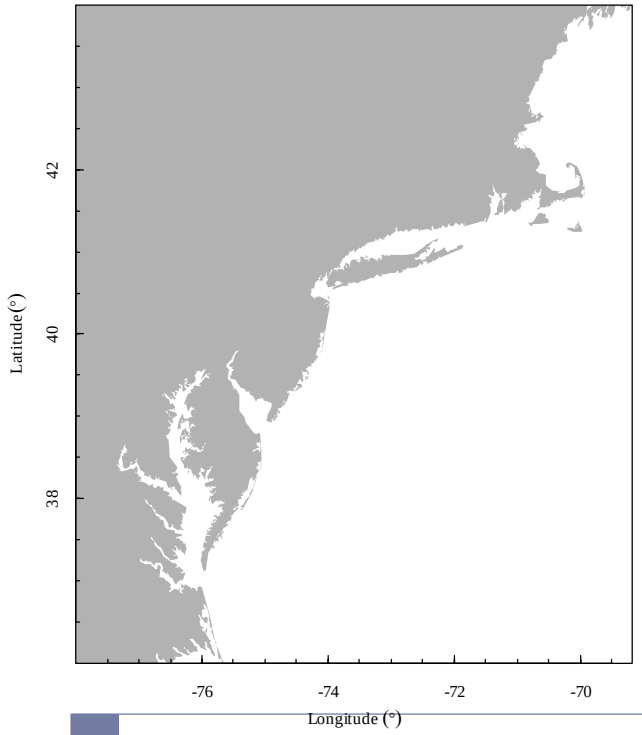


Changes in the distribution of southern New England/Mid-Atlantic coastal species

Black Sea Bass, Scup, Summer Flounder and Winter Flounder

Richard Bell, **David Richardson**, Jonathan Hare

Northeast Fisheries Science Center, Narragansett RI

Images: Northeast Fisheries Science Center

Presentation Outline

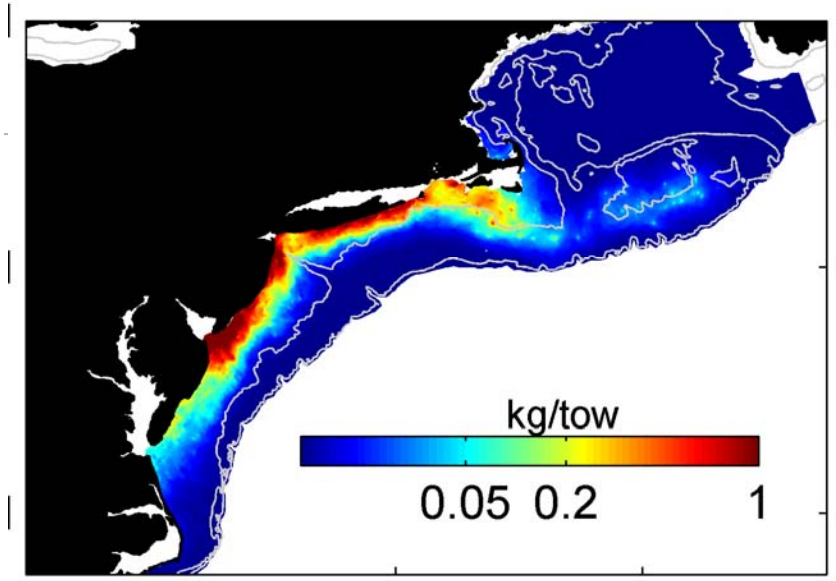
- What are the patterns of distribution shifts in these species?
- What factors are driving these distribution shifts?

