Portside Sampling and River Herring Bycatch Avoidance

in the Atlantic Herring and Mackerel Fishery

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Midwater Trawl Vessels

Rhode Island Bottom Trawl Vessels

With funding from:

Presentation Overview

Portside Sampling:

1. Fleet and Fishery Background
2. Sampling Design
3. Data Gathered
4. Data Utility

River Herring Bycatch Avoidance:

1. Overview of Methods
2. Preliminary Evaluation Results
3. Future Direction

Portside Sampling

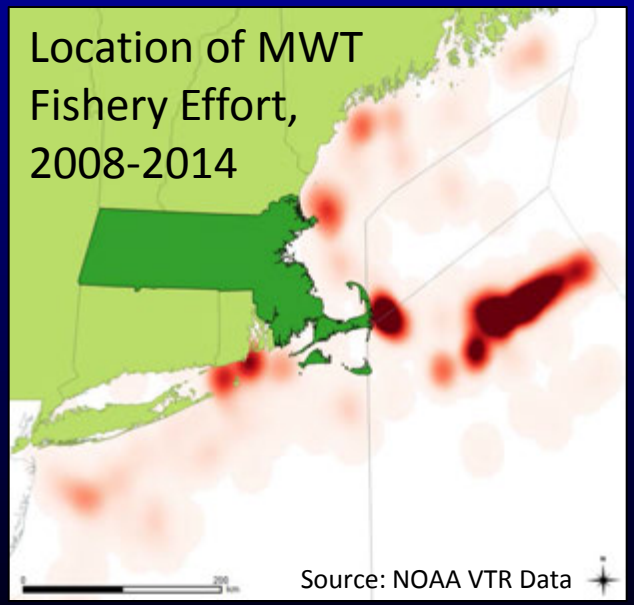
Herring/Mackerel Fleet and Fishery Background

Mid-water Trawl (MWT) Fleet

- 8-12 Pair and Single MWT Vessels
- 100-165 feet long
- 120-450 metric ton (mt) capacity
- Crews of 3-6
- Vessels make 20-60 trips/year

MWT Herring/Mackerel Fishery

- Landings AVG ~61,000mt/year, from NJ to ME (primary ports: Gloucester, New Bedford, Portland)
- 4 Herring Management Areas with indiv. quotas
- 1 coast-wide Mackerel quota
- 2-5 hauls/trip
- Pump fish from net into RSW tanks
- Traditionally fish SNE/CC in winter/spring, GB in summer/fall, GOM in fall



* NFWF, TNC, NOAA Herring RSA funded

Portside Sampling

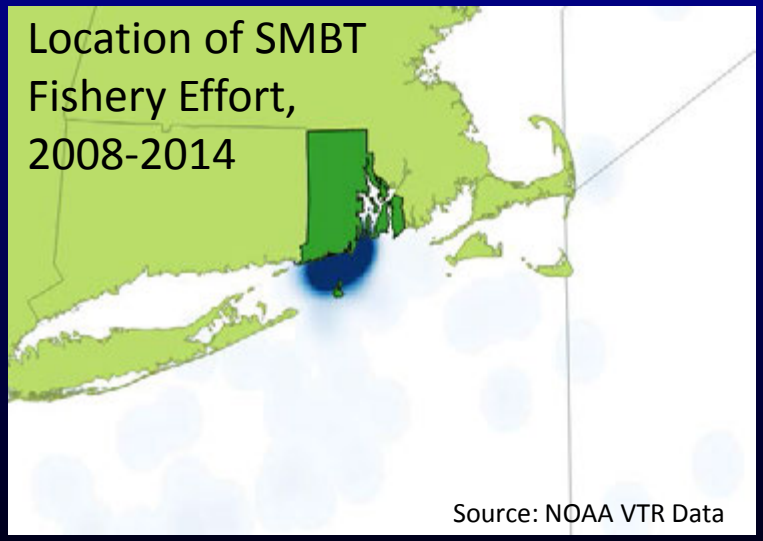
Herring/Mackerel Fleet and Fishery Background

Small-mesh Bottom Trawl (SMBT) Fleet

- 8-12 SMBT Vessels
- 45-100 feet long
- 20-100 metric ton (mt) capacity
- Crews of 3-4
- Vessels make 20-80 trips/year

SMBT Herring/Mackerel Fishery

- Landings AVG ~4,500mt/year, almost exclusively from RI ports (Point Judith, North Kingstown Newport,)
- Usually conduct day trips
- 2-5 hauls/trip
- Lift a few tons at a time into 'wet holds'
- Traditionally fish SNE in winter/spring



*** TNC funded**

Portside Sampling

Sampling Design

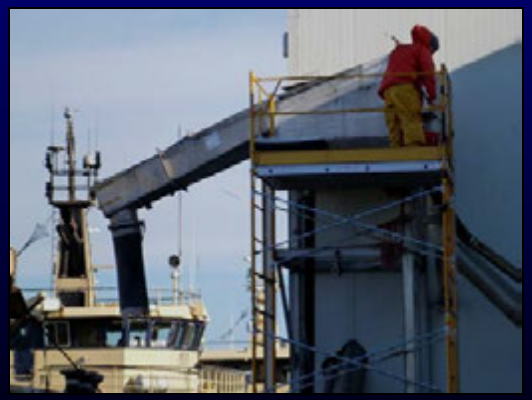
<u>2008-2011</u> –Modified NEFOP Herring Fishery Protocols

3 types of sampling:

