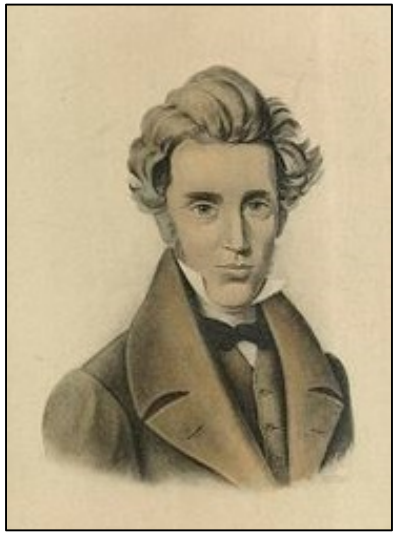
Management and Science Committee Roles and Past Projects

Mike Armstrong

Massachusetts Division of Marine Fisheries

MSC's Purpose

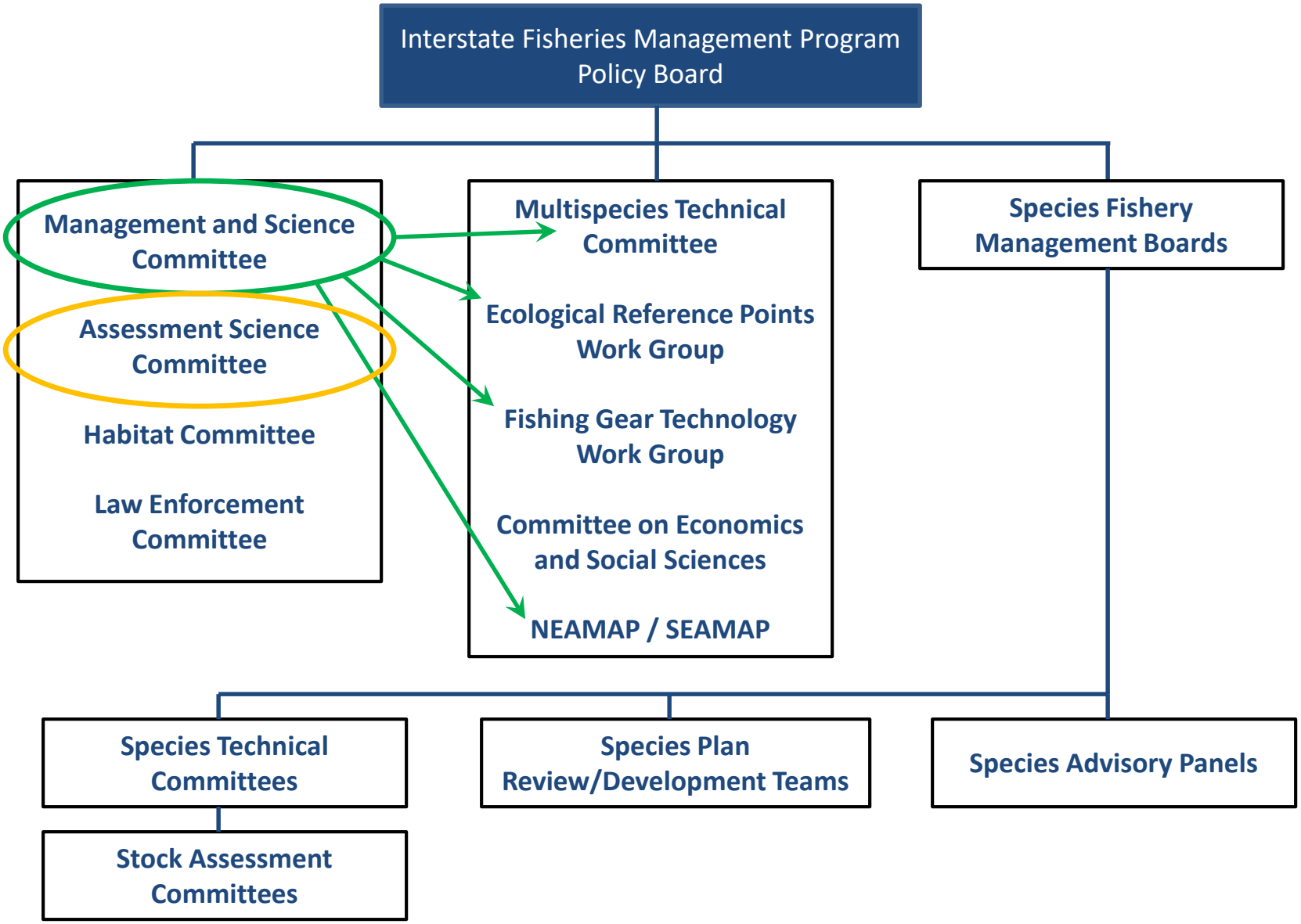
Where am I? Who am I? How did I come to be here? What is this thing called the world? How did I come into the world? Why was I not consulted? And If I am compelled to take part in it, Where is the director? I want to see him.



Kierkegaard, 1843

An oversight committee providing advice to the Commissioners on issues spanning coastal fisheries science and fisheries management

MSC in ASMFC Process



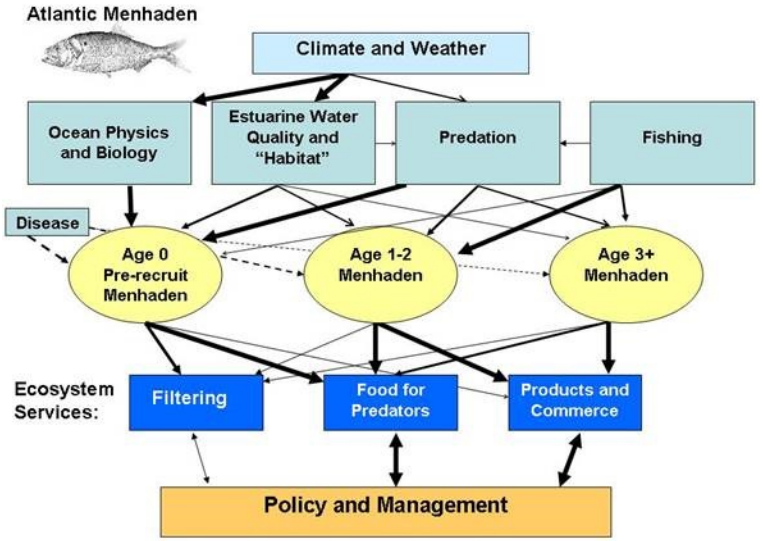
Roles and Responsibilities

1. Serve as the senior review body for the Commission, Executive Committee, and ISFMP Policy Board
2. **Evaluate and provide advice on cross-species issues**
3. Review and provide advice on individual species issues, as requested by the Policy Board
4. Coordinate technical and scientific workshops
5. **Provide oversight to ASMFC peer review processes**
6. Evaluate the state of science regarding species interactions and provide guidance to fisheries managers on **multispecies and ecosystem issues**, with a focus on modifying the single-species approach to FMPs and/or stock assessments

Past Projects

Ecosystem Science and Management

- Guided MSTC's development of Multispecies models (MSVPA for Menhaden)

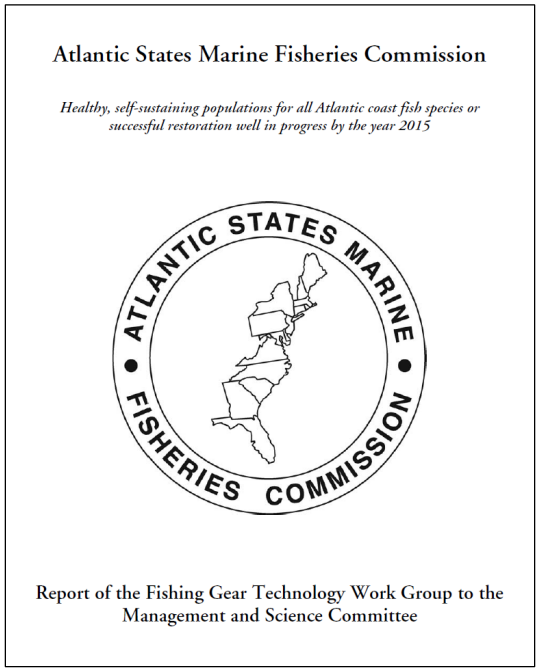


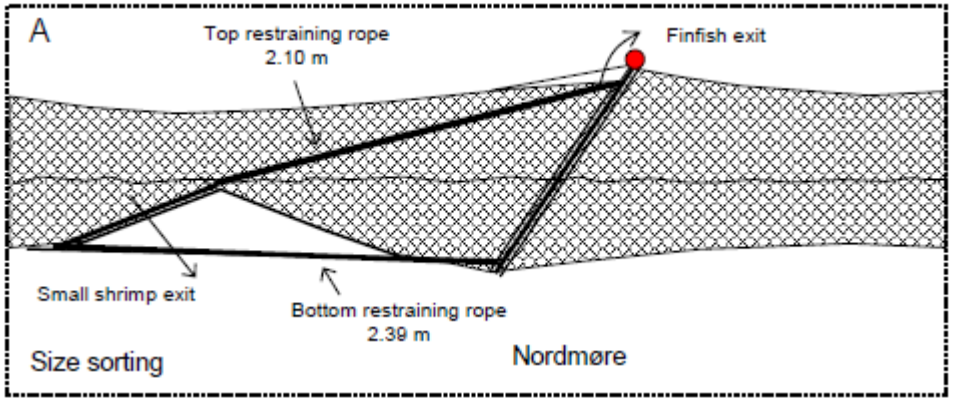
Houde UMCES, 2017

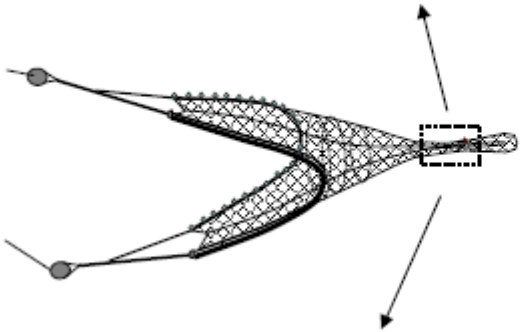
Past Projects

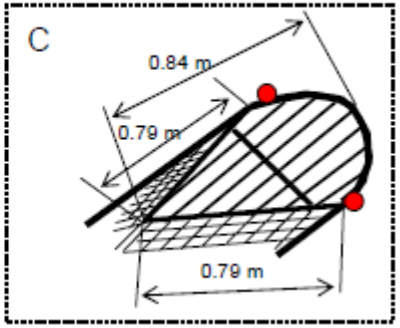
Fishing Gear Technology

– Evaluated Bycatch Reduction Methods in 10 Coastal Fisheries





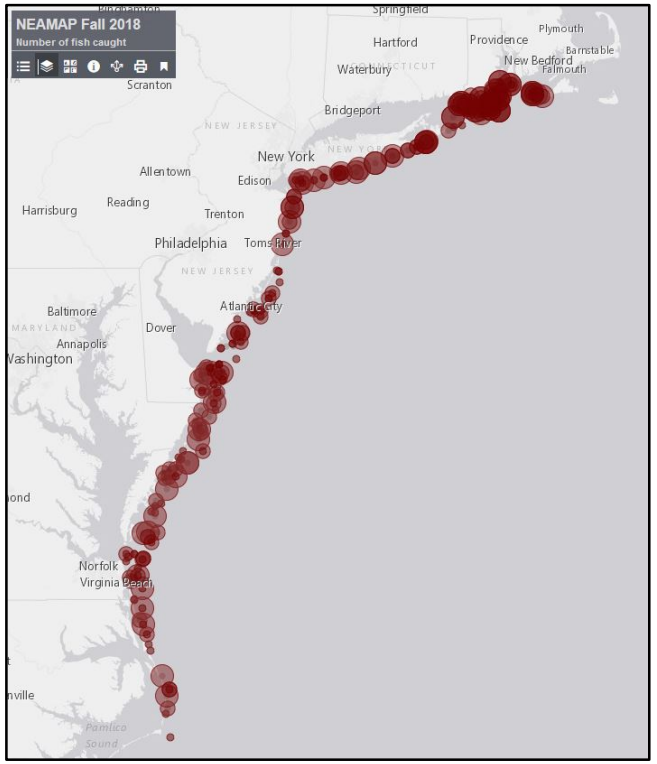




Past Projects

Development of the Northeast Area Monitoring and Assessment Program (NEAMAP)

- Defined Program structure, objectives, processes
- Issued new survey RFP, selected research team



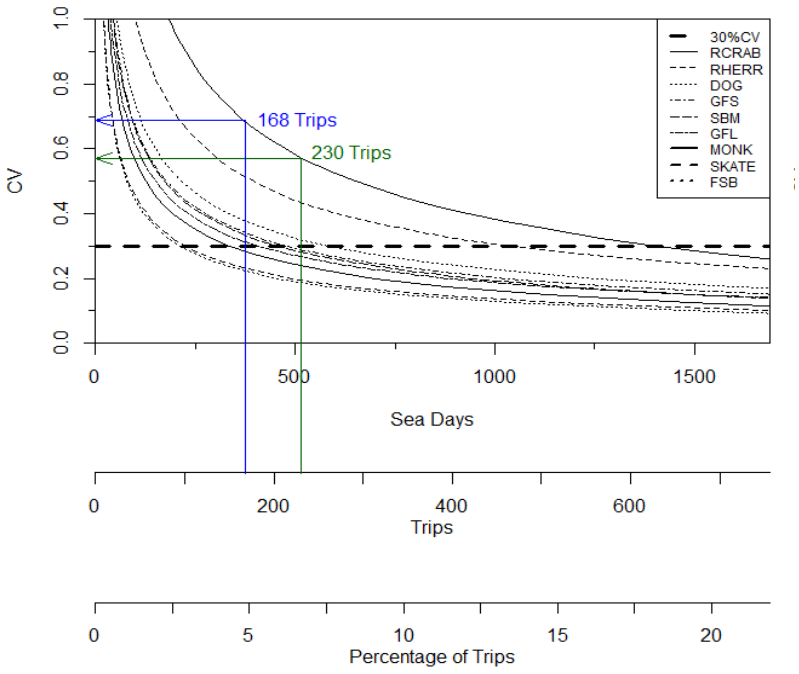
Past Projects

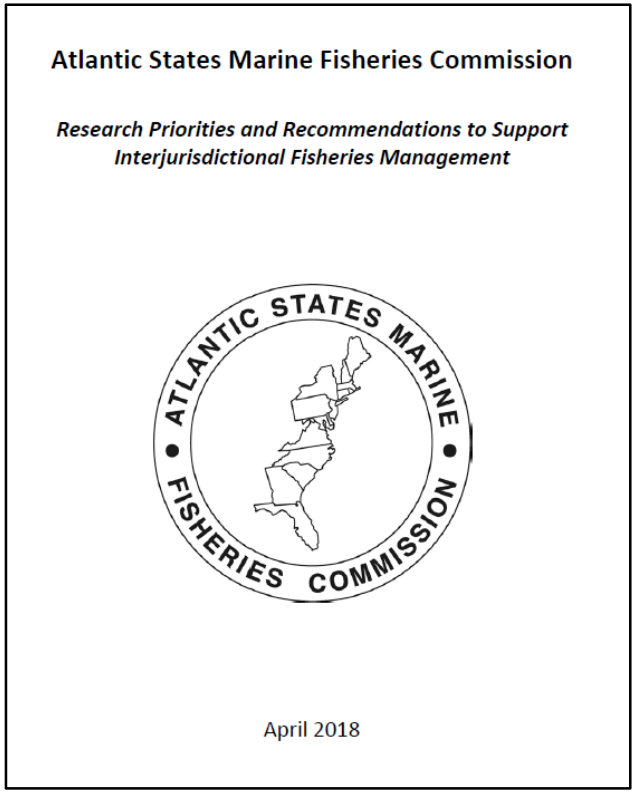
- Conservation Equivalency Policy
- Circle Hook Definitions and Issues

Past Projects

Identifying and Addressing Research Priorities

- Periodic Review and Updates
- Fishery Observer Add-on Proposals with NEFSC NEFOP funded by ACCSP

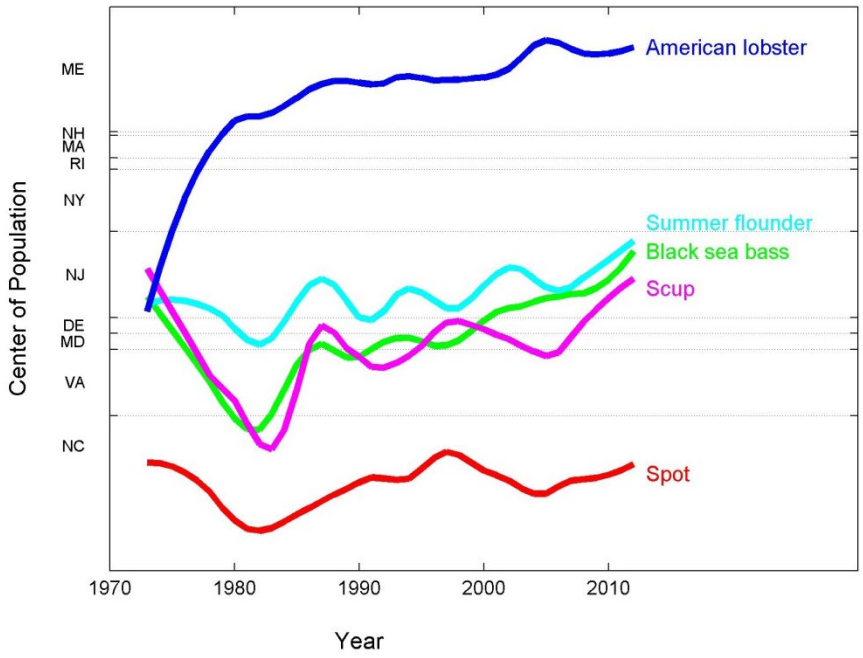


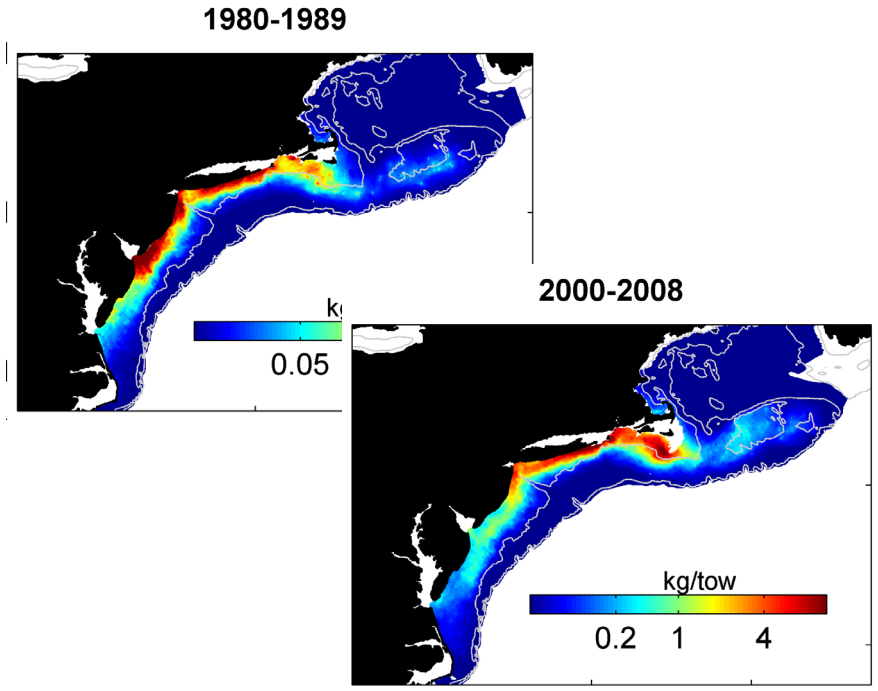


Past Projects

Climate Change and Fisheries Issues

- Completed Policy Board task on 4 stocks
- Contributed to ASMFC Climate Science and Fisheries Management Strategies





What's on the MSC Horizon

What fish science and management issues is your state or region facing that could be addressed by collaboration at ASMFC?

What coast wide or regional challenges can MSC address for ASMFC?

(Ask not what your Interstate Fisheries Commission can do for you…)

What's on the MSC Horizon

- Advise ERP WG and Boards on next steps with ASMFC EBFM*
- Pursue research to address priorities to improve data for multiple species
- Identify candidate stocks for Management Strategy Evaluations
- Provide guidance on implementing new MRIP data

MSC Review and Input to information in the Annual Review of Stock Rebuilding Performance

ASMFC Annual Meeting

October 2019

Background

- 2019-2023 Strategic Planning
- Commissioners Requested more frequent reviews
- Initiated in 2009
- Task in the 2019 Action Plan

Objective

- Validate Status/Rate of Progress
- If not acceptable: Identify corrective action

Outcome

- Direction/feedback to species management boards
- Input into the 2020 action planning process

Categories

- Rebuilt/Sustainable
- Recovering/Rebuilding
- Concern
- Depleted
- Unknown

Rebuilt/Sustainable and Recovering/Rebuilding Stocks

Rebuilt/Sustainable

- GOM/GBK Lobster
- Menhaden
- Black Drum
- Black Sea Bass
- Bluefish
- Cobia
- Horseshoe Crab (SE)
- Scup
- Spanish Mackerel
- Spiny Dogfish

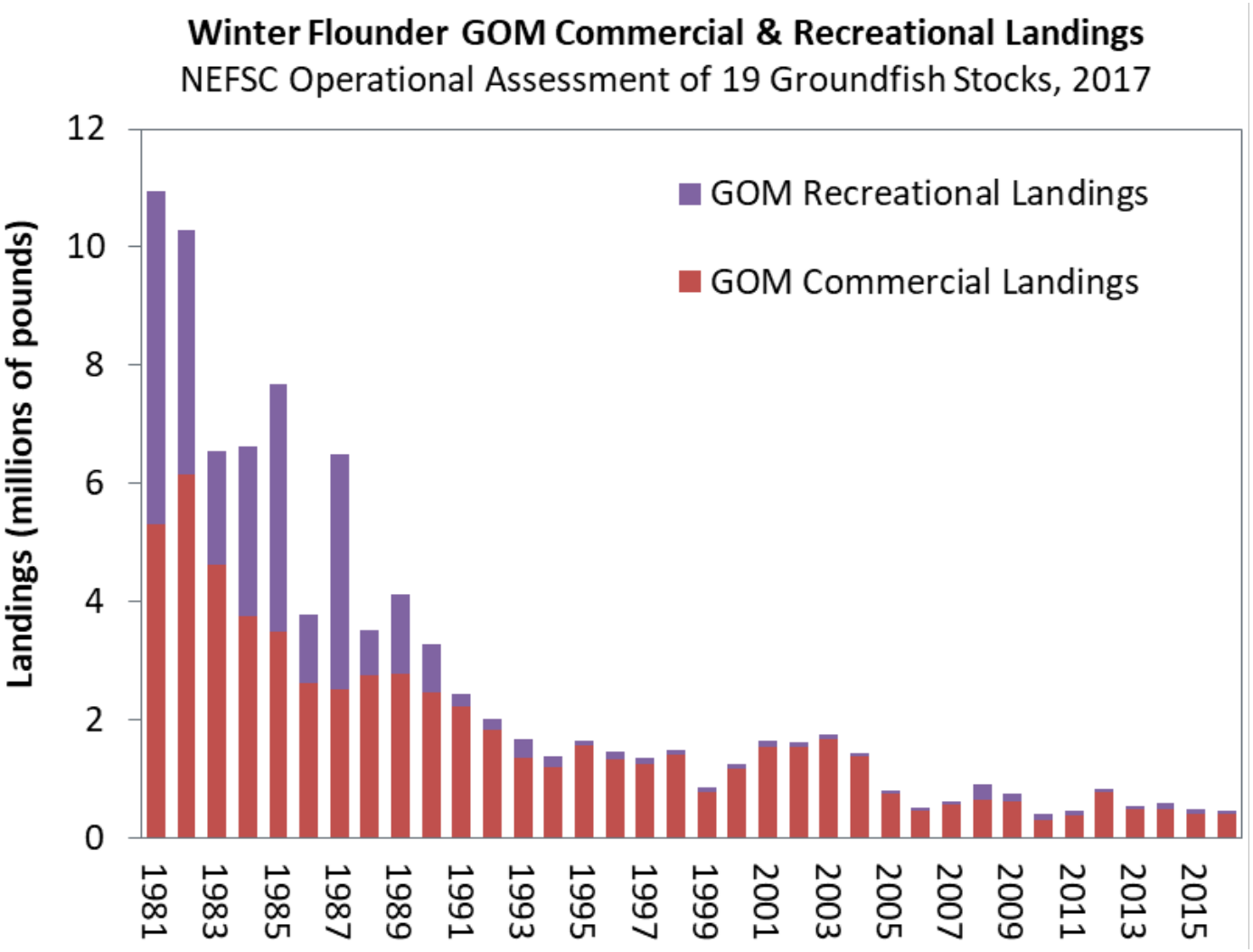
Recovering/Rebuilding

- Horseshoe Crab (DE Bay)
- Striped Bass
- Red Drum
- Summer Founder
- Tautog (MARI)

