if ostensibly accidental, is a cruel and heinous fate to which to subject our fellow mammals. NOAA must enforce their right to exist through, regardless of self-serving industry complaints with no moral merit.*** The North Atlantic right whale is critically endangered and needs immediate help to recover. It is NOAA Fisheries legal responsibility under the Endangered Species Act and the Marine Mammal Protection Act to protect this species from injury and death in U.S. waters. The greatest threat to right whales in U.S. waters is entanglement in commercial fishing gear. NOAA Fisheries estimates that entanglement risk from lobster and crab fisheries needs to be reduced by 60% to 80%. The calculations in the Draft Environmental Impact Statement showing how NOAA Fisheries proposes to achieve that risk reduction rely on an old stock assessment using 2016 population estimates, whereas the most recent population estimates indicate that the North Atlantic right whale has further declined to about 366 animals. So there is no question that a risk reduction target of at least 80% which accounts for unseen whale mortalities is required. The alternative measures that NOAA Fisheries released would achieve only 60-69% risk reduction. Further, these risk reduction measures rely on an ineffective gear modification called weak rope that has not proved to reduce serious injury and death in whales. It is not worth the economic burden on the industry to change to this rope if there is no proven conservation benefit. In addition, the closures outlined in the proposed rule are too small and too short in duration. Specifically, the closure south of Nantucket and Martha's Vineyard should be year-round, because right whales have been present nearly every month of the year in that area for the past several years. NOAA Fisheries proposed rule simply does not do enough to save the right whale from extinction. On the most optimistic timeline, the measures included in the final rule to reduce risk to whales would not be in effect on the water until 2022 or later. While this rule is revised, finalized, and implemented, NOAA Fisheries must immediately implement emergency action designating a year-round closure south of Martha's Vineyard and Nantucket and in three areas in the Gulf of Maine that would be closed seasonally to vertical buoy lines in the American lobster and Jonah crab fisheries. Targeted vertical buoy line closures where right whales interact with this heavy, lethal fishing gear are the fastest and most effective management tools to prevent unlawful deaths and extinction of the North Atlantic right whale. Closures in offshore areas would also minimize the impact on fishermen, because the majority of lobster fishing occurs closer to shore. North Atlantic right whales can recover if NOAA Fisheries takes swift, effective action to protect them from the vertical buoy lines that entangle and kill them. The proposed rule must be revised, and the final rule must meet the level of risk reduction required by the most recent scientific information. In the meantime, NOAA Fisheries must immediately implement closures to lobster and crab fishing with vertical buoy lines in the areas where right whales concentrate, and help prevent the extinction of this iconic animal.

Form Letter B

**Total matches 70-100%: 12,622**

National Oceanic and Atmospheric Administration (NOAA), The National Marine Fisheries Services proposed rule to address North Atlantic right whale entanglements in fishing gear does not go far enough to save this species from
extinction. With only about 360 individuals remaining, the right whale is one of the world's most critically endangered whales. The species has suffered a 25% population loss in less than a decade. Fishing gear entanglements are the leading cause of skyrocketing rates of right whale deaths and serious injuries and are also preventing them from reproducing, pushing calving rates to historic lows. National Marine Fisheries Service officials have acknowledged for years that the right whale's situation is dire and that more needs to be done. More right whales are being harmed and killed by fishing gear entanglements while we wait for action. The proposed rule must do more to protect right whales by expanding the proposed closures and fast-tracking the transition to requiring "ropeless" fishing gear. The Fisheries Service has the statutory authority to enact emergency regulations to close important right whale habitat to fishing with static vertical buoy lines. Please use that power to save this species from extinction. The Democratic Party platform should support: Animal Rights, Defending the Affordable Care Act, Ending Citizens United, Ending Marijuana Prohibition, Giving Greater Visibility to Pro-Life Democrats, Gun Control, Net Neutrality, Raising the Minimum Wage to $15 an Hour, Responding to the Scientific Consensus on Global Warming, and a Sustainable Energy Policy. Democrats for Life of America, 10521 Judicial Drive, #200, Fairfax, VA 22030, (703) 424-6663 Thank you for considering my perspective. Vasu Murti vasumurti@netscape.net 30 Villanova Lane Oakland, California 94611

Form Letter C
Total matches 70-100%: 9,360
North Atlantic right whales are dying solely due to human activities. Without bold action, I fear these whales may go extinct in my lifetime. The National Marine Fisheries Service has the opportunity to make the necessary changes to save this species. I am glad to see steps are being outlined to promote the protection and survival of right whales but, unfortunately, the proposed steps are based on outdated science. I urge NMFS to redraft these regulations using the most up-to-date population estimates of North Atlantic right whales in order to develop an accurate risk reduction plan. I also urge NMFS to aim to reduce risk to right whales by at least 80 percent, as recommended by the US Marine Mammal Commission, rather than the less effective risk reduction outlined in the current proposal. In the interim, NMFS should immediately implement temporary emergency regulations to protect right whales. I strongly encourage NMFS to further invest in developing ropeless technology as quickly and responsibly as possible, while establishing a plan to assist commercial trap fisheries in a transition to whale-safe gear. This rule relies too heavily on a costly and inadequate transition to weaker rope, which has not been proven to protect younger whales and does not reduce the long-term health effects of chronic entanglements on whales. In October 2020, it was estimated that fewer than 360 right whales remain. Although right whales received protection from whaling in 1935, the population has struggled to recover since then. They face growing modern-day threats from fishing gear entanglements, vessel strikes, habitat loss, and pollution. Thus, the need for NMFS to redraft, strengthen, and improve the Atlantic Large Whale Take Reduction Plan is critical to the whales' survival and recovery. Thank you for the opportunity to comment on enhanced protections for the North Atlantic right whale. It is my hope that my suggestions will be considered in this process and that NMFS will prioritize right whale protections.

Form Letter D
Total matches 70-100%: 7,822
Please accept these comments on the proposed modifications to the Atlantic Large Whale Take Reduction Plan as published in the Federal Register. As NOAA has recognized, entanglement in outmoded fishing gear is the leading cause of death for North Atlantic right whales. 85% of right whales have become entangled at least once as they navigate through more than one million buoy ropes attached to fishing gear on the East Coast of the United States. Where there is rope, there is real and imminent risk to right whales. Time is running out. According to NOAA’s most recent estimate, fewer than 370 right whales remain. The proposed rule modifications do not represent a serious, science and technology-based effort to save this species from extinction. If NOAA is going to change the rules protecting right whales, the new rules should reflect the most recent population estimate produced by the Agency’s own scientist, not data consider obsolete by NOAA itself. Proposals to reduce entanglement risks to right whales are

995
whales must promote and accelerate the permitting process for ropeless fishing gear. This 21st century technology, pioneered by New England lobstermen, reduces entanglement risk to right whales while maintaining fishermen’s access to otherwise closed areas. The NOAA-preferred option of reduced breaking strength or weak rope is a short-term policy option that offers no protection to right whale calves or juveniles from potentially lethal entanglements. We cannot state strongly enough our outrage that these magnificent mammals are being killed as collateral for profiteering greed, and treating the deaths with a shrug of the shoulder. We urge you to strengthen the proposed rule changes to ensure they are based on the best available science and technology and to accelerate the adoption of ropeless fishing, a win-win solution for endangered whales, fishermen and coastal economies. Otherwise, the use of any ropes, nets, or any other type of fishing gear that “may” entangle any species should be completely banned with fines and incarceration upon conviction to be large enough to create compliance incentives. Thank you.

Form Letter E
Total matches 70-100%: 552
My name is Mara Lyn Leverett, and I am a resident of New York, but was born in Georgia, where my family has lived for generations. I was born the same year that the Endangered Species Act passed and the year after the Marine Mammal Protection Act was passed. The right whale is my home state's Marine mammal, and right whales' calving area are off the coast of Georgia where I spent every summer. I appreciate that the National Oceanic and Atmospheric Administration (NOAA) has given the public an opportunity to comment on the new regulations regarding the lobster and crab fisheries. I encourage the agency to take every step possible to protect the North Atlantic right whales and enact stricter regulations than what are currently proposed, especially after reading about the death of the right whale known as Cottontail's death by entanglement off the coast of South Carolina today. With fewer than 375 North Atlantic right whales in the Atlantic, NOAA must act quickly to implement emergency closures to restrict the use of vertical buoys in high-risk areas while the agency finalizes the proposed regulations. The North Atlantic right whale population is at a tipping point, and without emergency action, they will suffer irreversible harm before new regulations can even be implemented. NOAA must rely on the best and most up-to-date data available to determine the final regulations and aim for a minimum of an 80% risk reduction. The unusual mortality events that have resulted in 46 known deaths since 2017 must be considered in NOAA's calculated risk reduction, but NOAA must also account for unknown deaths, which the latest science shows is significant. The weak rope equipment suggested as an alternative in the proposed rule has not been proven to effectively reduce harm to right whales. In fact, many fishermen have stated that they will use more rope if the weak rope requirement is implemented, overall increasing the likelihood of entanglements. Ropeless gear should be encouraged and as technology is improved, required, instead of weak rope. Finally, the rules should extend the duration of closures in high-risk areas where historical observation documents that right whales are present year-round. Thank you for your consideration of these comments.

