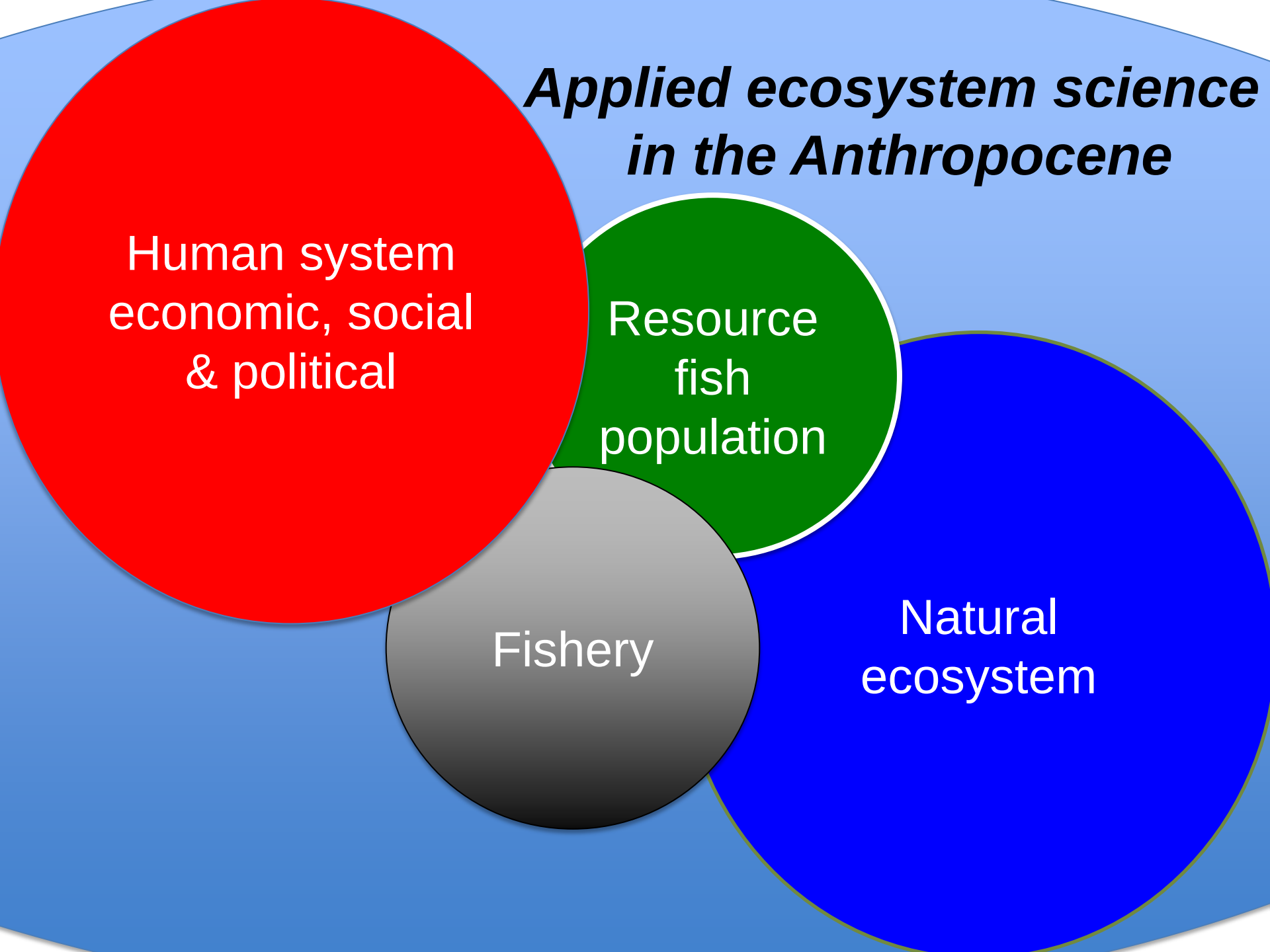
Applied ecosystem science in the Anthropocene



