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Atlantic Large Whale Take Reduction Plan:

Improving Understanding of Commercial Fishing Activity and Gear Use

Presentation to:

Atlantic Large Whale Take Reduction Team, Monitoring Work Group

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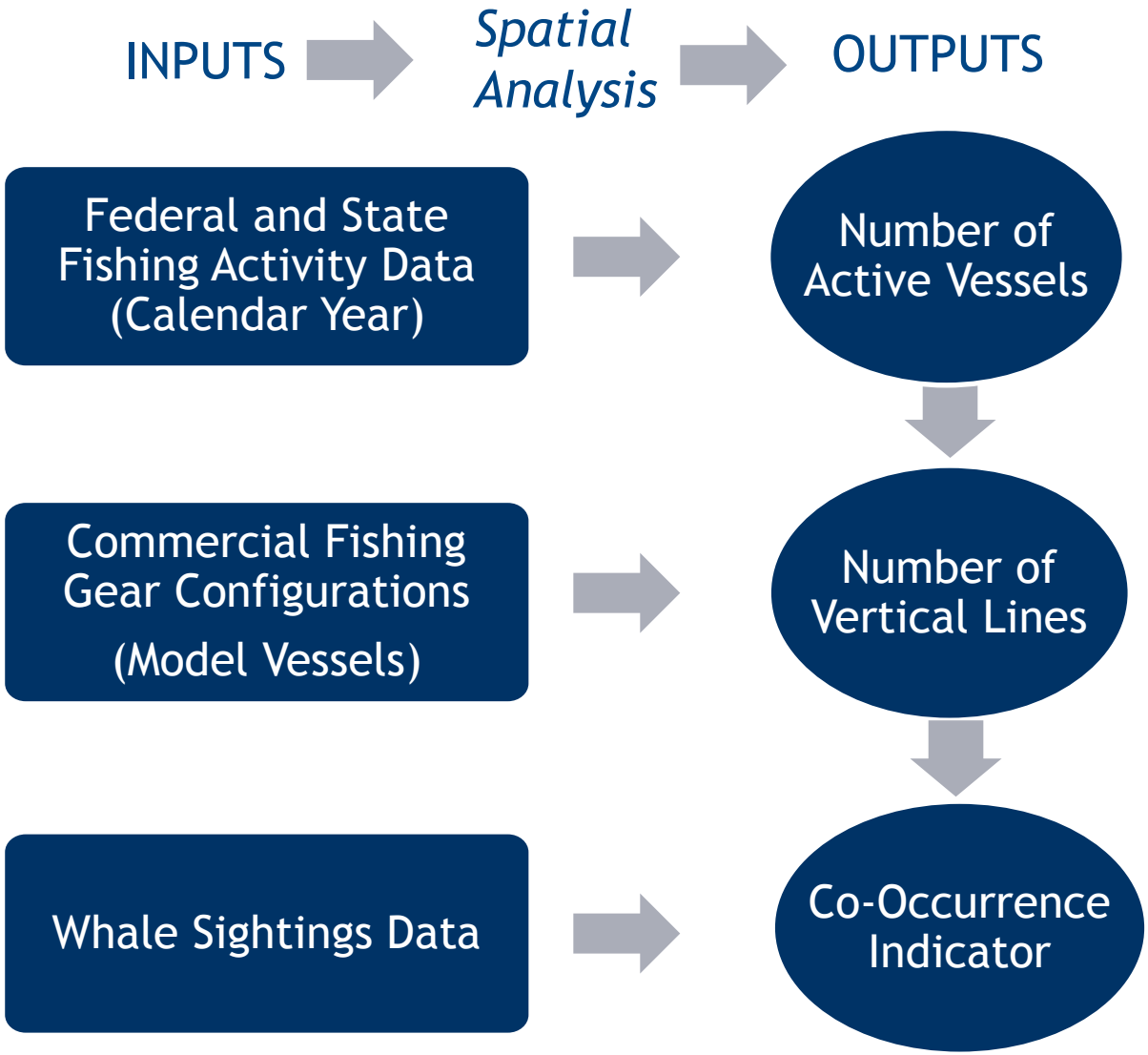
Overview