Form Letter F
Total matches 70-100%: 62
North Atlantic right whales are dying solely due to human activities. Without bold action, I fear these whales may go extinct in my lifetime. The National Marine Fisheries Service has the opportunity to make the necessary changes to save this species. I am glad to see steps are being outlined to promote the protection and survival of right whales but, unfortunately, the proposed steps are based on outdated science. I urge NMFS to redraft these regulations using the most up-to-date population estimates of North Atlantic right whales in order to develop an accurate risk reduction plan. I also urge NMFS to aim to reduce risk to right whales by at least 80 percent, as recommended by the US Marine Mammal Commission, rather than the less effective risk reduction outlined in the current proposal. In the interim, NMFS should immediately implement temporary emergency regulations to protect right whales. I strongly encourage NMFS to further invest in developing ropeless technology as quickly and responsibly as possible, while establishing a plan to assist commercial trap fisheries in a transition to whale-safe gear. This rule relies too heavily on a costly and inadequate transition to weaker rope, which has not been proven to protect younger
Form Letter G

Total matches 70-100%: 46

National Oceanic and Atmospheric Administration (NOAA), The National Marine Fisheries Services proposed rule to address North Atlantic right whale entanglements in fishing gear does not go far enough to save this species from extinction. With only about 360 individuals remaining, the right whale is one of the world's most critically endangered whales. The species has suffered a 25% population loss in less than a decade. Fishing gear entanglements are the leading cause of skyrocketing rates of right whale deaths and serious injuries and are also preventing them from reproducing, pushing calving rates to historic lows. National Marine Fisheries Service officials have acknowledged for years that the right whale's situation is dire and that more needs to be done. More right whales are being harmed and killed by fishing gear entanglements while we wait for action. The proposed rule must do more to protect right whales by expanding the proposed closures and fast-tracking the transition to requiring "ropeless" fishing gear. The Fisheries Service has the statutory authority to enact emergency regulations to close important right whale habitat to fishing with static vertical buoy lines. Please use that power to save this species from extinction. In closing I'd like to share my poem on what's happening to right whales, in hopes that it will lead to this necessary measure to protect them. RIGHT WHALE Bound up in plastic floats and ropes, it washes ashore, unrecognizable, an enormous garbage heap feathery baleen ripped and bedraggled beside its body, hardened wounds on its skin like craters edges, moon rocks. Its sightless eyes accuse us. Can I avenge this mauled being which can live a hundred years, span a thousand miles? I recognize my kindred. By mourning. By framing it for others to see. (c) Lisa Fleck Pleas

Form Letter H

Total matches 70-100%: 40

Thank you. I am writing to comment on the proposed modifications to the Atlantic Large Whale Take Reduction Plan as published in the Federal Register. As NOAA knows, entanglement in outmoded fishing gear is the leading cause of death for North Atlantic right whales, and fewer than 400 of these whales remain in the world. Fortunately, there is a perfect fix for this, to save this species! Ropeless gear technology. Ropeless gear is the long-term solution to reduce entanglements of right whales and other marine life, while keeping fishermen working and on the water. And these rules could be put in place now. Nearly the entire existing population of right whales, 85%, have become entangled at least once as they navigate through more than one million buoy ropes attached to fishing gear on the East Coast of the United States. Ridiculous and wasteful! We know, our best marine research scientists know, that where there is rope, there is real and imminent risk to right whales. And time is running out. According to NOAA’s own most recent estimate, fewer than 370 right whales remain. Please save this species from extinction. If NOAA is going to change the rules protecting right whales, the new rules should reflect the most recent population estimate produced by the Agency’s own scientist, not data consider obsolete by NOAA itself. Proposals to reduce entanglement risks to right whales must promote and accelerate the permitting process for ropeless fishing gear. This 21st century technology -- pioneered by New England lobstermen, no less (and they should know what is feasible, what will work for fishing AND whales) -- reduces entanglement risk to right whales while maintaining fishermen’s access to otherwise closed areas. The NOAA-preferred option of reduced breaking strength or weak rope is a short-
term policy option that offers no protection to right whale calves or juveniles from potentially lethal entanglements. In closing, my family and I urge you: Strengthen the proposed rule changes to ensure they are based on the best available science and technology and to accelerate the adoption of ropeless fishing, a win-win solution for endangered whales, fishermen and coastal economies. Thank you for making this fortuitous and effective solution happen now. Fishermen and scientists know what to do, and so do federal regulators. Let's make it happen now.

Form Letter I
Total matches 70-100%: 32
Dear NOAA Fisheries: I am writing in reference to Docket No. 201221-0351 - the rulemaking process to protect critically endangered North Atlantic right whales. The North Atlantic right whale is Georgia’s state marine mammal. Our coast is one of the few known calving grounds and each winter, calving North Atlantic right whales make their annual journey from New England and the Canadian Maritimes to give birth and rear young here. Since 1981, when they were first spotted along our coast, each calving season has been met with anticipation by right whale supporters. Successful reproduction is a challenge for the North Atlantic right whale. Female right whales reach reproductive maturity at around 10 years of age. Historically, the species can give birth to only one calf every three to five years, yet trauma from entanglement has increased this interval to nearly 10 years. With an estimated population of fewer than 100 breeding females, every birth is a cause for celebration and, unless action is taken by your agency, this species will be lost forever. The National Marine Fisheries Service (NMFS) released new data on October 26, 2020 indicating that the population estimates, and mortality and serious injury rates are worse than previously thought. Given the low population numbers (including fewer than 94 breeding females remaining), it is essential that we work together to protect every North Atlantic right whale in order to avoid extinction for this endangered species. Based on the expert opinions of scientists, trusted non-governmental organizations and conservation groups, I don’t believe NOAA Fisheries’ proposal to reduce the serious injury and mortality of right whales can move the lobster and crab fisheries into compliance with the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA). NOAA Fisheries’ proposed measures aim to achieve only 60-69% risk reduction, but they must recalculate the potential biological removal (PBR) level using updated data and publish a final rule that achieves a minimum of an 80% risk reduction. We have a biological, legal, and moral responsibility to curtail human-caused deaths of this species. The U.S. federal government is required to protect these animals in our waters, under the MMPA and the ESA. Please strengthen the proposed North Atlantic right whale take reduction plan and consider emergency action. Thanks for your consideration and efforts to preserve this symbol of our state, our ecosystem and biological diversity. Sincerely,

Form Letter J
Total matches 70-100%: 31
The North Atlantic right whale is critically endangered and needs immediate help to recover. As we already know, NOAA Fisheries legal responsibility is to protect this species from injury and death in U.S. waters. The greatest threat to right whales in U.S. waters is entanglement in commercial fishing gear. NOAA Fisheries estimates that entanglement risk from lobster and crab fisheries needs to be reduced by 60% to 80%. The calculations in the Draft Environmental Impact Statement showing how NOAA Fisheries proposes to achieve that risk reduction rely on an old stock assessment using 2016 population estimates, whereas the most recent population estimates indicate that the North Atlantic right whale has further declined to about 366 animals. So there is no question that a risk reduction target of at least 80% which accounts for unseen whale mortality is required. The alternative measures that NOAA Fisheries released would achieve only 60-69% risk reduction. Further, these risk reduction measures rely on an ineffective gear modification called weak rope that has not proved to reduce serious injury and death in whales. It is not worth the economic burden on the industry to change to this rope if there is no proven conservation benefit. In addition, the closures outlined in the proposed rule are too small and too short in duration. Specifically, the closure south of Nantucket and Marthas Vineyard should be year-round, because right whales have been present nearly
every month of the year in that area for the past several years. NOAA Fisheries proposed rule simply does not do enough to save the right whale from extinction. On the most optimistic timeline, the measures included in the final rule to reduce risk to whales would not be in effect on the water until 2022 or later. While this rule is revised, finalized, and implemented, NOAA Fisheries must immediately implement emergency action designating a year-round closure south of Marthas Vineyard and Nantucket and in three areas in the Gulf of Maine that would be closed seasonally to vertical buoy lines in the American lobster and Jonah crab fisheries. Targeted vertical buoy line closures where right whales interact with this heavy, lethal fishing gear are the fastest and most effective management tools to prevent unlawful deaths and extinction of the North Atlantic right whale. Closures in offshore areas would also minimize the impact on fishermen, because the majority of lobster fishing occurs closer to shore. North Atlantic right whales can recover if NOAA Fisheries takes swift, effective action to protect them from the vertical buoy lines that entangle and kill them. The proposed rule must be revised, and the final rule must meet the level of risk reduction required by the most recent scientific information. None of this is intended to curtail the fishing industry. Rather, overall environmental and economic futures depend on a renewed sense of cooperation between humanity and nature. Small adjustments based on positivity can create ripples and ultimately tides of positivity ... just as negativity has been so contagious along the way to the crossroads in history reached here.

Form Letter K

Total matches 70-100%: 21

National Oceanic and Atmospheric Administration (NOAA), The current National Marine Fisheries Services proposed rule to address North Atlantic right whale entanglements in fishing gear does not go far enough to save this species from extinction. There are only about 360 individuals remaining. The right whale is one of the world's most critically endangered whales. The species has had a 25% population loss in less than ten years. Fishing net/gear entanglements are the leading cause of increasing rates of right whale deaths and serious injuries. This type of fishing equipment and use are also preventing right whales from reproducing, causing calving rates to spiral to historic lows. Thankfully, National Marine Fisheries Service officials have acknowledged for years that the right whale's situation is dire and that more needs to be done. And, more must be done now. Unfortunately, more right whales are being harmed and killed by fishing gear entanglements as we wait for needed action. The recently proposed rule must do more to protect the lives of and reproduction of right whales by expanding the proposed closures and fast-tracking the transition to requiring "ropeless" fishing gear. The Fisheries Service has the statutory authority to enact emergency regulations to close important right whale habitat to fishing with static vertical buoy lines. Please use that power, now, to save this species from extinction. Thank you. Judy Lukasiewicz

jsteel@cruzio.com 701 Happy Valley Rd. Santa Cruz, California 95065

Form Letter L

Total matches 70-100%: 17

I write to you as a taxpayer who cares deeply about the extinction crisis and believes that it must be treated as the emergency that it is. I am writing to comment on the proposed modifications to the Atlantic Large Whale Take Reduction Plan as published in the Federal Register - a plan that is clearly inadequate. As NOAA has recognized, entanglement in outmoded fishing gear is the leading cause of death for North Atlantic right whales. 85% of right whales have become entangled at least once as they navigate through more than one million buoy ropes attached to fishing gear on the East Coast of the United States. Where there is rope, there is real and imminent risk to right whales. This situation never should have been allowed to happen in the first place and it has to be remedied fast. We are talking about extinction of an endangered species. This is an emergency. According to NOAA’s most recent estimate, fewer than 370 right whales remain. The proposed rule modifications do not represent a serious, science and technology-based effort to save this species from extinction. Whatever the intention, they look like a plan to kick addressing this lethal fishing gear down the road, at which point it will be too late. NOAA should deal with this issue realistically now. Its new rules should reflect the most recent population estimate produced by the Agency’s own scientist, not data considered obsolete by NOAA itself. Proposals to reduce entanglement risks to right whales
must promote and accelerate the permitting process for ropeless fishing gear. This 21st century technology, pioneered by New England lobstermen, reduces entanglement risk to right whales while maintaining fishermen’s access to otherwise closed areas. The NOAA-preferred option of reduced breaking strength or weak rope is a short-term policy option that offers no protection to right whale calves or juveniles from potentially lethal entanglements. It is a diversion from what will actually work best. If right whales are to survive, we cannot afford to lose any right whale calves. I urge you to strengthen the proposed rule changes to ensure they are based on the best available science and technology and to accelerate the adoption of ropeless fishing, a win-win solution for endangered whales, fishermen and coastal economies. Again, we are in an extinction crisis. Right whales are a species at extreme risk. It is incumbent upon NOAA to take action immediately and to do it in a way that will actually work. Thank you.