Summer Flounder Maps

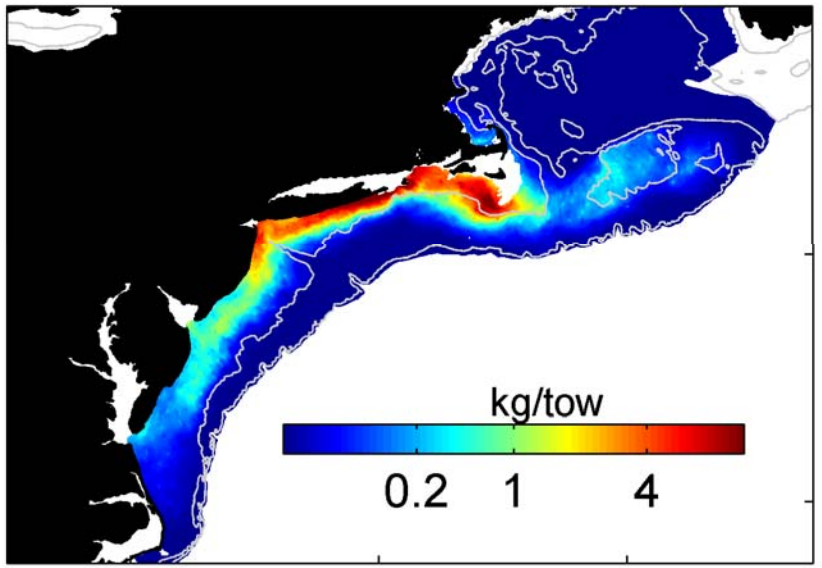
- A general northward shift is evident in Summer Flounder on the trawl survey