- Part 1: Brief refresher on commercial fishing data employed in Co-Occurrence Model
  - Data currently collected
  - Data gaps and concerns
- Part 2: Data needs and analytic rationale for improved data
- Part 3: Options for an MMPA-based reporting system

Part 1: Current Vessel Data

Co-Occurrence Model: Conceptual Overview

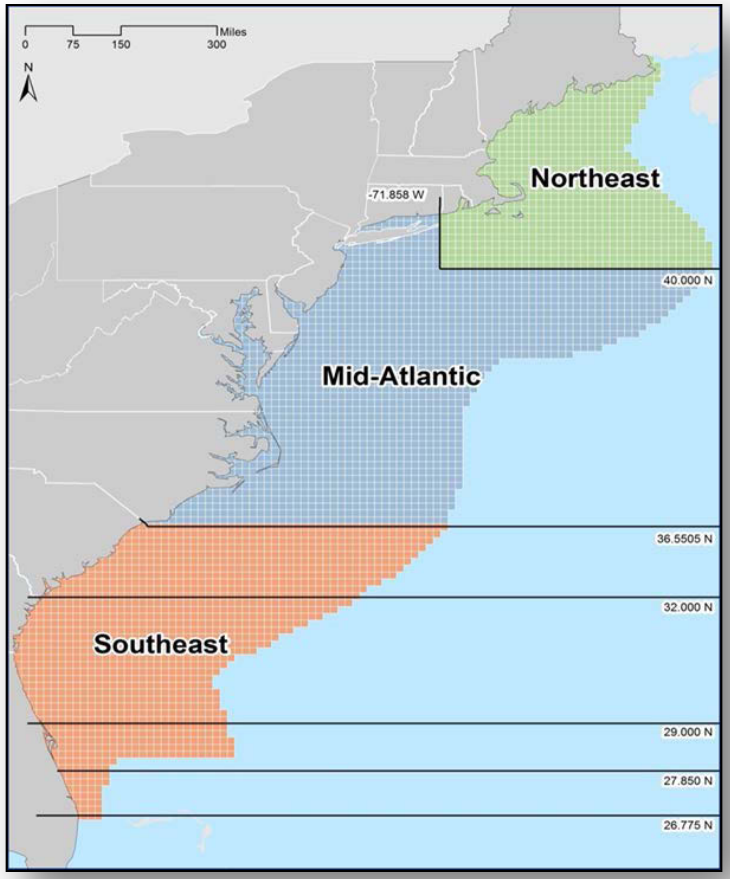


Development Timeline

2005:	Initial methods development and data collection
2006:	Working prototype for the Northeast region
2007-2009:	Expanded geographic scope/methods refinement
2010:	Module for analysis of management scenarios
2011-2012:	Analysis of TRT proposals Documentation and peer review
2013:	Analysis of proposed rule Draft Environmental Impact Statement
2014:	Analysis of final rule Final Environmental Impact Statement
2014-2015:	Analysis of exemption proposals Draft and Final Environmental Assessment