Many ecological & human dimensions are rapidly changing

AGU PUBLICATIONS

JGR

Journal of Geophysical Research: Oceans

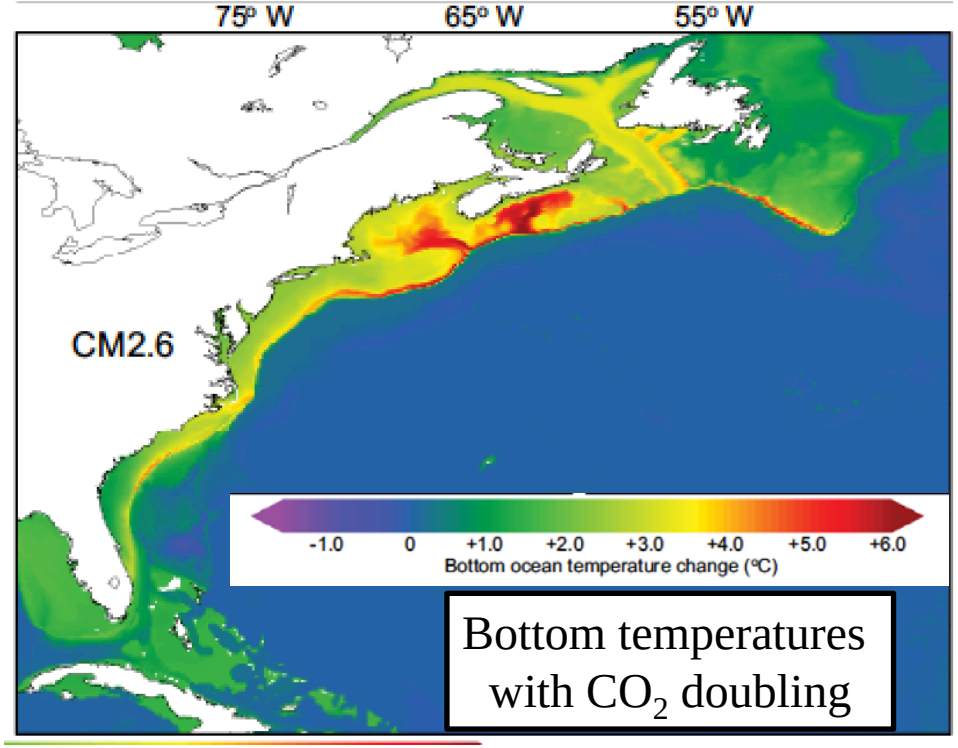
RESEARCH ARTICLE

10.1002/2015JC011346

Enhanced warming of the Northwest Atlantic Ocean under climate change

Key Points:
- Northwest Atlantic circulation bias is reduced in a high-resolution global climate model
- Atmospheric CO_2 doubling over 70–80 years results in an enhanced

Vincent S. Saba[1], Stephen M. Griffies[2], Whit G. Anderson[2], Michael Winton[2], Michael A. Alexander[3], Thomas L. Delworth[2], Jonathan A. Hare[4], Matthew J. Harrison[2], Anthony Rosati[2], Gabriel A. Vecchi[2], and Rong Zhang[2]