Species of Concern

- Coastal Sharks
- Winter Flounder (GOM)

Winter Flounder

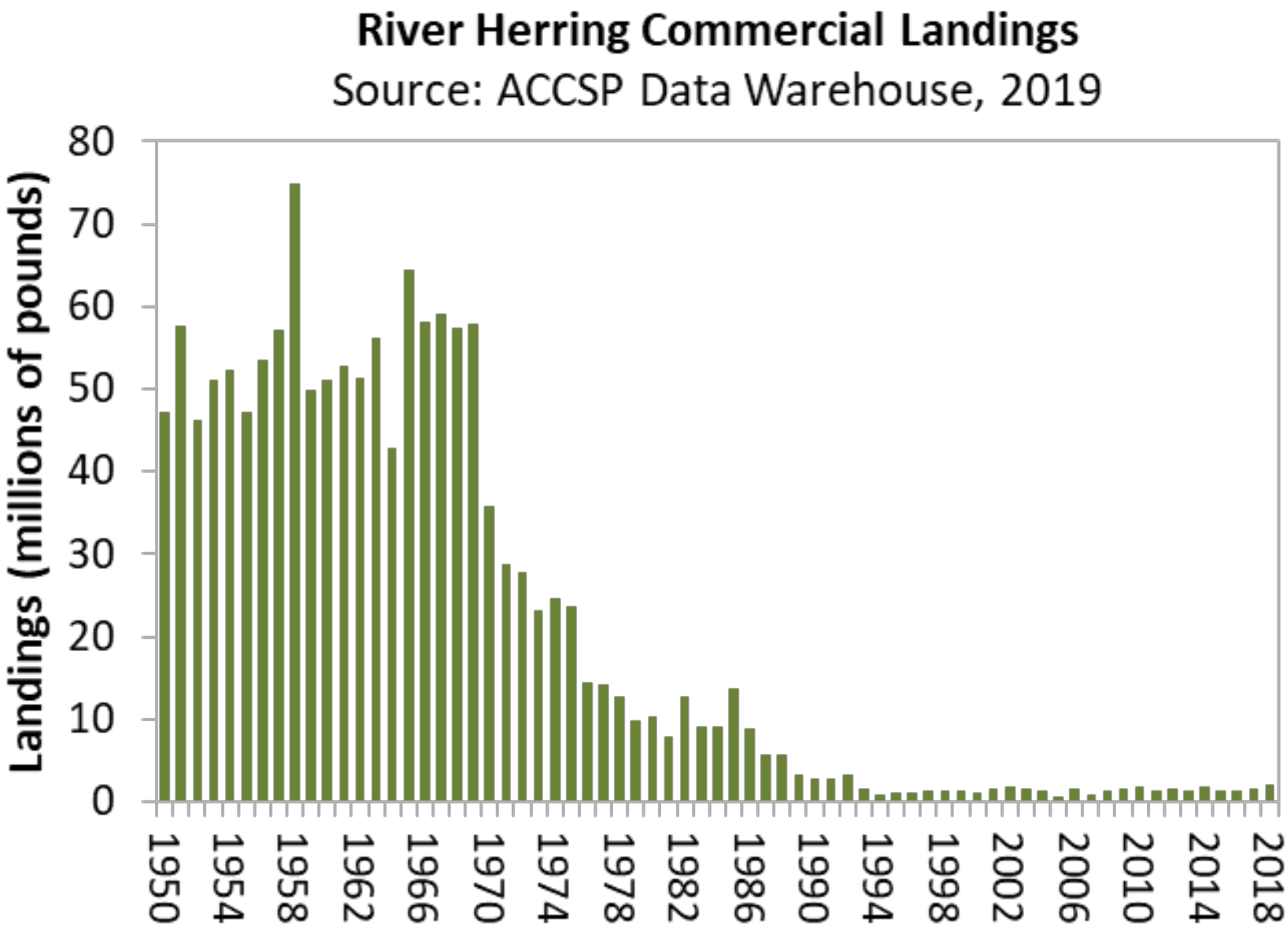


- Overfished Unknown; Overfishing not Occurring

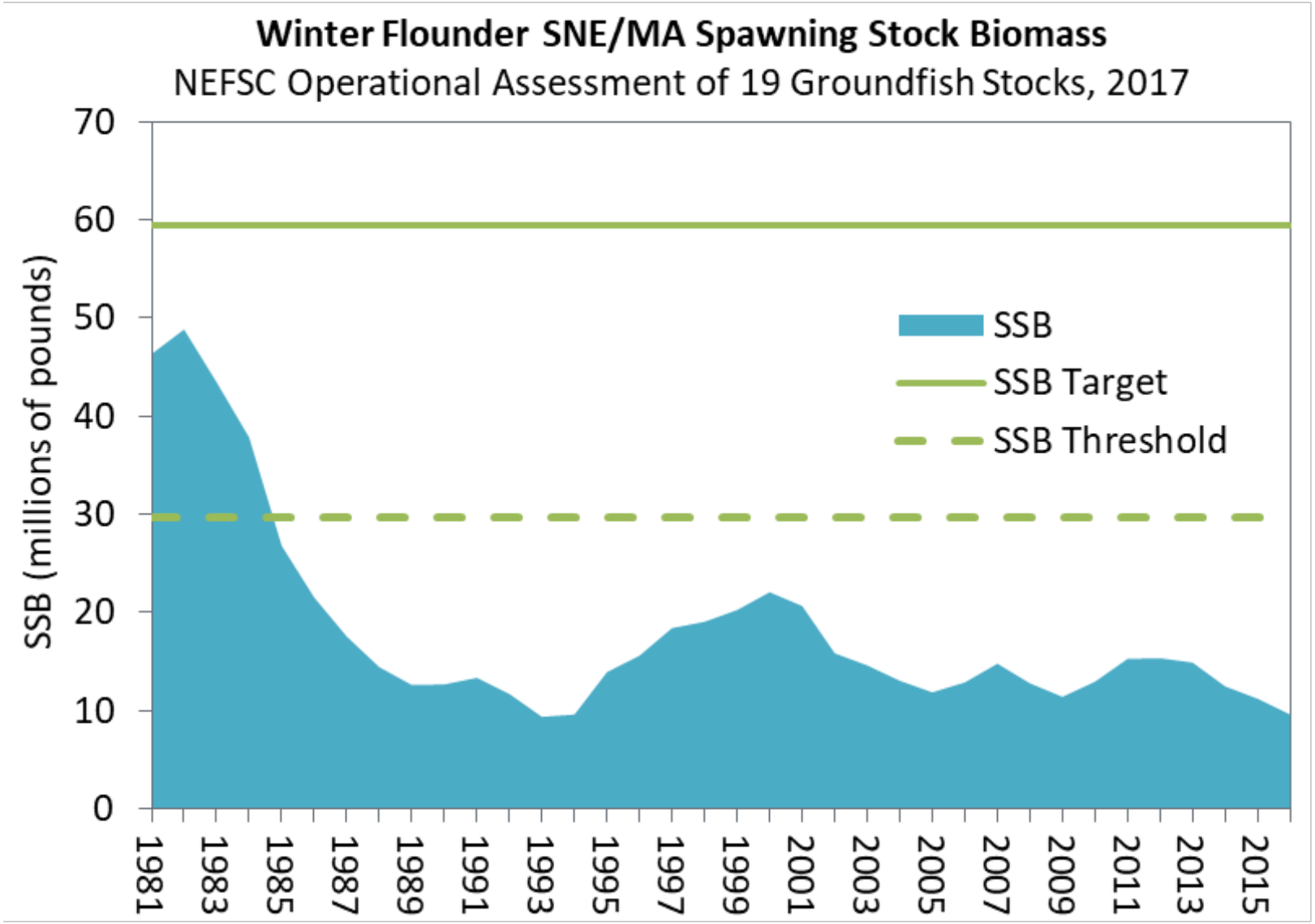
Depleted Species

- American Eel
- American Lobster (SNE)
- American Shad
- Atlantic Herring
- Atlantic Sturgeon
- Horseshoe Crab (New York)
- Striped Bass
- Northern Shrimp
- River Herring
- Tautog (LIS, NJ/NY Bight, DelMarVa)
- Weakfish
- Winter Flounder (SNE/MA)

River Herring



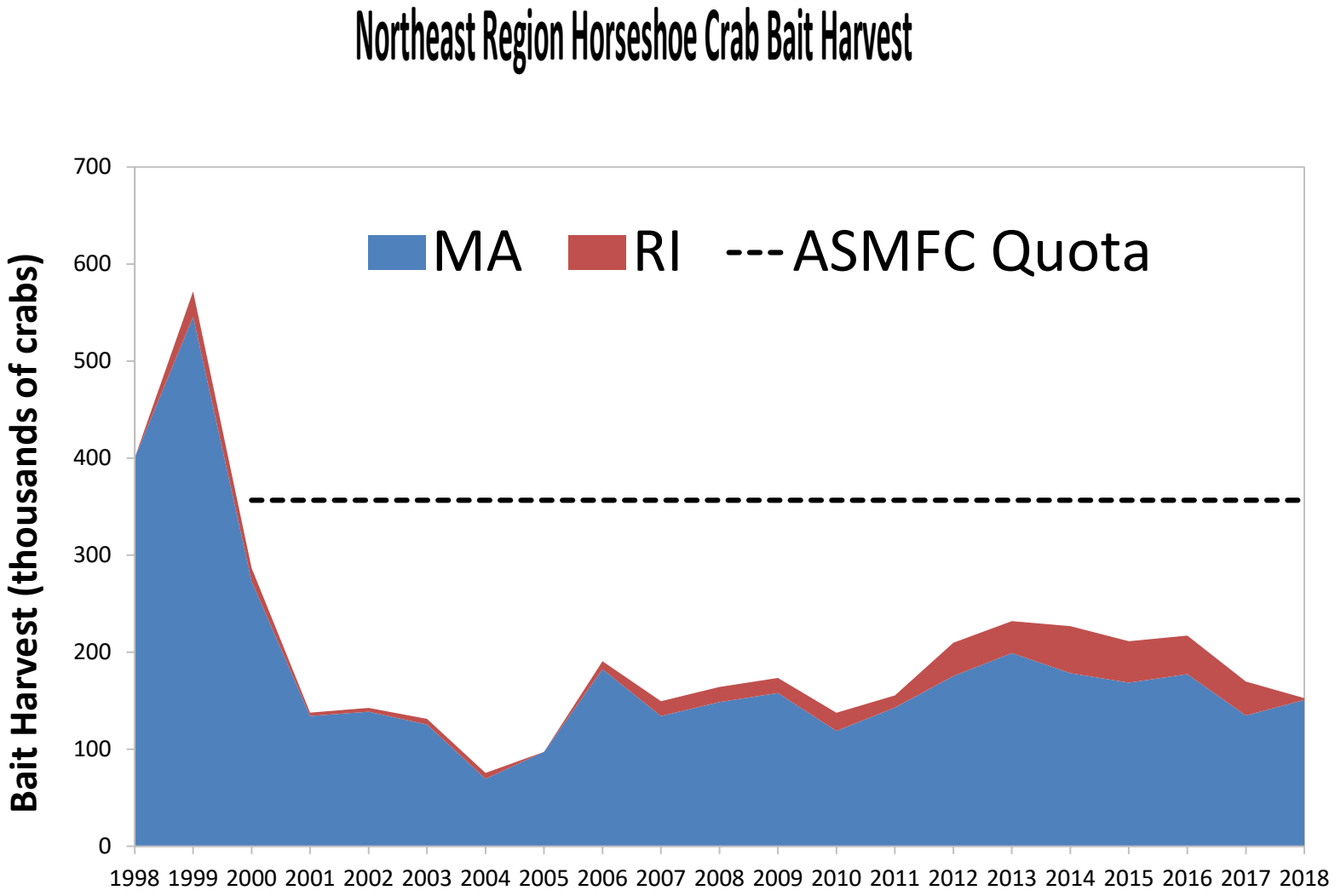
Winter Flounder SNE/MA



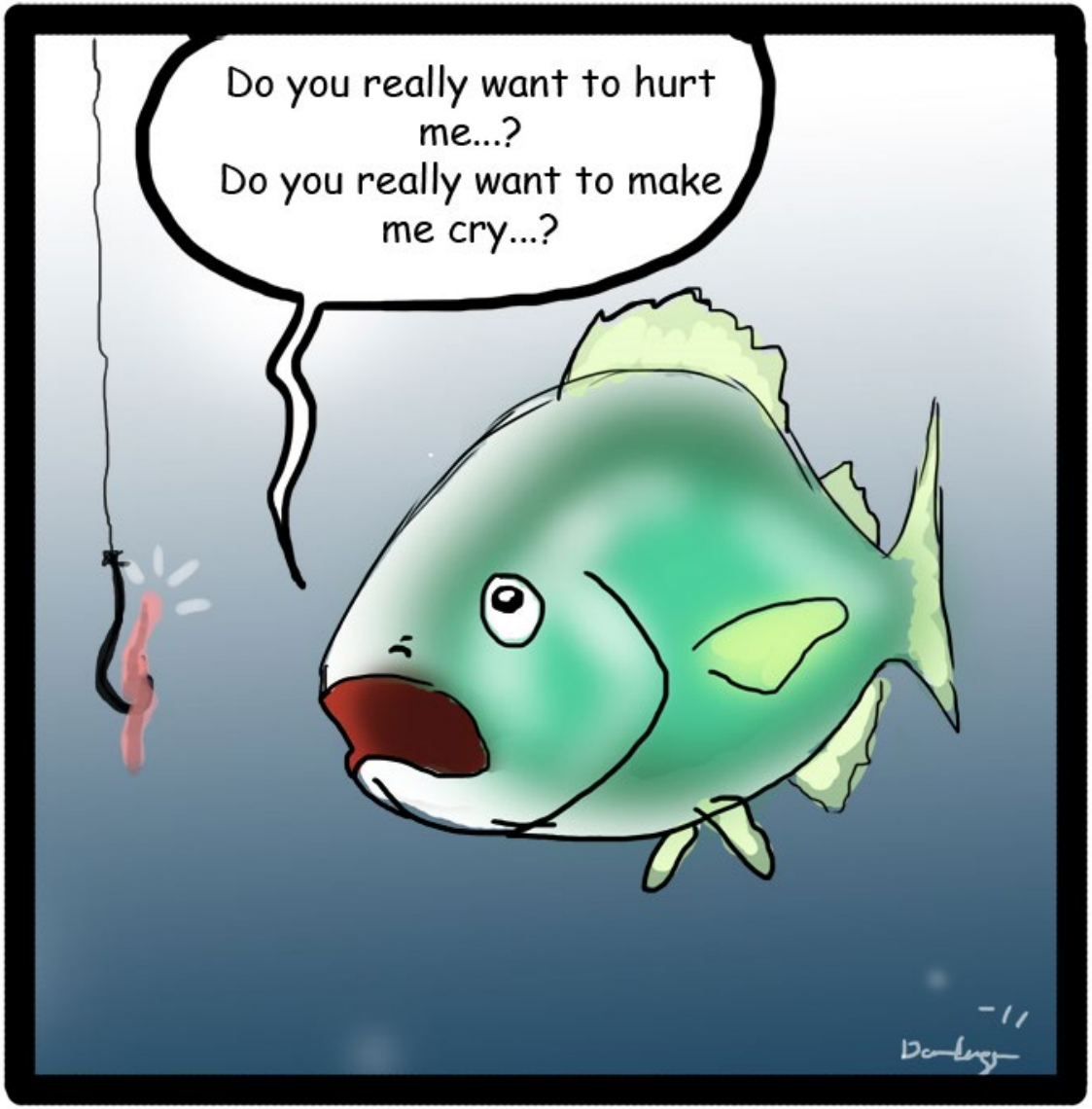
Unknown Species

- Atlantic Croaker
- Horseshoe Crab (New England)
- Jonah Crab
- Spot
- Spotted Seatrout

Horseshoe Crab (NE)



Questions?



Stock Status

Depleted	Reflects low levels of abundance though it is unclear whether fishing mortality is the primary cause for reduced stock size
Overfished	Occurs when stock biomass falls below the threshold established by the FMP, impacting the stock's reproductive capacity to replace fish removed through harvest, and that decline is driven primarily by fishing mortality.
Overfishing	Removing fish from a population at a rate that exceeds the target established in the FMP, impacting the stock's reproductive capacity to replace fish removed through harvest.
Recovering/Rebuilding	Stocks exhibit stable or increasing trends. Stock biomass is between the threshold and the target level established by the FMP.
Rebuilt/ Sustainable	Stock biomass is equal to or above the biomass level established by the FMP to ensure population sustainability. When between benchmark assessments, a stock can still be considered rebuilt/sustainable if it drops below the target but remains above the threshold.
Unknown	There is no accepted stock assessment model to estimate the stock status.

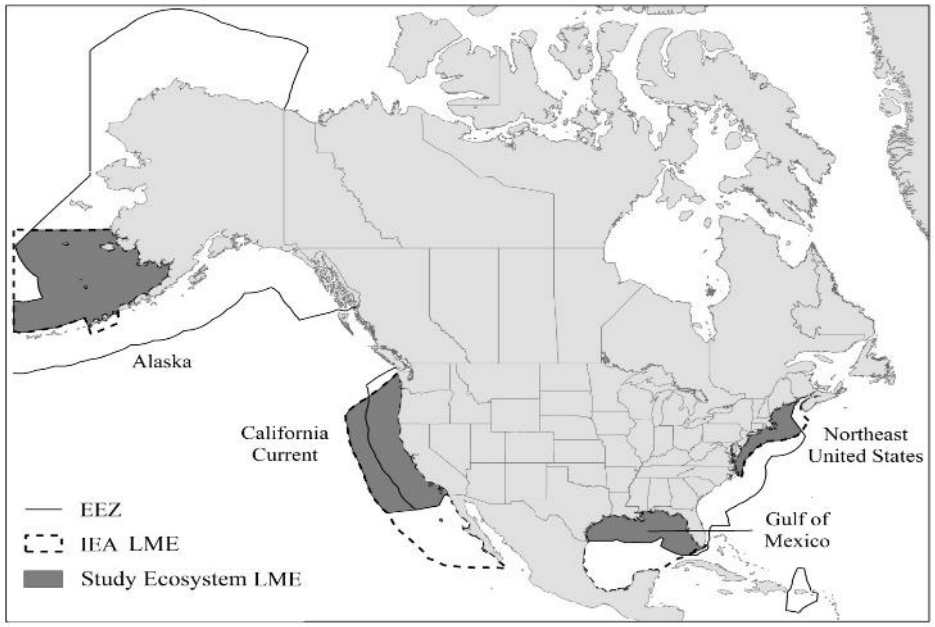
Development of an Ecosystem Status Report and Climate Vulnerability Assessment for southeastern US Atlantic waters

Kevin Craig, Todd Kellison, Mike Burton
NMFS / SEFSC / Beaufort, NC

October 2019

Ecosystem Status Reports

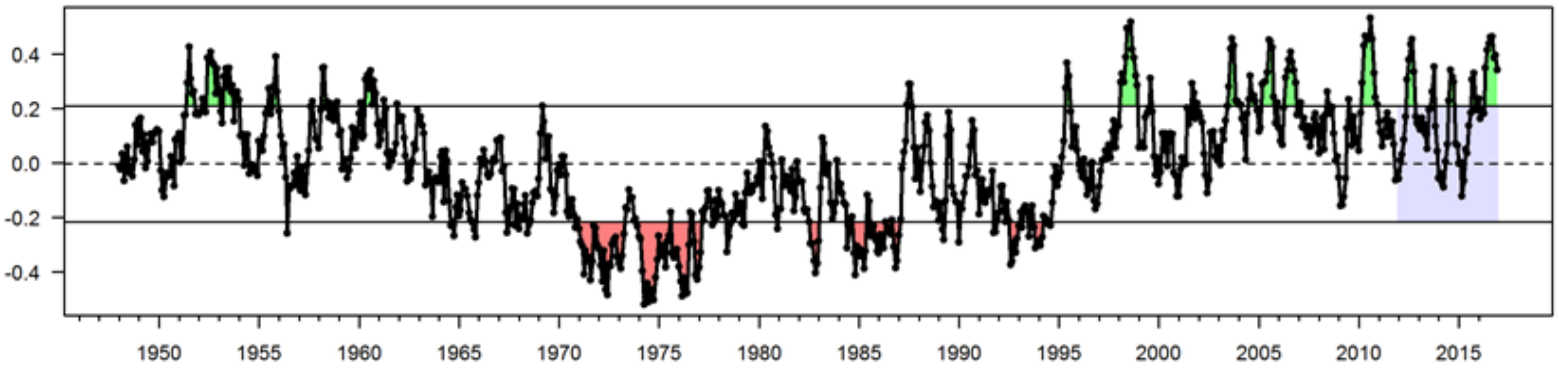
- Defined and directed for all NMFS regions under NMFS EBFM Policy and Road Map
- Intended for use by Fishery Management Councils, other management bodies, and updated periodically
- Developed for California Current, Bering Sea/Gulf of Alaska, Northeast shelf, Hawaii, Gulf of Mexico



Ecosystem Status Reports

- Provide trends over time in multiple ecosystem components (i.e., indicators)
- Typically, components included are regional in spatial scale and have annual (or sub-annual) values in terms of time scale
- How have ecosystem components changed over time, and are they interrelated?