Model Scope and Resolution

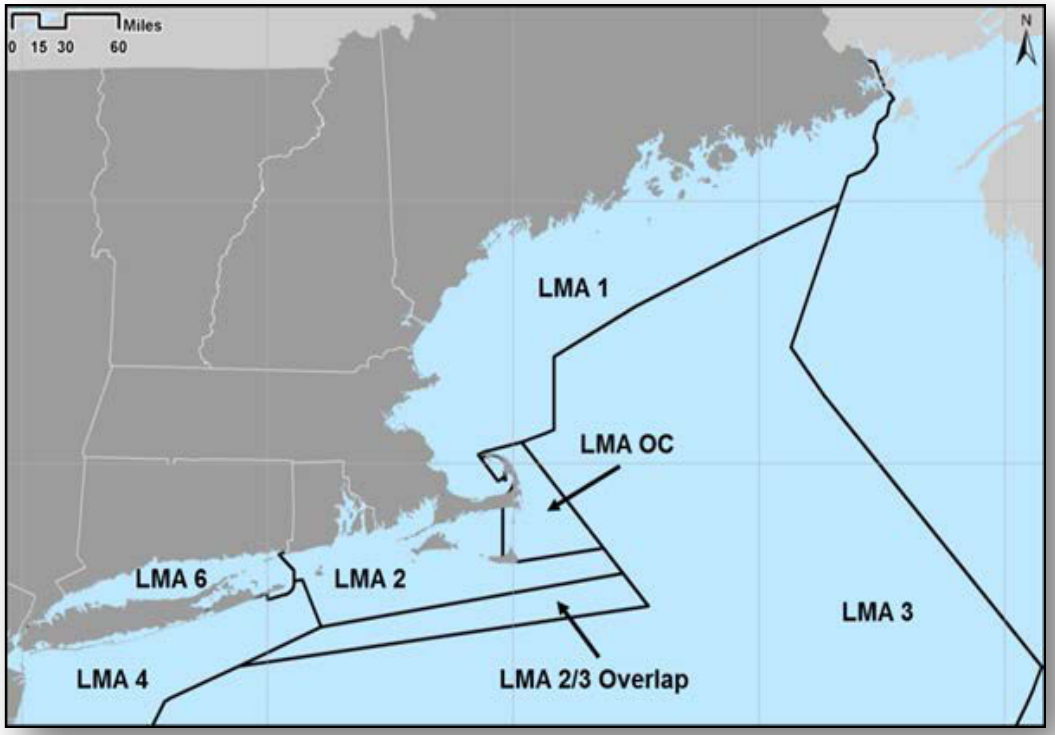
- Fisheries:
  - American lobster
  - Sink and anchored gillnets
  - Blue crab
  - Other trap/pot (e.g., black sea bass)
- Geographic resolution:
  - 1-minute grid cells (analysis of fishing activity and gear distribution)
  - 10-minute grid cells (co-occurrence indicator and mapping)
- Temporal resolution: monthly



Geographic Scope: All waters subject to the requirements of the ALWTRP.