Form Letter M
Total matches 70-100%: 17
National Oceanic and Atmospheric Administration (NOAA), The National Marine Fisheries Services proposed rule to address North Atlantic right whale entanglements in fishing gear does not go far enough to save this species from extinction. With only about 360 individuals remaining, the right whale is one of the world's most critically endangered whales. The species has suffered a 25% population loss in less than a decade. Fishing gear entanglements are the leading cause of skyrocketing rates of right whale deaths and serious injuries and are also preventing them from reproducing, pushing calving rates to historic lows. National Marine Fisheries Service officials have acknowledged for years that the right whale's situation is dire and that more needs to be done. More right whales are being harmed and killed by fishing gear entanglements while we wait for action. The proposed rule must do more to protect right whales by expanding the proposed closures and fast-tracking the transition to requiring "ropeless" fishing gear. The Fisheries Service has the statutory authority to enact emergency regulations to close important right whale habitat to fishing with static vertical buoy lines. Please use that power to save this species from extinction. The whales are also disturbed by all the darn ships. There should be a place they could be safe. Here where I live, people take out whale watching ships. It's like they have no idea that the whales did not come out to be seen but they are trying to eat. Every time these fools do that it makes me unhappy. We're losing our orcas because of people/dam interface and you're losing the right whales because of fishermen whining about making a living and being unwilling to change their behavior. I hope you can save the poor damn whales, they don't deserve the way they are being treated. Most of the living things left don't de

Form Letter N
Total matches 70-100%: 15
Dear NOAA Fisheries, My name is Daryn Clevesy and I currently reside in Portsmouth, NH. I have grown up in NH my entire life and have always been drawn to nature, both the mountains and the sea. My love for nature only grew as I did, leading me to earn a Bachelor's degree in Environmental Conservation and Sustainability from the University of New Hampshire. Today I am lucky to be working at the Seacoast Science Center (SSC) located inside the beautiful Odiorn Point State Park where I work everyday to educate the public about our World's Ocean importance, and what we can do to help protect the oceans themselves, as well as the many species that depend on it. Thats why I'm writing to you today about our North Atlantic right whales. I'm asking you to do everything you can to save this critically endangered species from extinction. While your proposed rule is a step in the right direction, it does not go far enough. I urge NOAA Fisheries to consider the following in formulating the final draft of the rule: Weak rope will not do enough: modifications to fishing gear, called weak rope, are intended to reduce risk of entanglement. But weak rope has not been thoroughly evaluated and has not been proven to reduce risk. We need more, and longer, habitat closures: to truly save the species, we need to dramatically reduce the amount of vertical lines in the water, for a longer period of time. The proposed closures are not long enough or large enough to protect these whales. Ropeless fishing gear is the best path forward: NOAA Fisheries must continue efforts to test and foster
a market for ropeless technologies by creating incentives for fishermen to try them. Right whales are majestic, social creatures that are a critical part of the ecosystem. We are their greatest threat, and only hope we have to act now to save them. Please do everything you can to prevent their extinction. Sincerely, Daryn Clevesy

Form Letter O

Total matches 70-100%: 13

Dear NOAA Fisheries: We are writing in reference to Docket No. 201221-0351 - the rulemaking process to protect critically endangered North Atlantic right whales. The North Atlantic right whale is Georgia’s state marine mammal. Our coast is one of the few known calving grounds and each winter, calving North Atlantic right whales make their annual journey from New England and the Canadian Maritimes to give birth and rear young here. Since 1981, when they were first spotted along our coast, each calving season has been met with anticipation by right whale supporters. Successful reproduction is a challenge for the North Atlantic right whale. Female right whales reach reproductive maturity at around 10 years of age. Historically, the species can give birth to only one calf every three to five years, yet trauma from entanglement has increased this interval to nearly 10 years. With an estimated population of fewer than 100 breeding females, every birth is a cause for celebration and, unless action is taken by your agency, this species will be lost forever. The National Marine Fisheries Service (NMFS) released new data on October 26, 2020 indicating that the population estimates, and mortality and serious injury rates are worse than previously thought. Given the low population numbers (including fewer than 94 breeding females remaining), it is essential that we work together to protect every North Atlantic right whale in order to avoid extinction for this endangered species. Based on the expert opinions of scientists, trusted non-governmental organizations and conservation groups, we don’t believe NOAA Fisheries’ proposal to reduce the serious injury and mortality of right whales can move the lobster and crab fisheries into compliance with the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA). NOAA Fisheries’ proposed measures aim to achieve only 60-69% risk reduction, but they must recalculate the potential biological removal (PBR) level using updated data and publish a final rule that achieves a minimum of an 80% risk reduction. PARK CANNON REPRESENTATIVE DISTRICT 58 931 MONROE DRIVE SUITE 102, NUMBER 460 ATLANTA, GA 30308 PARK.CANNON@HOUSE.GA.GOV House of Representatives COVERDELL LEGISLATIVE OFFICE BUILDING, ROOM 512 ATLANTA, GEORGIA 30334 (404) 656-7859 (O) (404)656-5605 (FAX) STANDING COMMITTEES: ETHICS CODE REVISION HUMAN RELATIONS & AGING INSURANCE SMALL BUSINESS DEVELOPMENT CREATIVE ARTS & ENTERTAINMENT WORKING GROUP We have a biological, legal, and moral responsibility to curtail human-caused deaths of this species. The U.S. federal government is required to protect these animals in our waters, under the MMPA and the ESA. Please strengthen the proposed North Atlantic right whale take reduction plan and consider emergency action. Thanks for your consideration and efforts to preserve this symbol of our state, our ecosystem and biological diversity. Sincerely, Representative Park Cannon Georgia House of Representatives, Dist. 58

Form Letter P

Total matches 70-100%: 12

Dear NOAA Fisheries: As a non-profit environmental law center, Midwest Environmental Advocates works to defend public rights, protect natural resources, and ensure transparency and accountability in government. That is why today we write with concern for the North Atlantic right whale. Right whales, which exist in Atlantic coastal waters off the eastern United States and Canada, are critically endangered with fewer than 360 left on Earth. Since 2017, 47 known right whale deaths have been documented – including the tragic death of a newborn calf in St. Augustine this month. Sadly, right whales are not dying of natural causes – they are hit by moving vessels or entangled in commercial fishing lines that connect lobster and crab traps on the seafloor to buoys at the water’s surface. The greatest threat to right whales in U.S. waters is entanglement in commercial fishing gear. Once entangled in vertical buoy lines, whales may drown or drag and swim with attached gear for long distances, ultimately resulting in fatigue, compromised feeding ability, or severe injuries that lead to reduced reproductive
success and long, protracted deaths. Scientists estimate that 85% of right whales have been entangled at least once, and over 50% of right whales have been entangled multiple times. We believe there is a biological, legal, and moral responsibility to end these human-caused deaths and keep the right whale from extinction. In fact, the U.S. federal government is required to protect these animals in our waters, under the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA). While we appreciate the agency’s work on new rules for the U.S. American lobster and Jonah crab fishery, to reduce the risk this fishery poses to endangered North Atlantic right whales, the rule must be reworked and strengthened to save right whales from extinction. As it is proposed, the rule 1) uses outdated data to calculate risk reduction to whales, 2) proposes fishing technology which has not been proven to help, Regarding: Docket No. 201221-0351 – The Taking of Marine Mammals Incidental to Commercial Fishing Operations Page 2 of 3 and 3) does not go far enough in its recommendation for closures. NOAA Fisheries estimates that entanglement risk from lobster and crab fisheries needs to be reduced by 60% to 80% for the right whale to survive extinction. Unfortunately, the calculations in the Draft Environmental Impact Statement showing how you achieve that risk reduction relies on 2016 population estimates of 412 whales, whereas the most recent population estimates indicate that the North Atlantic right whale has declined to about 366 animals. So there is no question that a risk reduction target of at least 80% which accounts for all whale mortalities is required. The latest preliminary data suggests the average annual right whale mortality is approximately 24 whales per year – meaning the risk of entanglement needs to be reduced to near zero for the population to survive. The proposed rule relies on the use of ineffective gear modifications, called “weak rope” (or “weak inserts”) to reduce risk, but weak rope has not been thoroughly evaluated or shown to reduce risk. Though intended to help entangled whales break free, this new style of rope does not prevent entanglements, has not been proven to sufficiently reduce serious injury and death in whales, and is especially risky for younger, smaller right whales. In addition, many fishermen say that if forced to use weak rope, they will add rope to their buoy lines for hauling traps, thus potentially increasing the risk of entanglement. It is not worth the economic burden on the industry to change to this rope if there is no proven conservation benefit. Closures and “ropeless” technologies are a step in the right direction but the rule doesn’t go far enough in either regard. The proposed closures to vertical buoy lines are too small, and too short in duration. The closure south of Nantucket and Martha’s Vineyard, in the most conservative alternative (3a) may be an appropriate size but is far too short in time at February through April. This should be a year-round closure as right whales have been seen almost every month of the year here for the last several years. Closures should be based on the best available science which includes recent and historical sightings, acoustic data, and prey data. As proposed by the rule, new and existing closures will allow for the use of ropeless fishing with special permits. NOAA Fisheries must continue the effort to test and foster a market for ropeless technologies by creating incentives for fishermen to try them. The technologies are a promising practice that can prevent extinction of the right whale and meet the needs of the fishing industry and its employees. Overall, the use of ropeless technologies in new and existing closed areas is a good idea. Because measures will not be implemented for at least another year, and the right whale cannot sustain more deaths while we wait for stronger rules to to be developed, NOAA Fisheries must use its emergency authority to put vertical buoy line closures in place in areas where large numbers of right whales and harmful fishing gear co-exist in Southern New England and offshore in the Gulf of Maine. Regarding: Docket No. 201221-0351 – The Taking of Marine Mammals Incidental to Commercial Fishing Operations Page 3 of 3 The North Atlantic right whale is critically endangered, dangerously close to the tipping point for extinction, but their population can rebound if we lower human-caused deaths. If we don’t act now, it would mark the first human-caused extinction of a large whale. This would be tragic for right whales and detrimental to the ocean ecosystem, to the lobster and crab fisheries, and to people who care about the health of our oceans and marine wildlife. Sincerely,

Form Letter Q
Total matches 70-100%: 11
Your plan is inadequate. You can do better that this. North Atlantic right whales can recover if NOAA Fisheries takes swift, effective action to protect them from the vertical buoy lines that entangle and kill them. The proposed rule must be revised, and the final rule must meet the level of risk reduction required by the most recent scientific information. In the meantime, NOAA Fisheries must immediately implement closures to lobster and crab fishing with vertical buoy lines in the areas where right whales concentrate, and help prevent the extinction of this iconic animal.