- Biomass of summer flounder sampled on the trawl survey has also increased

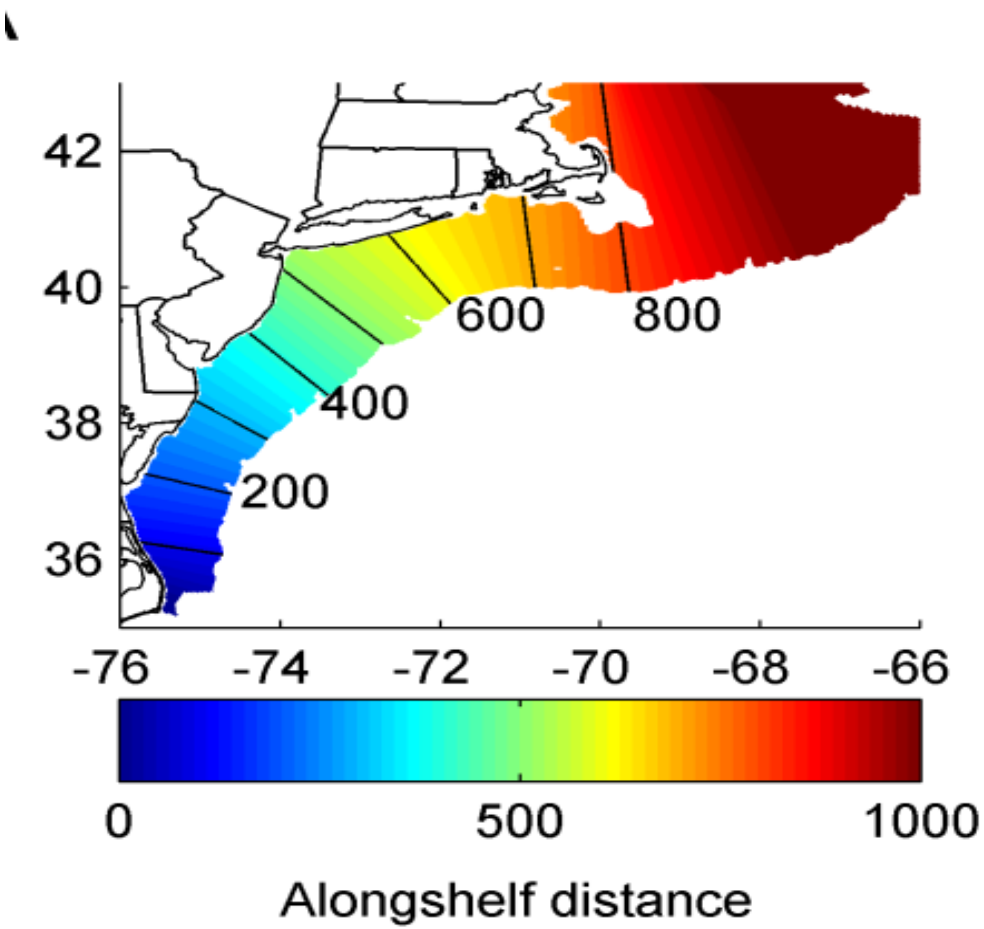
1980-1989



2000-2008



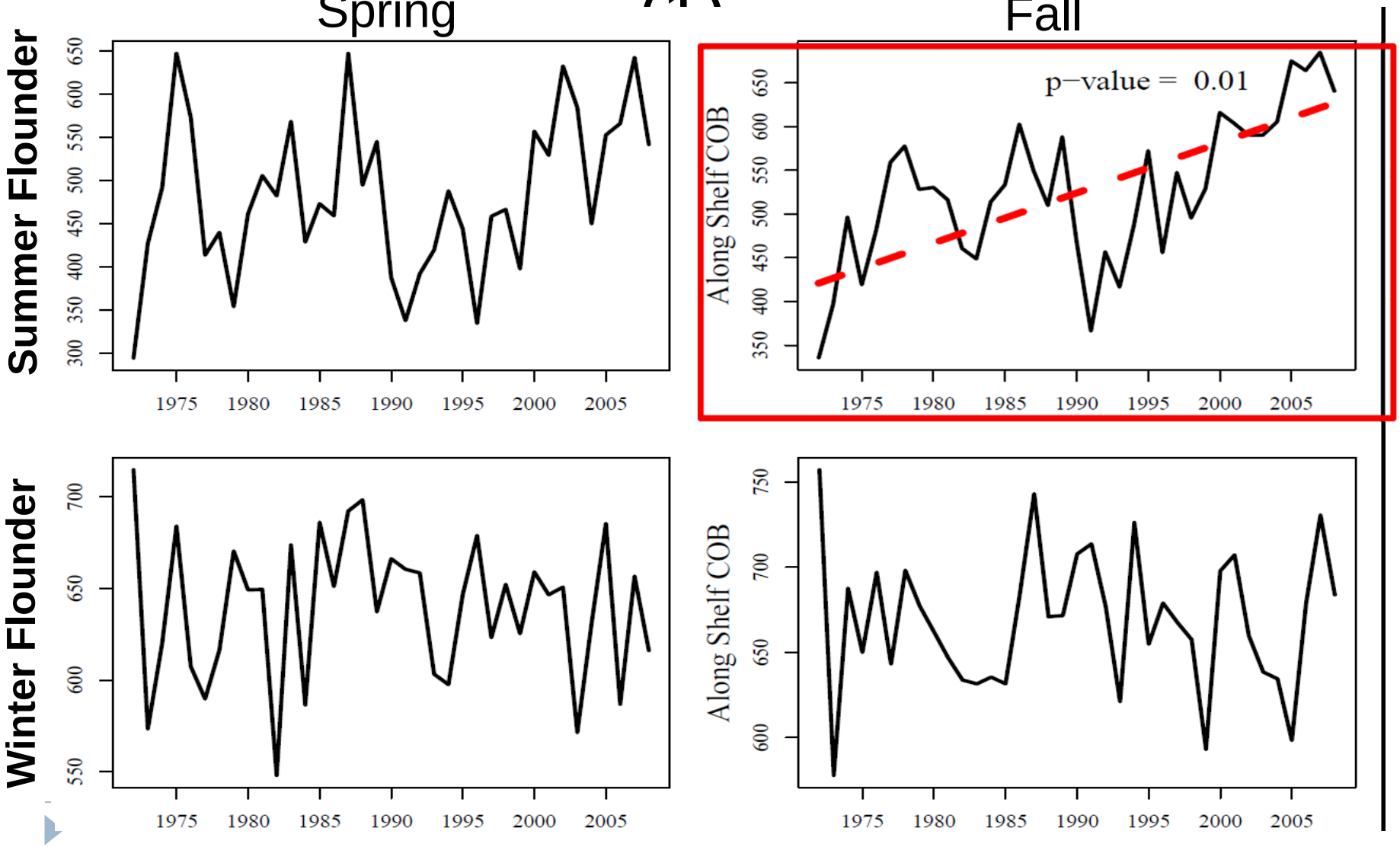
Quantifying distribution shifts: Along shelf distance (km)