Atlantic Multidecadal Oscillation (AMO)



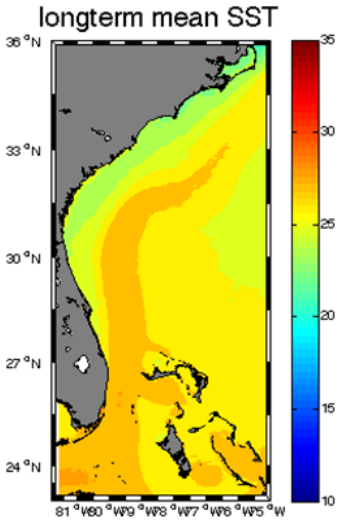
Typical Indicator Categories

- Climate
- Physical/chemical
- Habitat
- Lower trophic levels
- Upper trophic levels
- Fishery indicators
- Human dimensions

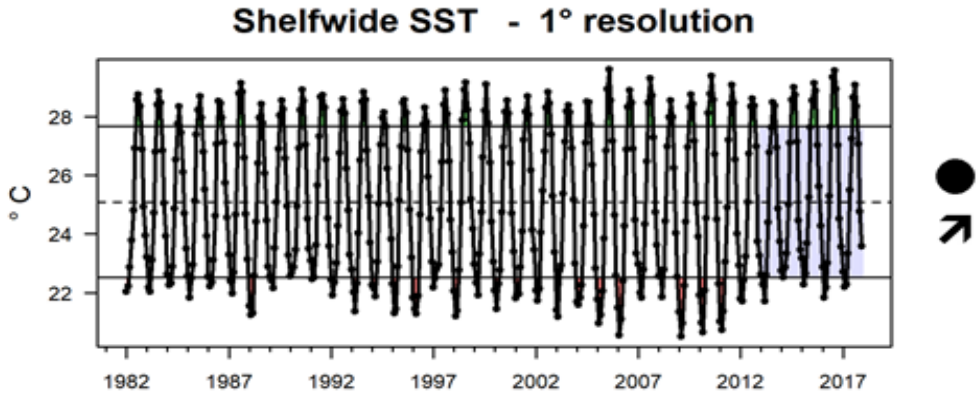
Sea Surface Temperature
Bottom Temperature
Florida Current Transport
Gulf Stream Transport/Position
River Flow
Nutrient Loading
Precipitation and Drought
Sea Level Rise
Storms and Hurricanes
Ocean Acidification

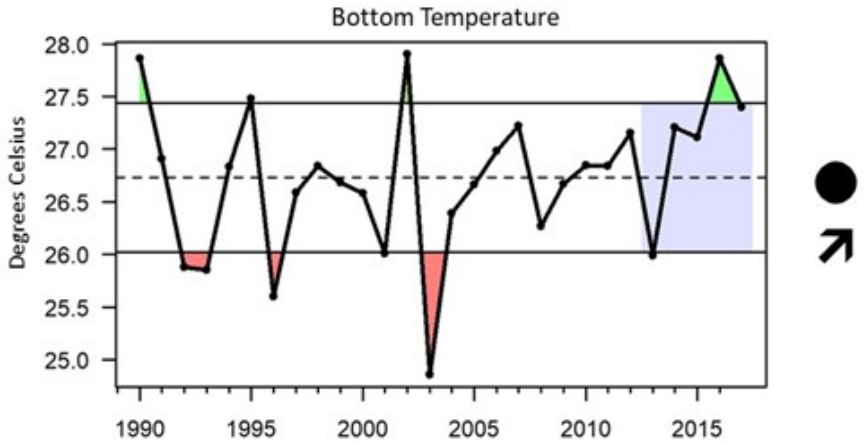
Human population
Population density
Coastal urban land use
Total ocean economy
Social connectedness
Commercial and recreational fishing engagement

Example: temperature



Data from NOAA Reynolds OI SST

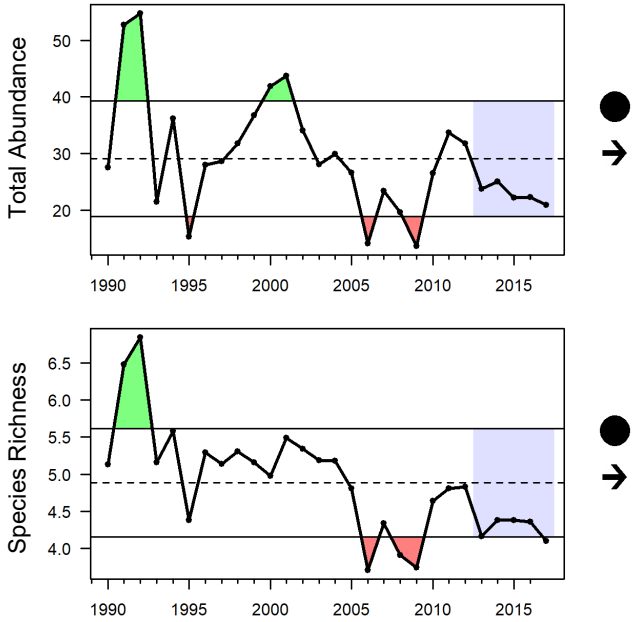




- Relatively stable temperatures over past few decades
- Some indication of increasing sea surface temperature over the last ~ 5 years
- Driven by winter temperatures--rarely below 22°C over last 5 years
- Greater than average bottom temperatures for most years since 2005

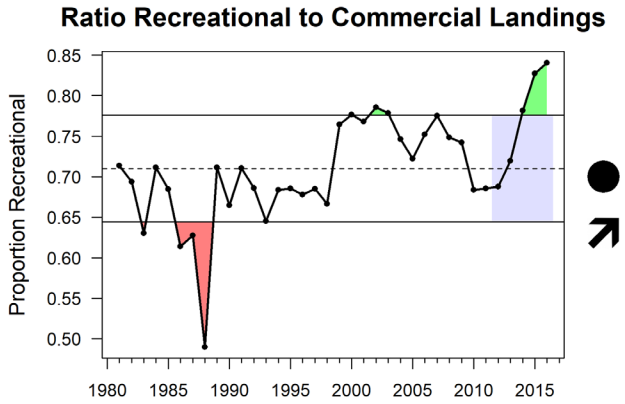
Example: Fishery Indicators

Declines in hard-bottom fishes



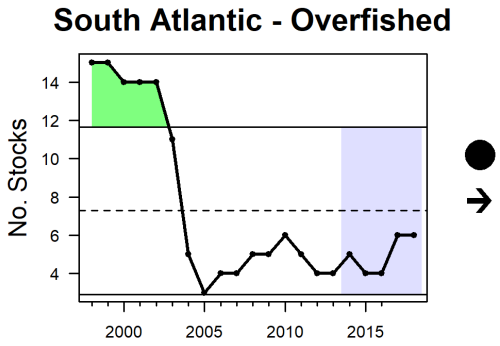
Bacheler & Smart (2016)

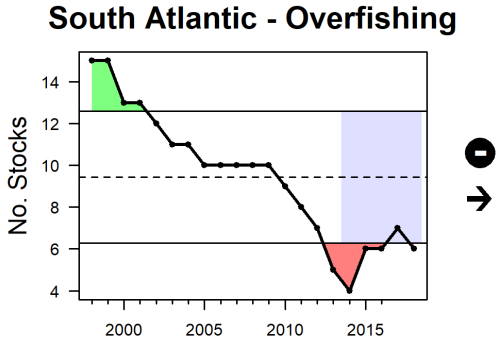
Changing South Atlantic fisheries



Shertzer et al. (2019)

Overfished & overfishing



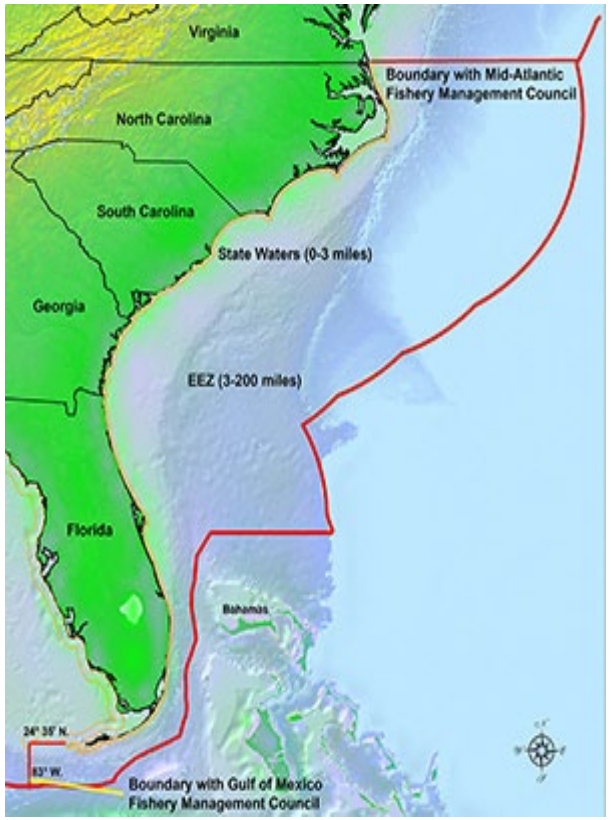


End of 2018:

- 29% overfishing
- 21% overfished
- 37.5% overfishing or overfished

Next Steps

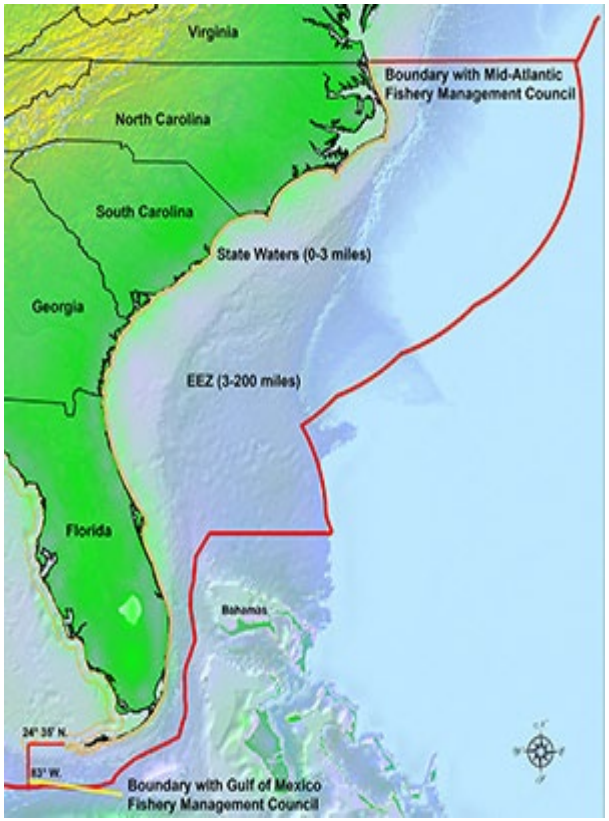
- Complete compilation of time series
- Data synthesis and interpretation
- Goal: draft report completed in 2019 / early 2020
- Reviews and feedback in 2020
  - Southeast Fisheries Science Center (SEFSC)
  - South Atlantic Fishery Management Council (SAFMC)
  - SAFMC Science and Statistics Committee (SSC)
  - NMFS National ESR working group
  - Other partners (SECART, SECOORA, state agencies)
- Finalize report and update at regular intervals



South Atlantic Ecosystem Status Report

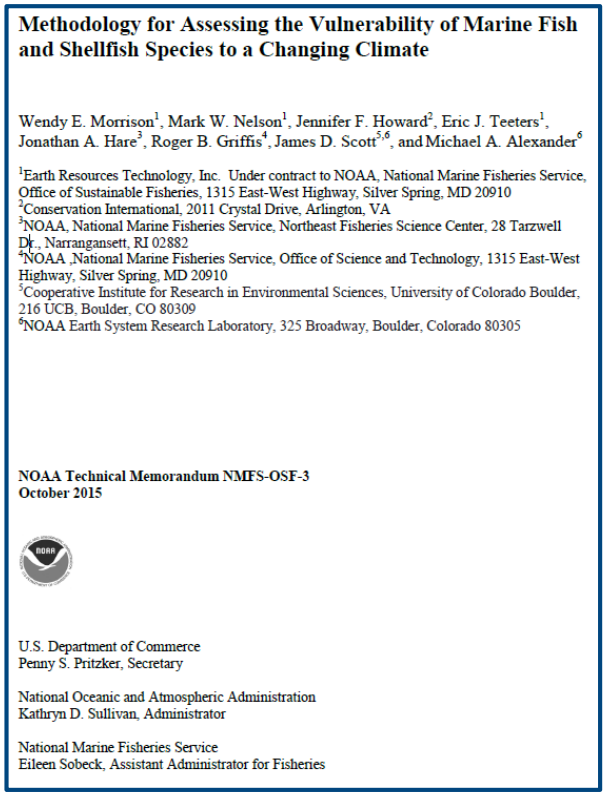
Contributors

- SEFSC (Beaufort, Miami, Pascagoula Labs)
- NOS (Beaufort, Charleston)
- NOAA/OAR/AOML
- National Center for Atmospheric Research
- USGS
- ACCSP
- FL-FWC, GA-DNR, SC-DNR, NC Wildlife Resources Commission
- U. Delaware, Duke, UNC, NCSU



Climate Vulnerability Assessment

- Tool to determine the likelihood that species' abundance, productivity or distribution will be affected by a changing climate
- Priority under the NMFS National Climate Science Strategy, South Atlantic Climate Science Regional Action Plan and South Atlantic EBFM Implementation Plan
- Morrison et al. 2015. Methodology for Assessing the Vulnerability of Marine Fish and Shellfish Species to a Changing Climate. NOAA Tech Memo.
- Completed or underway for all NMFS regions



Methodology for Assessing the Vulnerability of Marine Fish and Shellfish Species to a Changing Climate

Wendy E. Morrison[1], Mark W. Nelson[1], Jennifer F. Howard[2], Eric J. Teeters[1], Jonathan A. Hare[3], Roger B. Griffis[4], James D. Scott[5,6], and Michael A. Alexander[6]

[1]Earth Resources Technology, Inc. Under contract to NOAA, National Marine Fisheries Service, Office of Sustainable Fisheries, 1315 East-West Highway, Silver Spring, MD 20910
[2]Conservation International, 2011 Crystal Drive, Arlington, VA
[3]NOAA, National Marine Fisheries Service, Northeast Fisheries Science Center, 28 Tarzwell Dr., Narrangansett, RI 02882
[4]NOAA ,National Marine Fisheries Service, Office of Science and Technology, 1315 East-West Highway, Silver Spring, MD 20910
[5]Cooperative Institute for Research in Environmental Sciences, University of Colorado Boulder, 216 UCB, Boulder, CO 80309
[6]NOAA Earth System Research Laboratory, 325 Broadway, Boulder, Colorado 80305

NOAA Technical Memorandum NMFS-OSF-3
October 2015

U.S. Department of Commerce
Penny S. Pritzker, Secretary

National Oceanic and Atmospheric Administration
Kathryn D. Sullivan, Administrator

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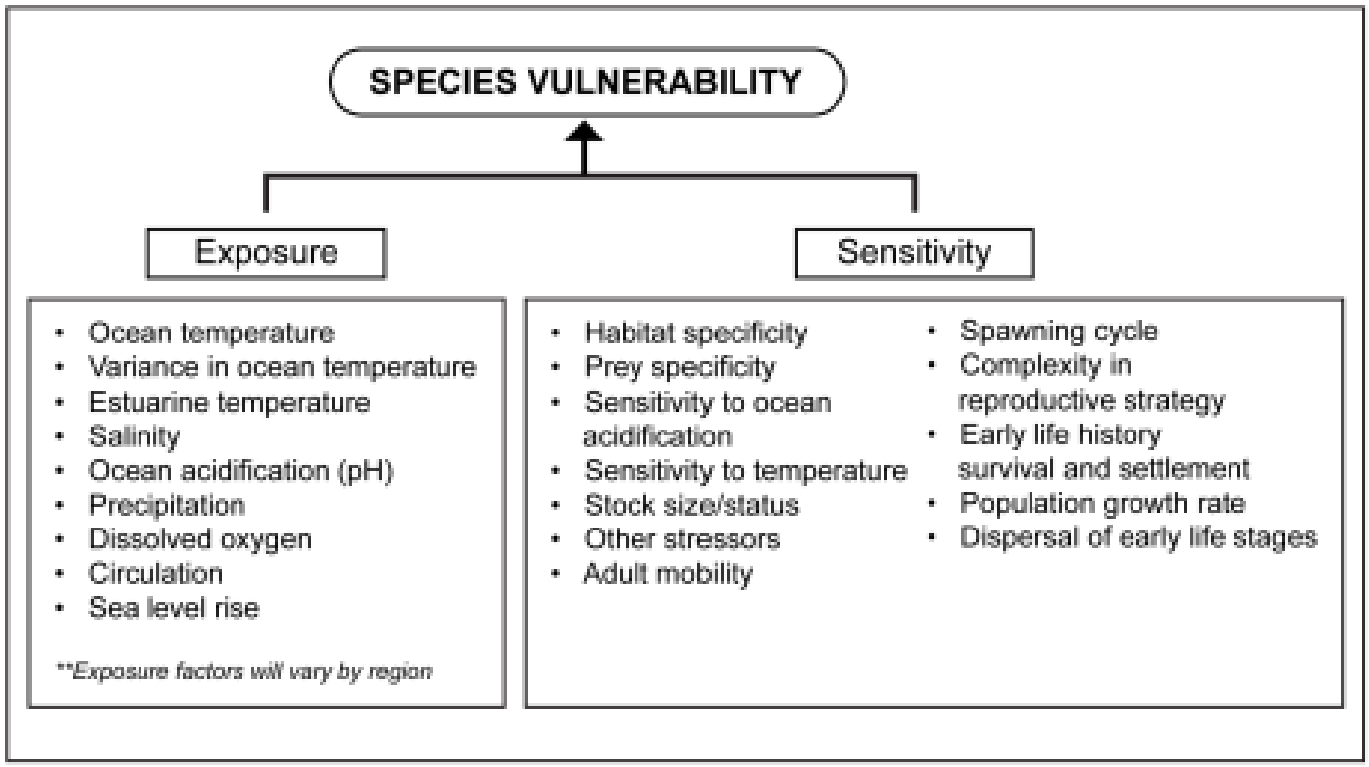
Eileen Sobeck, Assistant Administrator for Fisheries

Climate Vulnerability Assessment

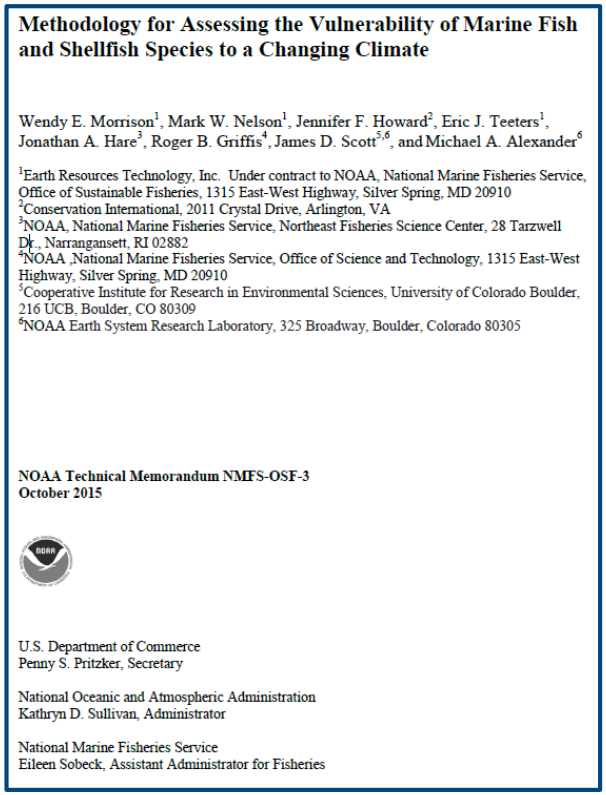


Morrison et al. 2015

Steps in the CVA process

1. Identify species (N = 69) and compile detailed species-specific information (species profiles)

    - Snappers
    - Groupers
    - Other reef fishes
    - Sharks
    - Coastal nearshore species
    - Coastal pelagics
    - Anadromous species
    - Invertebrates
    - Biomass / forage species
    - Lionfish



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Steps in the CVA process

1. Identify species (N = 69) and compile detailed species-specific information (species profiles)

ASMFC species

American eel	Black drum	Spotted seatrout
American shad	Bluefish	Striped bass
Atlantic croaker	Cobia	Weakfish
Atlantic menhaden	Horeshoe crab	Dusky shark
Atlantic sharpnose shark	Red drum	Sand tiger shark
Atlantic sturgeon	Spanish mackerel;	Sandbar shark
Black sea bass	Spot	Spiny dogfish

Steps in the CVA process

2. Assess species-specific sensitivity to climate change across a suite of life-history characteristics (sensitivity attributes)

- Complexity in Reproduction
- Spawning Cycle Specifics
- Dispersal of Early Life Stages
- Early Life History Survival and Settlement Requirements
- Habitat Specificity
- Prey Specificity
- Adult Mobility
- pH preferences
- Thermal preferences
- Population Growth Rate
- Stock Size/Status
- Other stressors (e.g., HABs, invasive species)

Steps in the CVA process

2. Assess species-specific sensitivity to climate change across a suite of life-history characteristics (sensitivity attributes)

Contributors

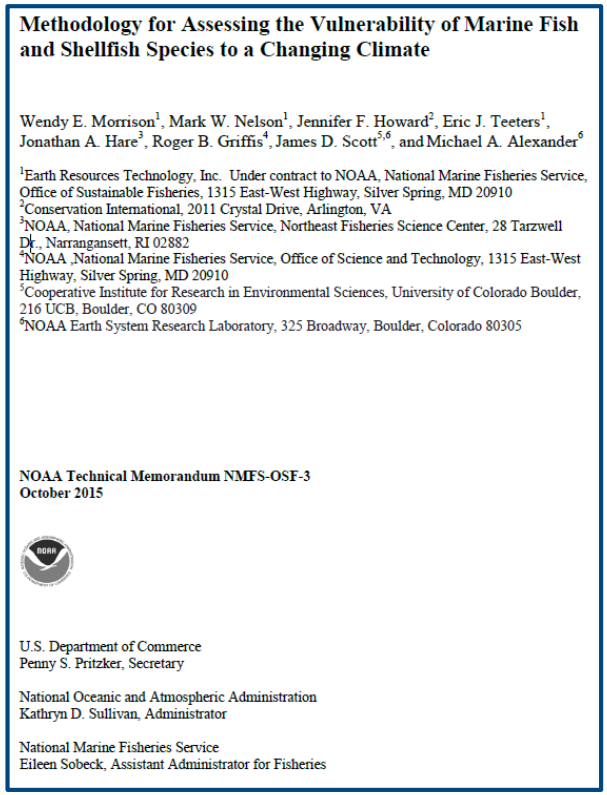
- NOAA Beaufort Laboratory
- South Atlantic Fishery Management Council
- Atlantic States Marine Fisheries Commission
- North Carolina Division of Marine Fisheries
- South Carolina Dept. Natural Resources
- Georgia Department of Natural Resources
- Florida Fish and Wildlife Commission
- Academic partners
- Retired experts (Laney, Sedberry, Smith)

Steps in the CVA process

3. Compile time series of potential physical and biological drivers ("exposure factors")

- SST
- Air temperature
- Salinity
- pH (ocean acidification)
- Productivity
- Precipitation
- Currents / upwelling - qualitative
- Sea level rise – qualitative

Assess "exposure" of each species to each exposure factor (i.e., degree to which species will experience change in that factor).



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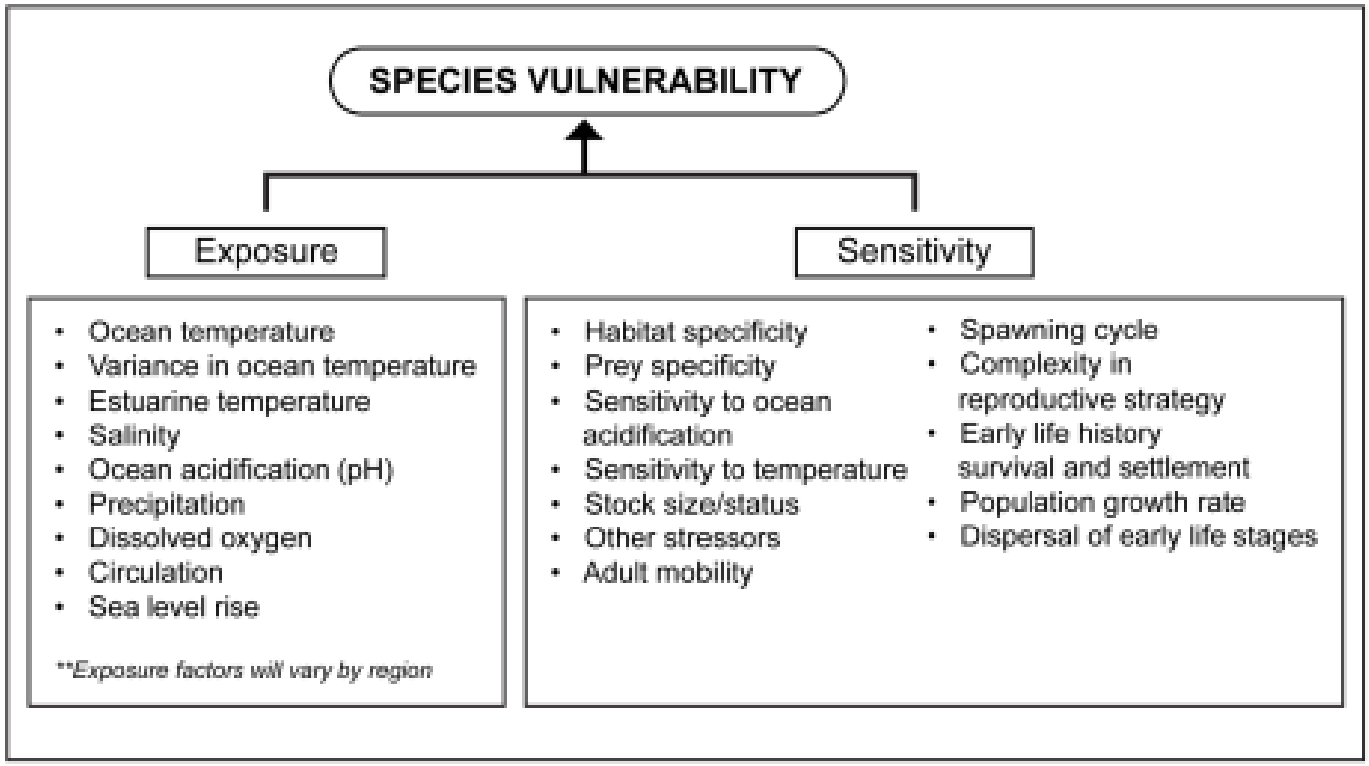
Steps in the CVA process