Form Letter R
Total matches 70-100%: 10
Dear NOAA Fisheries, My name is Michael Paige and I am from Newburyport, MA. I walk the beach every day. Every day the beach is littered with lobster traps and rope. We can't allow these marine mammals to be decimated by thousands of lines where they swim. That's why I'm writing to you today about our North Atlantic right whales. I'm asking you to do everything you can to save this critically endangered species from extinction. While your proposed rule is a step in the right direction, it does not go far enough. I urge NOAA Fisheries to consider the following in formulating the final draft of the rule: Weak rope will not do enough: modifications to fishing gear, called weak rope, are intended to reduce risk of entanglement. But weak rope has not been thoroughly evaluated and has not been proven to reduce risk. We need more, and longer, habitat closures: to truly save the species, we need to dramatically reduce the amount of vertical lines in the water, for a longer period of time. The proposed closures are not long enough or large enough to protect these whales. Ropeless fishing gear is the best path forward: NOAA Fisheries must continue efforts to test and foster a market for ropeless technologies by creating incentives for fishermen to try them. Right whales are majestic, social creatures that are a critical part of the ecosystem. We are their greatest threat, and only hope We have to act now to save them. Please do everything you can to prevent their extinction. Sincerely, Michael Paige

Form Letter S
Total matches 70-100%: 10
National Oceanic and Atmospheric Administration (NOAA), It is not any humans place to drive any species into extinction! AND in Nature: every species play a vital role, be it small or large. Think of Nature as a puzzle; all pieces are needed for the full picture. The National Marine Fisheries Services proposed rule to address North Atlantic right whale entanglements in fishing gear ***does not go far enough to save this species from extinction.*** With only about 360 individuals remaining(!), the right whale is one of the world's most critically endangered whales. The species has suffered a 25% population loss in less than a decade. Fishing gear entanglements are the leading cause of skyrocketing rates of right whale deaths and serious injuries and are also preventing them from reproducing, pushing calving rates to historic lows. SO STOP THEM. National Marine Fisheries Service officials have acknowledged -'for years-' that the right whale's situation is dire and that more needs to be done. Still more right whales are being harmed and killed by fishing gear entanglements while we wait for action.... The proposed rule must do more to protect right whales by: 1) expanding the proposed closures and 2) fast-tracking the transition to requiring "ropeless" fishing gear. The Fisheries Service has the statutory authority to enact --emergency regulations-- to close i

Form Letter T
Total matches 70-100%: 8
National Oceanic and Atmospheric Administration (NOAA), The National Marine Fisheries Services proposed rule to address North Atlantic right whale entanglements in fishing gear does not go far enough to save this species from extinction. With only about 360 individuals remaining, the right whale is one of the world's most critically endangered whales. The species has suffered a 25% population loss in less than a decade. Fishing gear entanglements are the leading cause of skyrocketing rates of right whale deaths and serious injuries and are also
preventing them from reproducing, pushing calving rates to historic lows. National Marine Fisheries Service officials have acknowledged for years that the right whale's situation is dire and that more needs to be done. More right whales are being harmed and killed by fishing gear entanglements while we wait for action. The proposed rule must do more to protect right whales by expanding the proposed closures and fast-tracking the transition to requiring "ropeless" fishing gear. The Fisheries Service has the statutory authority to enact emergency regulations to close important right whale habitat to fishing with static vertical buoy lines. Please use that power to save this species from extinction. Thank you for considering my perspective. Colette Flake-Bunz colette.flakebunz@gmail.com 84-12 35th Avenue, Apt 2A, Apt.2A Jackson Heights, New York 11372

Form Letter U
Total matches 70-100%: 6
North Atlantic right whales are dying solely due to human activities. Without bold action, I fear these whales may go extinct in my lifetime. The National Marine Fisheries Service has the opportunity to make the necessary changes to save this species. I am glad to see steps are being outlined to promote the protection and survival of right whales but, unfortunately, the proposed steps are based on outdated science. I urge NMFS to redraft these regulations using the most up-to-date population estimates of North Atlantic right whales in order to develop an accurate risk reduction plan. I also urge NMFS to aim to reduce risk to right whales by at least 80 percent, as recommended by the US Marine Mammal Commission, rather than the less effective risk reduction outlined in the current proposal. In the interim, NMFS should immediately implement temporary emergency regulations to protect right whales. I strongly encourage NMFS to further invest in developing ropeless technology as quickly and responsibly as possible, while establishing a plan to assist commercial trap fisheries in a transition to whale-safe gear. This rule relies too heavily on a costly and inadequate transition to weaker rope, which has not been proven to protect younger whales and does not reduce the long-term health effects of chronic entanglements on whales. I strongly support full protection for the critically endangered North Atlantic right whales, which are cherished gentle giants who traverse the busy waters of the US East Coast. Many of these docile creatures wear the painful evidence of fishing gear entanglements and ship strikes which is a reminder of the dangers they face. Eighty-five percent of North Atlantic right whales bear scars from being entangled in gear at least once in their lives, while over half bear scars from being entangled at least twice. Right whales nearly went extinct due to commercial whaling but were able to slowly recover after whaling on them ceased. Now, they are once again in serious jeopardy of extinction due to human actions. I thank the NMFS for consideration of my letter and strongly urge the NMFS to please institute emergency protective measures and regulations to ensure the survival of the critically endangered North American right whale species. Please prioritize the enforcement of these protective measures. Thank you for the opportunity to comment on enhanced protections for the North Atlantic right whale. It is my hope that my suggestions will be considered in this process and that NMFS will prioritize right whale protections.

Form Letter V
Total matches 70-100%: 6
Dear NOAA Fisheries: As a Florida resident, I have spent my life energizing and inspiring the community around me to value diverse ecosystems, because they are fundamental to the health and wellbeing of us all, human and non-human; because they help us redefine our relationships upon socially just and ecologically sustainable terms; and because I believe we need to work collaboratively to conserve, restore and protect Florida’s precious waters for our children and theirs, for generations to come. That is why I write today with deep concern for the survival of the North Atlantic right whale. Right whales, which exist in Atlantic coastal waters off the eastern United State and Canada, are critically endangered with fewer than 360 left on Earth. Since 2017, 47 known right whale deaths have been documented – including the tragic death of a new born calf in St. Augustine this month. Sadly, right whales are not dying of natural causes – they are dying because of unsustainable fishing practices, ship strikes, and the impacts of a changing climate. The greatest threat to right whales in U.S. waters is entanglement in commercial fishing gear. Once entangled in vertical buoy lines, whales may drown or drag and swim with attached gear for long distances,
ultimately resulting in fatigue, compromised feeding ability, or severe injuries that lead to reduced reproductive success and long, protracted deaths. Scientists estimate that 85% of right whales have been entangled at least once, and over 50% of right whales have been entangled multiple times. NOAA Fisheries estimates that entanglement risk from lobster and crab fisheries needs to be reduced by 60% to 80% for the right whale to survive extinction. Unfortunately, the calculations in the Draft Environmental Impact Statement showing how you achieve that risk reduction relies on 2016 population estimates of 412 whales, whereas the most recent population estimates indicate that the North Atlantic right whale has declined to about 366 animals. So there is no question that a risk reduction target of at least 80% which accounts for all whale mortalities is required. The latest preliminary data suggests the average annual right whale mortality is approximately 24 whales per year – meaning the risk of entanglement needs to be reduced to near zero for the population to survive. The proposed rule relies on the use of ineffective gear modifications, called “weak rope” (or “weak inserts”) to reduce risk, but weak rope has not been thoroughly evaluated or shown to reduce risk. Though intended to help entangled whales break free, this new style of rope does not prevent entanglements, has not been proven to sufficiently reduce serious injury and death in whales, and is especially risky for younger, smaller right whales. In addition, many fishermen say that if forced to use weak rope, they will add rope to their buoy lines for hauling traps, thus potentially increasing the risk of entanglement. It is not worth the economic burden on the industry to change to this rope if there is no proven conservation benefit. Closures and “ropeless” technologies are a step in the right direction but the rule doesn’t go far enough in either regard. The proposed closures to vertical buoy lines are too small, and too short in duration. The closure south of Nantucket and Martha’s Vineyard, in the most conservative alternative (3a) may be an appropriate size but is far too short in time at February through April. This should be a year-round closure as right whales have been seen almost every month of the year here for the last several years. Closures should be based on the best available science which includes recent and historical sightings, acoustic data, and prey data. As proposed by the rule, new and existing closures will allow for the use of ropeless fishing with special permits. NOAA Fisheries must continue the effort to test and foster a market for ropeless technologies by creating incentives for fishermen to try them. Overall, the use of ropeless technologies in new and existing closed areas is a good idea. Because measures will not be implemented for at least another year, and the right whale cannot sustain more deaths while we wait for stronger rules to be developed, NOAA Fisheries must use its emergency authority to put vertical buoy line closures in place in areas where large numbers of right whales and harmful fishing gear co-exist in Southern New England and offshore in the Gulf of Maine. The North Atlantic right whale is critically endangered and dangerously close to the tipping point for extinction, but their population can rebound if we lower human-caused deaths. Unless we act now, it would mark the first human-caused extinction of a large whale. This would be tragic for right whales and detrimental to the ocean ecosystem, to the lobster and crab fisheries, and to people who care about the health of our oceans and marine wildlife. Sincerely, John Moran

Form Letter W

Total matches 70-100%: 6

It is NOAA Fisheries legal responsibility under the Endangered Species Act and the Marine Mammal Protection Act to protect the North Atlantic right whale from injury and death in U.S. waters. The greatest threat to right whales in U.S. waters is entanglement in commercial fishing gear. The most recent population estimates indicate that the North Atlantic right whale has further declined from the 2016 population estimates to about 366 animals. So there is no question that a risk reduction target of at least 80% which accounts for unseen whale mortalities is required. The alternative measures that NOAA Fisheries released would achieve only 60-69% risk reduction. The ineffective gear modification called weak rope has not proved to reduce serious injury and death in whales. It is not worth the economic burden on the industry to change to this rope if there is no proven conservation benefit. NOAA Fisheries must immediately implement emergency action designating a year-round closure south of Martha’s Vineyard and Nantucket and in three areas in the Gulf of Maine that would be closed seasonally to vertical buoy lines in the American lobster and Jonah crab fisheries. Targeted vertical buoy line closures where right whales interact with this
heavy, lethal fishing gear are the fastest and most effective management tools to prevent unlawful deaths and extinction of the North Atlantic right whale. Closures in offshore areas would also minimize the impact on fishermen, because the majority of lobster fishing occurs closer to shore. North Atlantic right whales can recover if NOAA Fisheries takes swift, effective action to protect them from the vertical buoy lines that entangle and kill them. The proposed rule must be revised, and the final rule must meet the level of risk reduction required by the most recent scientific information. In the meantime, NOAA Fisheries must immediately implement closures to lobster and crab fishing with vertical buoy lines in the areas where right whales concentrate, and help prevent the extinction of this iconic animal.