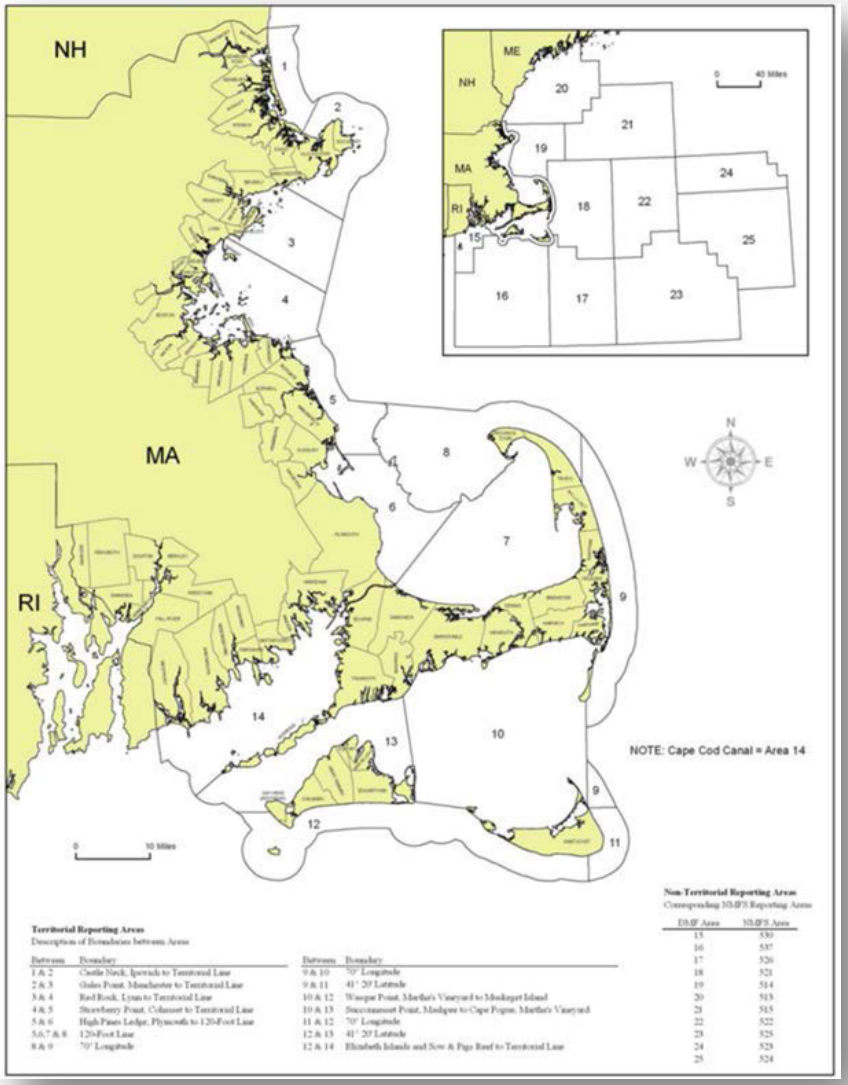
Data Sources: Vessel Activity - Federal

- Northeast Vessel Trip Report (VTR) data
  - Lobster, blue crab, other trap/pot (OTP), gillnet
  - Indicates location to nearest minute of longitude/latitude
- NMFS Permit data – by Lobster Management Area
- Southeast Logbook data
  - Blue crab, other trap/pot, gillnet
  - Report trip location to nearest degree of longitude/latitude



Data Sources: Vessel Activity - State

- Obtained via outreach to representatives of state fishery management agencies on TRT
- Includes exempt and non-exempt waters
- Sources vary by state:
  - Trip reports
  - Monthly catch reports
  - Permit data and dealer reports
  - Surveys
- Typically indicates location by state management zone



Data Sources: Vessel Activity – State (cont.)

State	Year	Source
ME	2011	• Permit data on vessels licensed in each lobster zone • Dealer data on active vessels in each month/zone
NH	2010	• Trip-level Fisherman/Dealer reporting (larger vessels) • Monthly Harvester reporting (smaller vessels)
MA	2010	• Custom data merging trip-level and annual recall components of DMF Catch Report data
RI	2010	• Commercial Harvester Logbook
CT	2011	• Custom DEP analysis developed from state Catch Report data

Data Sources: Vessel Activity – State (cont.)