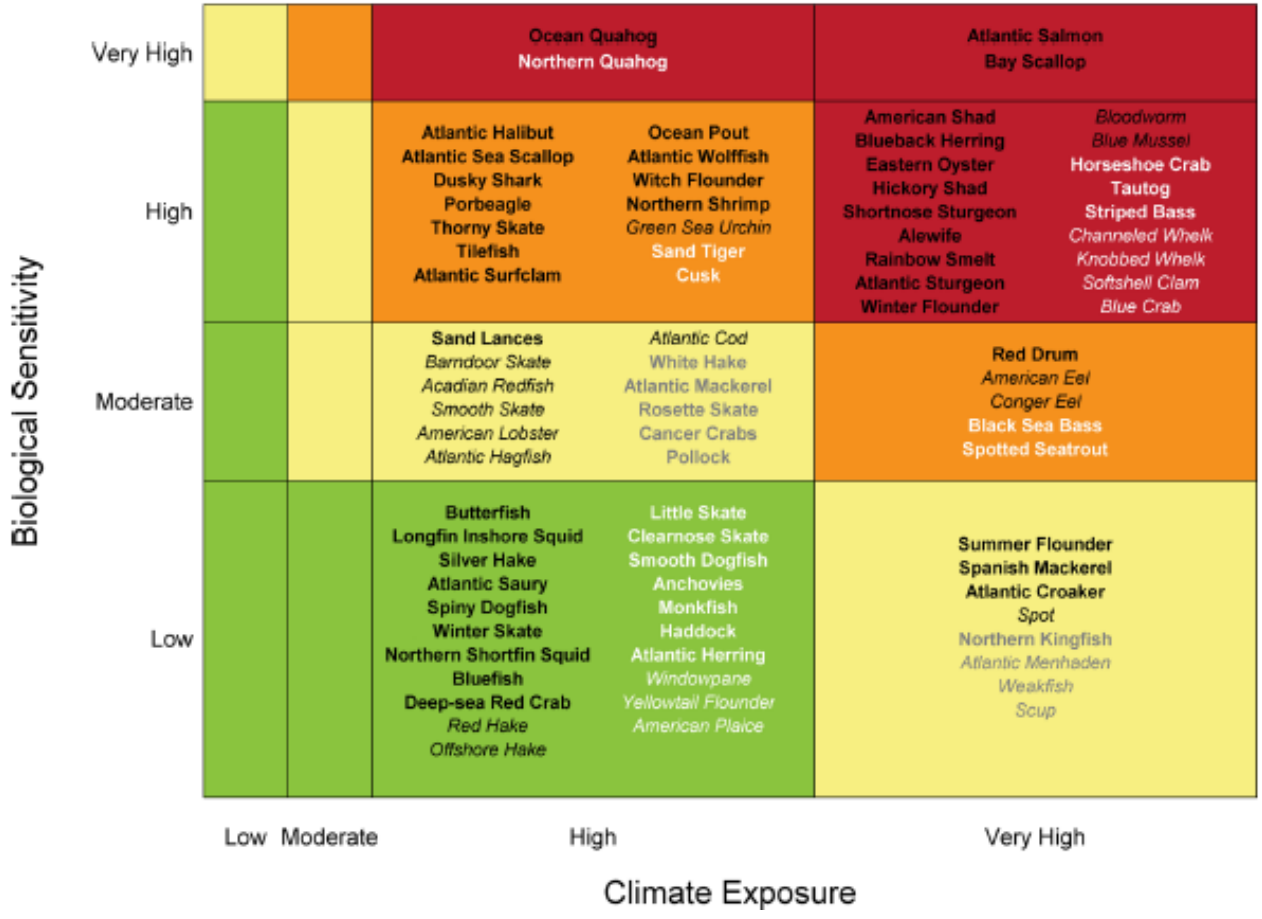
4. For each species, determine overall vulnerability and potential for distribution shifts



Morrison et al. 2015

Steps in the CVA process

4. For each species, determine overall vulnerability and potential for distribution shifts



Hare et al. 2016

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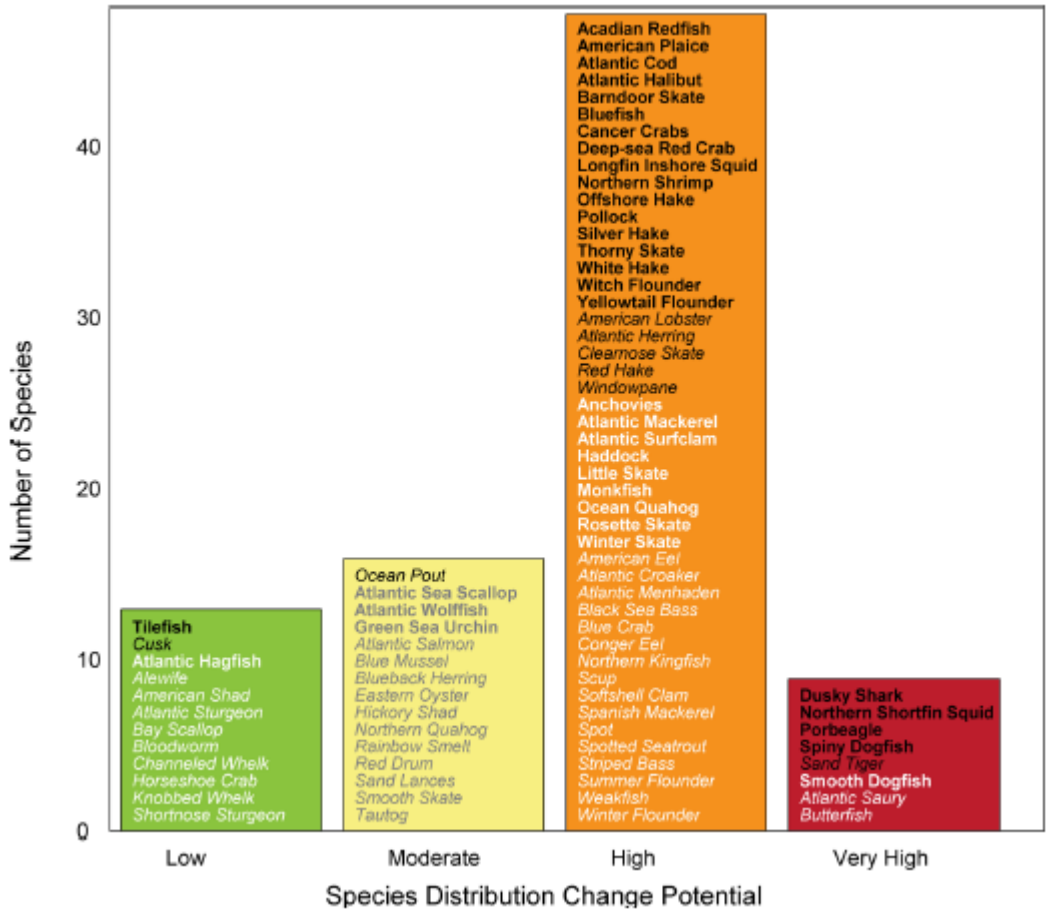
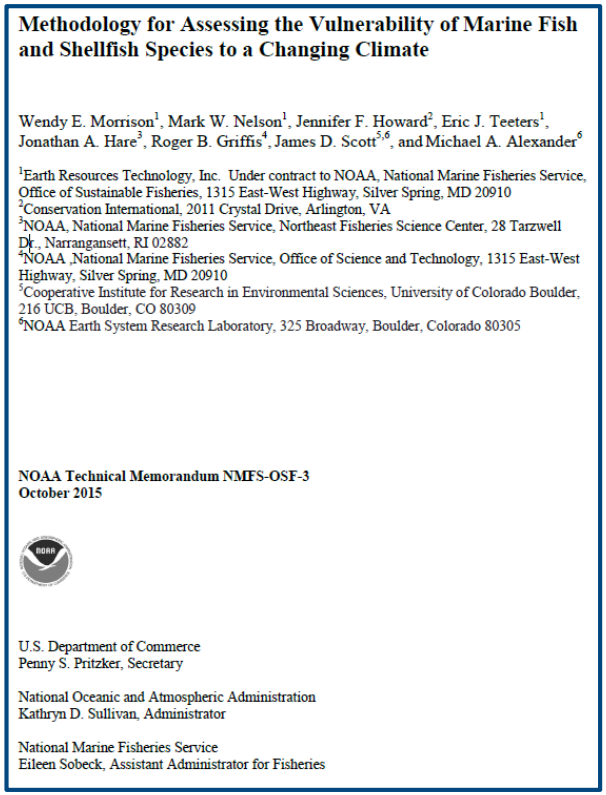


Hare et al. 2016

Timeline

- Identify species (n = 69)
- Complete species profiles
- Expert scoring of species' sensitivity
- Select exposure factors and compile related data
- Data analysis and vulnerability assessment
- Final report - 2020



Methodology for Assessing the Vulnerability of Marine Fish and Shellfish Species to a Changing Climate

Wendy E. Morrison[1], Mark W. Nelson[1], Jennifer F. Howard[2], Eric J. Teeters[1], Jonathan A. Hare[3], Roger B. Griffis[4], James D. Scott[5,6], and Michael A. Alexander[6]

[1]Earth Resources Technology, Inc. Under contract to NOAA, National Marine Fisheries Service, Office of Sustainable Fisheries, 1315 East-West Highway, Silver Spring, MD 20910
[2]Conservation International, 2011 Crystal Drive, Arlington, VA
[3]NOAA, National Marine Fisheries Service, Northeast Fisheries Science Center, 28 Tarzwell Dr., Narrangansett, RI 02882
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[5]Cooperative Institute for Research in Environmental Sciences, University of Colorado Boulder, 216 UCB, Boulder, CO 80309
[6]NOAA Earth System Research Laboratory, 325 Broadway, Boulder, Colorado 80305

NOAA Technical Memorandum NMFS-OSF-3
October 2015

U.S. Department of Commerce
Penny S. Pritzker, Secretary

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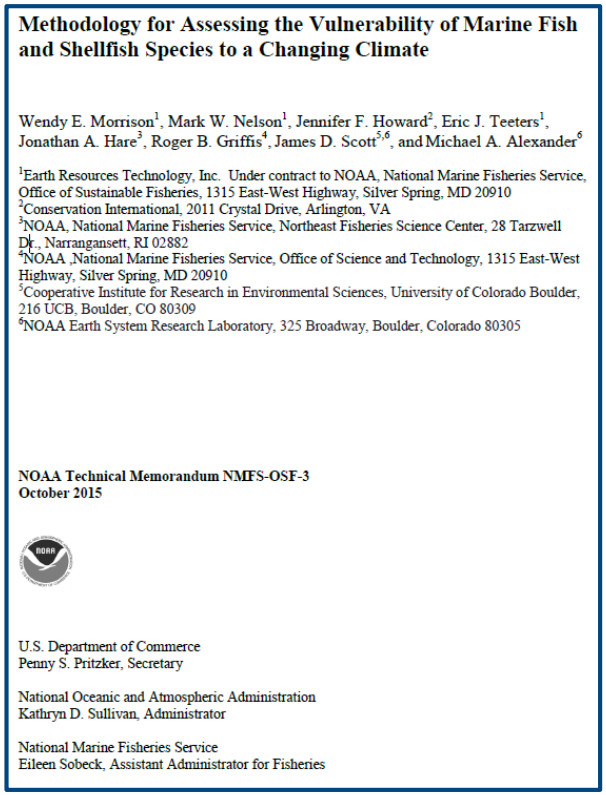

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Thank you!

Questions?

Management Strategy Evaluation: An Overview

Gavin Fay, University of Massachusetts Dartmouth

Jason McNamee, RI DEM Division of Marine Fisheries

Email: Jason.mcnamee@dem.ri.gov
gfay@umassd.edu

Overview

- Description of Management Strategy Evaluation (MSE)
- Highlight existing MSE's that intersect with the ASMFC
- Discussion on potential MSE candidates for ASMFC

Background

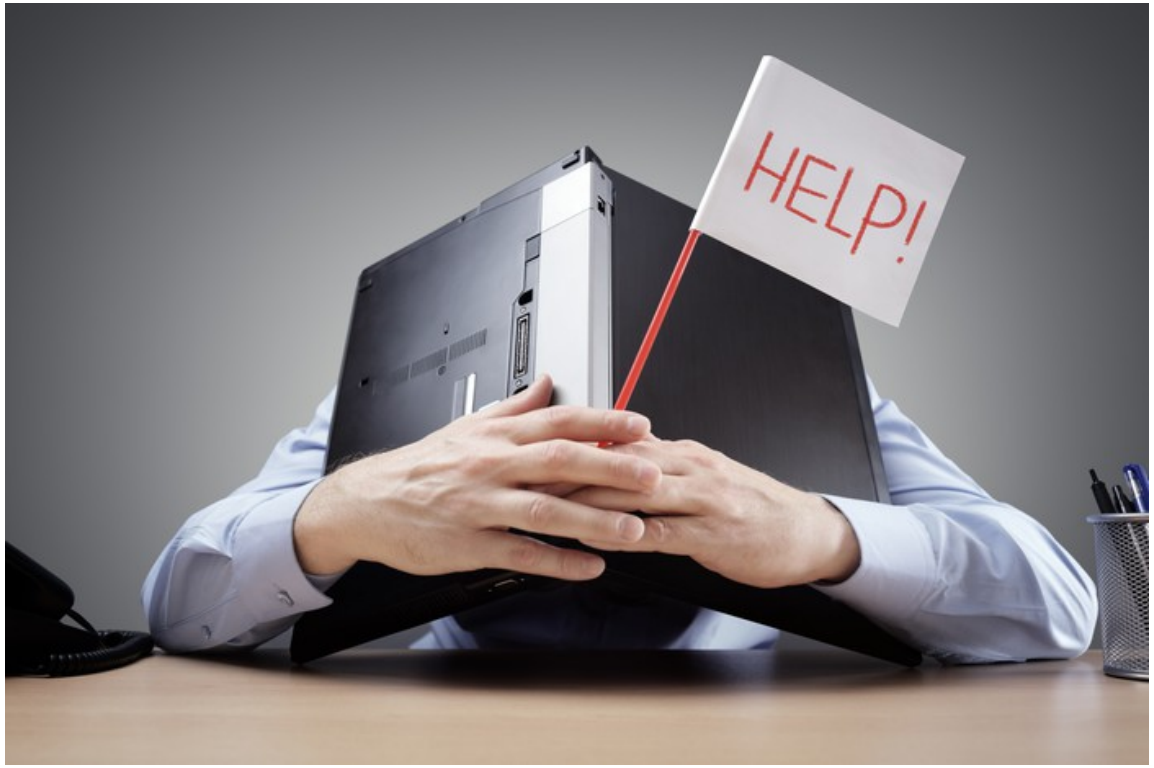
The ASMFC management process generally follows the existing format:

- Assessment
- Technical Committee review of the assessment
- Board acceptance/rejection of the assessment and initiation of management action if warranted
- Technical review of any proposed management
- Management Board action

Background

The TC review of the management action is usually limited to analysis of data used and mathematical rigor of the approach

- Often followed by pages of caveats about potential outcomes that may not meet objectives
- Often the objectives attempting to be achieved are unclear



Approach

- MSE is a **decision support framework** to understand how choices used for management can be expected to perform when actually applied, in terms of how choices meet (or do not) meet specified management objectives.

- MSE is used to **compare** the **likely relative performance** of current and potential alternative management approaches for the fishery being considered, and **assess robustness** of approaches to uncertainty.

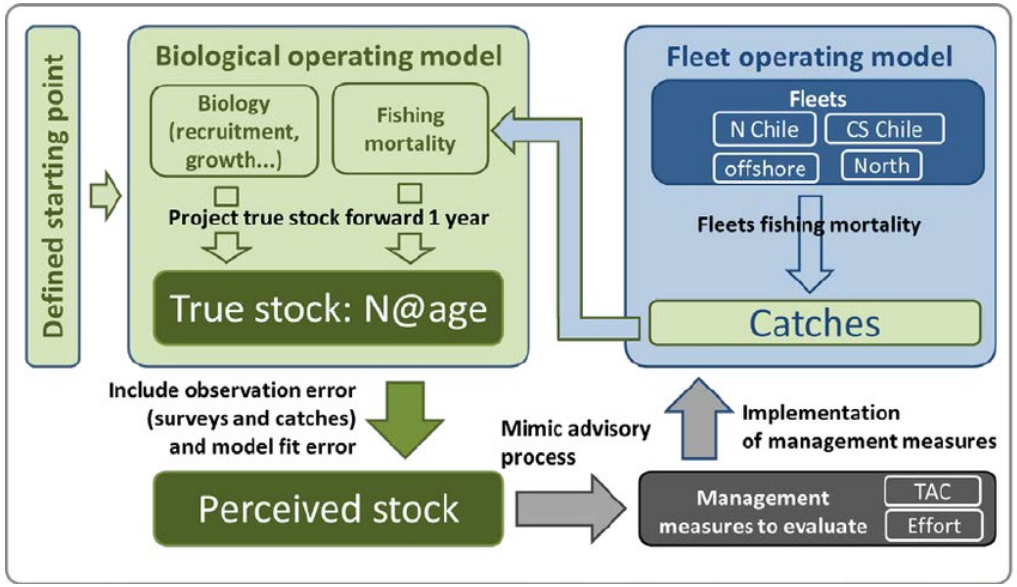
- Really the only method we have for making choices about decisions in a formal structured way.

Management Strategy Evaluation

Process for:

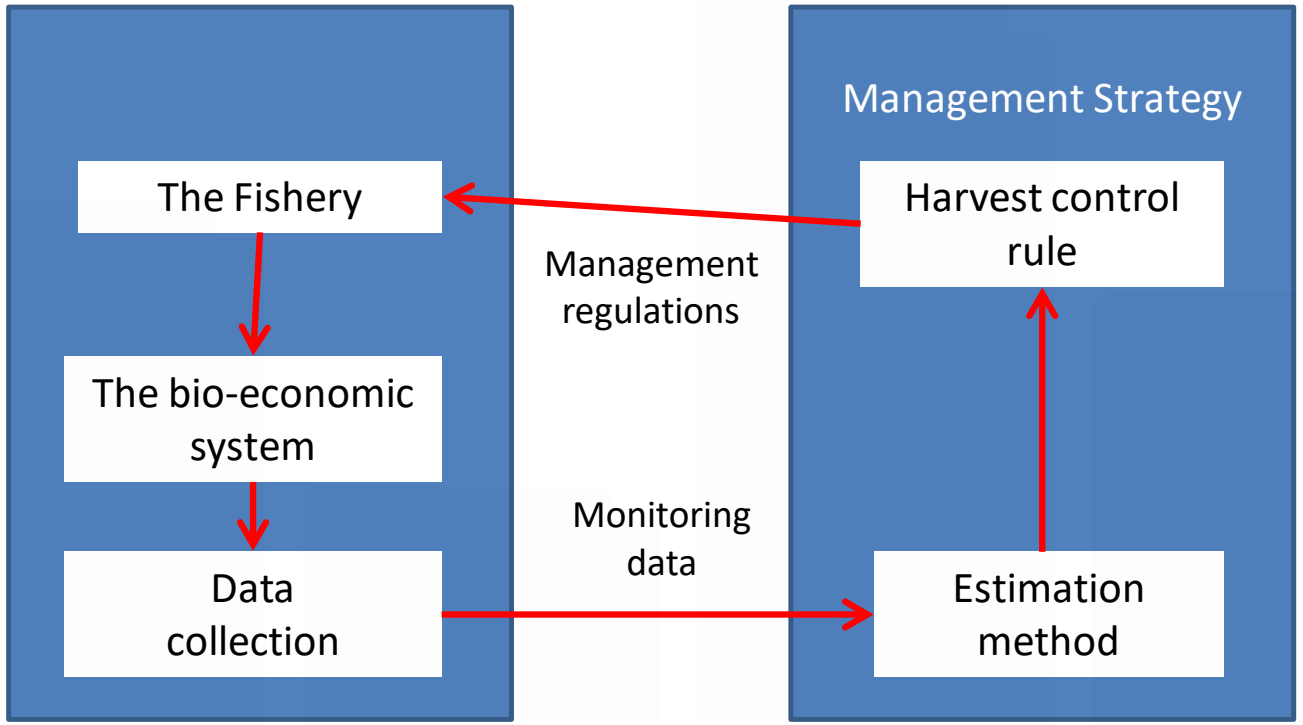
- Comparing the performance of management strategies under multiple (& often conflicting) management objectives
- Examining impacts, tradeoffs, & robustness of management strategies

Can allow for error in implementation of management actions, associated with uncertain or unforeseen responses by resource users to changes in management measures



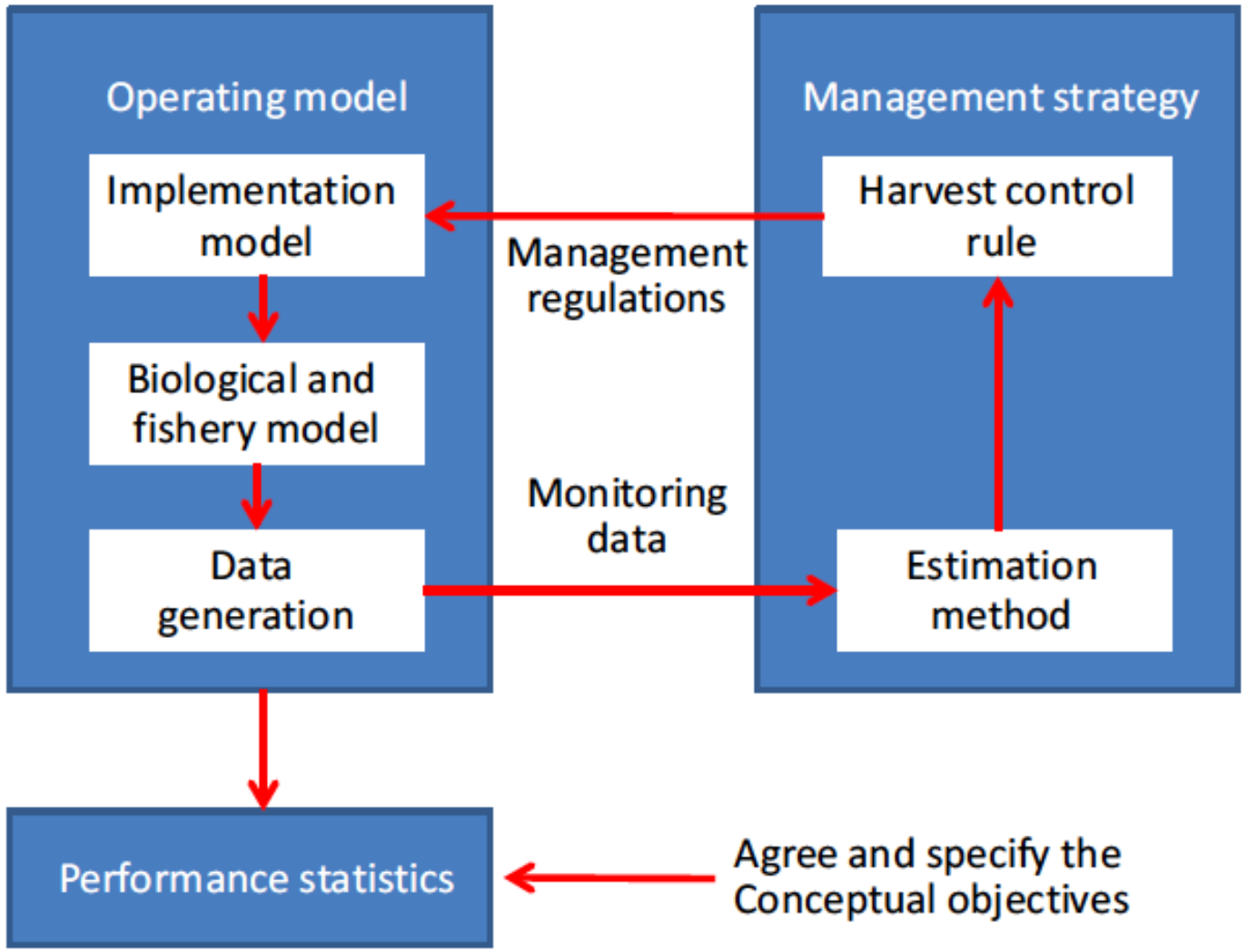
Hintzen, Niels & Corten, Ad & Gerlotto, F. & Habasque, Jeremie & Bertrand, Arnaud & Lehodey, P. & Brunel, Thomas & Dragon, A.C. & Senina, Inna. (2014). Hydrography and Jack mackerel stock in the South Pacific - Final report.

Management Conceptually



Punt et al. 2016. Fish. & Fish.

Management Strategy Evaluation



Why do MSEs?

- Evaluate full management cycle
- Compare relative effectiveness of management strategies for **achieving multiple management objectives**, and to quantify tradeoffs
- Identify sensitivity of management performance to system drivers and key uncertainty
- Pathway for formal decision analysis
- Play out ‘what if’ scenarios when
  - Truth is known
  - No real negative consequences of poor options

MSE components

- The **operating model** (OM) represents the 'truth' for the simulations, and characterizes the dynamics of the fishery.
  - Often (but not always) 'conditioned' on available data to reflect life history and dynamics of the species/stock of interest.
- An **observation model generates data** from the OM to represent the monitoring that would be available for providing scientific advice to support management decision (e.g. data fit to in a stock assessment).
- Observations are used by a **management procedure** that consists of **an estimation method** (stock assessment) and **a rule that translates the results to (say) catch advice** (e.g. Harvest Control Rule).
- Importantly, the advice is implemented in the OM and **dynamics are updated to reflect the consequences of management decisions**.
- After decisions have been implemented several times, the OM is queried using **performance metrics** that map to objectives.

MSE: Best Practices

- MSEs should have certain characteristics (cf Punt et al. 2016):
  - Identification of the management objectives;
  - Identification of a broad range of uncertainties to which the management strategy should be robust;
  - Development of a set of operating models which provide a mathematical representation of the system to be managed;
  - Selection of OM parameters and quantifying parameter uncertainty;
  - Identification of candidate management strategies;
  - Simulation of application of each strategy for each OM; and
  - Summary and interpretation of the performance statistics;
- The extent of these depend on the question and how decision-making wishes to be informed.