Form Letter X
Total matches 70-100%: 6
Lobstermen are fully in support of protecting the Right Whales but the proposed measures go too far and this could put many Lobsterman out of business. The regulations should be reviewed further before they are mandated as these fishing restrictions will end up seriously harming the lobster industry.

Form Letter Y
Total matches 70-100%: 6
National Oceanic and Atmospheric Administration (NOAA), The National Marine Fisheries Services proposed rule to address North Atlantic right whale entanglements in fishing gear is not sufficient to save this endangered species from extinction. It is estimated that there are about 360 individuals remaining. The North Atlantic right whale is one of the world's most critically endangered whale species. The species has suffered a 25% population loss in less than a decade, with fishing gear entanglements as the leading cause of death and serious injuries. The steep population decline and low population density are also preventing them from reproducing, pushing calving rates to historic lows. National Marine Fisheries Service officials have acknowledged for years that the right whale's situation is a policy priority with extinction looming. The proposed rule must do more to protect right whales by expanding the proposed closures and fast-tracking the transition to requiring "ropeless" fishing gear. The Fisheries Service has the statutory authority to enact emergency regulations to close important right whale habitat to fishing with static vertical buoy lines. Please use that power to save this species from extinction. Thank you for considering my perspective. Madeline Piscetta mpiscetta17@gmail.com 2366 Osage Trail Wadsworth, Ohio 44281-8474

Form Letter Z
Total matches 70-100%: 5
The North Atlantic right whale is critically endangered and needs immediate help to recover. It is NOAA Fisheries legal responsibility under the Endangered Species Act and the Marine Mammal Protection Act to protect this species from injury and death in U.S. waters. The greatest threat to right whales in U.S. waters is entanglement in commercial fishing gear.

Form Letter ZA
Total matches 70-100%: 5
As per the following statement from the Turtle Island Restoration Network: "Lobster and crab are caught with vertical buoy lines in areas where right whales concentrate. Because vertical lines run from the trap up to the surface buoy, traps and pots can entangle marine animals including endangered North Atlantic right whales, humpback whales, fin whales, and grey whales. The effects of entanglement can range from no permanent injury to serious injury and death. If the traps are weighted down, entangled whales, dolphins, and sea turtles can drown if they cannot reach the surface to breathe. NOAA Fisheries estimates that entanglement risk from lobster and crab fisheries needs to be reduced by 60% to 80%. The calculations in the Draft Environmental Impact Statement showing how NOAA Fisheries proposes to achieve that risk reduction rely on an old stock assessment using 2016 population
estimates, whereas the most recent population estimates indicate that the North Atlantic right whale has further declined to about 366 animals. So there is no question that a risk reduction target of at least 80% which accounts for unseen whale mortalities is required. The alternative measures that NOAA Fisheries released would achieve only 60-69% risk reduction. North Atlantic right whales can recover if NOAA Fisheries takes swift, effective action to protect them from the vertical buoy lines that entangle and kill them. The proposed rule must be revised, and the final rule must meet the level of risk reduction required by the most recent scientific information. I support any revisions that will help in the recovery of the North Atlantic Right Whales. Our world is losing way too many species that keep it in balance and we absolutely must take bold steps in protecting wildlife and marine species.

Form Letter ZB
Total matches 70-100%: 5
The North Atlantic right whale is critically endangered and needs immediate help to recover. The greatest threat to right whales in U.S. waters is entanglement in commercial fishing gear. NOAA Fisheries estimates that entanglement risk from lobster and crab fisheries needs to be reduced by 60% to 80%. There is no question that a risk reduction target of at least 80% which accounts for unseen whale mortalities is required. The alternative measures that NOAA Fisheries released would achieve only 60-69% risk reduction. On the most optimistic timeline, the measures included in the final rule to reduce risk to whales would not be in effect on the water until 2022 or later. While this rule is revised, finalized, and implemented, NOAA Fisheries must immediately implement emergency action designating a year-round closure south of Martha's Vineyard and Nantucket and in three areas in the Gulf of Maine that would be closed seasonally to vertical buoy lines in the American lobster and Jonah crab fisheries. Targeted vertical buoy line closures where right whales interact with this heavy, lethal fishing gear are the fastest and most effective management tools to prevent unlawful deaths and extinction of the North Atlantic right whale. Closures in offshore areas would also minimize the impact on fishermen, because the majority of lobster fishing occurs closer to shore. The proposed rule must be revised, and the final rule must meet the level of risk reduction required by the most recent scientific information. NOAA Fisheries must immediately implement closures to lobster and crab fishing with vertical buoy lines in the areas where right whales concentrate, and help prevent the extinction of this iconic animal.

Form Letter ZC
Total matches 70-100%: 5
National Oceanic and Atmospheric Administration (NOAA), The National Marine Fisheries Services proposed rule to address North Atlantic right whale entanglements in fishing gear does not go far enough to save this species from extinction. Fishing gear entanglements are the leading cause of skyrocketing rates of right whale deaths and serious injuries and are also preventing them from reproducing, pushing calving rates to historic lows. The proposed rule must do more to protect right whales by expanding the proposed closures and fast-tracking the transition to requiring "ropeless" fishing gear. The Fisheries Service has the statutory authority to enact emergency regulations to close important right whale habitat to fishing with static vertical buoy lines. Please use that power to save this species from extinction. Thank you for considering my perspective. Tim Barrington tim_barrington@hotmail.com 344 N 5th St, APT 6 San Jose, California 95112-5237

Form Letter ZD
Total matches 70-100%: 5
I am commenting on the proposed modifications to the Atlantic Large Whale Take Reduction Plan as published in the Federal Register. As NOAA is aware, the leading cause of death for North Atlantic right whales is getting entangled in old fishing gear. The vast majority of right whales (85%) have become entangled in gear at least once as they attempt to swim through over a million buoy ropes attached to fishing gear on the U.S. East Coast. These ropes are real risk to right whales. As a result, the right whales are practically extinct. According to NOAA’s most
recent estimate, fewer than 370 right whales remain. The proposed rule modifications won't solve the problem and
are not science and technology-based. If NOAA is going to change the rules protecting right whales, those rules
should be based on the most recent population estimate produced by the Agency’s own scientists, not obsolete data.
Proposals to reduce entanglement risks to right whales must promote and speed-up the permitting process for
ropeless fishing gear. This latest technology, pioneered by New England lobstermen, reduces entanglement risk to
right whales while maintaining fishermen’s access to otherwise closed areas. The NOAA-preferred option of
reduced breaking strength or weak rope can still kill young right whales that get tangled. I urge you to strengthen the
proposed rule changes based on the latest science, and to accelerate the use of ropeless fishing - a win-win for
endangered whales, fishermen and coastal economies. Thank you

Form Letter ZE
Total matches 70-100%: 5
I wish to comment on the proposed modifications to the Atlantic Large Whale Take Reduction Plan shown in the
Federal Register. As NOAA has recognized, entanglement in outmoded fishing gear is the leading cause of death for
North Atlantic right whales. Where there is rope, there is real and imminent risk to right whales. Leveraging ropeless
fishing technology is the best way forward. Time is running out. According to NOAA’s most recent estimate, fewer
than 370 right whales remain. The proposed rule modifications do not represent a serious, science and technology-
based effort to save this species from extinction. If NOAA is going to change the rules protecting right whales, the
new rules should reflect the most recent population estimate produced by the Agency’s own scientist, not data
consider obsolete by NOAA itself. Proposals to reduce entanglement risks to right whales must promote and
accelerate the permitting process for ropeless fishing gear. This 21st century technology, pioneered by New England
lobstermen, reduces entanglement risk to right whales while maintaining fishermen’s access to otherwise closed
areas. The NOAA-preferred option of reduced breaking strength or weak rope is a short-term policy option that
offers no protection to right whale calves or juveniles from potentially lethal entanglements. Please strengthen the
proposed rule changes to ensure they are based on the best available science and technology and to accelerate the
adoption of ropeless fishing, a win-win solution for endangered whales, fishermen and coastal economies. Thank
you.

Form Letter ZF
Total matches 70-100%: 5
North Atlantic right whales are dying solely due to human activities. Without bold action, I fear these whales may
go extinct in my lifetime. The National Marine Fisheries Service has the opportunity to make the necessary changes
to save this species. I am glad to see steps are being outlined to promote the protection and survival of right whales
but, unfortunately, the proposed steps are based on outdated science. I urge NMFS to redraft these regulations using
the most up-to-date population estimates of North Atlantic right whales in order to develop an accurate risk
reduction plan. I also urge NMFS to aim to reduce risk to right whales by at least 80 percent, as recommended by
the US Marine Mammal Commission, rather than the less effective risk reduction outlined in the current proposal. In
the interim, NMFS should immediately implement temporary emergency regulations to protect right whales. I
strongly encourage NMFS to further invest in developing ropeless technology as quickly and responsibly as
possible, while establishing a plan to assist commercial trap fisheries in a transition to whale-safe gear. This rule
relies too heavily on a costly and inadequate transition to weaker rope, which has not been proven to protect younger
whales and does not reduce the long-term health effects of chronic entanglements on whales. I can absolutely
appreciate the time and effort that would have to be put into a transition to ropeless technology and an updated risk
reduction plan, but the reality is that we, as human beings with a significant impact on the environment, have a
moral responsibility to protect wild animal life. I sincerely and wholeheartedly plead that we take these small steps
towards taking a greater responsibility for our place in the world around us. I love animals, but loving animals is not
my job or my passion in life. I personally believe that humans have emerged as one of the most intelligent and
impactful species through the natural process of evolution, and there's no reason why we can't take pride in that
position. I say this to be clear that I speak from a position of concern but not a position of bias. Ultimately, any position of power comes with responsibility, and taking care of animal species that share the world with us is simply right, especially when such simple measures would go such a long way. Thank you for the opportunity to comment on enhanced protections for the North Atlantic right whale. It is my hope that my suggestions will be considered in this process and that NMFS will prioritize right whale protections.