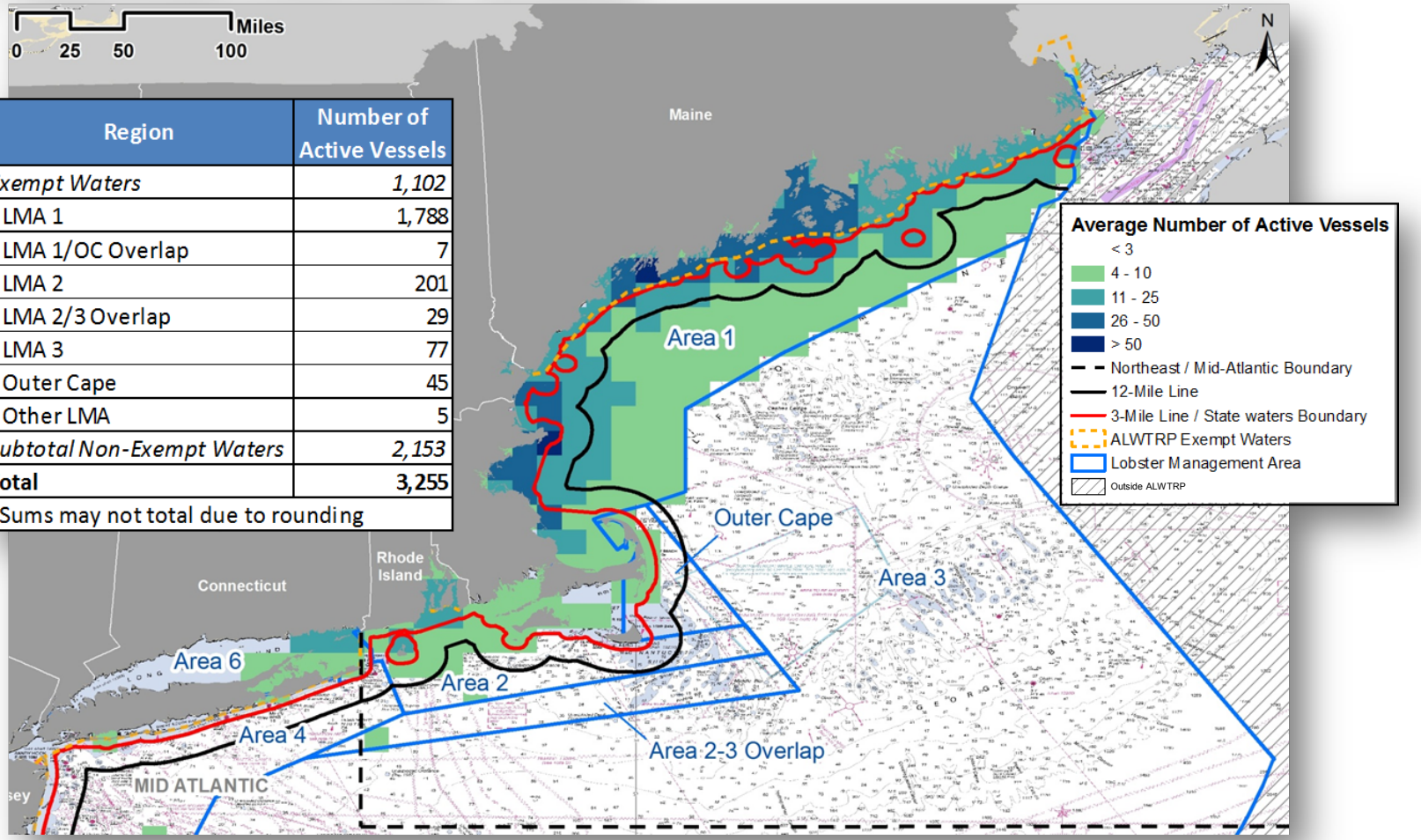
State	Year	Source
NY	2010	• Annual Recall Survey data show general fishing area; DEC analysis of VTR data to set seasonal pattern
NJ	2010	• State BPJ
DE	2011	• State logbook data
MD	2010	• MDNR/MFS estimate of active vessels (produced for sea turtle determination)
VA	2010	• VA MRC Harvest Reporting System
NC	2011	• NC DMF trip ticket data
SC	2010	• SC OFM data on blue crab harvest activity
GA	2010	• GA DNR custom survey of blue crab harvesters
FL	2010	• FWC trip ticket data, by area and month

Illustrative Results: Vessel Activity

2010/2011 Northeast Baseline (Monthly Average)
Estimated Number of Active Vessels ~ All Fisheries

Region	Number of Active Vessels
Exempt Waters	*1,102*
LMA 1	1,788
LMA 1/OC Overlap	7
LMA 2	201
LMA 2/3 Overlap	29
LMA 3	77
Outer Cape	45
Other LMA	5
Subtotal Non-Exempt Waters	*2,153*
Total	**3,255**

*Sums may not total due to rounding



Data Limitations: Vessel Activity

- Northeast VTR – "average" location
- Southeast Logbook – coarse resolution
- Federal lobster permits impose no trip reporting requirements
  - Rely on permit data for "lobster-only" vessels
  - Activity assumed to be evenly distributed throughout each LMA – in each case, a very broad area

Estimate of Active Lobster Vessels Not Subject to Trip Report Requirements (July 2011)

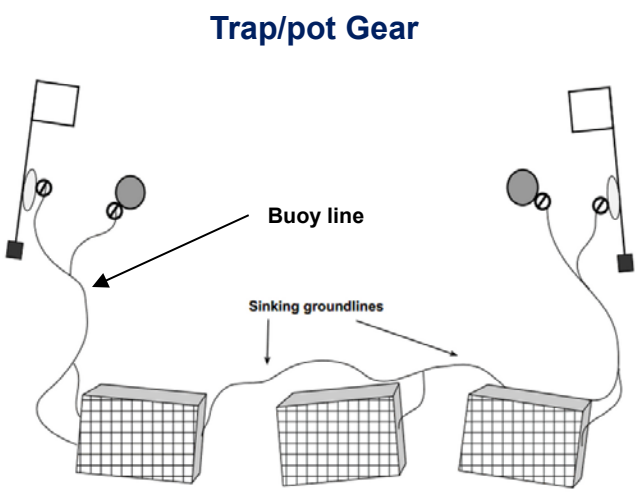
Area	Fed Vessels without VTR Requirements	Total Federal Vessels	Share of LMA's Active Vessels
LMA 1	1,071	1,217	88%
LMA 2	73	129	57%
LMA 3	21	60	36%
OCC	7	24	29%