Existing ASMFC MSEs

- ASMFC has species that have undergone MSE type approaches
- Black sea bass was undergoing management difficulties
- MAFMC underwent a benchmark process, but in the lead up, a “Data Limited” MSE was used to help add some more dynamics in to the management
  - Implemented in the DLMToolkit https://www.datalimitedtoolkit.org/

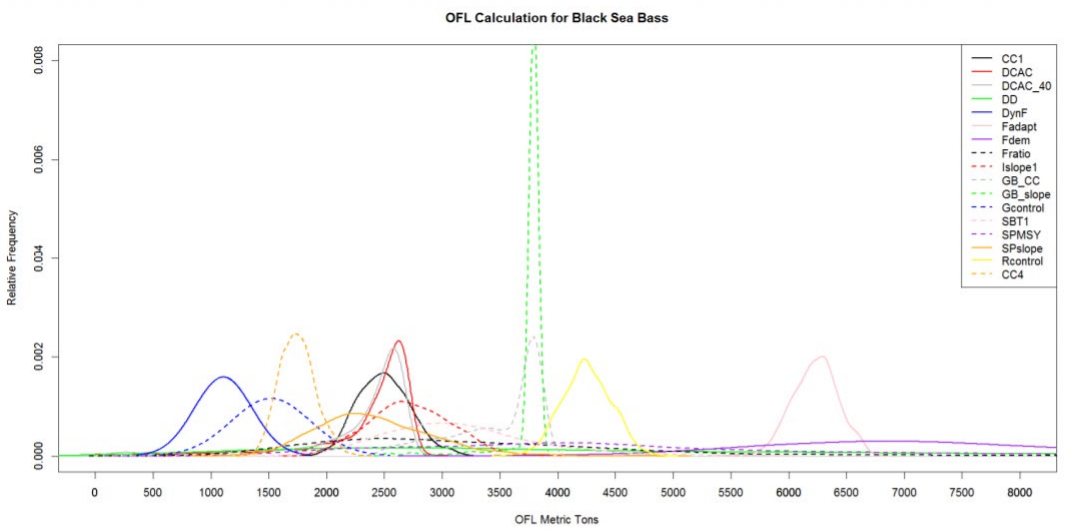
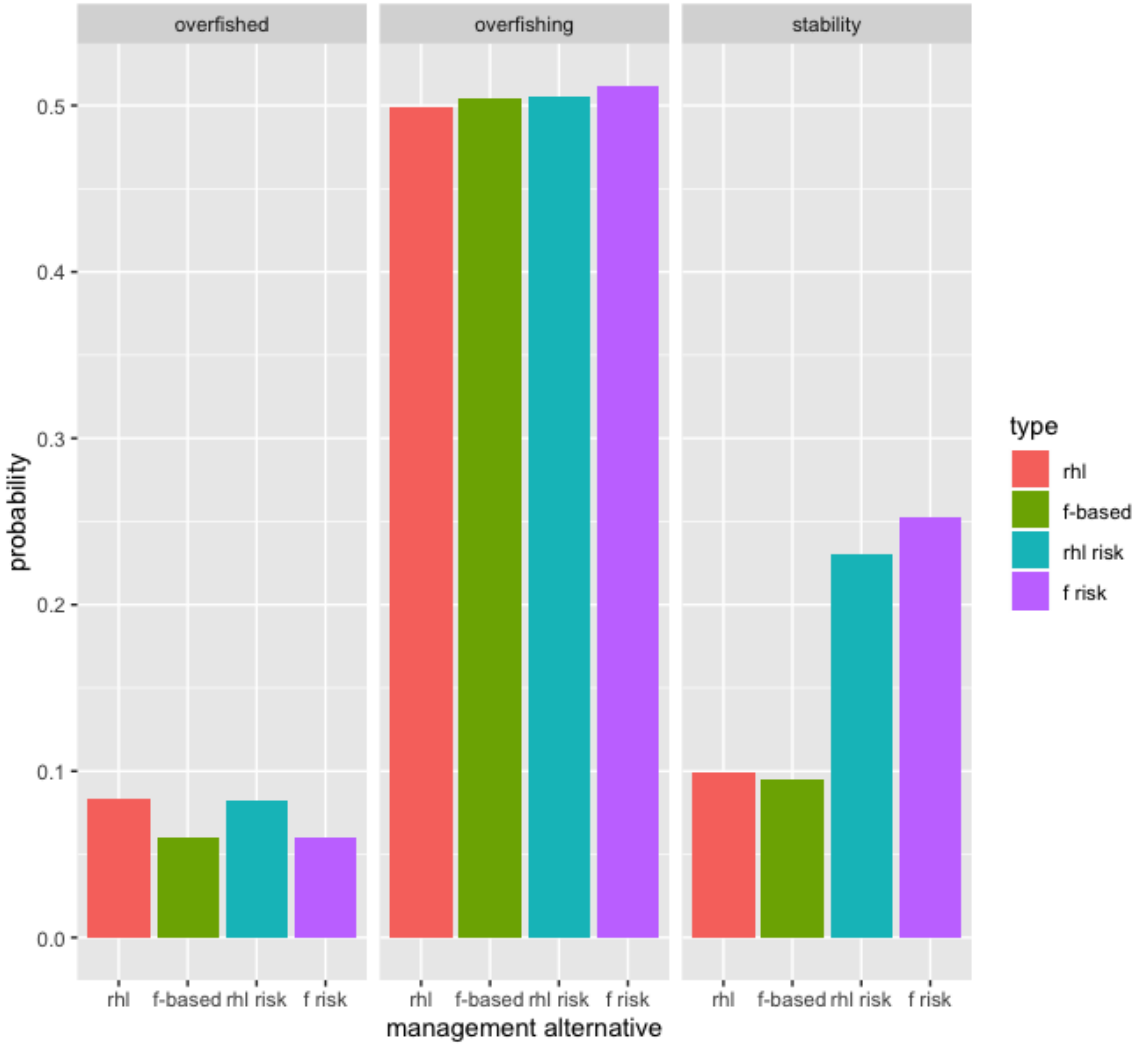


Figure 6 – Calculated OFLs for all approaches.

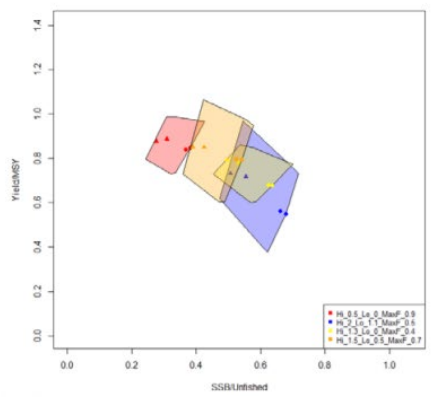
Existing MSEs

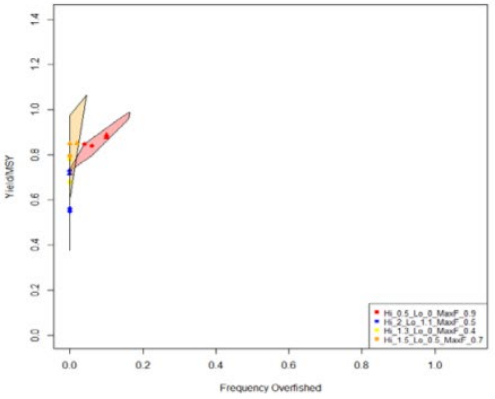
- Summer flounder. Project funded by MAFMC to evaluate performance of options for the recreational fisheries
- Analysis focused on charactering the implementation of management decisions (fishery response)
- Did not have engagement on the objectives beyond scoping during conversation with SSC.

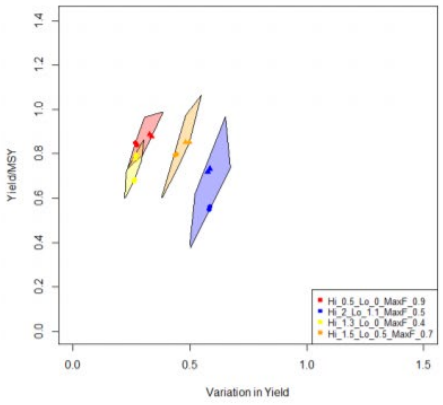


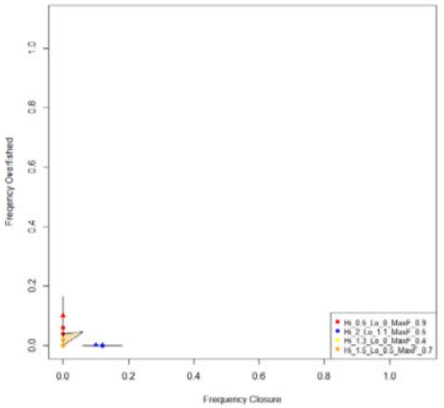
Existing MSEs

- NEFMC implemented one on Atlantic herring to develop new ABC control rule.
- Streamlined short process, approximated a ‘full’ MSE in terms of participatory process of stakeholder workshops to identify objectives and preferred options.
- However, these preferences and the simulations were not used as the basis for decision-making.









How does the ASMFC see MSE being used and providing value for decision-making going forward?

What types of management, monitoring, method, and uncertainty questions would you like to be addressed?

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Effort Survey Designs

Explaining Differences Between the Coastal Household Telephone Survey and the Fishing Effort Survey

I. The FES: A Different Design

The FES addresses **known limitations** of the CHTS

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CHTS

- Random-digit dial survey of households in coastal counties.

FES

- Residential mail survey of addresses in coastal states.

NOAA FISHERIES

CHTS

- Random-digit dial survey of households in coastal counties.
- Asks initial respondent a series of questions about household-level fishing activity.

FES

- Residential mail survey of addresses in coastal states.
- Gives respondents time to consider request, determine who should respond, and consult others.

NOAA FISHERIES

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- Residential mail survey of addresses in coastal states.
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- Includes cues that support cognitive processing and recall.

NOAA FISHERIES

CHTS

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FES

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- Requires summary reports.

NOAA FISHERIES

CHTS

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- Asks initial respondent a series of questions about household-level fishing activity.
- Contacts households with no prior notice and expects immediate response.
- Requires trip-level reporting.
- Suffered from declining rates of coverage and response.

FES

- Residential mail survey of addresses in coastal states.
- Gives respondents time to consider request, determine who should respond, and consult others.
- Includes cues that support cognitive processing and recall.
- Requires summary reports.
- Designed to maximize coverage and response rates.

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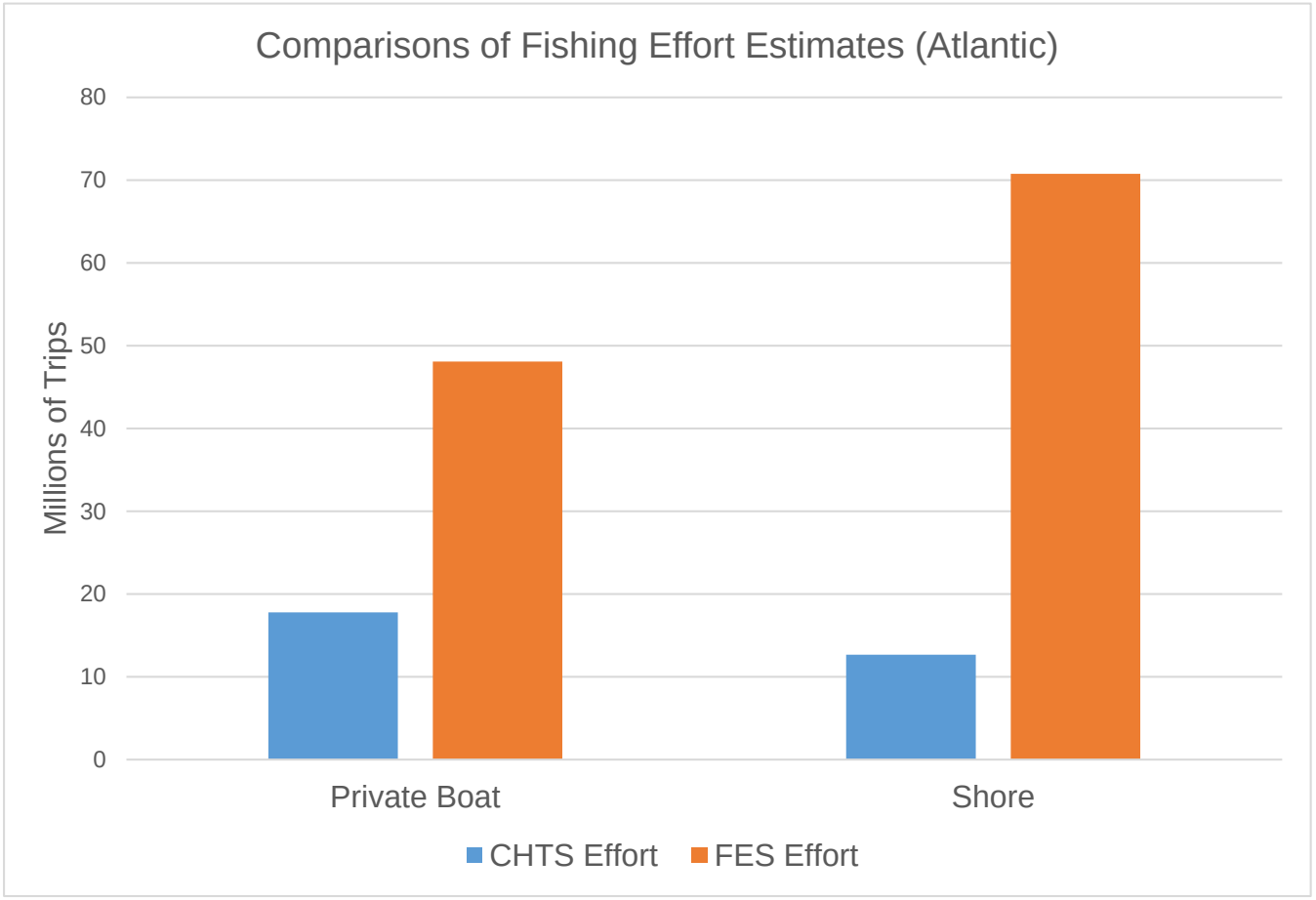

Differences between CHTS and FES designs resulted in large differences in survey estimates

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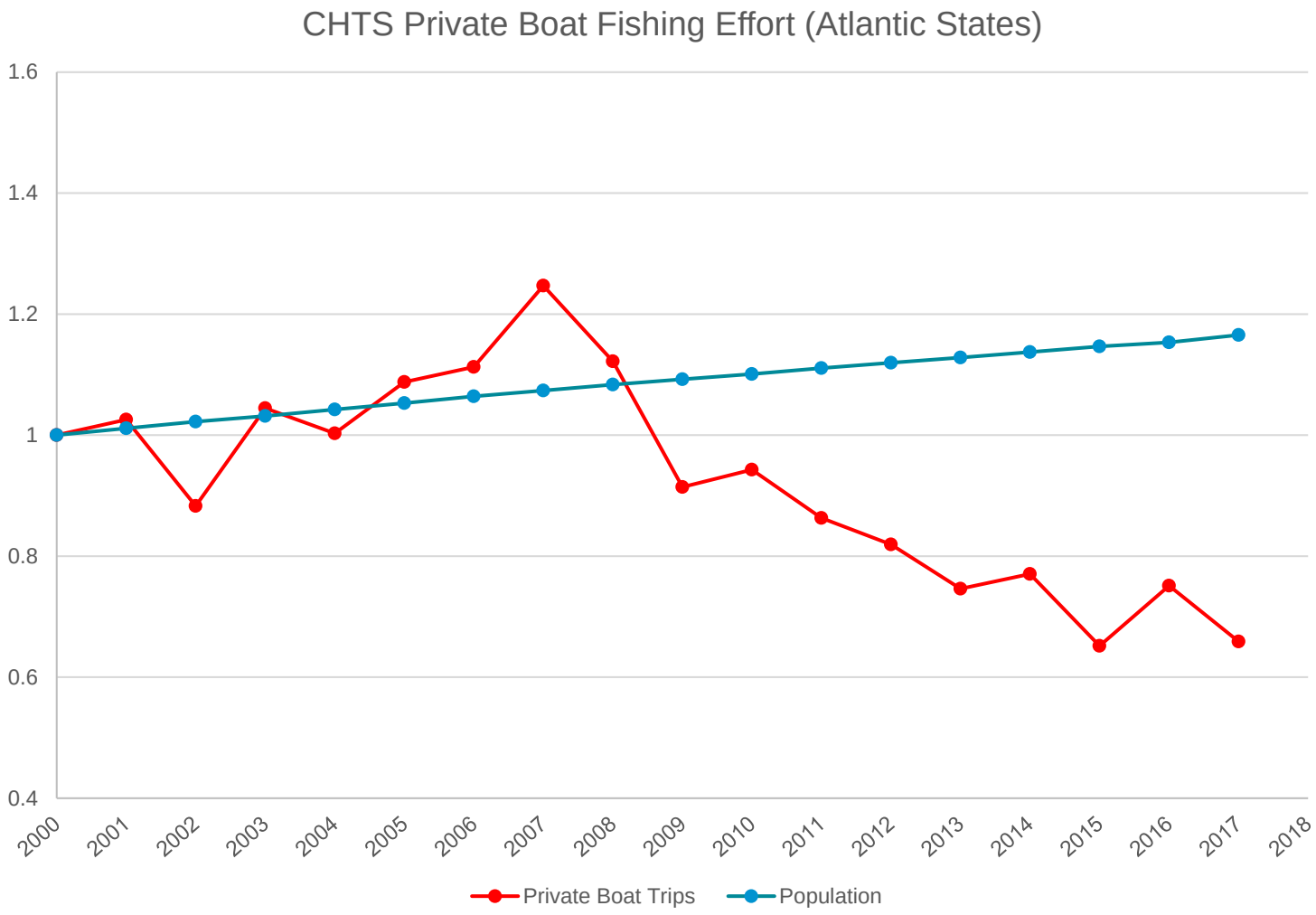

Through the mid 2000's, CHTS effort tracked very closely with population

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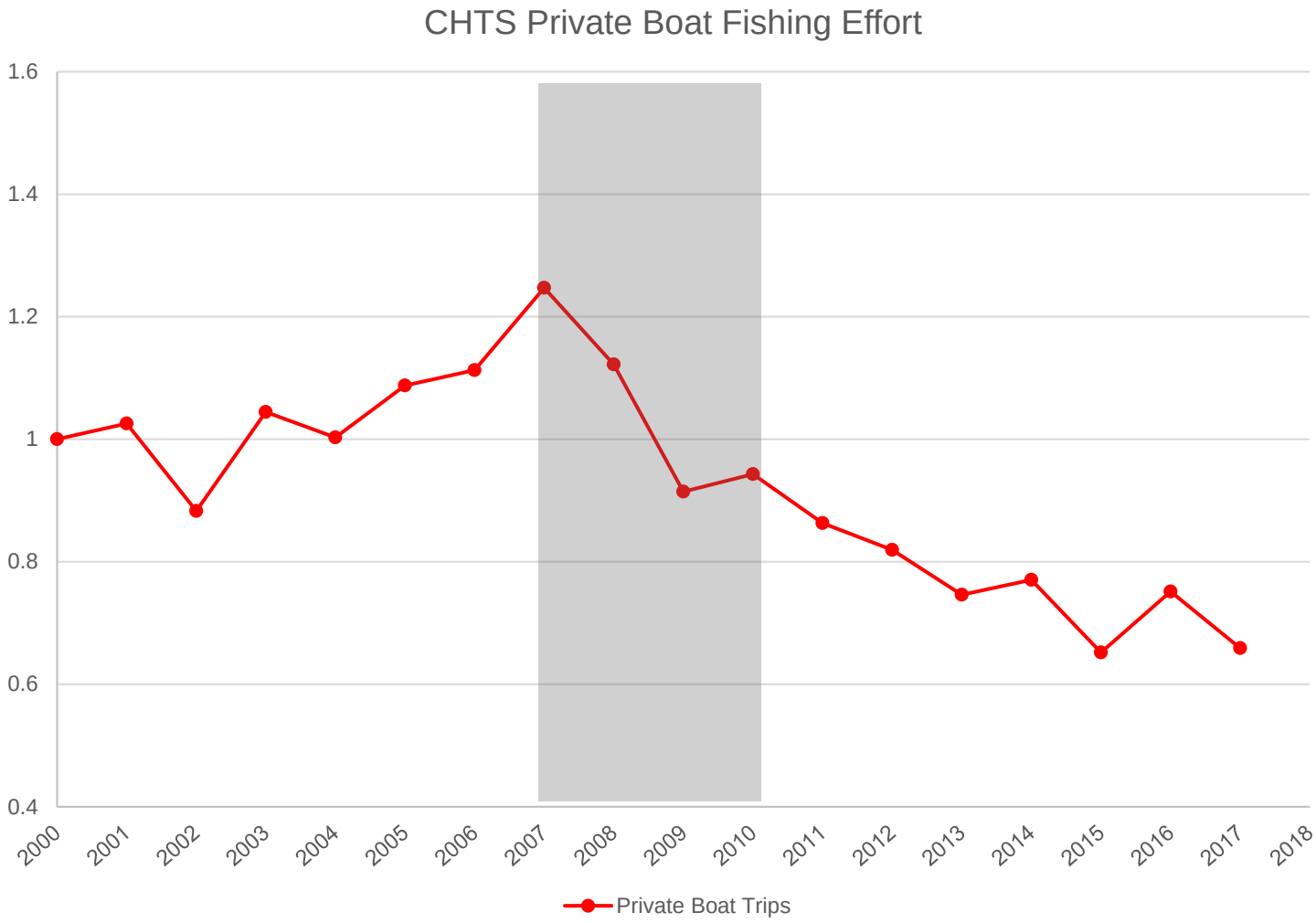

The decline in fishing effort coincided with the beginning of the economic downturn

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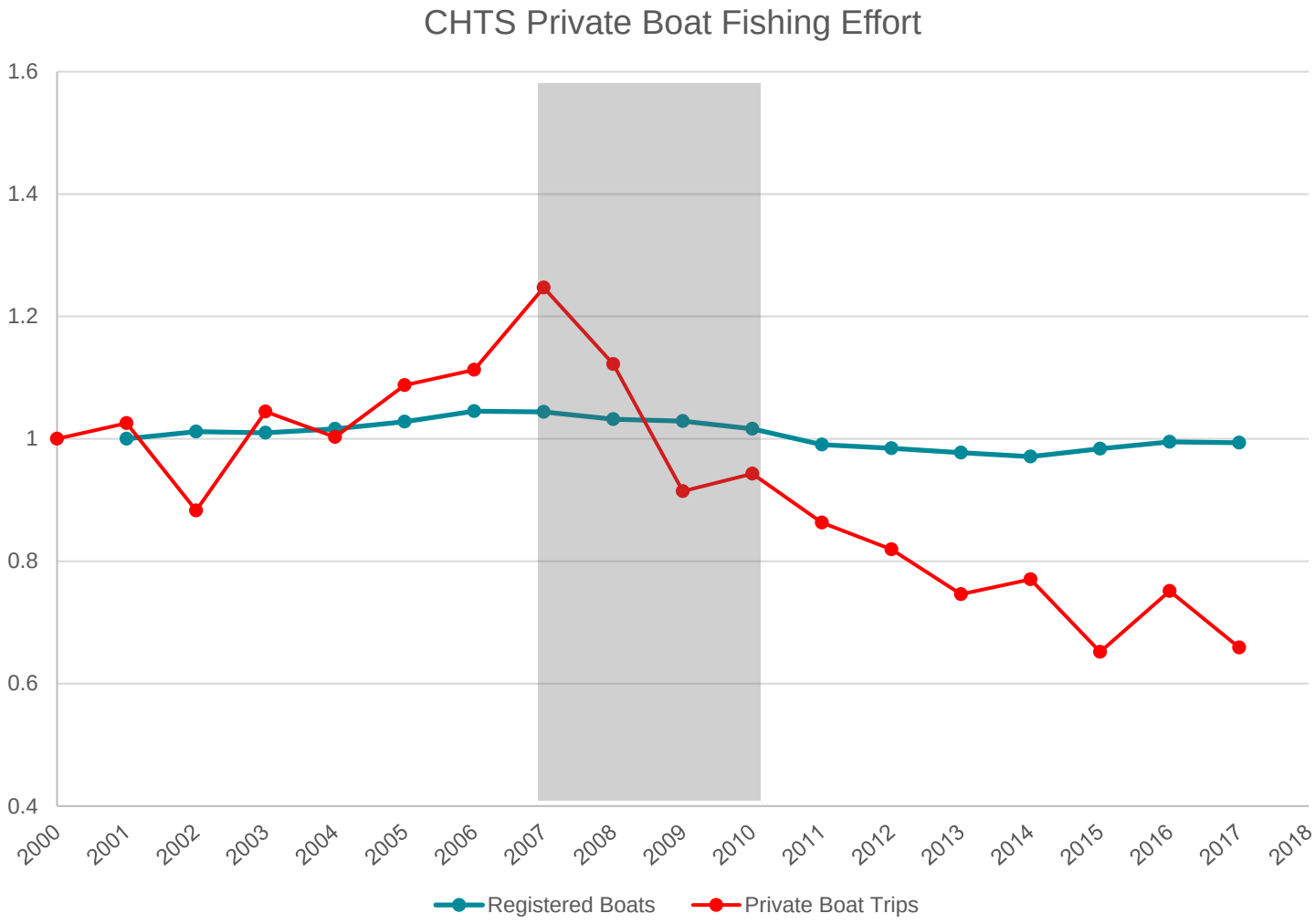