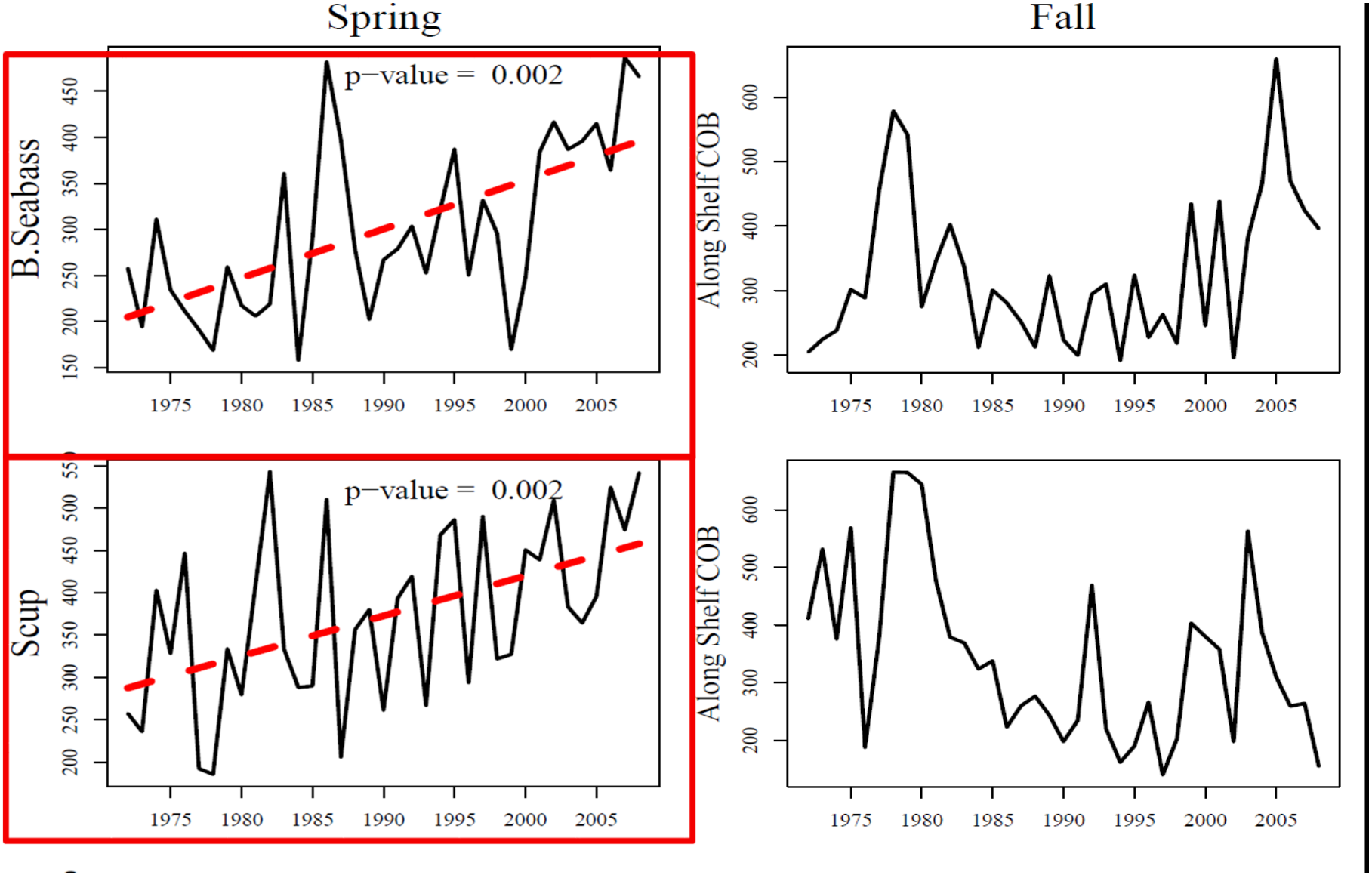
- All survey strata from SNE/MAB and GB
- Inshore and offshore strata
- 1972 – 2008
- Bigelow starts 2009