Form Letter ZG
Total matches 70-100%: 5
The Georgia Conservancy is pleased to provide comments for the rulemaking related to the NMFS Large Whale Take Reduction Plan Regulations ("proposed rule"). The members of our organization, along with residents across the state of Georgia, have a strong interest in the North Atlantic right whale (Eubalaena glacialis) ("right whale"), which spends part of each year off of our shores. Founded in 1967, the Georgia Conservancy is one of Georgia's oldest nonprofit conservation organizations. Working to protect our coast for more than 50 years, the Georgia Conservancy is a statewide conservation organization whose goal is to develop practical solutions for protecting Georgia's environment. We establish policy decisions under a vision statement that seeks to cultivate a Georgia where people and the environment thrive. In the 1980's, Georgia Conservancy staff played a role in discovering the then unknown calving grounds off our shore. Since that time, this iconic animal has played a role in the organization's conservation outreach and advocacy. Right whales are critically endangered, but their population can rebound if we lower human-caused deaths using updated science and fishing technologies. Currently, conservation of the right whale is of principal concern now that the species' apparent recovery seems to have stalled. The National Marine Fisheries Service (NMFS) has proposed rules to amend the regulations to reduce serious injury to North Atlantic right whales in the northeast commercial lobster and crab trap/pot fisheries. The most recent stock assessments during the regulation development have shown that the species is declining more rapidly than initially anticipated. The numerous right whale deaths since 2017 have rendered the measures in the proposed rule to be "too little, too late." However, Georgia Conservancy supports updated regulations that build off of three primary elements of the proposed rules (closures, gear, and technology). COASTAL OFFICE 428 Bull Street, Suite 210 Savannah, GA 31401 tel 912.447.5910 fax 912.447.0704 coastal@gaconservancy.org georgiaconservancy.org. PRESIDENT Katherine Moore* BOARD CHAIR Mark S. Berry, Douglasville* BOARD OF TRUSTEES Felicia Adkins, Canton Brent Beatty, Atlanta Hardie Davis Jr., Hephzibah Richard S. Downey, Atlanta Patrice T. Francis, Atlanta* Stephen Green, Savannah Virginia Harman, Cave Spring* Peter Hartman, Atlanta Holden Hayes, Savannah Byron Kirkpatrick, Atlanta* Mike LaFerle, Marietta Leslie D. Mattingly, St, Simons* Tim McKinley, Atlanta Chris Miller, LaGrange Robert Morris, Tybee Island PJ Newcomb, Decatur Amanda Brown Olmstead, Atlanta Russ Pennington, Brookhaven* Steven E. Pohl, Atlanta* Stacy Shailendra, Atlanta* W. Michael Stubbs, Macon Charles Thomas, Mableton* Malon Wickham, Columbus* ADVISORY COUNCIL Claire L. Arnold, Atlanta Brayce Boardman, Augusta Joel Cowan, Peachtree City Ann Q. Curry, Atlanta C. Edward Dobbs, Atlanta Amir Farokhi, Atlanta Elliott Levitas, Atlanta J. Lacey Lewis, Atlanta Hank Linginfelter, St. Simons Clay C. Long, Atlanta Joe Montgomery, Rome Marci Collier Overstead, Atlanta Laura Turner Seydel, Atlanta Ron Shipman, Macon Jim Timmons, Atlanta* Executive Committee Member These updates should reflect recent developments that could shift the recovery trajectory, namely. • Expanded and improved fishery monitoring to account for interactions between fishing gear and right whales • Additional measures provided for fisheries that must close due to the presence of whales and • Interim emergency management measures including vertical line reductions, seasonal closures, and ropeless fishing areas We realize that these proposed regulations create significant economic impacts on fishermen and their communities. Though the restrictions will impact fisheries, we anticipate that they will create areas off of Georgia's shores that can be used for right whale protection. Opportunities, which build on and support NOAA regulatory changes: Investing in longer-term adaptations (technology and fishery practices) that take effective action over the years will once more place the right whale on a trajectory to becoming a truly viable population. Hopefully, this combination will encourage a future where local fisheries prosper while protecting our stock of whales from entanglement. We want to emphasize that these measures will minimize conflicts across the
range (northern and in southeastern waters too): Equipment adaptation and incentives across the range: "Ropeless (or buoyless) fishing” adaptations carry the promise to improve fishing and protect whales. These systems allow fishers to continue operating in areas where right whales are present without further endangering these marine mammals. We advocate for NOAA Fisheries to continue to test and foster a market for ropeless technologies by creating incentives for their use. Additional funding and scientific inquiry: Improvements in stock assessment and support for science related to right whale conservation are very much needed. We hope for additional funding from legislation such as the proposed "Scientific Assistance for Very Endangered North Atlantic Right Whales Act of 2019" (S.2453), also known as the SAVE Right Whales Act. This bill seeks to establish "a grant program to promote collaboration between states, nongovernmental organizations, and members of the fishing and shipping industries to reduce human impacts on right whales and promote the recovery of the population." Another bill, titled the Right Whale Protection Act, goes a long way to furthering much needed NOAA research, stock assessments, and gear adaptation. The bipartisan Senate bill, which former Senator Johnny Isakson of Georgia co-signed, was introduced in September 2019 and would authorize up to $5 million annually from 2019 - 2029 to projects that promote or contribute to the wild population's sustainability and recovery. The SAVE Right Whales Act also encourages North Atlantic right whale recovery efforts between the United States and Canadian governments. We see a perilous need for a spirit of cooperative action that furthers right whale conservation. To that end, we would like to see agency support for speeding up the adaptation of new technologies and added funding that will lead to a reduction in human/right whale conflicts. The Georgia Conservancy has been involved with North Atlantic right whale conservation issues for nearly 40 years. Stewardship of our iconic state marine mammal is a legacy for the Georgia Conservancy and thus provides a policy lens through which we view our advocacy, research, and outreach. Specifically, the proposed rulemaking is directed to New England fisheries; however, notable changes in Southeastern US fisheries may be made to reduce rope entanglements as well. By way of example, the Georgia Conservancy seeks to support the early, promising work being done in Georgia to adapt ropeless gear in the black sea bass fishery. With less than 400 right whales left and deaths occurring at a rate that far exceeds the sustainable level, there is an imperative to approve strong regulatory changes and to do more across the entire migration range-north and southeast. Further protective measures will need to be implemented across the whole range, from the southeastern shores to New England and Canadian waters. As they stand now, the proposed regulations do not meet the threshold of strength needed to support this critical species. If there is no significant revision to the Proposed Risk Reduction Rule by NMFS, the Georgia Conservancy recommends that it be withdrawn and updated and emergency measures put in place. We look for an informed and comprehensive implementation of these measures.

Form Letter ZH

Total matches 70-100%: 4

Dear NOAA Fisheries, My name is Deb Wills, and I am from Oakland, CA. I have fundamental concerns about the decline in biodiversity. While no longer pursued for its oil, meat and bones, North Atlantic right whales continue to be the victim of ship strikes and entanglement in fishing gear, which can result in protracted, painful deaths. This whale population is declining so quickly that they may be functionally extinct by 2040, if not before, if more isn't done to protect them. That's why I'm writing to you today about our North Atlantic right whales. I'm asking you to do everything you can to save this critically endangered species. While your proposed rule changes are a step in the right direction, it does not go far enough. I urge NOAA Fisheries to consider the following in formulating the final draft of the rule: 1. Weak rope will not do enough: modifications to fishing gear, called weak rope, are intended to reduce risk of entanglement. But weak rope has not been thoroughly evaluated and has not been proven to reduce risk. 2. We need more, and longer, habitat closures: to truly save the species, we need to dramatically reduce the amount of vertical lines in the water. Additionally the proposed closures are too short in duration and not large enough to protect these whales, so some areas need to be enlarged, and some areas need to be protected for longer periods of time, possibly year-round in some cases. 3. Ropeless fishing gear is the best path forward: NOAA Fisheries must continue efforts to test and foster a market for ropeless technologies by creating incentives for
fishermen to try them. Right whales are majestic, maternal creatures that live in our own local oceans. Its up to us to save them. Please do everything you can to prevent their extinction.

**Form Letter ZI**

*Total matches 70-100%: 4*

The North Atlantic right whale is critically endangered and needs immediate help to recover. It is NOAA Fisheries legal responsibility under the Endangered Species Act and the Marine Mammal Protection Act to protect this species from injury and death in U.S. waters. The greatest threat to right whales in U.S. waters is entanglement in commercial fishing gear. NOAA Fisheries estimates that entanglement risk from lobster and crab fisheries needs to be reduced by 60% to 80%. The calculations in the Draft Environmental Impact Statement showing how NOAA Fisheries proposes to achieve that risk reduction rely on an old stock assessment using 2016 population estimates, whereas the most recent population estimates indicate that the North Atlantic right whale has further declined to about 366 animals. So there is no question that a risk reduction target of at least 80% which accounts for unseen whale mortalities is required. The alternative measures that NOAA Fisheries released would achieve only 60-69% risk reduction. North Atlantic right whales can recover if NOAA Fisheries takes swift, effective action to protect them from the vertical buoy lines that entangle and kill them. The proposed rule must be revised, and the final rule must meet the level of risk reduction required by the most recent scientific information. In the meantime, NOAA Fisheries must immediately implement closures to lobster and crab fishing with vertical buoy lines in the areas where right whales concentrate, and help prevent the extinction of this iconic animal.