Bottom temperatures with CO_2 doubling

Changing processes:
Ecological
Economic
Social-political

Applied marine ecosystem science

In the face of complexity & change

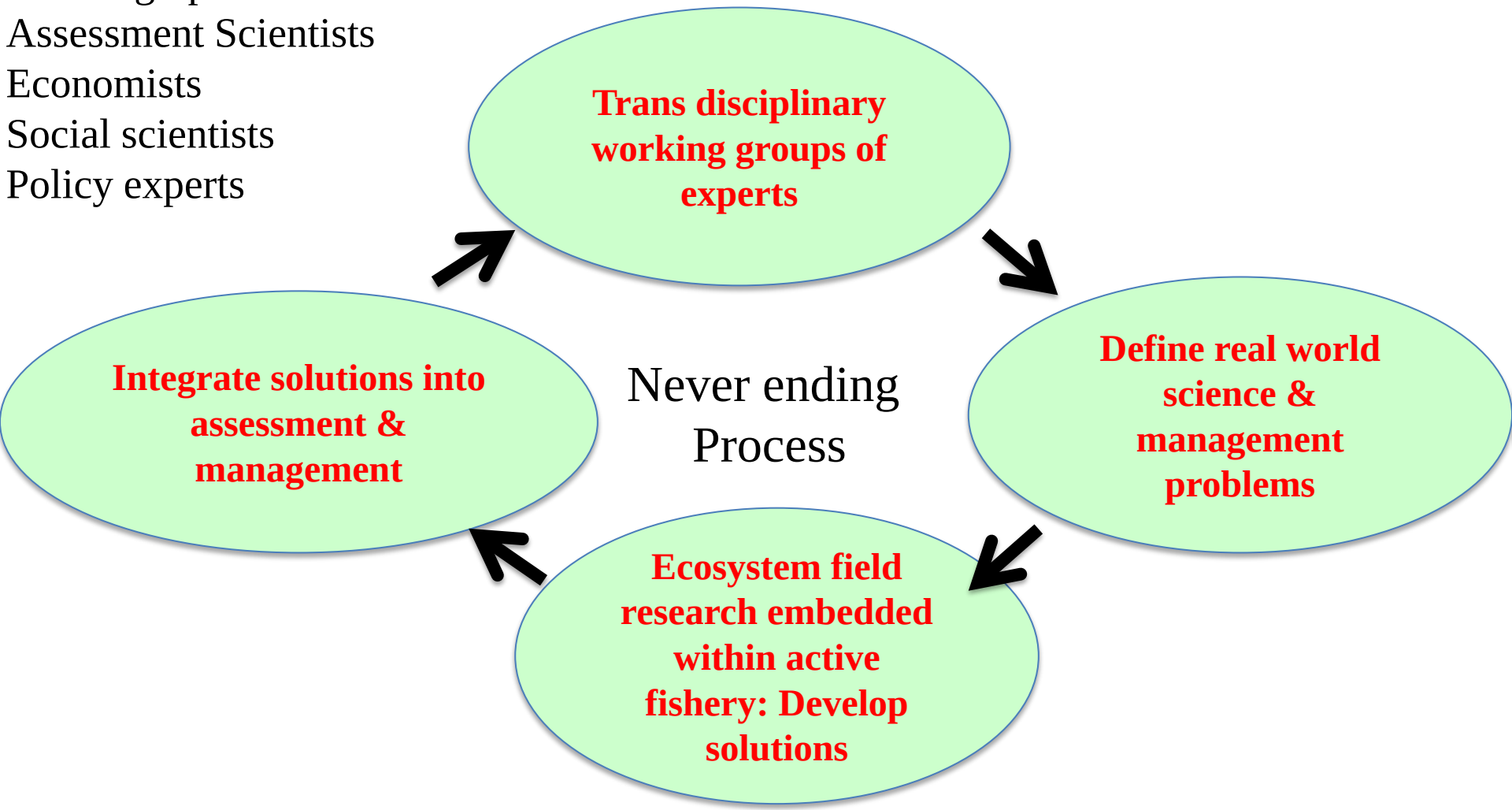
Most problems are novel & the solutions; provisional

What does this have to do with collaborative research?

Fisherman have practical, real time knowledge of ecological, economic, & social dimensions of fisheries systems & ecosystems

Collaborative ecosystem based fisheries science
complexity & change

"Fisher" ecologists & business experts
Academic ecologists
Oceanographers
Assessment Scientists
Economists
Social scientists
Policy experts



Atlantic Mackerel Population Ecology & Fishery Workshop
Industry & Science perspectives

December, 2015, 2016

Point Judith, Narragansett, Rhode Island

Funded by NEFSC COOP research, Salt Pond Fisheries, MAFMC

Government | Fishing industry | NGO | Academia

Adams, Chuck (Assessment)
Anderson, Emory (Assessment)
Axelson, Leif (Fisheries & Ecology)
Bari, Carly (Marine Policy)
Bell, Rich (Ecology)
Bright, Bill (Fisheries & Ecology)
Carter, Lauren (Assessment)
Curti, Kiersten (Assessment)
Didden, Jason (Marine Policy)
Gaiches, Sarah (Ecosystem science)
Goodwin, Glenn (Fisheries & Ecology)
Hare, Jon (Oceanography & Ecology)
Hoey, John (COOP research)
Jardine, Sunny (Fisheries Economics)
Kaelin, Jeff (Fisheries & Gov't relations)
Kohut, Josh (Ocean physics)
Lapp, Meghan (Fisheries & Gov't relations)
Lee, John (Journalist)
Manderson, John (Ecology & COOP research)
Martin, Mike (FI Surveys & COOP research)
McBride, Richard (Reproductive Ecology)
Miller, Alicia (Assessment Science)
Moore, Peter (Fisheries & Economics)
O'Neill, Gerry (Fisheries & Economics)
Redding, Gray (Ecology)
Rhule, Jim (Fisheries & Ecology)
Richardson, David (Oceanography & Ecology)
Roebuck, Chris (Fisheries & Ecology)
Sarro, Chris (COOP research)
Secor, David (Ecology)
Shepherd, Gary (Assessment)

Discuss knowns, known unknowns & unknown unknowns
about mackerel population ecology
& ecological, economic, & regulatory drivers of the fishery.
Develop alternative hypothesis for observations & define next steps
before the assessment process begins

Next steps developed by Working Group

- Investigate stock structure
- Survey catchability = Population availability to survey*Net efficiency
- Unconfound model catchability estimates from uncertainties in M + F
- Develop coast wide egg index
- Estimation of natural mortality (M)
  - Species displacement > Dogfish driving distributions?
  - Consumption > estimate for dogfish + other fish & mammals
- Estimation of fishing mortality (F)
  - What are the ecological, economic, regulatory drivers of availability & landings