The number of registered boats has remained fairly consistent

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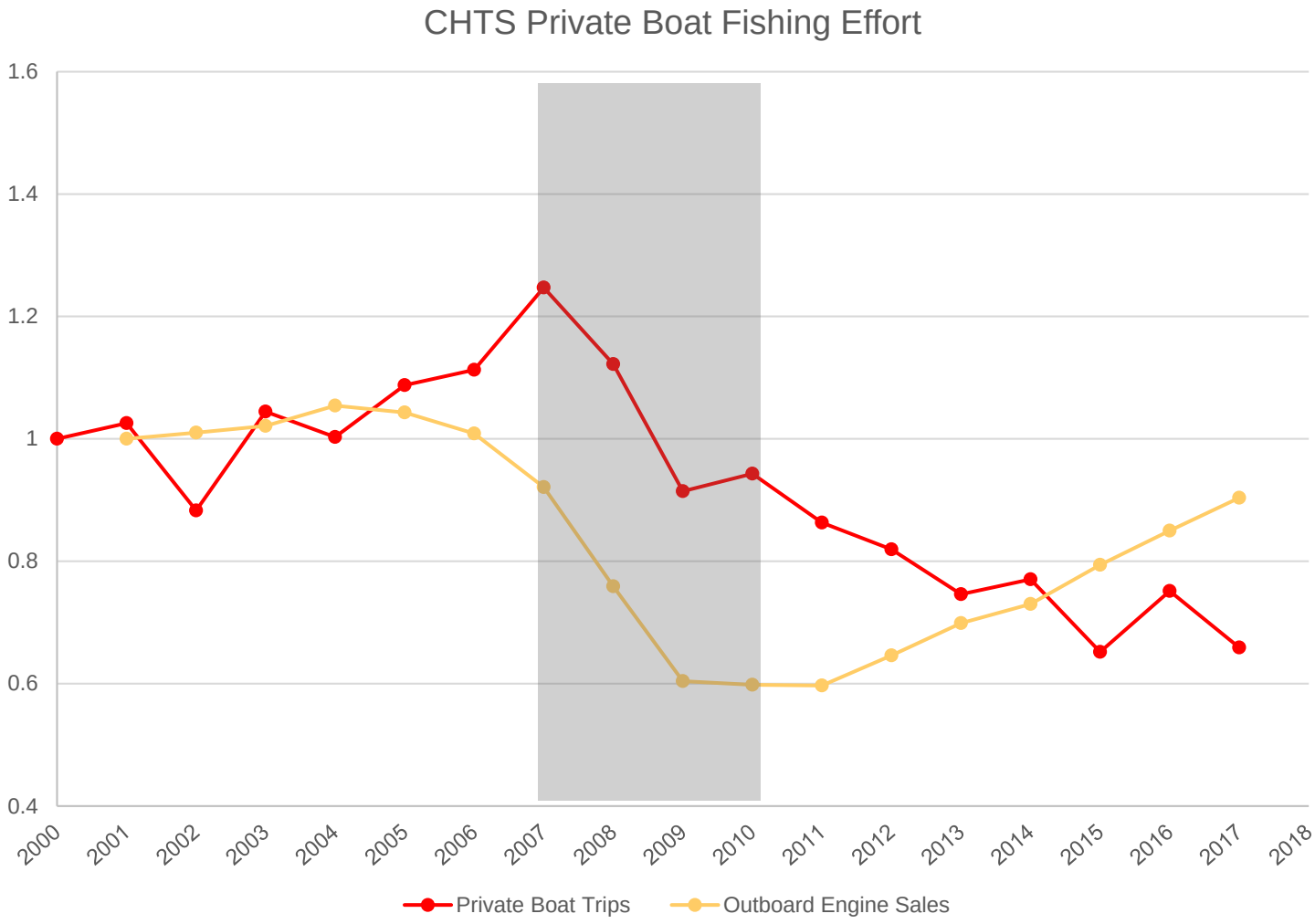

Outboard engine sales declined during the economic downturn but have since recovered

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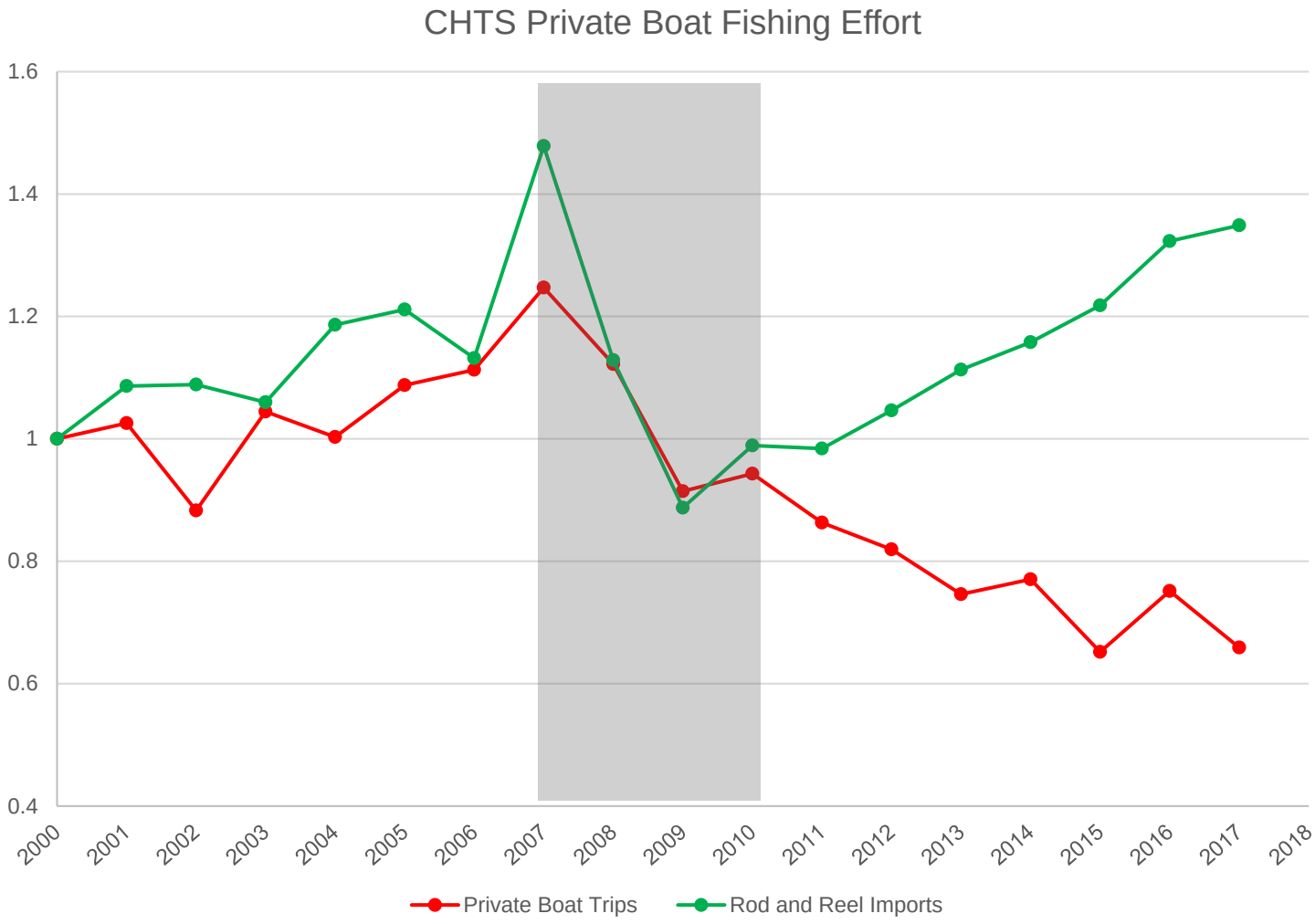

Rod and reel imports declined during the economic downturn but have since recovered

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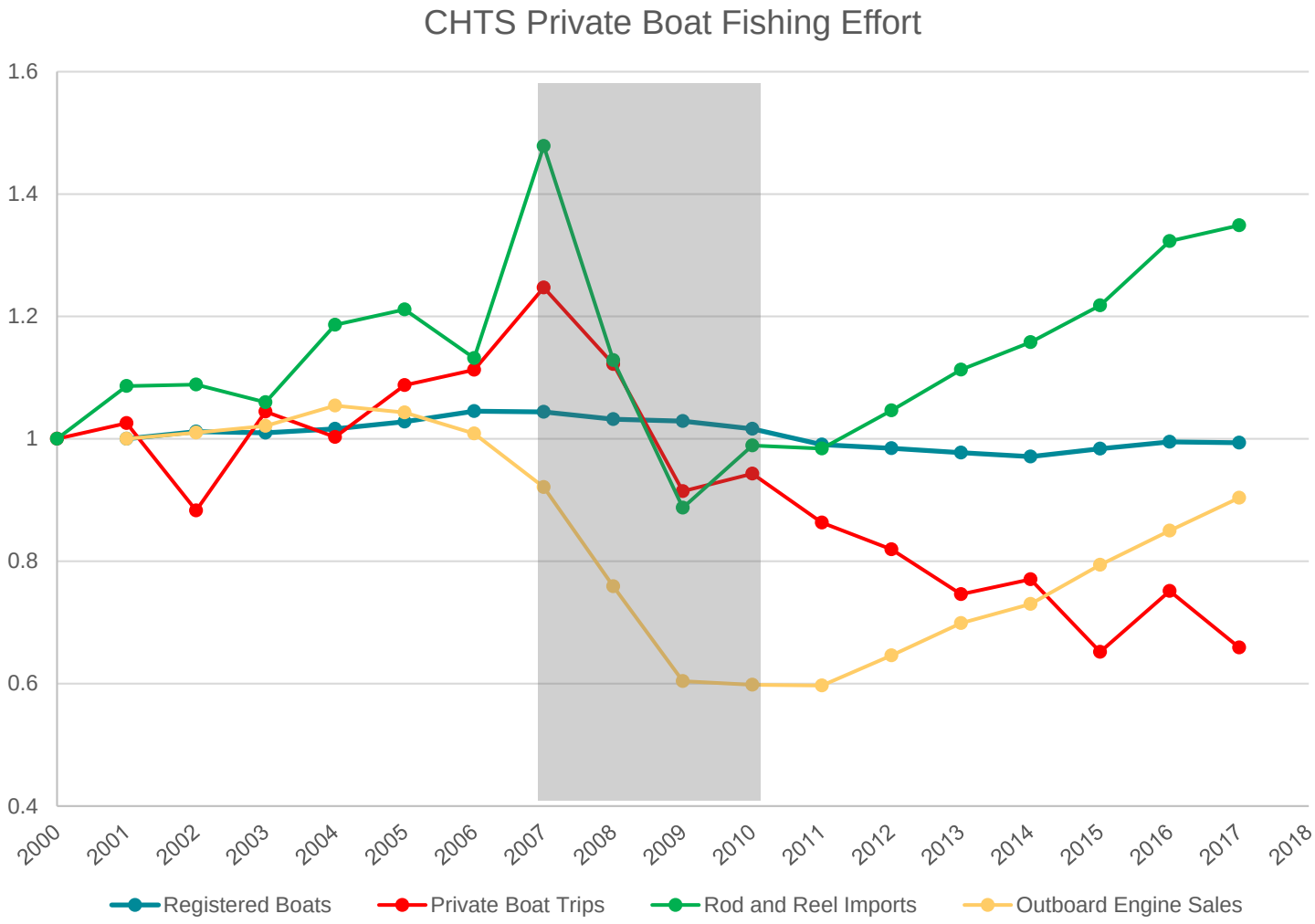

Independent indicators of fishing activity declined during the economic downturn but have since recovered

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II. Coverage Error

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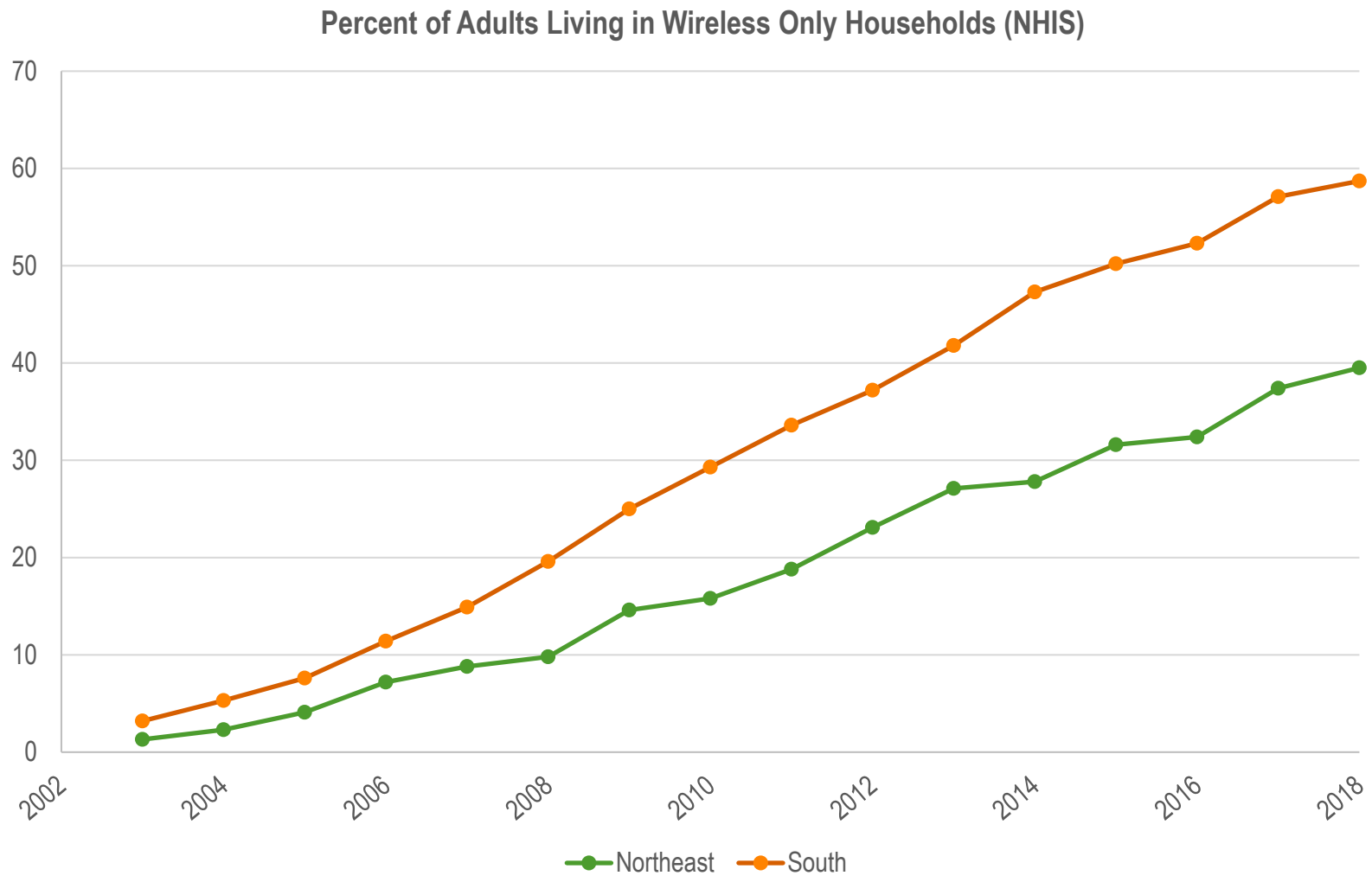

Instead, the declining trend in CHTS estimates reflects the declining number of households with landline phones.

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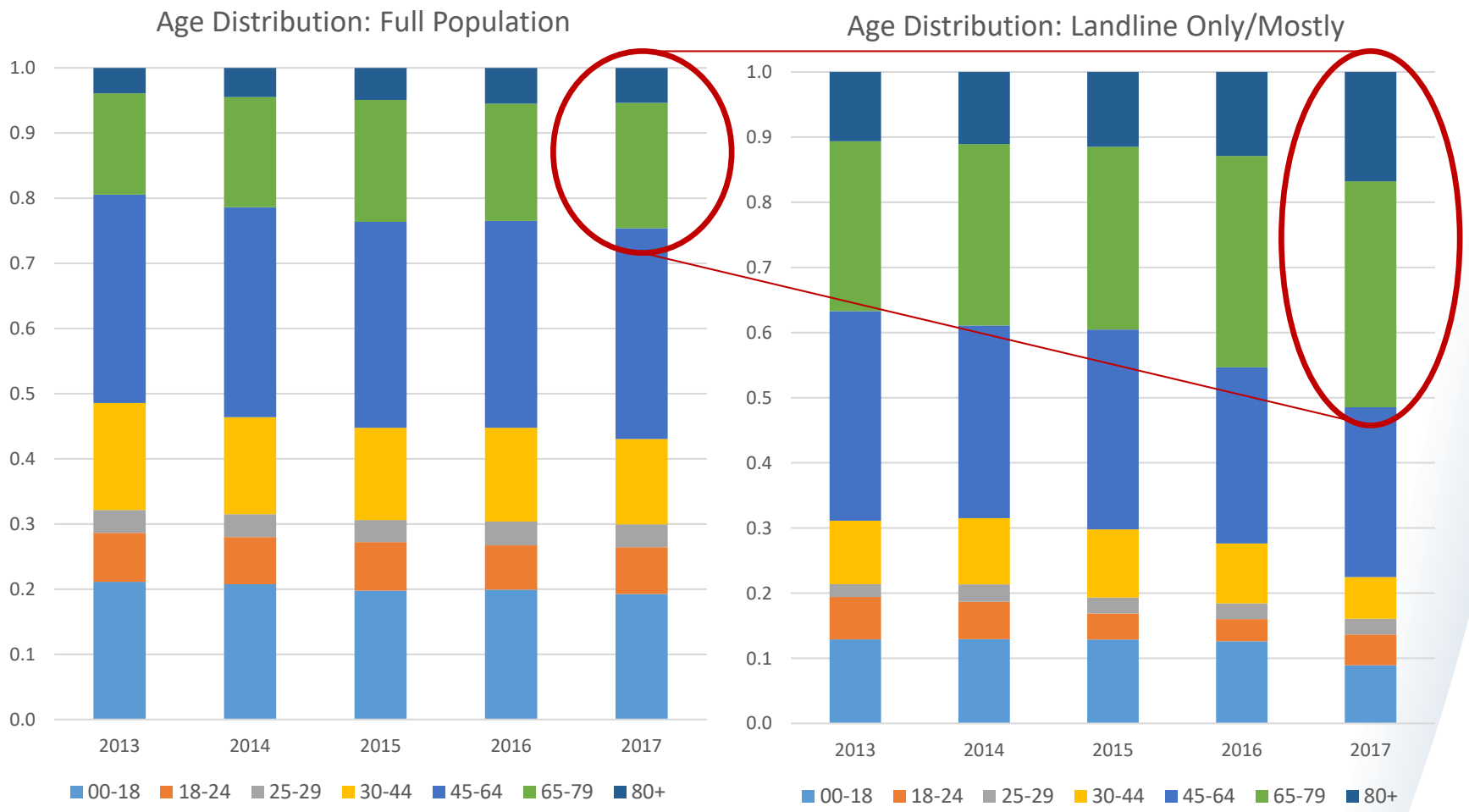

In 2017, more than 50% of the landline population was estimated to be aged 65+, compared with 25% of the full population.

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Health Characteristics of Landline Households (NHIS)

- Less likely to describe health status as excellent or very good
- Less likely to have met Federal guidelines for leisure-time aerobic activity
- More likely to report difficulty
  - Walking ¼ mile
  - Standing for two hours
  - Stooping, bending or kneeling

The landline population is older and exhibits characteristics associated with poor health

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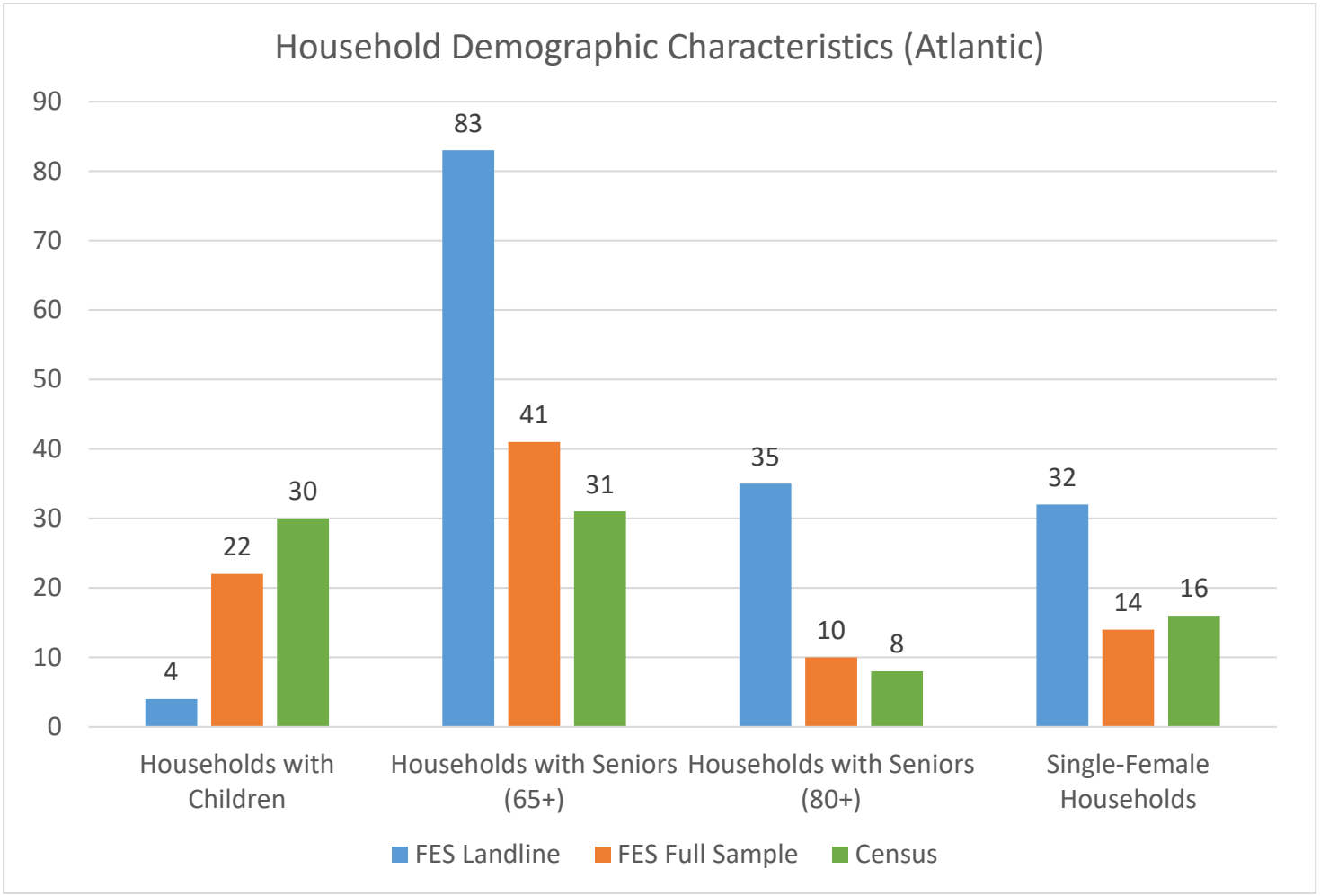

FES full sample estimates are similar to census estimates for demographic characteristics, while FES landline estimates severely over- or under-represent certain segments of the population

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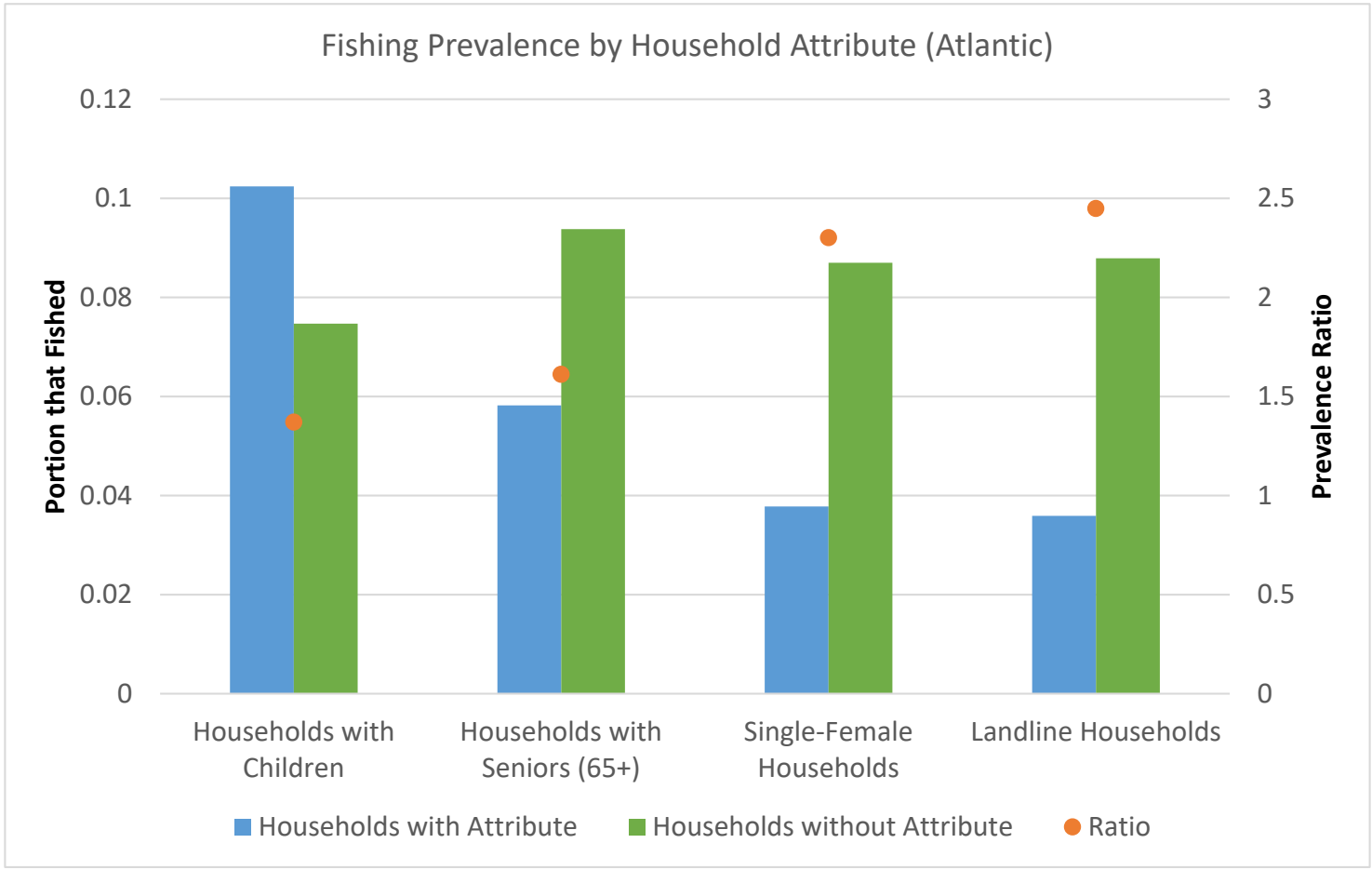

Demographic groups represented by landline samples are unlikely to participate in recreational fishing.