**Form Letter ZJ**

*Total matches 70-100%: 4*

This is a test Form Letter, please ignore

**Form Letter ZK**

*Total matches 70-100%: 4*

National Oceanic and Atmospheric Administration (NOAA), The National Marine Fisheries Services proposed rule to address North Atlantic right whale entanglements in fishing gear is inadequate to save this species from extinction. With only about 360 individuals remaining, the right whale is one of the world's most critically endangered whales. The right whale population has declined 25% in less than a decade. The leading cause of skyrocketing rates of right whale deaths and serious injuries is fishing gear entanglements, which are also preventing reproduction, pushing calving rates to historic lows. More right whales are being harmed and killed by fishing gear entanglements every day. The proposed rule must do more to protect right whales by expanding the proposed closures and fast-tracking the transition to requiring "ropeless" fishing gear. The Fisheries Service has the statutory authority to enact emergency regulations to close important right whale habitat to fishing with static vertical buoy lines. Please use that power to save this species from extinction. Thank you for considering my perspective. Patricia Harlow harlowpp@gmail.com 624 Erlen Road Plymouth Meeting, Pennsylvania 19462

**Form Letter ZL**

*Total matches 70-100%: 4*

National Oceanic and Atmospheric Administration (NOAA), Can we please make the changes we need to make an order to protect the North Atlantic right whale? I think so. It will be a terrible thing if this whale becomes extinct under our watch. The National Marine Fisheries Services proposed rule to address North Atlantic right whale entanglements in fishing gear does not go far enough to save this species from extinction. More right whales are being harmed and killed by fishing gear entanglements while we wait for action. The proposed rule must do more to protect right whales by expanding the proposed closures and fast-tracking the transition to requiring "ropeless" fishing gear. The Fisheries Service has the statutory authority to enact emergency regulations to close important right whale habitat to fishing with static vertical buoy lines.
right whale habitat to fishing with static vertical buoy lines. Please use that power to save this species from extinction. Thank you for considering my perspective. Rose Latino roselatino@gmail.com 133 East 2nd St Brooklyn, New York 11218

Form Letter ZM
Total matches 70-100%: 4
I am writing to comment on the proposed modifications to the Atlantic Large Whale Take Reduction Plan as published in the Federal Register. As NOAA has recognized, entanglement in outmoded fishing gear is the leading cause of death for North Atlantic right whales. 85% of right whales have become entangled at least once as they navigate through more than one million buoy ropes attached to fishing gear on the East Coast of the United States. Where there is rope, there is real and imminent risk to right whales. Proposals to reduce entanglement risks to right whales must promote and accelerate the permitting process for ropeless fishing gear. This 21st century technology, pioneered by New England lobstermen, reduces entanglement risk to right whales while maintaining fishermen’s access to otherwise closed areas. The NOAA-preferred option of reduced breaking strength or weak rope is a short-term policy option that offers no protection to right whale calves or juveniles from potentially lethal entanglements. I urge you to strengthen the proposed rule changes to ensure they are based on the best available science and technology and to accelerate the adoption of ropeless fishing, a win-win solution for endangered whales, fishermen and coastal economies. Thank you.

Form Letter ZN
Total matches 70-100%: 4
North Atlantic right whales are on the brink of extinction. Current population studies estimate that there are fewer than 366 living whales, with only 82 reproductively active females. Entanglement in commercial fishing gear is the leading cause of serious injury and death for this iconic species. The law requires NOAA Fisheries to make new rules to protect endangered North Atlantic right whales in U.S. waters. After years of delay, the agency finally released a proposed rule to reduce entanglement risk, but its risk reduction measures are based on outdated science and do not go far enough to save right whales from extinction. Also, on the most optimistic timeline, measures included in the final rule to reduce risk to whales would not be in effect on the water until 2022 or later, and the right whale population cannot sustain more deaths in the interim. NOAA Fisheries officials must take emergency action and create immediate fishing closures in areas where right whales are most prevalent while the agency develops stronger protections for the long term.

Form Letter ZO
Total matches 70-100%: 4
CENTER FOR A SUSTAINABLE COAST 221 Mallery Street, Suite B Saint Simons Island, Georgia 31522 Voice: 912.506.5088 REVISED Draft We share the concerns of millions who are witnessing the alarming decline of marine mammals pushing them to the brink of extinction, including the Right Whale. The population of these magnificent animals has plummeted, making them extremely vulnerable to further risks, including offshore fishing that is the cause for most fatalities, in combination with ship-strikes. According to marine scientists, since 2017, 45 right-whale deaths have been documented, and many more are suspected. Because injuries and deaths are often caused by entanglement with vertical buoy lines, rules governing related offshore fisheries activities are extremely important. We are advised that some 85% of right whales have been entangled at least once, and an alarming 50% or more have been entangled repeatedly. As currently drafted, marine biologists advise that unacceptable risks would be propagated despite efforts intended to reduce hazards to right whales and other marine mammals. The proposed requirements are based on obsolete information, leaving right whales needlessly vulnerable to further fatalities and suffering. Moreover, in the interim period of at least a year prior to these new measures being implemented, the right whale population remains dangerously exposed to continued destruction. Due to the dire predicament of near
extinction and such unacceptable hazards, we strongly urge NOAA Fisheries to adopt added protection of the right whale, using the agency’s lawful emergency authority to impose restrictions suspending the use of vertical buoy lines in zones where large numbers of right whales are known to have been entangled. Fisheries experts advise that new technologies, called rope-free (or buoy-free) fishing are an opportunity for lobster and crab fishermen to continue operating in areas where right whales are present without further endangering these marine mammals. To develop these alternatives, NOAA Fisheries must continue efforts to test and foster a market for rope-free technologies, including the creation of incentives for fishermen to try them. Accordingly, rope-free testing in closure areas should be authorized under carefully monitored and evaluated conditions, using “exempted” fishing permits. We have a biological, legal, and moral responsibility to end these cruel and avoidable human-caused deaths. Under the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA), the U.S. federal government is required to protect these animals in our nation’s waters. We implore you to take our comments to heart by adopting the most protective approach possible to prevent extinction of the right whale.

Form Letter ZP
Total matches 70-100%: 4

I am writing to comment on the proposed modifications to the Atlantic Large Whale Take Reduction Plan as published in the Federal Register. As NOAA has recognized, entanglement in outmoded fishing gear is the leading cause of death for North Atlantic right whales. 85% of right whales have become entangled at least once as they navigate through more than one million buoy ropes attached to fishing gear on the East Coast of the United States. Where there is rope, there is real and imminent risk to right whales. Time is running out. According to NOAA’s most recent estimate, fewer than 370 right whales remain. The proposed rule modifications do not represent a serious, science and technology-based effort to save this species from extinction. If NOAA is going to change the rules protecting right whales, the new rules should reflect the most recent population estimate produced by the Agency’s own scientist, not data consider obsolete by NOAA itself. Proposals to reduce entanglement risks to right whales must promote and accelerate the permitting process for ropeless fishing gear. This 21st century technology, pioneered by New England lobstermen, reduces entanglement risk to right whales while maintaining fishermen’s access to otherwise closed areas. The NOAA-preferred option of reduced breaking strength or weak rope is a short-term policy option that offers no protection to right whale calves or juveniles from potentially lethal entanglements. I urge you to strengthen the proposed rule changes to ensure they are based on the best available science and technology and to accelerate the adoption of ropeless fishing, a win-win solution for endangered whales, fishermen and coastal economies. I have been advocating this same issue for these creatures for 40 years. Enough talk and review just take action. I am exhausted by the tedious continuation of debate that goes no where. We are loosing this battle. The North Atlantic Right Whales are loosing this battle and we keep meeting, discussing, debating to no avail. We have equipment roaming planets beyond countless miles from this planet and yet somehow we can't get fishermen the equipment they need to maintain their livelihood while keeping whales from entanglement or monitor whales right here on this planet to keep them safe from ship strikes. Just how incompetent are we. or more accurately just how much don't we care? Get this done-rope less gear totally subsidized by government for immediate implementation and increase monitoring to avoid ship strikes immediately. We are out of time. The North Atlantic Right Whale is out of time. How ironic #3920-Cottontail has just died after months and months of suffering with entangled line. Thank you. Elizabeth Clemmey 175 Essex Street Mansfield Ma 02048

Form Letter ZQ
Total matches 70-100%: 3

Please protect the whales!
Form Letter ZR

Total matches 70-100%: 3

Time is running out to save the right whales. NOAA’s own scientists estimate only 366 remain. We must act now to save them from extinction. The main threat to the survival of this species is entanglement in fishing gear up and down the East coast, and recent proposed rule changes are supposed to reduce this threat. Some of these rule changes might help, but they do not do enough to save right whales from extinction. And whales are not the only ones threatened. NOAA’s proposals close more areas to fishing but fail to provide support and fast-track permitting for rope-less fishing gear, a win-win solution that reduces entanglement while fishermen continue to make a living. Ropeless gear technology is the only long-term solution to reduce entanglements while keeping fishermen on the water. NOAA should include a fast-track permitting process to ensure ropeless is legal. Let’s get as much rope out of the water as we can and give the North Atlantic right whale a fighting chance. Thank you for your consideration.

Form Letter ZS

Total matches 70-100%: 3

North Atlantic right whales are among the most endangered animals on the planet and without strong, evidence-based protections, the species will continue to decline. And so my family and I urge the NIAA to create immediate fishing closures in areas where right whales are most prevalent, while the agency develops stronger protections in the long term.

Form Letter ZT

Total matches 70-100%: 3

NOAA Fisheries 1315 East-West Highway Silver Spring, MD 20910 RE: Docket No. 201221-0351 - the rulemaking process to protect critically endangered North Atlantic right whales. Dear NOAA Fisheries: Successful reproduction is a challenge for the North Atlantic right whale. Female right whales reach reproductive maturity at around 10 years of age. Historically, the species can give birth to only one calf every three to five years, yet trauma from entanglement has increased this interval to nearly 10 years. With an estimated population of fewer than 100 breeding females, every birth is a cause for celebration and, unless action is taken by your agency, this species will be lost forever. The National Marine Fisheries Service (NMFS) released new data on October 26, 2020 indicating that the population estimates, and mortality and serious injury rates are worse than previously thought. Given the low population numbers (including fewer than 94 breeding females remaining), it is essential that we work together to protect every North Atlantic right whale in order to avoid extinction for this endangered species. Based on the expert opinions of scientists, trusted non-governmental organizations and conservation groups, I don’t believe NOAA Fisheries’ proposal to reduce the serious injury and mortality of right whales can move the lobster and crab fisheries into compliance with the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA). NOAA Fisheries’ proposed measures aim to achieve only 60-69% risk reduction, but they must recalculate the potential biological removal (PBR) level using updated data and publish a final rule that achieves a minimum of an 80% risk reduction. We have a biological, legal, and moral responsibility to curtail human-caused deaths of this species. The U.S. federal government is required to protect these animals in our waters, under the MMPA and the ESA. Please strengthen the proposed North Atlantic right whale take reduction plan and consider emergency action. Thanks for your consideration and efforts to preserve our ecosystem and biological diversity for future generations. Sincerely, Representative Rachel Hunt North Carolina House District 103 Rachel.Hunt@ncleg.gov