Lot sample, **Plant** sample, Sub-sample of **unsorted** offloads

<u>2010-2011</u> – Sampling Eval., Modeling and Comparison to NEFOP

- 2010 – M. Cieri and S. Corriea compared 52 Portside-NEFOP trips and found "**relatively low levels of agreement**…"
- 2011 – M. Dean modeled hypothetical offloads and compared 30 additional Portside unsorted/NEFOP trips:
  - **-Lot/Plant sampling not representative of NEFOP**, and
  - **-Portside unsorted had comparable data and often lower variance**



<u>2012-2015</u> – MA DMF using only subsampling of unsorted offloads

- Modified DW boxes, erected scaffolding, etc to increase sampling opportunities

Portside Sampling

Data Gathered

<u>Species Composition</u> – Trip Level Expansion

- Basket subsample species weights → trip level bycatch estimates

<u>Length Frequencies</u> – Target and Priority Species

- 100 target species (Atl. Herring and/or Mackerel)
- Every priority species (alewife, blueback herring, Am. shad, groundfish, etc…)

<u>Fish/Sample Collection</u> – Internal and External Requests

- River herring collected and frozen
- Atl. herring and mackerel commercial samples frozen and saved for NEFSC PopDy Stock Assessments

<u>Fisheries Effort Data</u> – Informs RHBA, Understanding of Fishery

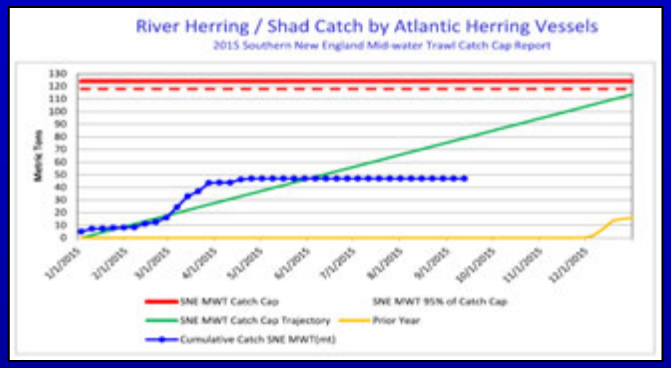
- Captains report via DMF-created Tow and Trip reports on laptops, and/or NOAA Cooperative Research eVTR/FLDRS
- As part of RHBA, MA DMF has BTConnect® account for *all* MWT vessels

Portside Sampling

Data Utility

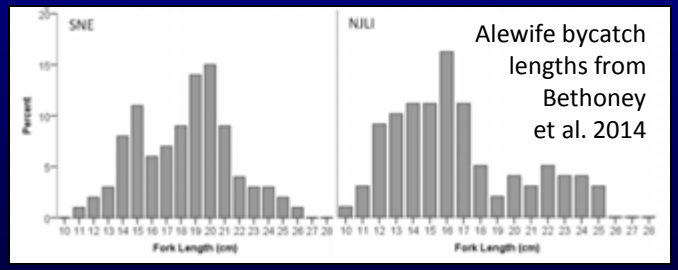
<u>Inform Management</u>– Increase Data Available for Decision Making

- Portside data used in developing RH Caps
- RH bycatch data included in ASMFC RH Compliance reports
- Utility for RH/S Catch Cap monitoring?
- Outreach/presentations to captains, fisheries managers, public stakeholders



<u>Advancing Fisheries Research</u>– Quantify and Characterize Catch

- Collaborative research: 2 publications (*Bethoney et al 2013 and 2014*), 2 manuscripts ongoing
  - -Bycatch avoidance methods and efficacy
  - -Bycatch characterization (age, size, maturity and spatial distribution)
  - -Genetic makeup of RH bycatch
- External data requests are considered and filled



Alewife bycatch lengths from Bethoney et al. 2014

<u>Inform River Herring Bycatch Avoidance Programs</u>– MWT + SMBT fisheries

River herring/Shad Bycatch Avoidance

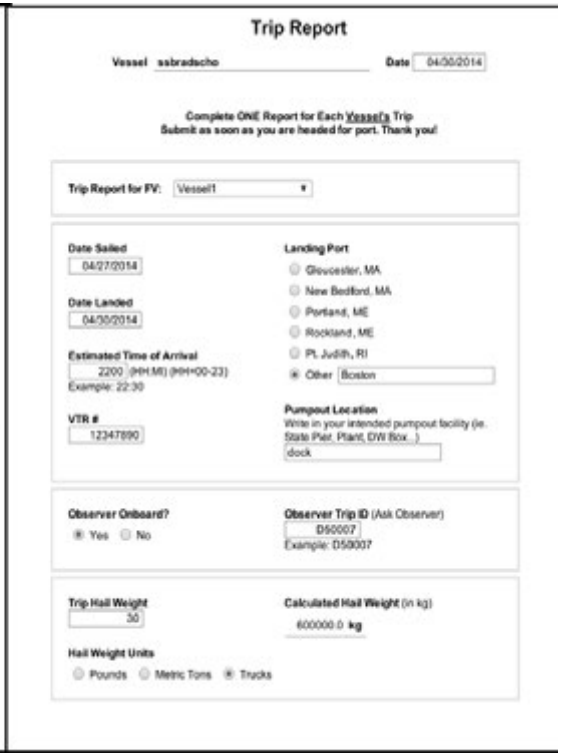
Rapid Communication of high bycatch events

- Primary catch data source: MA DMF portside
  - Incorporate several other data sources (NEFOP, Study Fleet, DMR, other fisheries)
- At-sea communication/accountability
  - BTVessel and BT Forms
  - Responsible Fishing Agreement