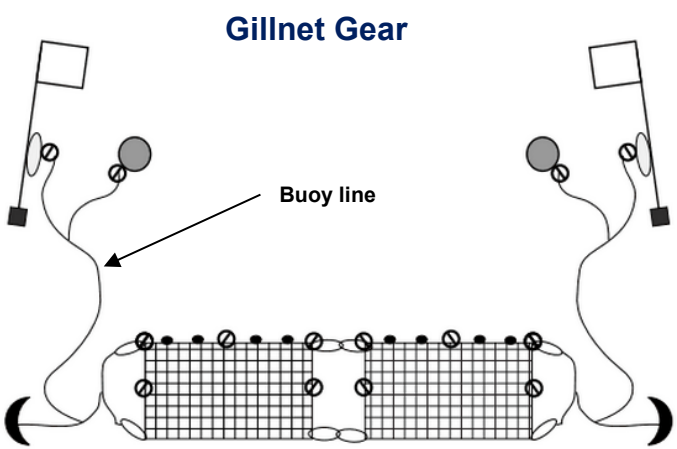
- State sources
  - Inconsistent data across states; limits comparability and accuracy
  - Hard to keep pace with emerging fisheries and changing activity levels
  - Labor-intensive collection and pre-processing

Gear Configuration

- Estimates of vertical line use are based on "model vessel" approach:
  - Each model vessel is designed to represent a group of vessels that share similar gear configurations
  - The model currently incorporates ~300 model vessels
- Users can assign model vessels to a suite of regions, including:
  - Lobster Management Areas
  - ALWTRP trap/pot areas
  - Federal waters off the coast of Maine delineated by distance from shore
  - State waters (exempt and non-exempt)
  - State fishery management areas (where available)

Variables that Characterize Model Vessels





- Trap/pot model vessels:
  - Total traps fished
  - Number of traps per trawl
  - Number of endlines (i.e., buoy lines) per trawl
  - Length of groundline between traps
  - Number of anchors per trawl
  - Length of anchor lines
- Gillnet vessels:
  - Total strings fished
  - Net panels per string
  - Endlines per string
  - Number of anchors per string
  - Length of anchor lines

Data Sources: Gear Configuration – Federal Waters

- Gillnet:
  - Based on Northeast Domestic Fisheries Observer Program data, 2009-2011
  - Differentiated by region (Northeast and Mid-Atlantic/Southeast)
- Lobster:
  - Based on best professional judgment (BPJ) – NMFS gear specialists
  - Differentiated by region (Northeast nearshore, Mid-Atlantic nearshore, and offshore)
  - For nearshore waters off Maine and Massachusetts, also draw on state reports and surveys
- Blue crab:
  - Mid-Atlantic - average of configurations reported for ocean waters under DE, MD, VA, or NC jurisdiction
  - Southeast - average of configurations reported for ocean waters under SC, GA, or FL jurisdiction

Data Sources: Gear Configuration – Federal Waters

- Other trap/pot: based on BPJ of NMFS gear specialists and/or TRT members for specified region/fishery
  - Northeast state waters – shrimp
  - Northeast nearshore waters - scup, black sea bass, shrimp, hagfish, and conch/whelk
  - Northeast offshore waters – hagfish and red crab
  - Mid-Atlantic nearshore waters– black sea bass (north and south of Cape Hatteras), scup, and conch/whelk
  - Mid-Atlantic offshore waters – hagfish and red crab
  - Southeast nearshore – black sea bass
  - Southeast offshore waters – black sea bass

Data Sources: Gear Configuration – State Waters

State	Year	Source
ME	2010	• Annual Logs survey (discontinued) • Distributional analysis of model vessels by #traps and traps per trawl
NH	2010	• Custom data set merging Fisherman/Dealer and Harvester data • Distributional analysis (non-exempt waters)
MA	2009	• Custom DMF Catch Report data • 2009 to take advantage of buoy line information; estimate traps per trawl • Distributional analysis
RI	2010	• Commercial Harvester Logbook • Distributional analysis (seasonal)
CT	2011	• Average # traps by month/area • Assumed 6 traps per trawl