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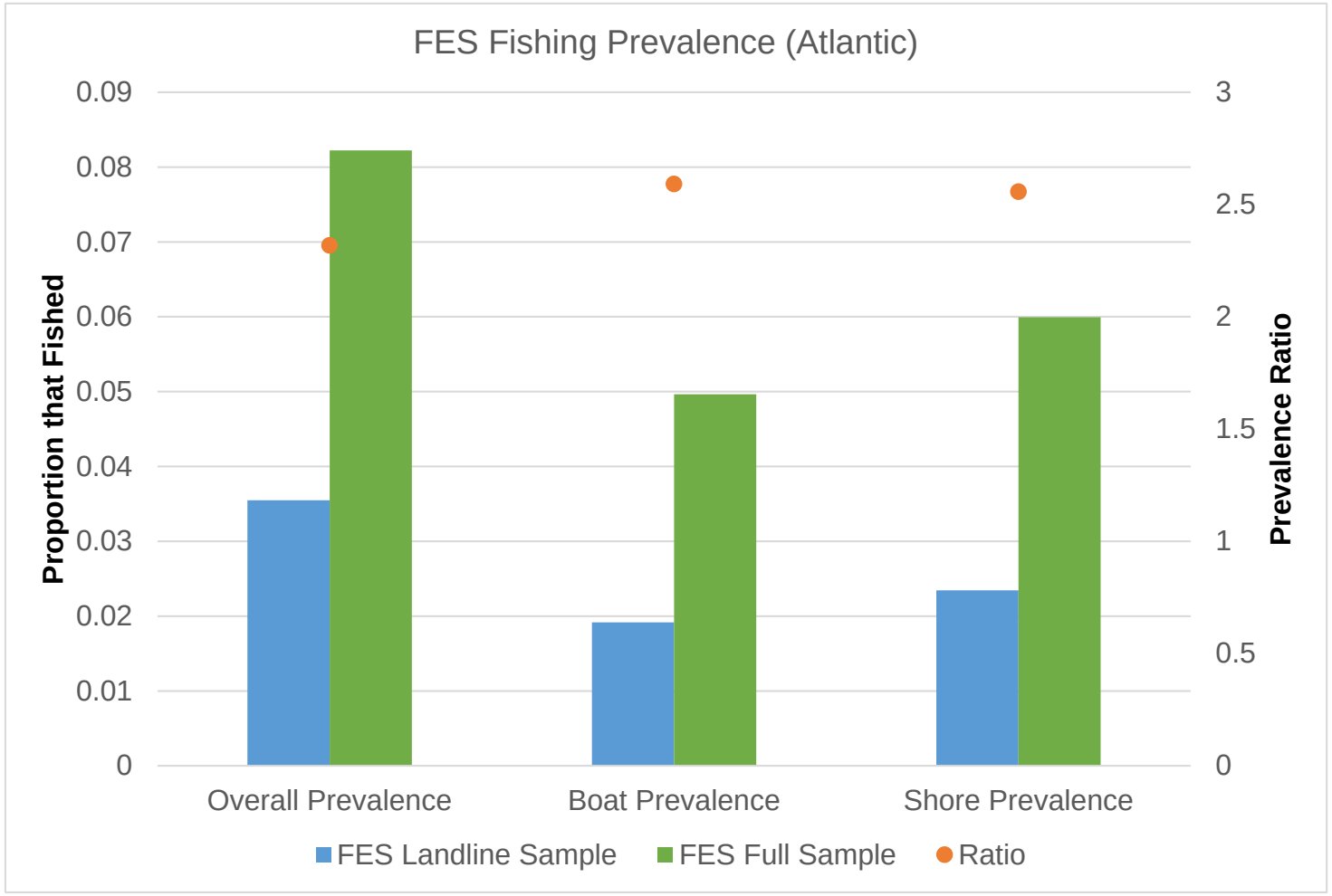

FES estimates derived from landline samples under-estimate fishing activity

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- Older residents.
- Fewer children.
- Smaller household sizes.
- More households comprised of single females.
- Poorer health.
- Less leisure-time physical activity.
- Less fishing activity.

Landline-only/mostly households have become increasingly different from the rest of the United States population.

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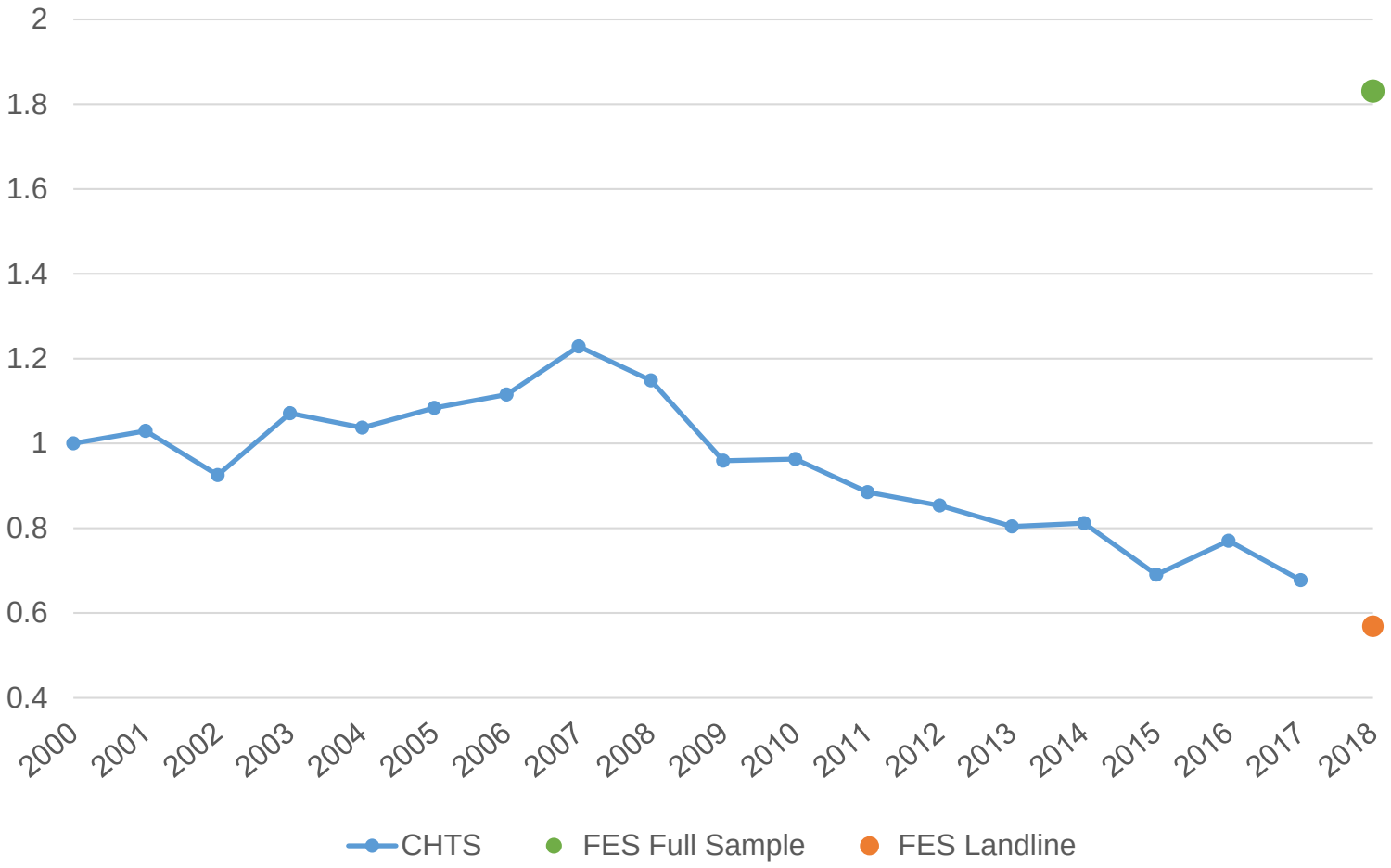
CHTS Estimates of Private Boat Effort (Atlantic)



Fishing effort may have declined slightly during the economic downturn, but the continued collapse of effort beyond the economic recovery is a function off eroding survey coverage

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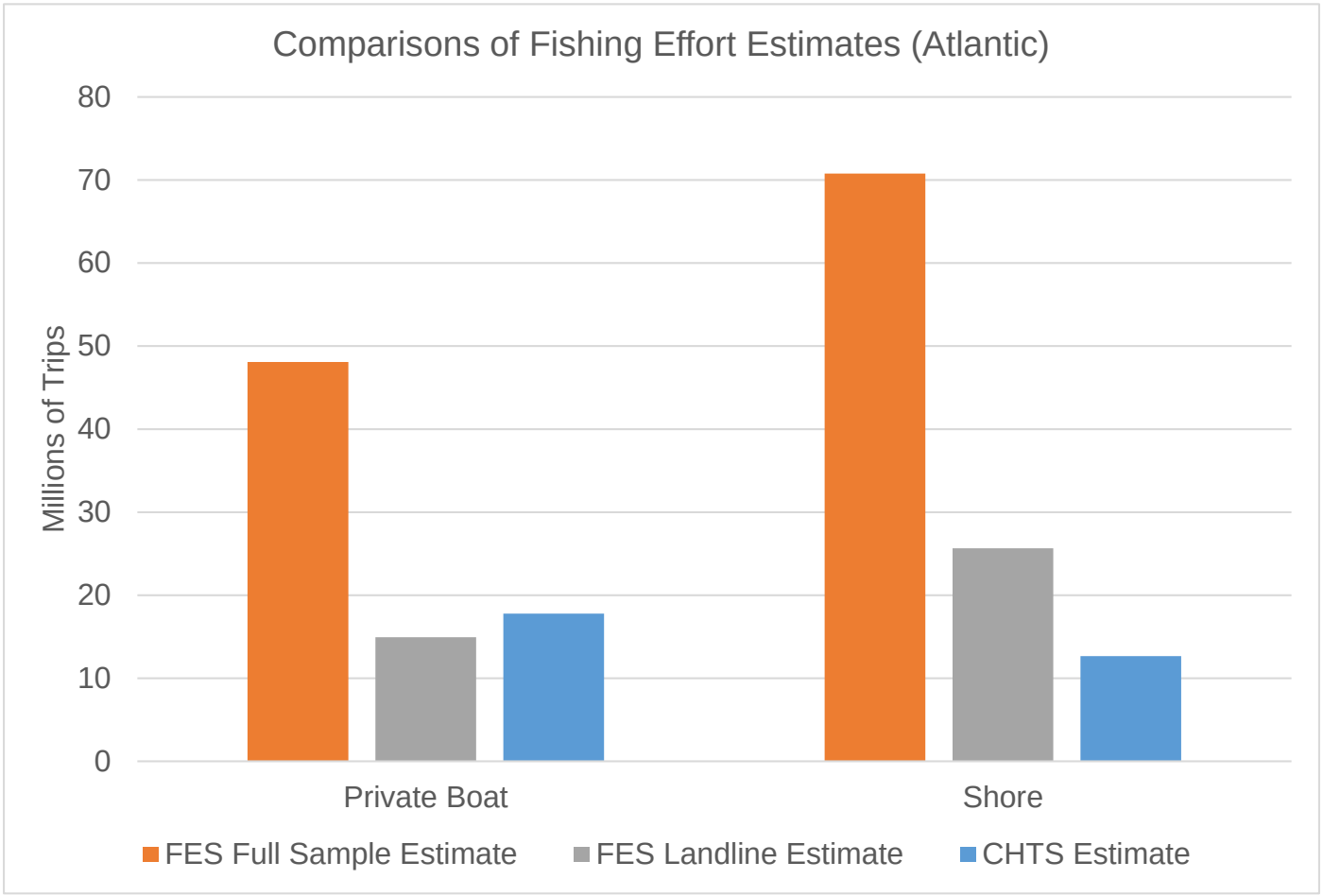

Coverage error in the CHTS explains the majority of difference between FES and CHTS estimates

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III. Gatekeeper Effect

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CHTS Screening

- How many people in this household go fishing?
- How many people in your household, including children and adults, have been recreational saltwater fishing in the past 12 months anywhere in the U.S. or in a U.S. territory?
- Thinking just about the past two months, how many people living in your household have been recreational saltwater fishing in the past two months in the U.S. or U.S. territory?

In the CHTS, screening questions are administered to whomever answers the telephone. About 2/3 of the time, this household "Gatekeeper" is female

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Gatekeeper Experiment

- Sampled from lists of licensed saltwater anglers in NC
- Allocated sample into two treatments
  1. Asked for sampled angler by name prior to administering CHTS screening questions
  2. Administered CHTS screening questions to whomever answered phone

In 2012, MRIP initiated an experiment to try and measure the impact of the Gatekeeper Effect

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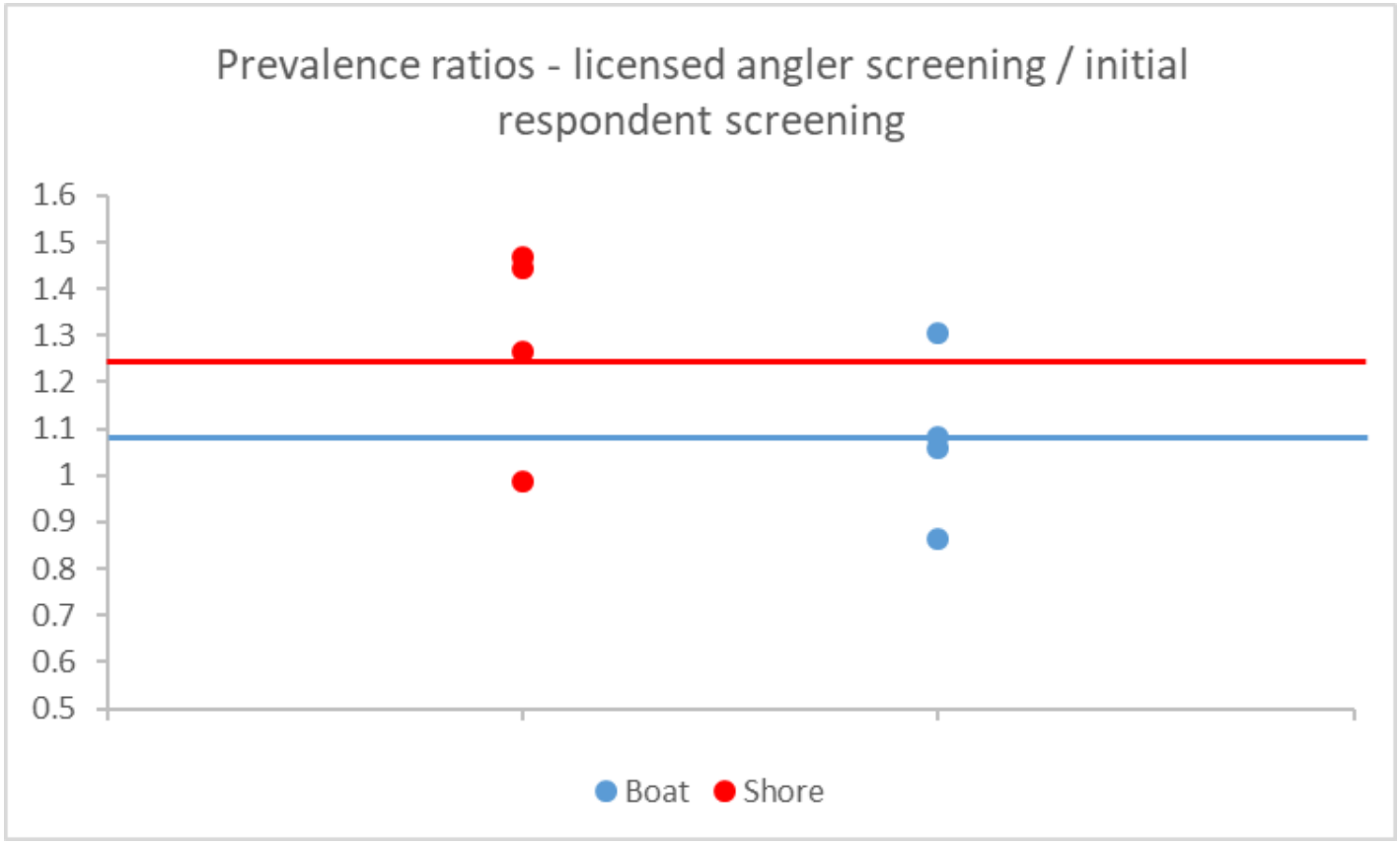
Gatekeeper Experiment



The experiment demonstrated that the initial respondent – the Gatekeeper – under reported household fishing activity by as much as 20%

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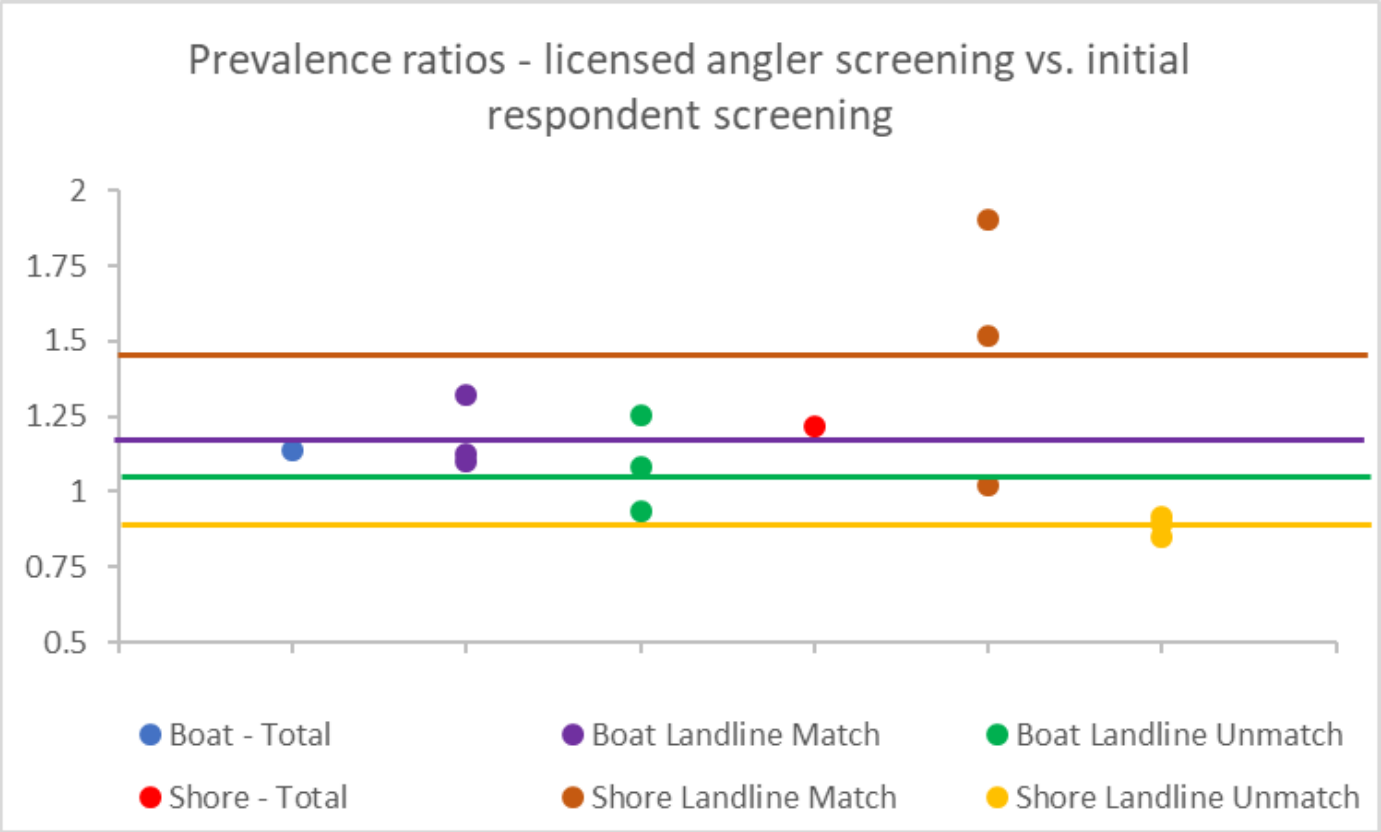
Gatekeeper Experiment



Because the experimental sample frame included cell phone numbers, the experimental results are likely a minimum effect. The magnitude of the Gatekeeper effect on landline samples is likely much larger

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Gatekeeper Summary

- Females are more likely than males to answer a landline telephone
- Females are much less likely to report household fishing activity than males
- Results from the Gatekeeper Experiment confirmed a Gatekeeper Effect – the screening respondent matters
- The Gatekeeper Effect is larger for shore fishing than boat fishing
- The Gatekeeper Effect results in an underestimate of fishing effort by as much as 30%

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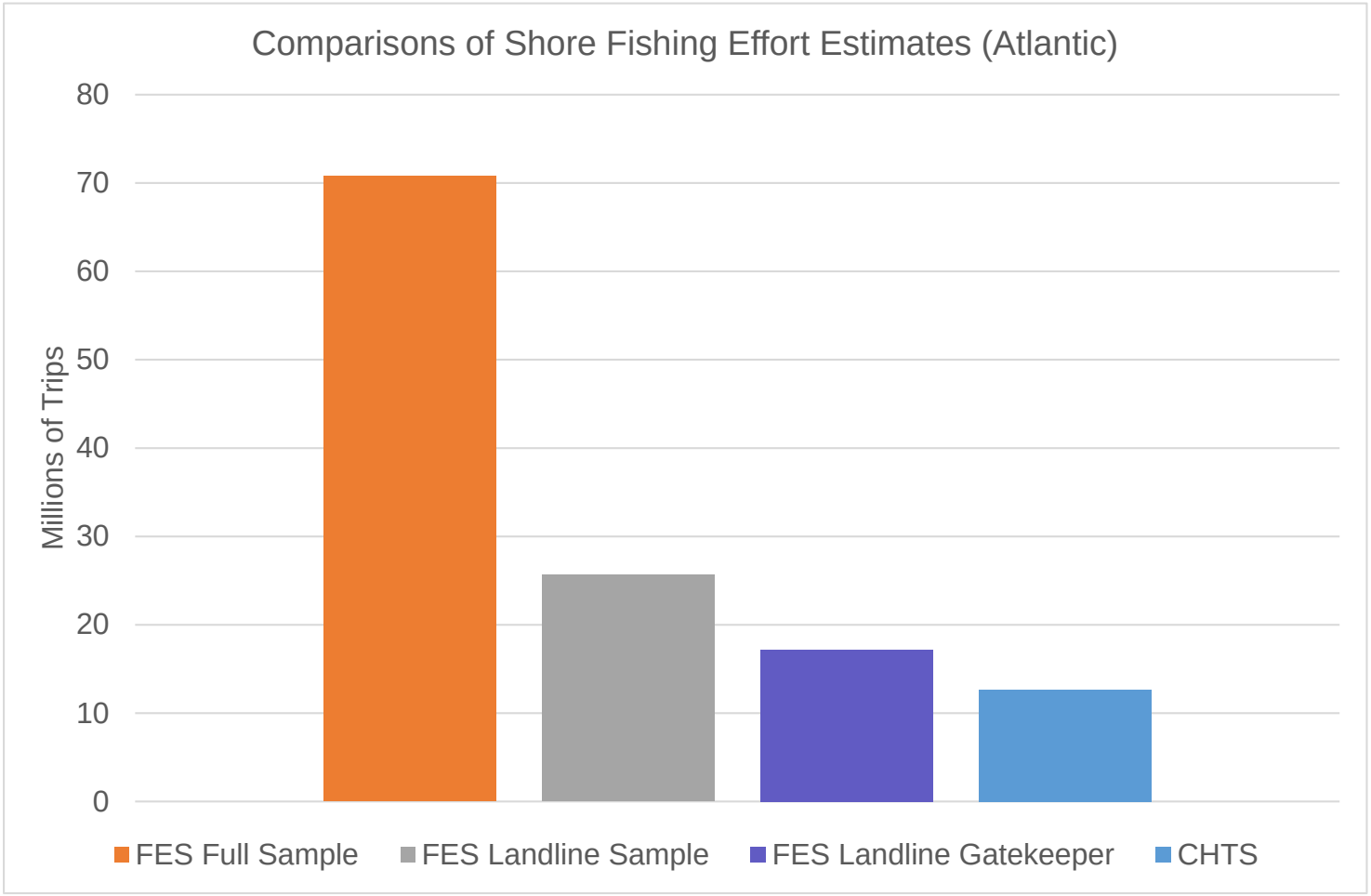

For shore fishing, coverage error and the gatekeeper effect account for 95% of the total difference between FES and CHTS estimates

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IV. Plausibility

The FES design is less susceptible to bias than the CHTS design – estimates are more accurate!