Participating Vessels
Tow Information Daily
with
NEFOP Observers
River herring catch estimates

Advisories when necessary

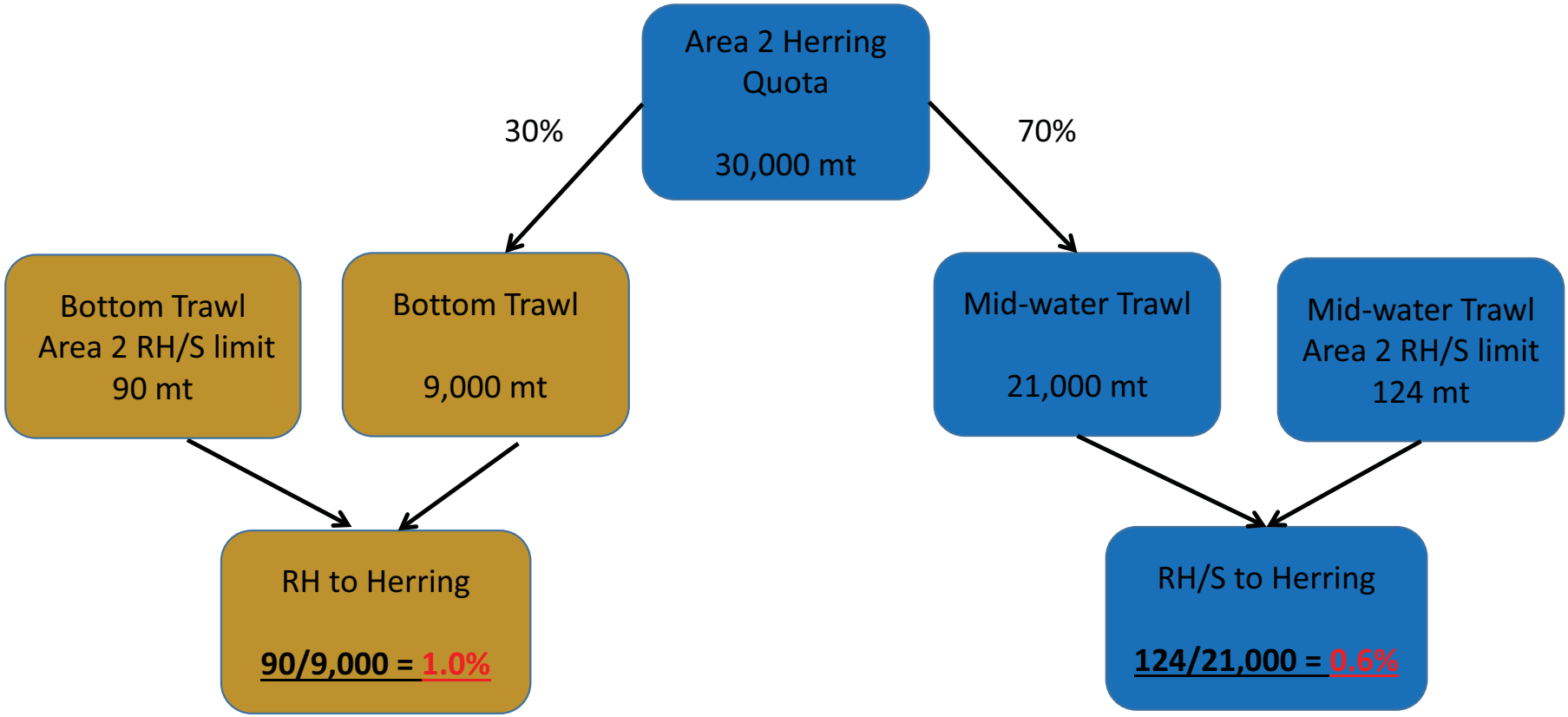
MA DMF and SMAST
Sample Unobserved Trips (≈ 50%)
Aggregate data
Classify Tows/Trips