Next steps developed by Working Group

- Investigate stock structure
  - Dave Secor: Contribution of Canadian fish to US fishery
- Survey catchability = Population availability to survey*Net efficiency

- Unconfound model catchability estimates from uncertainties in M + F

- Develop coast wide egg index
  - Dave Richardson & Lauren Carter
- Estimation of natural mortality (M)
  - Species displacement > Dogfish driving distributions?
  - Consumption > estimate for dogfish + other fish & mammals

- Estimation of fishing mortality (F)
  - What are the ecological, economic, regulatory drivers of availability & landings

Next steps developed by Working Group

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- Estimation of fishing mortality (F)
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Unmanaged Forage Amendment - Public Hearing #4

Monday, May 23, 2016

6:00pm – 7:30pm

U of Rhode Island Bay

LATEST NEWS

2016

Mid-Atlantic Council Announces Funded Collaborative Research Projects

The Mid-Atlantic Fishery Management Council announces that four research projects have been selected to receive a total of approximately $610,000 in funding as part of the Council's 2016-2017 Collaborative Fisheries Research Program. The four projects each address research priorities identified by the Mid-Atlantic Council in a Request for Proposals distributed in December 2015.

"Accurate information is the foundation of effective fisheries management," said Council Chairman Rick Robins. "These research projects will help fill critical gaps in our understanding of Mid-Atlantic fisheries and ensure their continued sustainability."

Details on the selected projects are provided below.

Changes in Availability of Mid-Atlantic Fish Stocks To Fisheries-Independent Surveys

Principal Investigators: Janet Nye, Michael Frisk, and Skyler Sagarese.

This project will investigate how habitat modifies the availability of summer flounder, black sea bass, and spiny dogfish to the NEFSC trawl survey. The focus of this research is on the relationship between the NEFSC trawl survey index and actual abundance of these species.

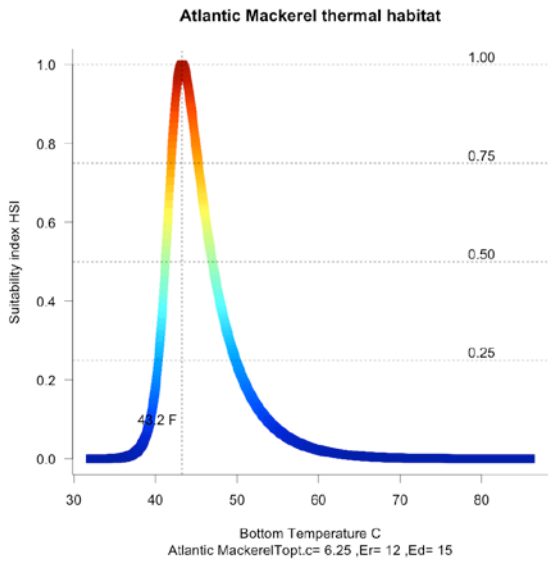
Collaborative Development Of A Winter Habitat Model For Atlantic Mackerel, "Version 2.0", For The Identification Of "Cryptic" Habitats And Estimation Of Population Availability To Assessment Surveys And The Fishery