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Effort in the Atlantic

In July and August of 2018:

- About 6% of Massachusetts residents reported fishing. The average angler took four trips.
- About 6% of Maryland residents reported fishing. The average angler took fewer than five trips.
- About 5% of South Carolina residents reported fishing. The average angler took six trips.
- About 3% of Georgia residents reported fishing. The average angler took three trips.

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Florida has approximately 1,500 intercept sites in the APAIS site register

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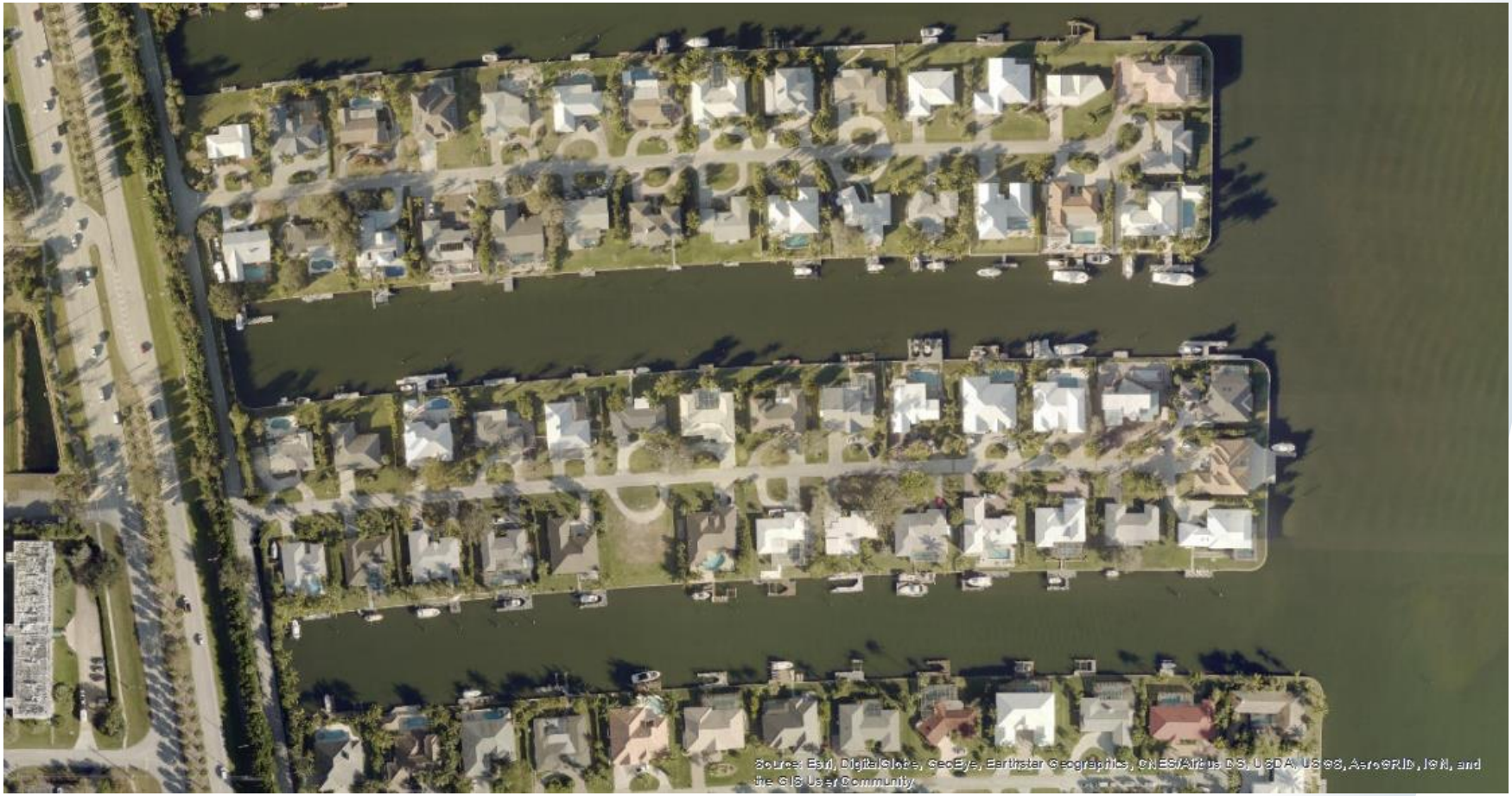
Vero Beach

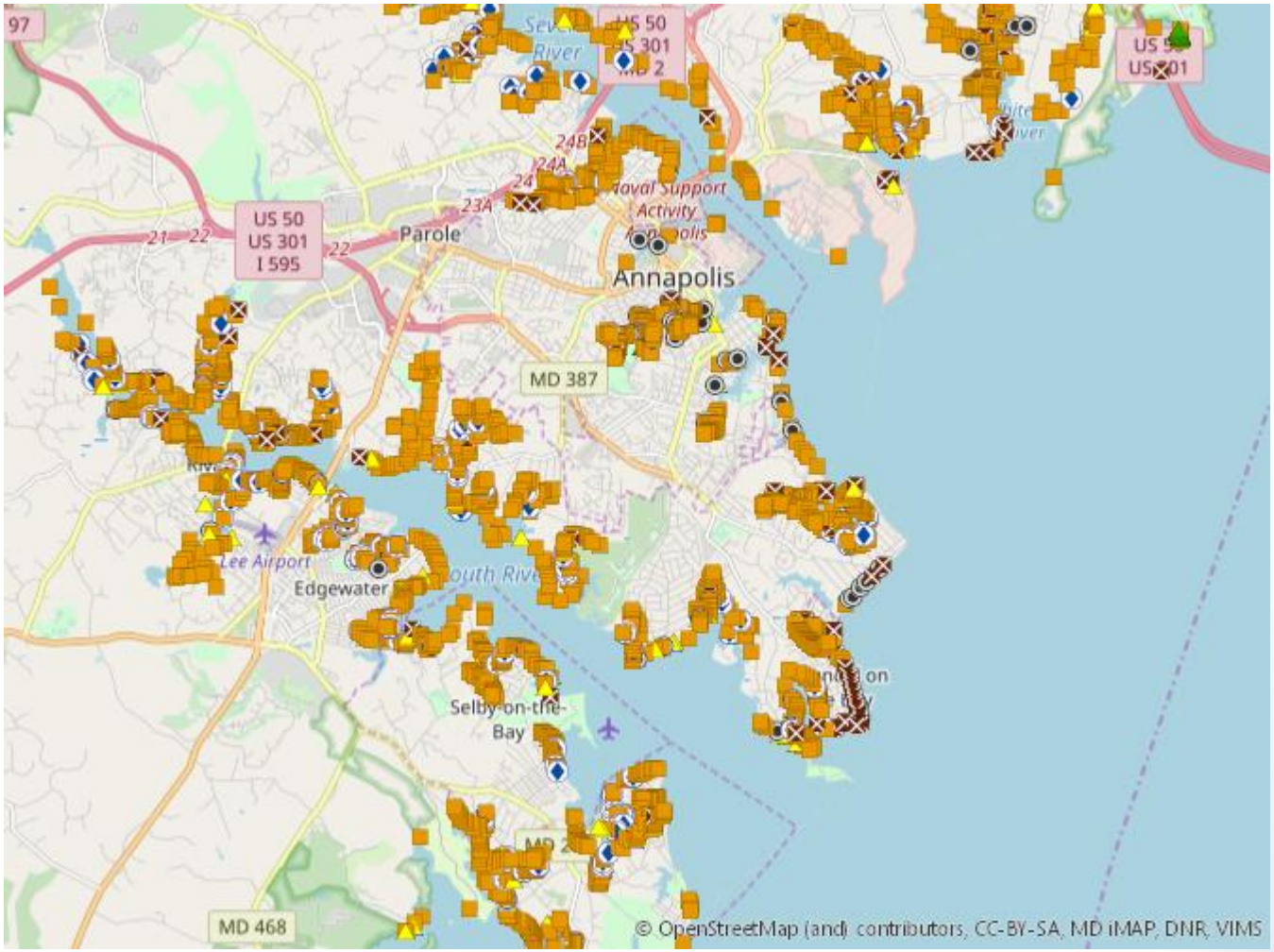
The map includes a land are of less than 5 square miles and includes 5 APAIS intercept sites

This area of Vero Beach includes 1,300 waterfront properties



Waterfront properties are a source of “hidden fishing trips”

NOAA FISHERIES



Maryland has nearly 30,000 private docks, boat houses and ramps

NOAA FISHERIES

Each of these is potentially a private access fishing site

NOAA FISHERIES

Each of these is potentially a private access fishing site

NOAA FISHERIES

Summary

- Over the past 15 years, CHTS samples have become increasingly biased as a result of declining coverage
  - Seniors, single females, individuals in poor health
- This bias resulted in a severe under-estimate of fishing effort
- Screening errors in the CHTS – the "Gatekeeper Effect" – also resulted in an under-estimate of fishing effort
- Coverage error and the Gatekeeper effect explain nearly all of the difference between FES and CHTS estimates
- Despite larger FES estimates, fishing is still a rare event
- The potential magnitude of "hidden fishing trips" is enormous

NOAA FISHERIES

Questions?

NOAA FISHERIES

ASMFC Science Support

Stephen Faulkner
USGS Leetown Science Center

October 29, 2019

Portsmouth, NH

USGS
science for a changing world

Leetown Science Center

- Aquatic Ecology Laboratory, National Fish Health Laboratory, Conte Anadromous Fish Laboratory
- Provide decision-relevant science on health and ecology of aquatic and terrestrial ecosystems across spatial and temporal scales
- Provide resource managers with tools and information relevant to the appropriate unit of management (e.g., population, patch, river, region)
- Understand the genetics and genomics of target/at-risk species to forecast persistence under changing environmental conditions

Summary of FY18/19 ASMFC Science Support Projects

- Eel migration/chemical attractants (Heather Galbraith)
- Horseshoe crab survival – analyzing tagging USFWS data (Dave Smith)
- Improving downstream passage for American eels (Alex Haro)
- Development of an American eel habitat model to support stock assessment (John Young, Heather Galbraith, Alex Haro)

Summary of FY19/20 ASMFC Science Support Projects

Updating the ASMFC Horseshoe Crab Adaptive Resource Management (ARM) Model

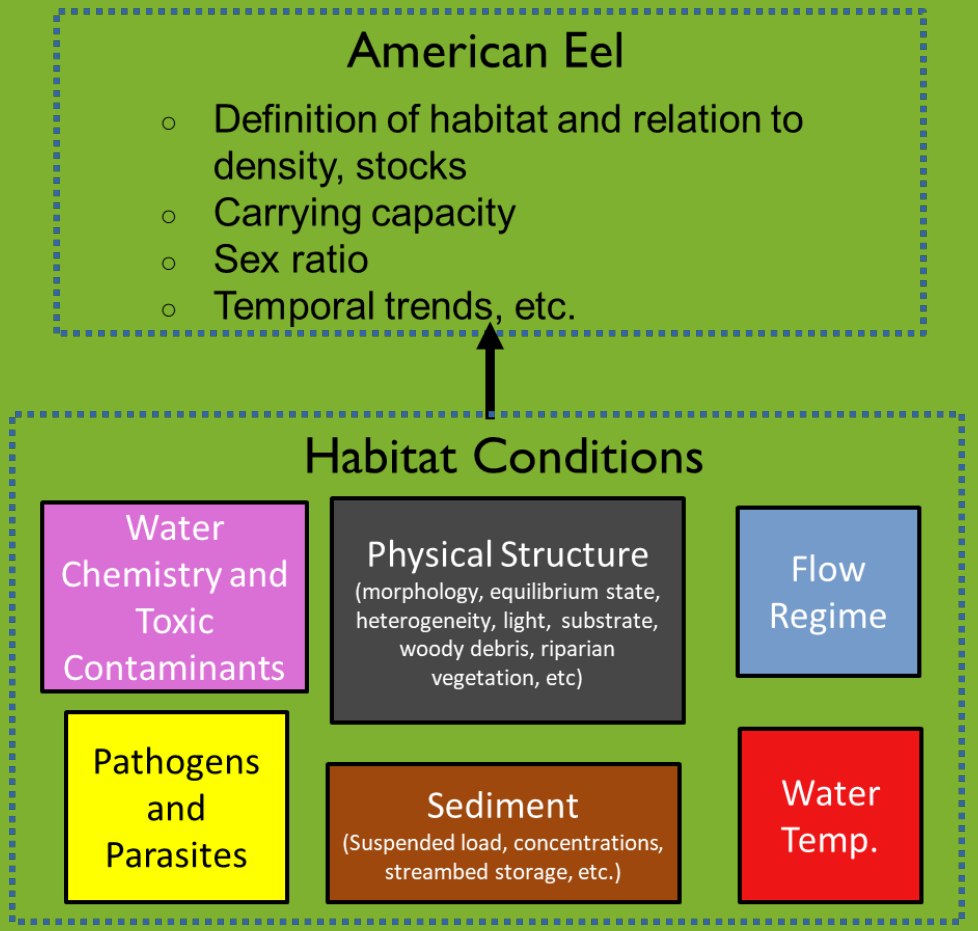
- Incorporating the advanced estimates and models into the ARM framework

- Translating and testing the conversion of the optimization software.

Summary of FY19/20 ASMFC Science Support Projects

Development of an American eel habitat model to support stock assessment

- Inventory and data compilation
- Pilot study - GIS-based habitat assessment approaches Delaware Bay, Chesapeake Bay



Summary of FY19/20 ASMFC Science Support Projects

Developing the next generation of fish-passable stream-gaging weirs

- Establish performance guidelines -flow sensitivity, fish passage.
- Identify and prioritize existing stream-gages - Delaware River Basin
- Design and test a “next generation” hybrid or modified weir design

Summary of FY19/20 ASMFC Science Support Projects

Characterize seasonal distribution, abundance and movement patterns and diets for invasive catfish (Christine Densmore)

- Locations and abundance during winter/ spawning season
- Percentage of likely year-round residents
- Seasonal diet across freshwater and mesohaline habitats


Thank you!
faulkners@usgs.gov

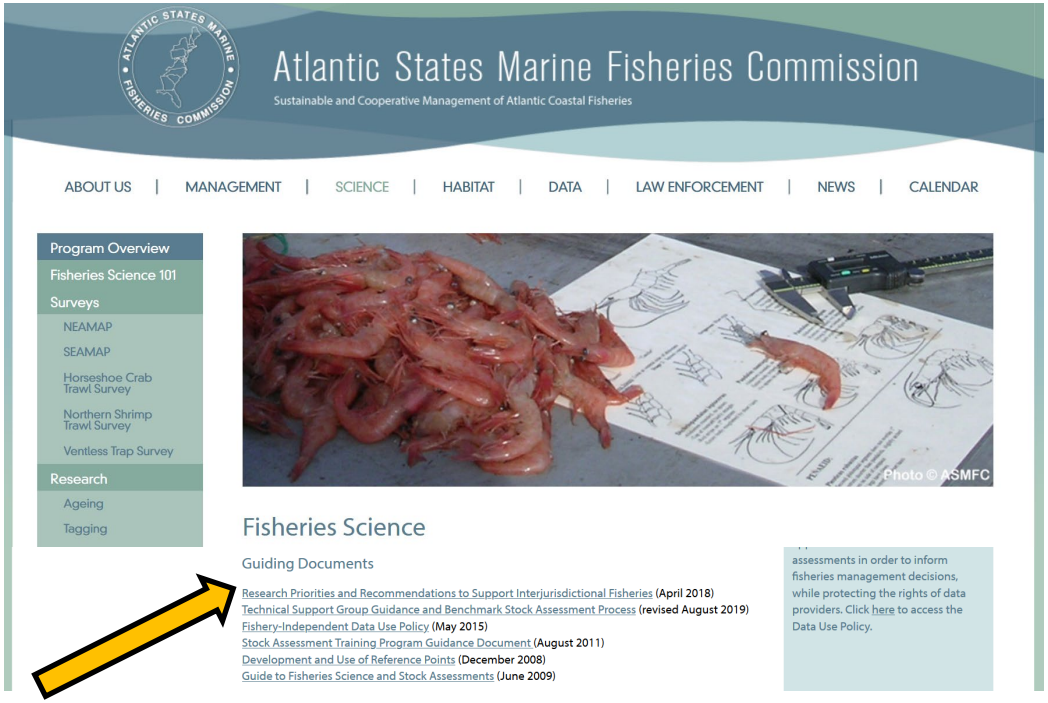
ASMFC Research Priorities

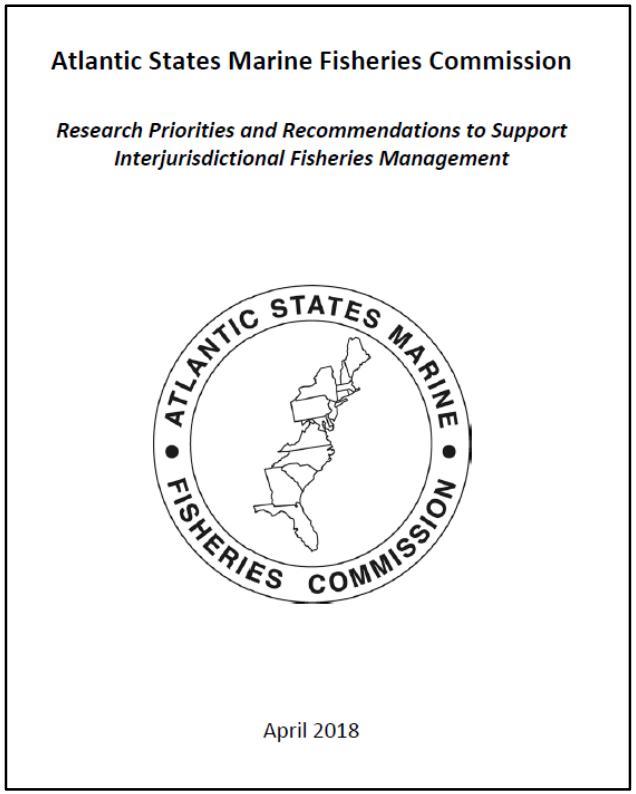
Management and Science Committee
New Castle, New Hampshire
October 29, 2019

MSC's Roles

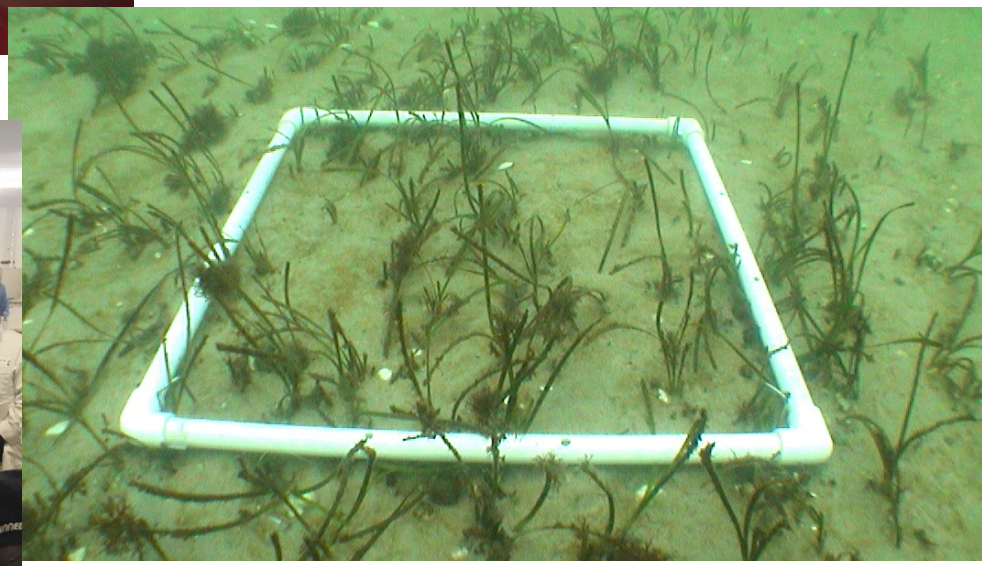
Identify and Address Research Priorities

- Periodic review and updates
- Pursue funding for projects





Scope



Process

Species Technical Committees

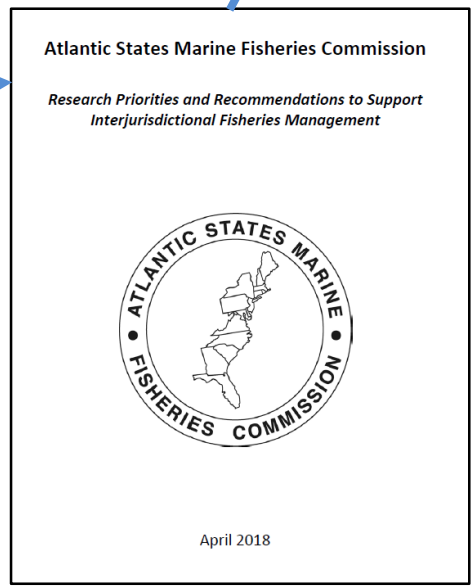
1

Stock Assessments

2 + –

3

Management & Science Committee


Atlantic States Marine Fisheries Commission

Research Priorities and Recommendations to Support Interjurisdictional Fisheries Management

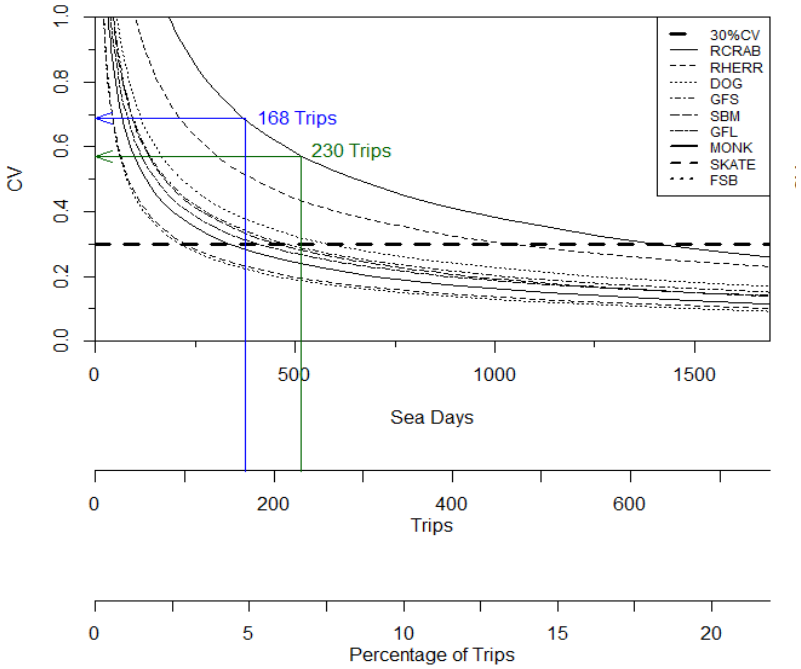
April 2018

1. Identify themes across species
   - Better discard estimates small-mesh trawl fisheries
   - NE regional nearshore trawl survey

2. Develop thematic proposals

3. Apply for funding

Improving Commercial Discard Estimates



ACCSP
Good Data, Good Decisions

Funding Sources

Future Projects

1. Improve bycatch monitoring, estimates in state/estuarine waters → sturgeon, Sciaenids
2. Design and implement fishery-independent H&L survey for nearshore pelagics → cobia, mackerel
3. Citizen science to improve pH/ocean acidification monitoring → lobster, shrimp
4. Atlantic telemetry tagging infrastructure
5. …