River herring/Shad Bycatch Avoidance

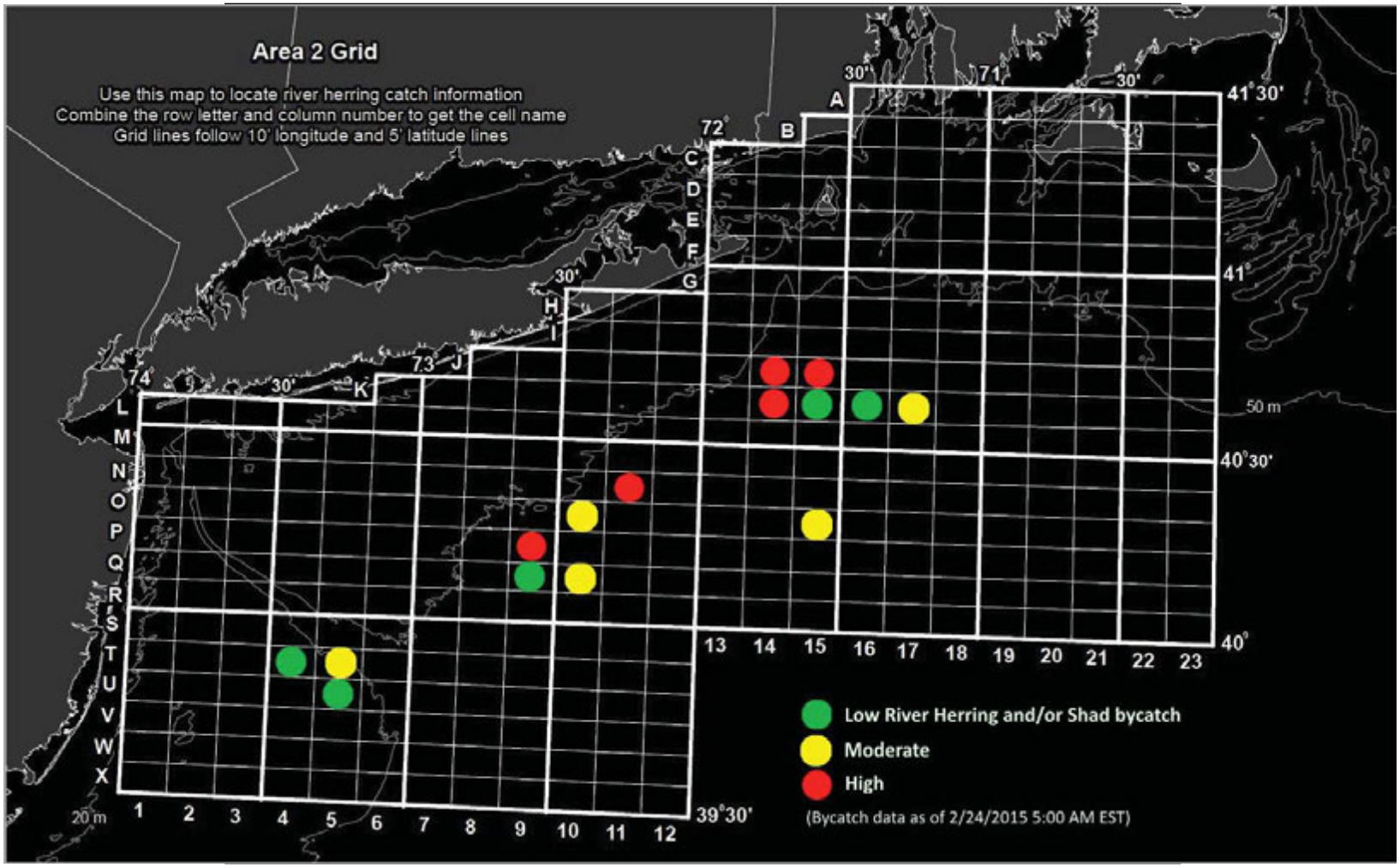
Bycatch Classification

Rate that will result in area closure due to RH/S catch limits before Atlantic herring quota can be harvested



River herring/Shad Bycatch Avoidance

Advisories



River herring/Shad Bycatch Avoidance

Results

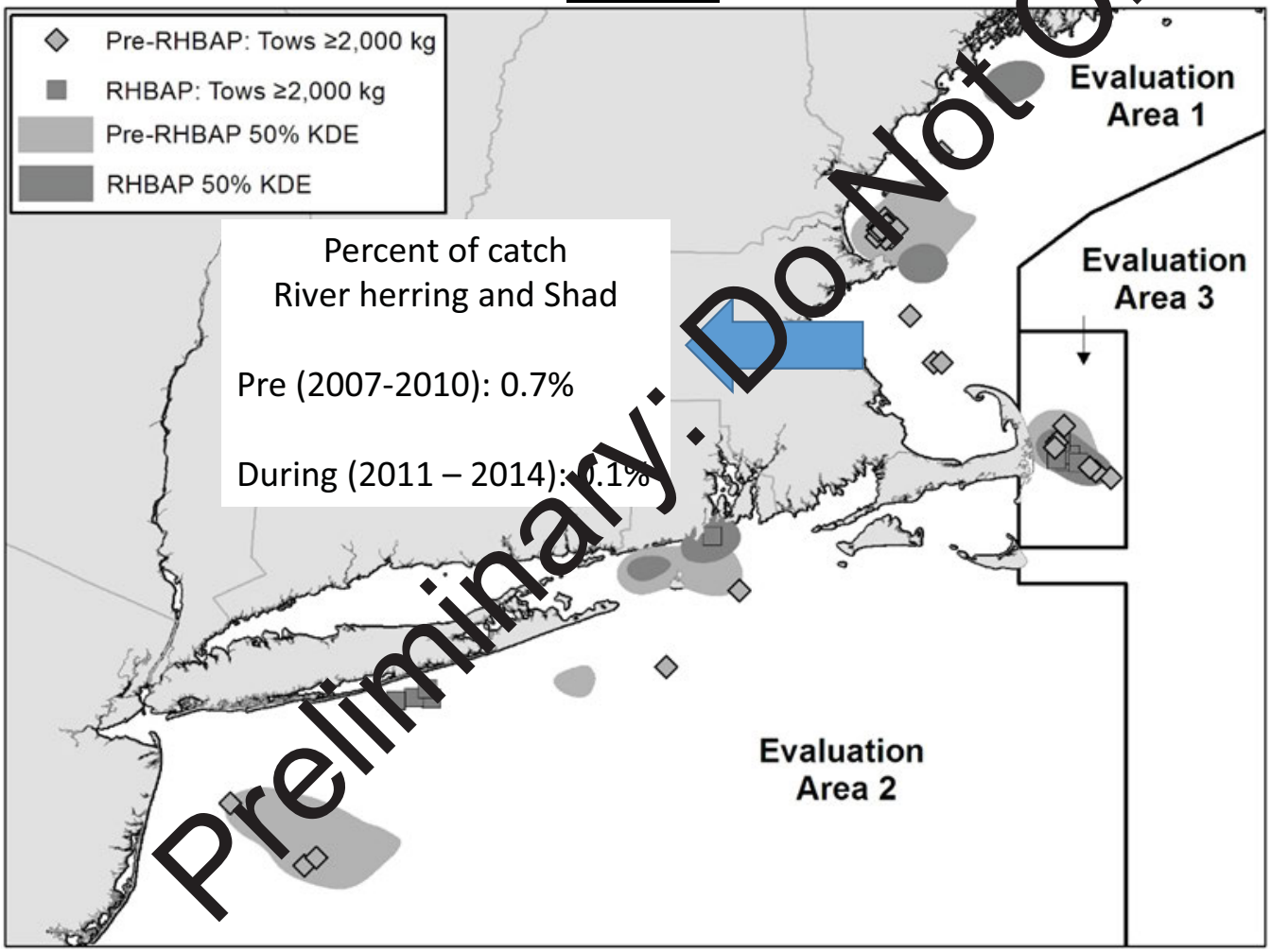
- Increased communication/awareness
  - Over 100 bycatch advisories sent
    - Weekly and Immediate (for high events)
    - Evidence of behavior changes
    - Limited Entry into areas classified as high bycatch areas
  - Over 350 communications sent by vessels each year
  - Over 200 BTVessel Tow Reports sent so far