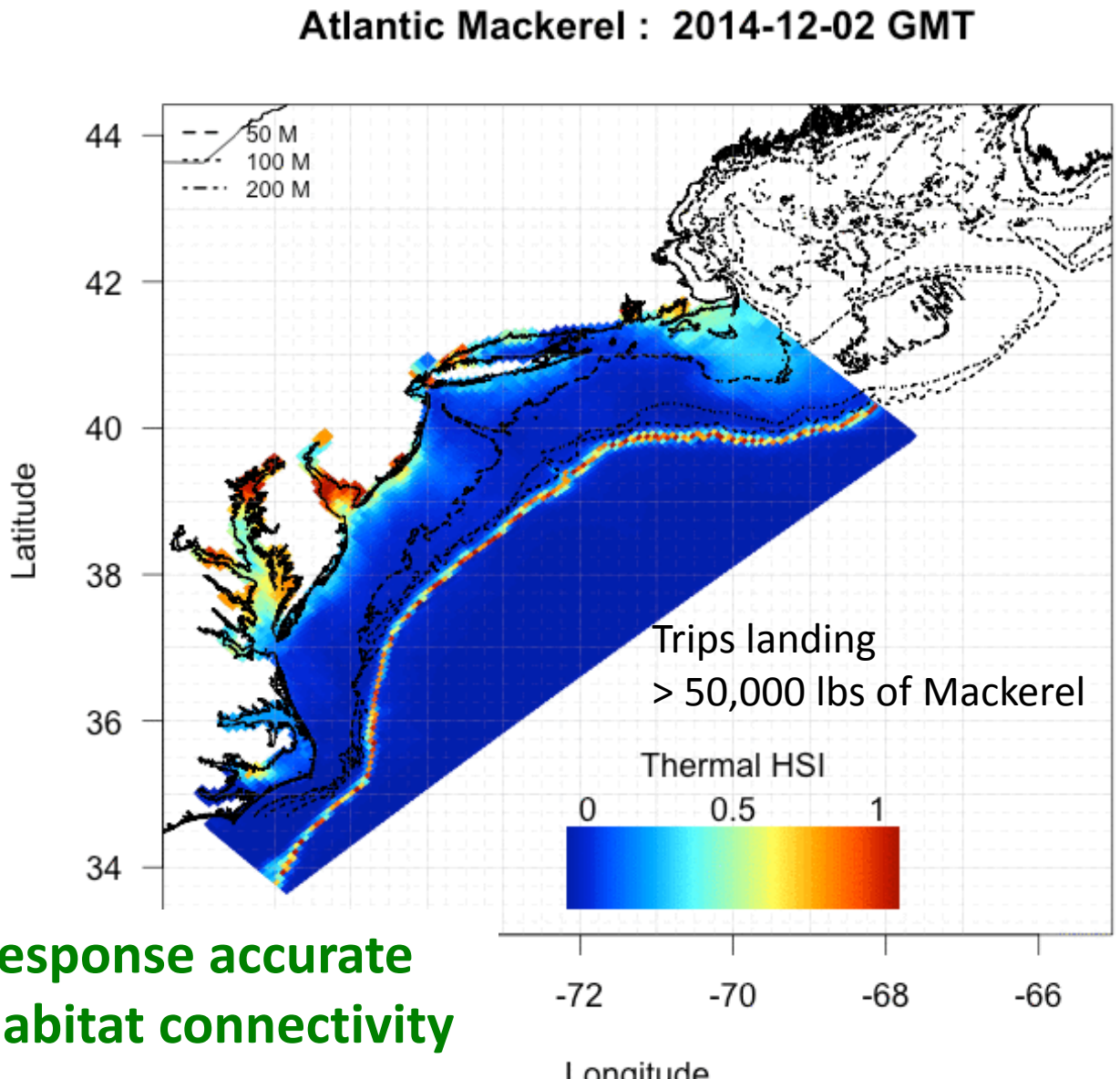
Principal Investigator: Gregory DiDomenico; Co-Principal Investigators: William Bright; Peter Moore, Josh Kohut, Mitchell Roffer, and John Manderson.

This project will synthesize existing information to develop and evaluate a quantitative model describing dynamic winter habitat distributions for Atlantic Mackerel. The goal of this study is to develop a model that can be used to accurately estimate the availability of the population to fishery independent surveys.

Hypothesis: availability of adults & juveniles to survey determined by the amount winter habitat surveyed

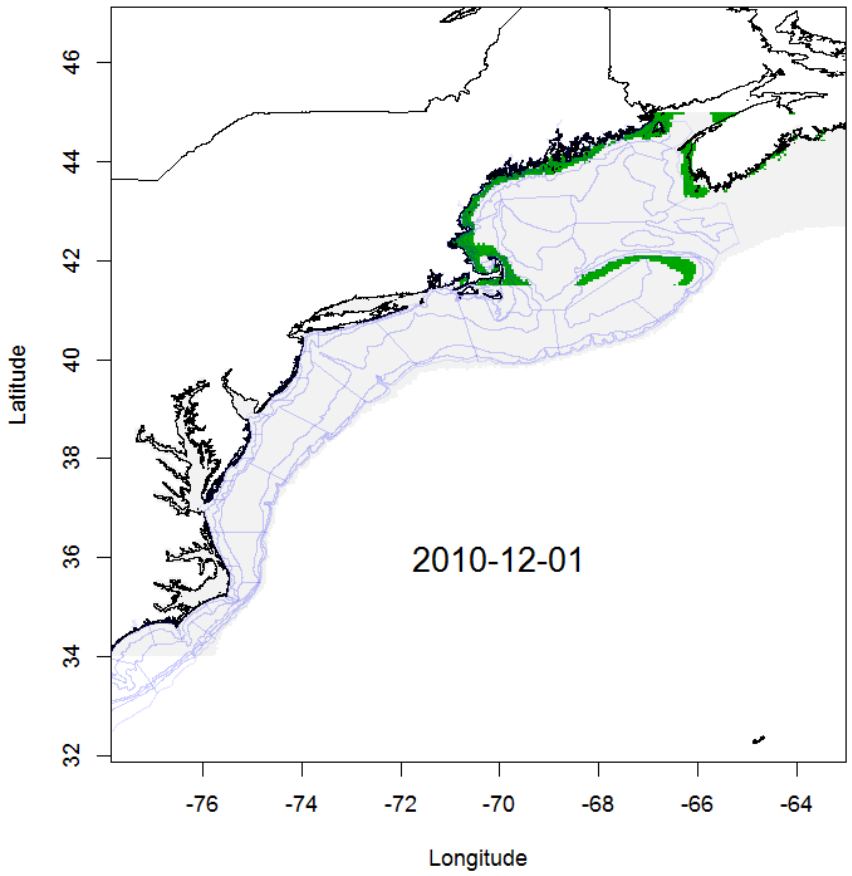
Collaborative habitat model development with NEFSC study fleet members during 2015-16, 2016-17 fishing seasons