Form Letter ZU

Total matches 70-100%: 3

My name is Brennan Strong and I have already shared a lot of my thoughts with you and others regarding the new BiOp and regulations for right whales. I wanted to share a few more genuine suggestions while you are still accepting comments. Instead of more U.S. fishing industry regulation, we all need a lot more research. The only new
U.S. trap/pot regulation I support is increased gear marking with state and area specific colors and that all gear buoys everywhere have at least the same marking requirements as Maine (license number unique to that fisherman/gear owner). Beyond this, anymore regulation is not backed by enough credible research to justify immediate implementation. I can say this with absolute certainty for Maine, I can not speak specifically for other states. I heard the testimony of a Man at a recent public hearing, who was at an ALWTRT meeting and saw a pile of fishing gear pulled off a whale and immediately could tell none of it was from Maine. Please re-direct all effort to increased research and whale disentanglement efforts. We need whale disentanglement teams that are as fearless and tenacious as they are intelligent, willing to do whatever it takes whenever needed to disentangle whales safely. I applaud those who have led the way with these brave rescues. You have my contact so I would happy to be trained on how to help, as well as many others I know. We should be conducting a world-class study on what specific gear configurations and locations are causing entanglements, and during what times of the year. We need both public and private, state and federal, U.S. and Canadian scientists, engineers, ocean goers, and fishermen for an all hands on deck effort to get to the bottom of this serious issue. As well as the gear studies, we need to do much better with tracking right whales. I appreciate and congratulate the work that has been done so far, but it is time to build on our successes, and turn away from the scary path we appear to be going down. If you do not make serious and timely changes to your plans, I will go out of business in 10 years or less. The job I’ve loved and pursued for over half of my 22 years on earth will be illegal to do practically, safely, or efficiently. I will have to sell my boat and gear which will be rendered worthless, and try to fit in somewhere in the world that I don’t belong. As far as vessel strikes go, the U.S. and Canada need immediate world-class research and regulations to reach 0 vessel strike injuries/deaths. Again utilizing both public and private, state and federal, U.S. and Canadian scientists, engineers, ocean goers, and fishermen. This research needs to include a specific study on how the complete shutdown of cruise ships and reduction in freight ships in 2020 positively effected the right whale population. Remembering that during this time the U.S trap/pot fishery still deployed almost 100% of our gear. Personally, I actually doubled gear and production from 2019 to 2020. Most vessel speed and route information can be easily tracked with AIS, so 100% enforcement and compliance is very realistic. Frankly the fact that we don’t yet have 100% enforcement and compliance for the current vessel speed/route rule is a failure. I see 10 knots is the number, but that is twice the speed of a right whale. Our dynamic management areas need to be accurate, enforced, and continually updated and moved if necessary to provide the best whale protections possible. Ship noise interferes with right whale communication. I truly care deeply about the whales, all sea life, our way of life, and coastal communities, I hope and pray everyone else involved in this process does too. If there is any way I can be of help in making things work for everyone, please don’t hesitate to contact me.

Form Letter ZV
Total matches 70-100%: 3
The North Atlantic right whale is critically endangered and needs immediate help to recover. It is NOAA Fisheries legal responsibility under the Endangered Species Act and the Marine Mammal Protection Act to protect this species from injury and death in U.S. waters. The greatest threat to right whales in U.S. waters is entanglement in commercial fishing gear. NOAA Fisheries estimates that entanglement risk from lobster and crab fisheries needs to be reduced by 60% to 80%. The calculations in the Draft Environmental Impact Statement showing how NOAA Fisheries proposes to achieve that risk reduction rely on an old stock assessment using 2016 population estimates, whereas the most recent population estimates indicate that the North Atlantic right whale has further declined to about 366 animals. So there is no question that a risk reduction target of at least 80%which accounts for unseen whale mortalities is required. The alternative measures that NOAA Fisheries released would achieve only 60-69% risk reduction. Further, these risk reduction measures rely on an ineffective gear modification called weak rope that has not proved to reduce serious injury and death in whales. It is not worth the economic burden on the industry to change to this rope if there is no proven conservation benefit. In addition, the closures outlined in the proposed rule are too small and too short in duration. Specifically, the closure south of Nantucket and Marthas Vineyard should be year-round, because right whales have been present nearly every month of the year in that area for the past several
years. NOAA Fisheries proposed rule simply does not do enough to save the right whale from extinction. OVERWHELMINGLY, the American people want to PROTECT THE ENVIRONMENT and PROTECT ENDANGERED SPECIES such as the right whale. I IMPLORE YOU TO TAKE IMMEDIATE STRONG ACTIONS to protect the right whale. NOAA Fisheries must take IMMEDIATE EMERGENCY ACTION to PERMANENTLY CLOSE the areas south of Marthas Vineyard and Nantucket and in three areas in the Gulf of Maine. Fisheries for lobster and Jonah crab hurt right whales with their lines, etc. NOAA Fisheries must immediately implement closures to lobster and crab fishing with vertical buoy lines in the areas where right whales concentrate, and help prevent the extinction of this iconic animal.

**Form Letter ZW**

*Total matches 70-100%: 3*

The North Atlantic right whale is critically endangered and needs immediate help to recover. It is NOAA Fisheries legal responsibility under the Endangered Species Act and the Marine Mammal Protection Act to protect this species from injury and death in U.S. waters. The greatest threat to right whales in U.S. waters is entanglement in commercial fishing gear. North Atlantic right whales can recover if NOAA Fisheries takes swift, effective action to protect them from the vertical buoy lines that entangle and kill them. The proposed rule must be revised, and the final rule must meet the level of risk reduction required by the most recent scientific information. In the meantime, NOAA Fisheries must immediately implement closures to lobster and crab fishing with vertical buoy lines in the areas where right whales concentrate, and help prevent the extinction of this iconic animal.

**Form Letter ZX**

*Total matches 70-100%: 3*

National Oceanic and Atmospheric Administration (NOAA), The National Marine Fisheries Services proposed rule to address North Atlantic right whale entanglements in fishing gear does not go far enough to save this species from extinction. Only about 360 individual whales remain, which means the right whale is one of the world's most critically endangered whales. The population has declined by 25% in only ten years. Fishing gear entanglements have proven to be the leading cause of skyrocketing rates of right whale deaths and are also preventing them from reproducing. National Marine Fisheries Service officials have acknowledged for years that the right whale's situation is dire and that more needs to be done. Right whales are continuing to be harmed and killed by fishing gear entanglements while we wait for action. In order to protect the right whales, we must expand proposed closures and require "ropeless" fishing gear much quicker than the proposed rule outlines. The Fisheries Service has the statutory authority to enact emergency regulations to close important right whale habitat to fishing with static vertical buoy lines. Please use that power to save this species from extinction. Thank you for considering my perspective. Heather Maresh Heather Maresh heather@gsco.biz 3245 Curtis St Denver, Colorado 80205

**Form LetterZY**

*Total matches 70-100%: 3*

National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service officials have acknowledged for years that the right whale's situation is dire and that more needs to be done. More right whales are being harmed and killed by fishing gear entanglements while we wait for action. The proposed rule must do more to protect right whales by expanding the proposed closures and fast-tracking the transition to requiring "ropeless" fishing gear. The Fisheries Service has the statutory authority to enact emergency regulations to close important right whale habitat to fishing with static vertical buoy lines. Please use that power to save this species from extinction. Thank you for considering my perspective. kathy knapik kathyknapik@gmail.com 797 Iroquois Trail Macedonia, Ohio 44056
Form Letter ZZ

Total matches 70-100%: 3

I support limiting the number of buoys, it would help reduce the chances of whales becoming entangled, the ocean should not be an obstacle course for whales and other marine life to swim through.

Form Letter ZZA

Total matches 70-100%: 3

Everyone wants to save the right whales. INCLUDING the Lobster man. We have done everything possible at this point to coexist modifying our gear, even though we are NOT the problem! All of these so called "entanglements" have been proven they are not American lobster gear. One thing that CAN NOT happen is ROPELESS fishing! Ropeless is not real and will not work! Ropeless technology will never be able to combat with the north Atlantic Ocean and the elements along with impossible avoidance of gear conflict not being able to mark our gear from the surface! We have more safe regulations now then ever INCLUDING closures when the whales are even in our waters! The lobstorman have eliminated every factor of harming these whales possible. Ropeless needs to be forgotten, it's not needed with the precautions we have now taken and is a impractical fantasy that would miserably fail and ruin the lobstering industry.

Form Letter ZZB

Total matches 70-100%: 3

I am writing to comment on the proposed modifications to the Atlantic Large Whale Take Reduction Plan as published in the Federal Register. And to simply say that I urge you to strengthen the proposed rule changes to ensure they are based on the best available science and technology and to accelerate the adoption of ropeless fishing gear, a win-win solution for endangered whales, fishermen and coastal economies. Thank you.
Appendix 7.5 Comment Submission List
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Comment from Patrick Hartnett
Comment from Sharon Morrison
Comment from Karen Sinclair
Comment from Lisa Krieger
Comment from Diane Watson
Comment from Lillian Nordin
Comment from Riley Canada
Comment from Laurel Gress
Comment from Carolyn O'Shea
Comment from Christy Spear
Comment from Fiona Nolan
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Comment from Lillyam Barberi
Comment from Franceline Malone
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Comment from Galina Krichmar
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Comment from Mary Will

Comment from Grace Padelford

Comment from Joan Davidson

Comment from Geralyn Gulseth

Comment from Celeste Watt

Comment from Melissa Warfield

Comment from The Kern

Comment from Robert Meier

Comment from Mary Miller

Comment from Ben Rall

Comment from Patrick Soby

Comment from Charles Miller

Comment from Tamara Voyles

Comment from Justin Smith

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Comment from Beverly Menosky

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Comment from DALE ANANIA

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Comment from Eric Pash
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Comment from Scott Emsley
Comment from Pat Petro
Comment from Caitlin Burke
Comment from Julie Sacco
Comment from Ronna Kabler
Comment from Carol Modrell
Comment from Angela Judy
Comment from Lena Fine
Comment from Graciela Huth
Comment from Scott Rubel
Comment from Ms. Menard
Comment from Barbra Raymond
Comment from Susan Grabowski
Comment from Judith Weis
Comment from Tim Dresel
Comment from Richard Coreno
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Comment from Michael Bittner
Comment from Milissa Burge
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Comment from Mina Bornn
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Comment from Alan Kennedy
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Comment from Joshua Wallman
Comment from Bonnie Roscinski
Comment from Marcia Grabowski
Comment from Alison Zyla
Comment from John Adams
Comment from Jerilyn Sackler
Comment from scott Finamore
Comment from Priscilla Mezrahi
Comment from Anna Wibalda
Comment from Heather Keast
Comment from James Glucroft
Comment from Carol Elder
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Comment from Karynn Merkel
Comment from Mary Ellen Milesnick
Comment from Melissa & Steven Lawrence
Comment from jera petersen
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Comment from Diann Rose
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Comment from Nicole Durden-Mundy
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Comment from Michael Watson
Comment from Karen Langlais
Comment from Mary Jackson
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Comment from Mary Christman
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Comment from Deb Christensen
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