- Sustained Participation
  - All mid-water trawl vessels participating (**9/9** vessels report NEFOP data from at sea)
  - Majority of Rhode Island bottom trawl vessels participating (**6/8** that had>100mt last 2 yrs)

- Bycatch Reduction?
  - Exploitable time/space patterns
  - Numerical Evidence
    - Not designed as experiment
    - Total bycatch

River herring/Shad Bycatch Avoidance

Results



Percent of catch
River herring and Shad

Pre (2007-2010): 0.7%

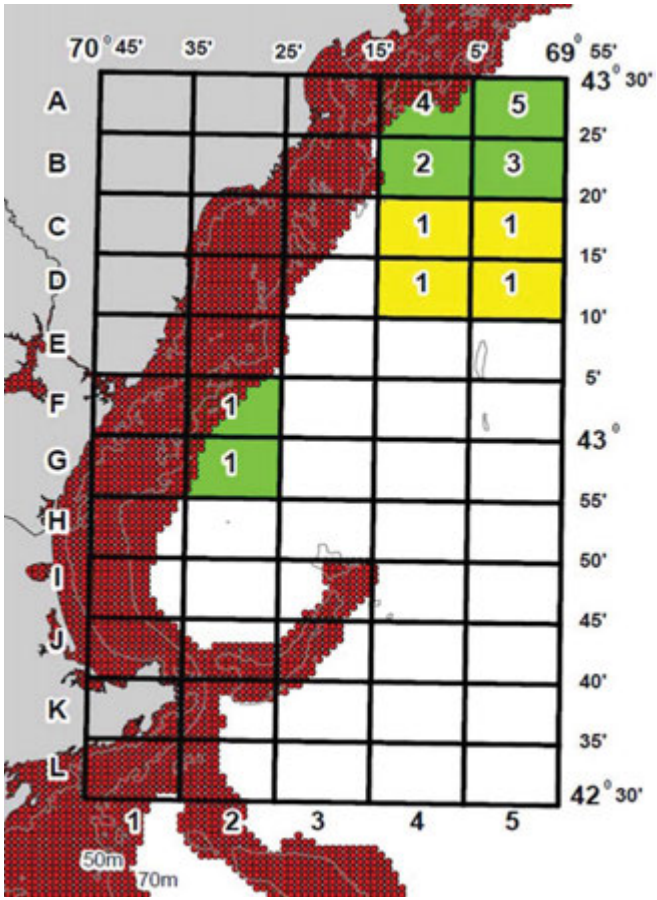
During (2011 – 2014): 0.1%

Preliminary: Do Not Cite

River herring/Shad Bycatch Avoidance

Results

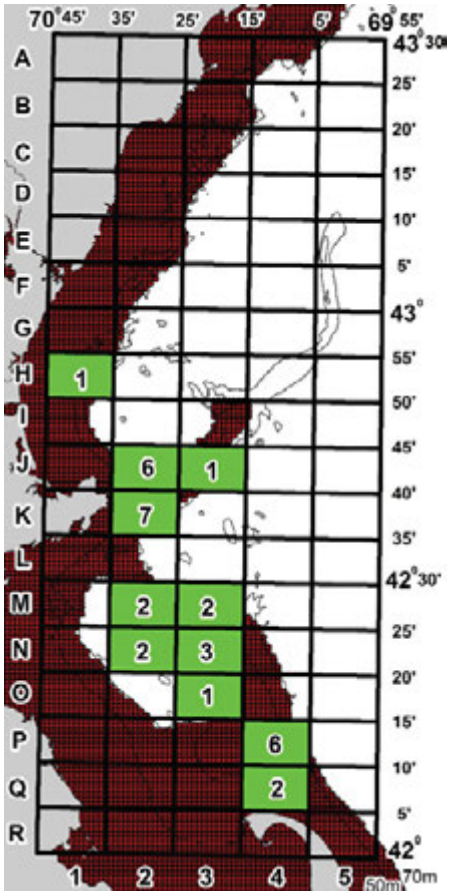
Fall 2011



- Circulate Depth Information
  - >40 fth
  - Alosines unlikely
  - Atlantic herring likely