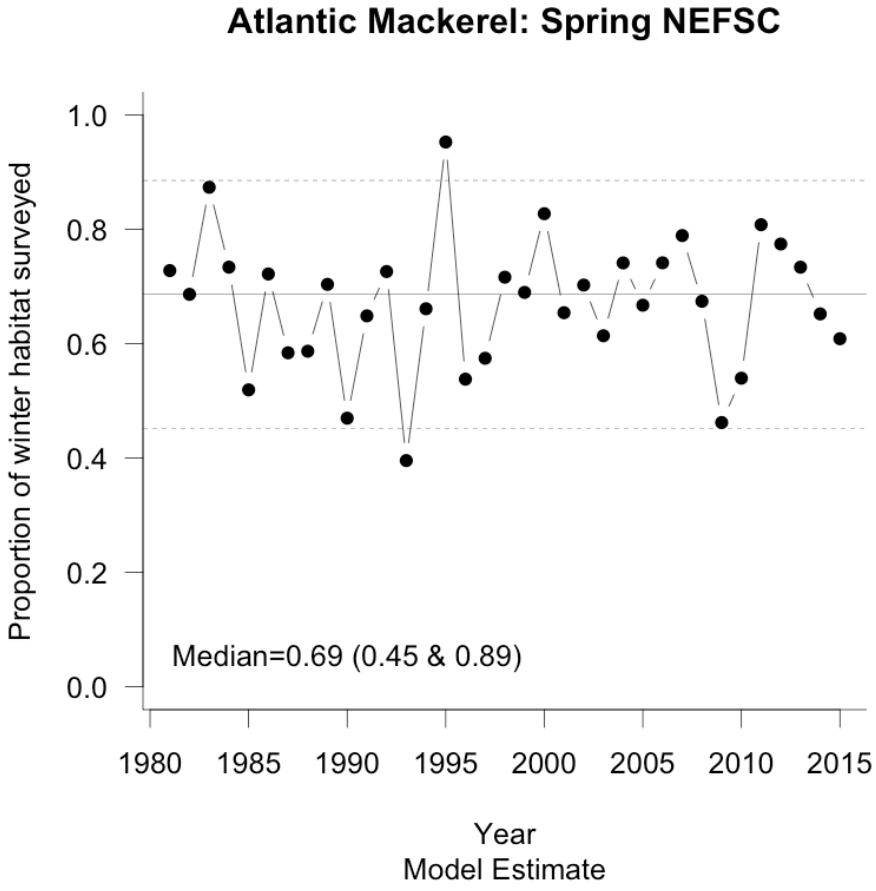




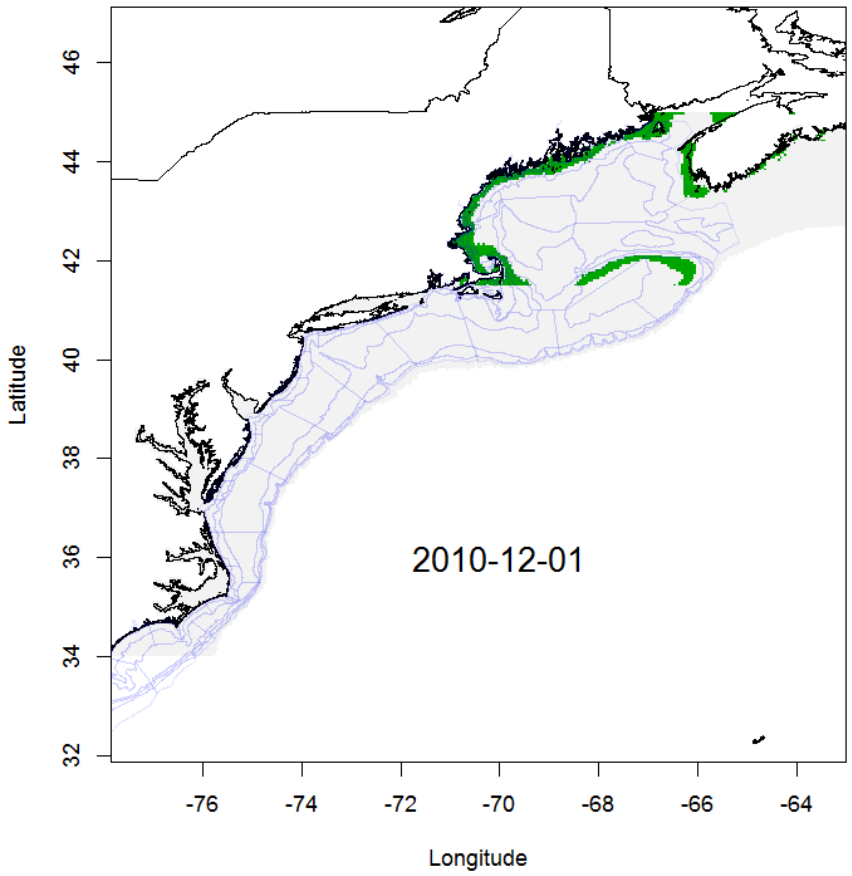
Results: temperature response accurate but