Data Sources: Gear Configuration – State Waters

State	Year	Source
NY	2010	• Total traps based on Recall Survey • Traps per trawl assumed (BPJ)
NJ	N.A.	• State BPJ
DE	2011	• State logbook data
MD	2010	• State BPJ
VA	2010	• VA MRC Harvest Reporting System and BPJ
NC	2009	• 2009 survey/article (sea bass) • NMFS regional liaison BPJ (gillnet)
SC	2010	• State BPJ
GA	2009	• GA DNR custom survey of blue crab harvesters
FL	2010	• FWC trip ticket data, translate trap hauls to number of traps fished

Data Limitations: Gear Configuration

- Reporting on gear configurations/vertical line use in most fixed gear fisheries is not routinely required
- For several areas/fisheries, assumptions concerning gear configurations are based partly or completely on professional judgment
- Even with vertical line data, estimating traps per trawl is subject to uncertainty
- State reporting requirements are evolving
  - Currently rely on some state surveys that are discontinued (e.g., Maine) or that have eliminated key variables (e.g., Massachusetts)
  - New requirements emerging, e.g., New Hampshire considering vertical line reporting
- Labor-intensive collection and pre-processing

Questions for the Monitoring Work Group

- Is the information now available on commercial fishing activity adequate to support development and implementation of the ALWTRP?
- If not, what data gaps or data quality issues are the most important to address?
- How can the quality of available information be improved without imposing an undue burden on commercial fishermen?

Part 2: Data Needs and Analytic Rationale

Overview

- What data would improve our understanding of ALWTRP fisheries?
- What analyses would the data support?
- How would improved data and analysis further ALWTRP objectives?

Data on Trap/Pot Fisheries

- Critical data:
  - Approximate fishing location during specified period of activity
  - Total traps fished
  - Configuration (traps per trawl, number of buoy lines)
- Useful for future analysis:
  - Landings
  - Trap hauls
  - Trips
  - Number of vertical lines
  - Groundline between traps
  - Use of anchor lines (if any)
  - Buoy type
  - Rope gauge
  - Home port
  - Landing port
  - Gear loss
  - Number of crew
  - Vessel size
  - Permitted traps

Data on Gillnet Fisheries

- Critical data:
  - Approximate fishing location during specified period of activity
  - Strings fished
  - Panels per string
- Useful for future analysis
  - Landings
  - Net hauls
  - Trips
  - Panel size
  - Panel spacing
  - Buoy type
  - Use of anchor lines (if any)
  - Rope gauge
  - Home port
  - Landing port
  - Number of crew
  - Vessel size

Analytic Rationale

- Considering data needs for:
  - Future ALWTRP rulemakings
  - Retrospective evaluation of ALWTRP
    - Effectiveness in reducing entanglements
    - Economic impacts over time
- Critical data cited above support basic analysis of fishing location and gear quantities
- Recommended data may be reported, but in separate contexts
  - For instance, dealer data provides landings and logbooks report gear
  - But often it is the interaction between parameters that matters; e.g., how does trawling affect landings?
  - A unified reporting requirement would allow assessment of such interactions

Analytic Rationale

- Examples of other analytic benefits of unified reporting:
  - Landings data linked to general fishing location allows better analysis of closure impacts
  - Rope gauge data might allow analysis of how trawling requirements affect rope gauge and entanglement risk/severity
  - Gear loss data might help in assessing gear loss costs associated with trawling requirements as well as retrospective evaluation of how all gear requirements (sinking GL, weak links, trawling, etc.) affect gear loss
  - Crew data might help in assessing impact of trawling on vessel management, as well as impact of closures on employment

Part 3: Options for an MMPA-Based Reporting System

Key Dimensions of a Reporting System

- **Activity covered** – all activity by vessels in ALWTRP fisheries, or a targeted subset of vessels/activity?
- **Census or survey** – require response from full population or statistical sample?
- **Reporting method** – paper/mail, electronic (Excel/email), Internet-based?
- **Reporting frequency** – how often would fishermen submit a report?
- **Period of activity** – what period of activity would each report address (e.g., individual trips, months)?
- **Spatial specificity** – how precise should location data be?
- **Gear parameters** – how much detail on gear configurations would reports require?