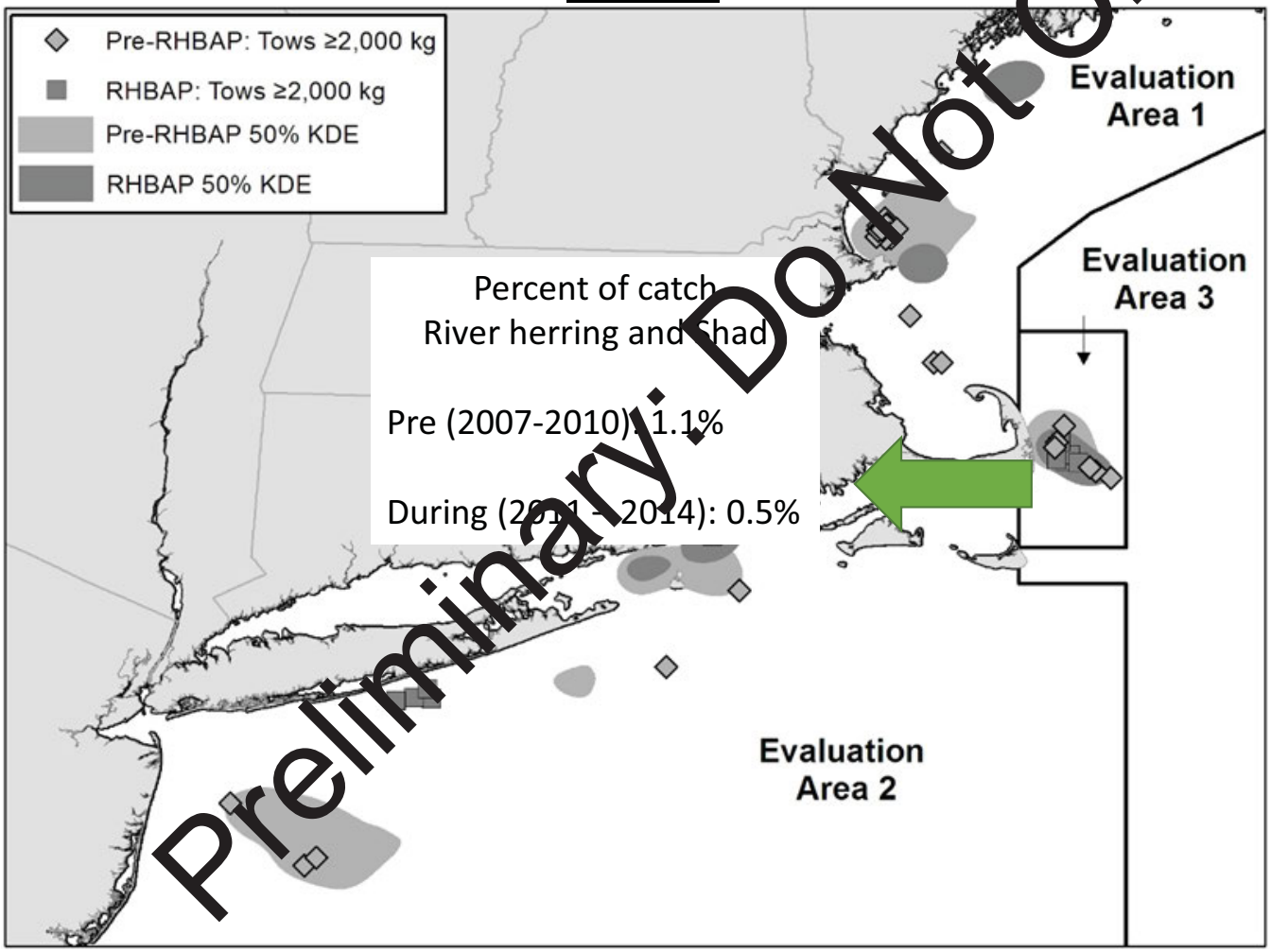
- Avoidance Grid

Fall 2014



River herring/Shad Bycatch Avoidance

Results



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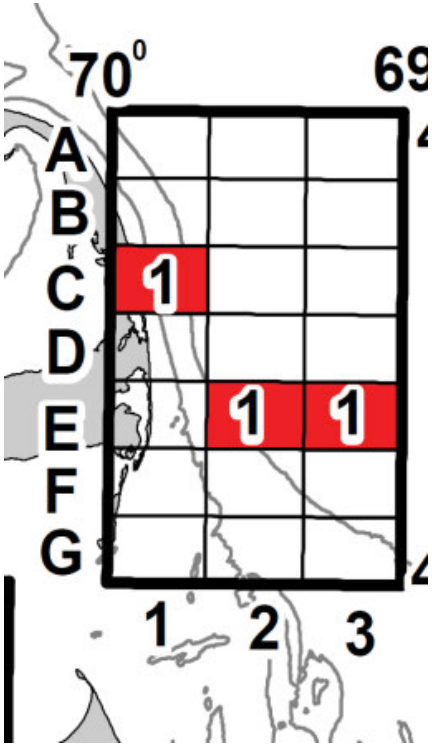
River herring/Shad Bycatch Avoidance