must account for habitat connectivity

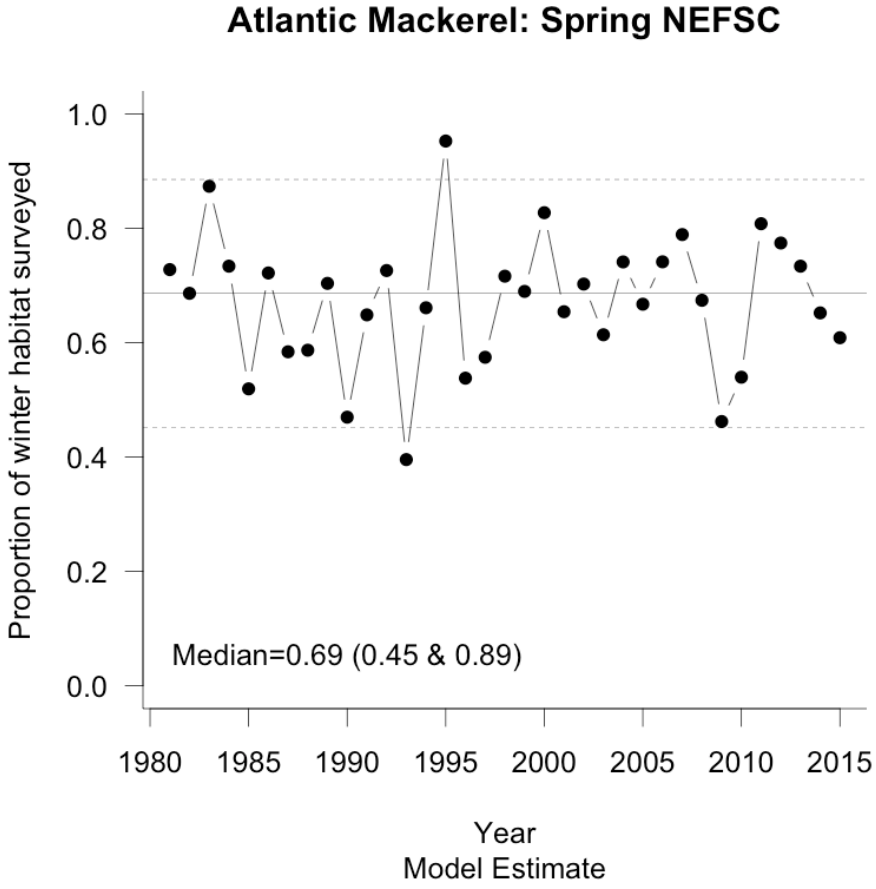
Winter habitat model accounting for connectivity