Dimensions: Activity Covered

- What activity would be reported?
  - All activity by vessels in fisheries subject to ALWTRP?
  - Only a subset of activity – e.g., only activity in waters not fully exempted from TRP requirements?

Option	Advantages	Disadvantages
All Activity in Regulated Fisheries	• Comprehensive, consistent data • Simplicity of administration	• Greater reporting burden • Redundancy with current state reporting
Subset of Activity	• Lesser reporting burden • Would address the most critical data gaps • Excludes areas ALWTRP is unlikely to target – e.g., Chesapeake Bay	• Does not fully address desire for data integration and consistency • Potential data gaps if future management measures target currently exempt waters

Dimensions: Census or Survey

- Require response from full population or statistical sample?
- ME using sample (10%), remaining states essentially a census

Option	Advantages	Disadvantages
Census	• Comprehensive, no sampling issues	• Greater reporting burden
Sample/survey	• Lesser reporting burden	• Requires statistical preparation • Reduced model accuracy (small samples in subareas)

Dimensions: Reporting Method

- How would fisherman submit reports?
- Options include
  - Paper/mail
  - Electronic (e.g., Excel, pdf)
  - Internet-based software accessed directly (e.g., SAFIS)

Option	Advantages	Disadvantages
Paper	• Universally accessible • Quick and easy to initiate	• Data entry and processing burden • Quality control (e.g., deciphering handwriting)
Electronic	• Easier to complete and submit • Streamlined processing	• Electronic format may not be universally accessible
Online	• No issues of software accessibility • Streamlined processing • Interactive guidance • Built-in quality control	• Internet access may be limited for some fishermen • Up-front cost/time to develop online system

Dimensions: Reporting Frequency

- How often would fishermen submit a report?

Option	Advantages	Disadvantages
Submit Monthly	• More accurate recall • Timeliness (e.g., tracking seasonal closures)	• Greater reporting burden
Submit Annually	• Lesser reporting burden	• Less accurate recall

Dimensions: Period of Activity

- What period of activity would each report address (e.g., individual trips, months)?
- States appear to be moving toward trip reports to meet ACCSP reporting standard

Option	Advantages	Disadvantages
Trip	• Comprehensive data; no averaging over month • May enable more rigorous statistical analysis	• Greater reporting burden • Analytic burden to pre-process data for Co-Occurrence Model
Month	• Lesser reporting burden • Satisfies most anticipated analytic needs	• In reporting information, respondent must "average" over the month • Limits ability to analyze management measures of shorter duration or outside a monthly cycle

Dimensions: Spatial Specificity

- How precise should information on location of activity be?
- Could organize around:
  - Existing reporting regions, e.g., NMFS statistical areas
  - New subdivisions of existing reporting regions
  - Standardized lat/long grid
  - Lat/long coordinates

Option	Advantages	Disadvantages
Less (e.g., large management regions)	• Alleviates fishermen's confidentiality concerns	• Reduced model accuracy
More (e.g., standardized, fine-scale grid)	• Enhanced model accuracy	• Increases fishermen's confidentiality concerns • Does not conform to ALWTRP management areas
Hybrid	• Use familiar management areas in near-coastal waters • Carve large offshore areas (e.g., LMA 3) into finer subareas	

Dimensions: Gear Parameters

- How much information on gear configurations would reports seek to gather?

Option	Advantages	Disadvantages
Less	• Alleviates fishermen's confidentiality concerns • Lesser reporting burden	• Reduced model accuracy • Limits ability to analyze impact of alternative management measures
More	• Improves model's accuracy • Enhances ability to analyze impact of alternative management measures	• Increases fishermen's confidentiality concerns • Greater reporting burden

Additional Considerations

- Numerous possible combinations of key dimensions of the reporting system
- Finer spatial information supports development of finer-scale management measures
- Consider future regulatory and analytic interests
- How could a new reporting system be coordinated with state reporting?
- Options for collaborative administration?

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