Results

Winter 2013



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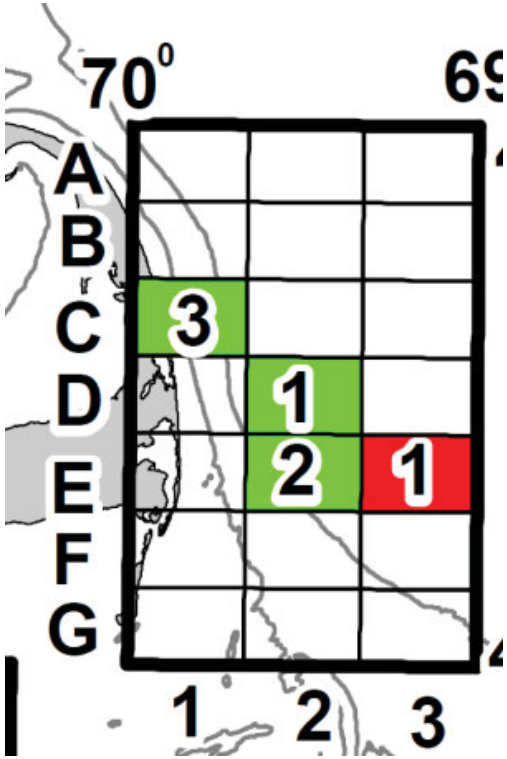

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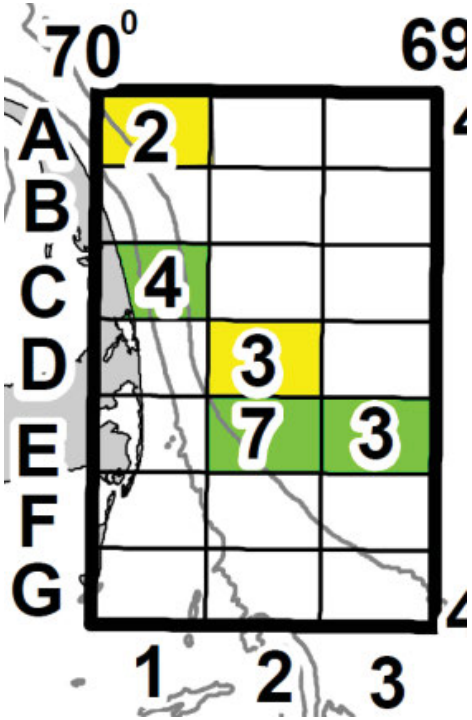
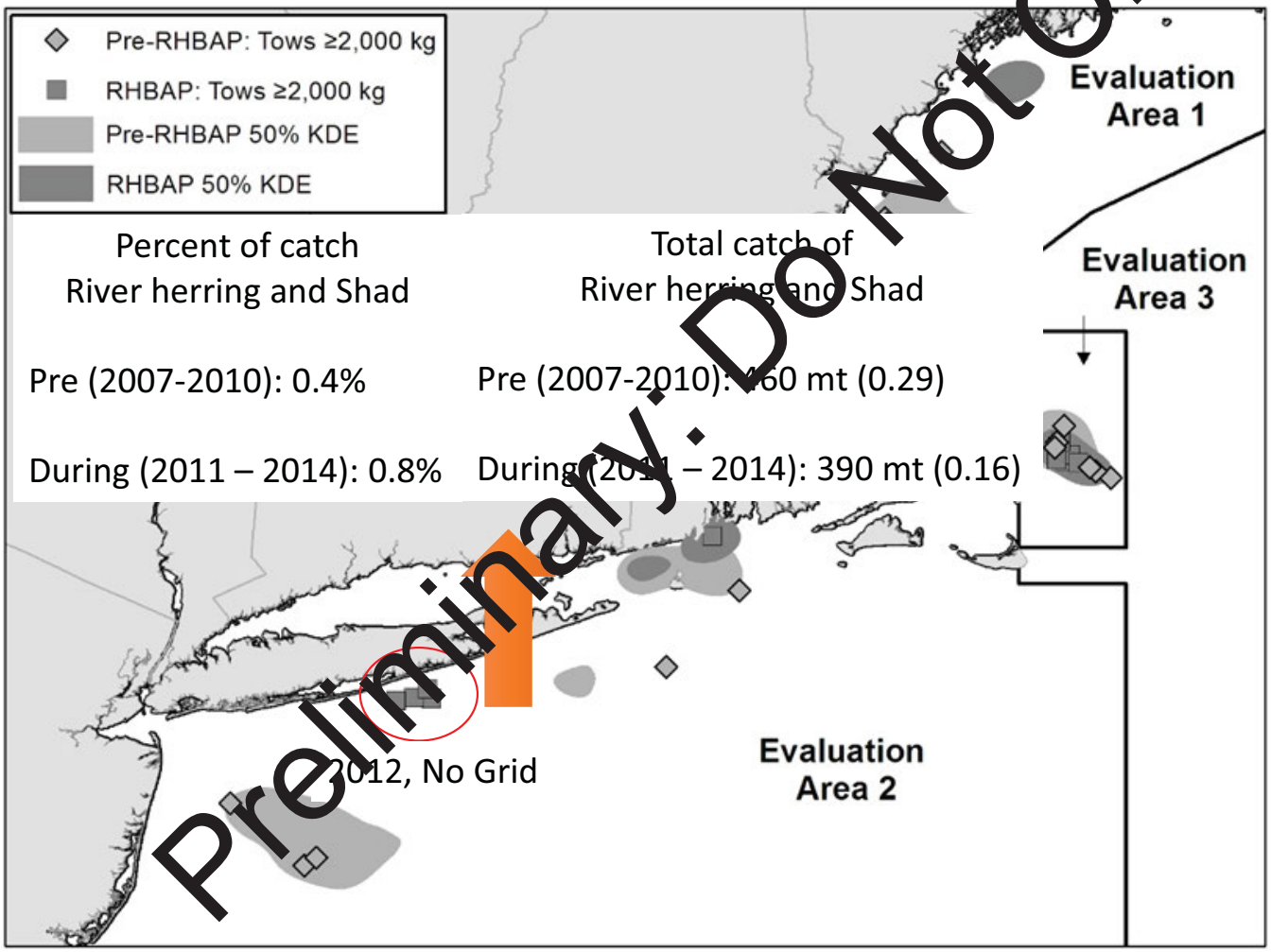