Winter habitat model accounting for connectivity

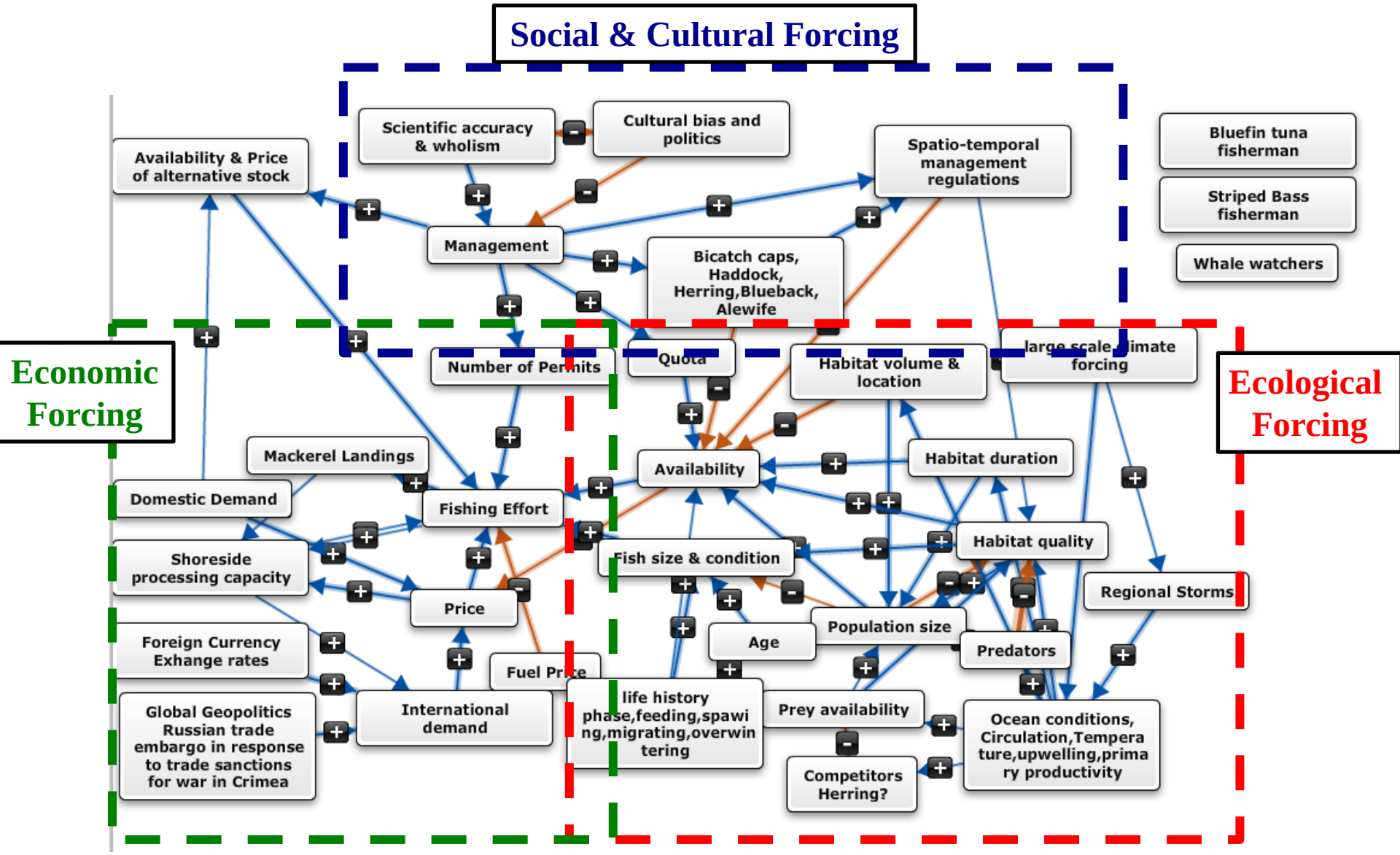




Finding: Distribution & availability to survey not just a function of of available winter habitat for juveniles & adults

Continuous engagement with industry collaborators
What's going in the fishery & ecosystem in real time?
(*ecological, economic & socio-political dimensions*)

“Horrendogram” of Atlantic Mackerel socio-ecological fishery system



SARC 64 WP: Fishing industry perspectives on socio-ecological factors driving Atlantic Mackerel catchability & landings in US waters

Submitted by: Northeast Fisheries Cooperative Research Program & Fishing Industry Partners

The order of authors is alphabetical:
Axelson, Leif. FV Dyrsten
Bright, William K. Loper Bright FV Retriever
DiDomenico, Greg. Garden State Seafood Association
Goodwin, Glenn. FV Relentless, Seafreeze limited,
Hoey, John. NEFSC Cooperative Research Program
Kaelin, Jeff. Lund's Fisheries
Knight, John, Superior Trawl
Lapp, Meghan. Seafreeze limited
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Mitchell, Brendan P. Northern Pelagic Group LLC (NORPEL)
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O'Neill, Gerry. Cape Seafoods
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Sarro, Christopher. NEFSC Cooperative Research Program

Collaborative ecosystem based fisheries science
complexity & change