End of 2013

River herring/Shad Bycatch Avoidance

Results



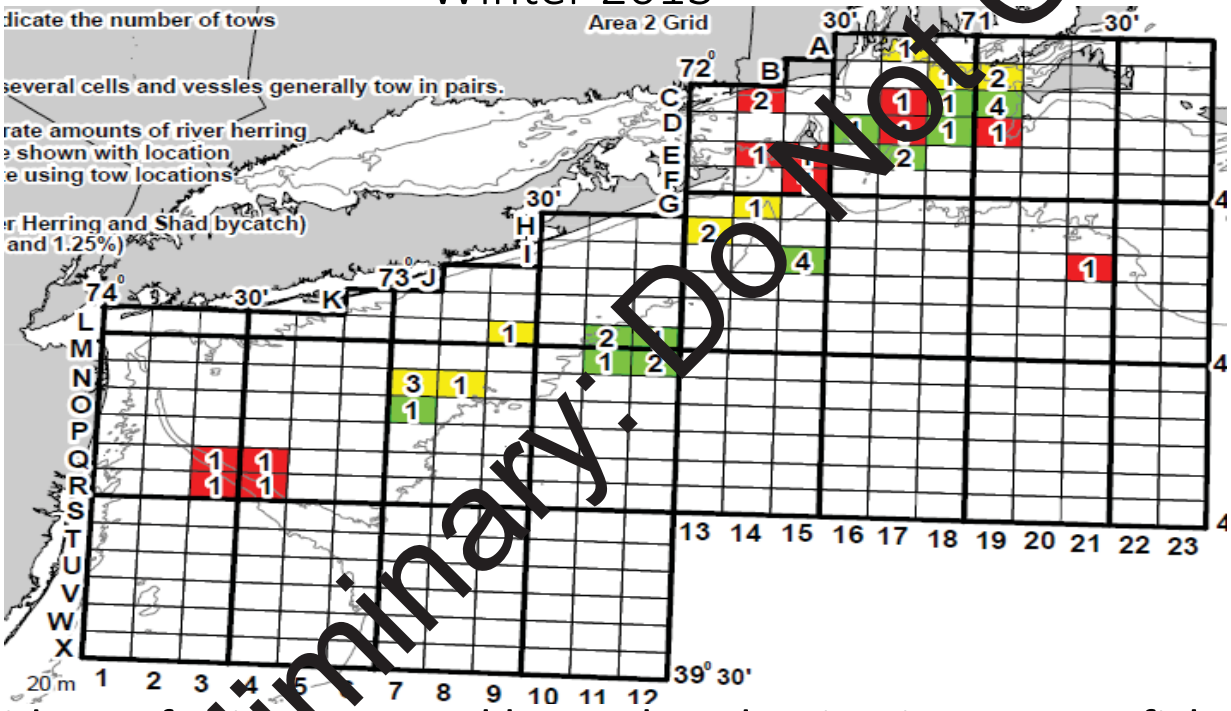
Percent of catch River herring and Shad	Total catch of River herring and Shad
Pre (2007-2010): 0.4%	Pre (2007-2010): 460 mt (0.29)
During (2011 – 2014): 0.8%	During (2011 – 2014): 390 mt (0.16)

Preliminary: Do Not Cite

River herring/Shad Bycatch Avoidance

Results

Winter 2013



- Evidence for intra-annual bycatch reduction in RI SMBT fishery
  - ≈ 65% cell classified as "high" avoided
  - ≈ 10% of re-entries into a "high" cells resulted in high bycatch event
    - 6 of the top 10 highest catches of river herring (kg)
    - 30% of all bycatch

Preliminary. Do Not Cite

River herring/Shad Bycatch Avoidance

Future

2016 – 2018 Atlantic Herring RSA Proposal

1. Portside sample at least 50% of mid-water trawl trips landed in Massachusetts
2. Continue the river herring avoidance program with mid-water trawlers
3. Advance the avoidance program through habitat forecasts
4. Comprehensive evaluation of program
    1. Total river herring and shad bycatch
    2. Bycatch rates
    3. Frequency of high bycatch events
    4. Fishing patterns
    5. Context of target species and river herring abundance, distribution, and catchability (in relation to the environment and regulations)

Acknowledgements

Mid-water trawl

Fishing Vessels: Western Venture, Osprey, Endeavour, Challenger, Enterprise, Retriever, Sunlight, Starlight, Providian, Voyager, Jean McCausland, Isabel Taylor, Nordic Explorer, Dona Martita

Numerous Industry members: Owners, managers, captains, shoreside personnel

Small mesh bottom trawl

Fishing Vessels: Heather Lynn, Ocean State, Sea Breeze Too, Darana R, Prevail, Lightning Bay, Elizabeth&Katherine, Tiger Jo

Numerous Industry members: Owners, captains, shoreside personnel

Funding Sources

Atlantic Herring Research Set Aside Program (NOAA Cooperative Research)

Collaborators

Northeast Fisheries Observer Program
Maine Dept. of Marine Resources
NOAA Study Fleet
A.I.S., Inc
P. Moore & D. Georgianna (project initiators)