The center of biomass is reported as the distance along the NE shelf

Change in the annual along shelf center of biomass for each species in each season



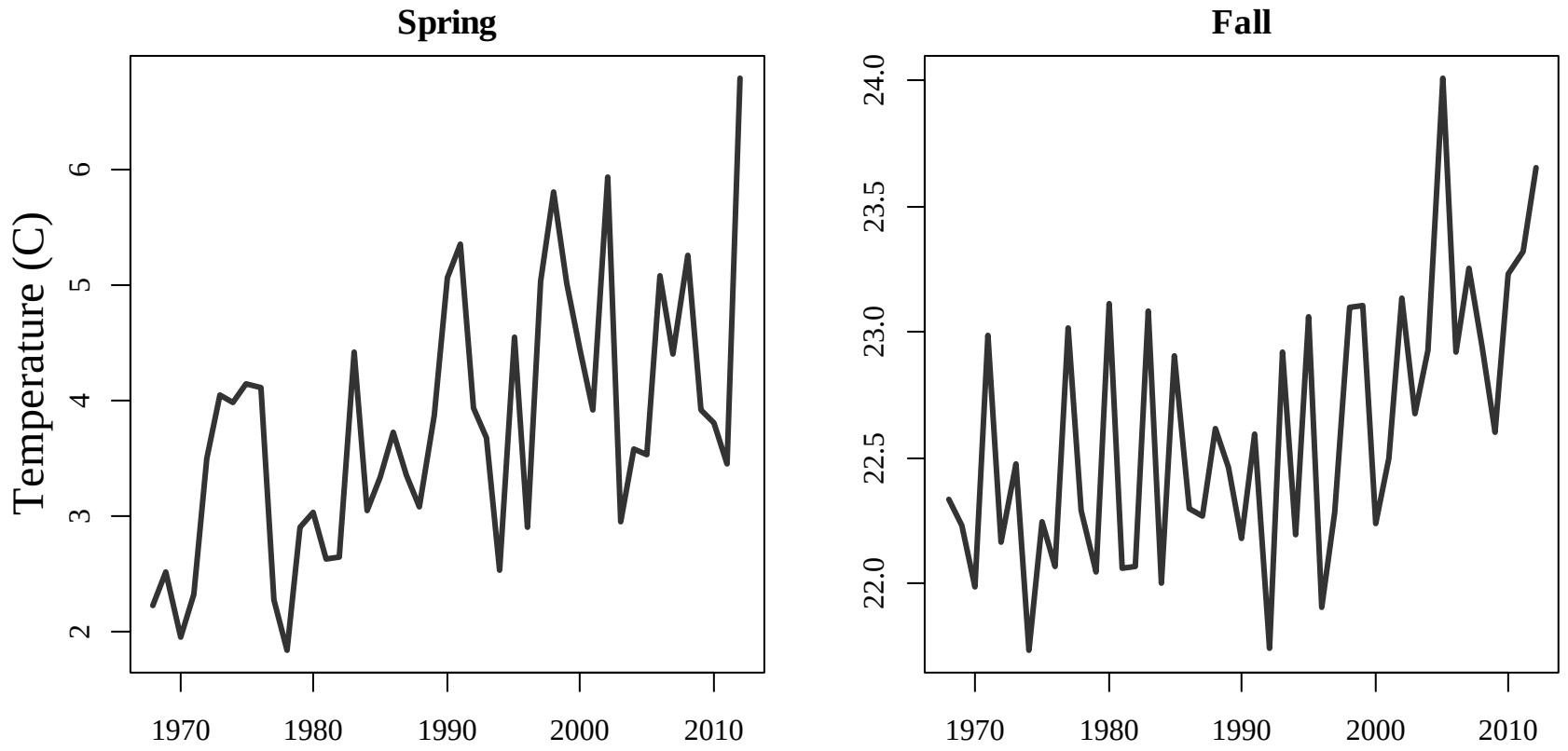
Change in the annual along shelf center of biomass for each species in each season



What factors are driving these distribution shifts?

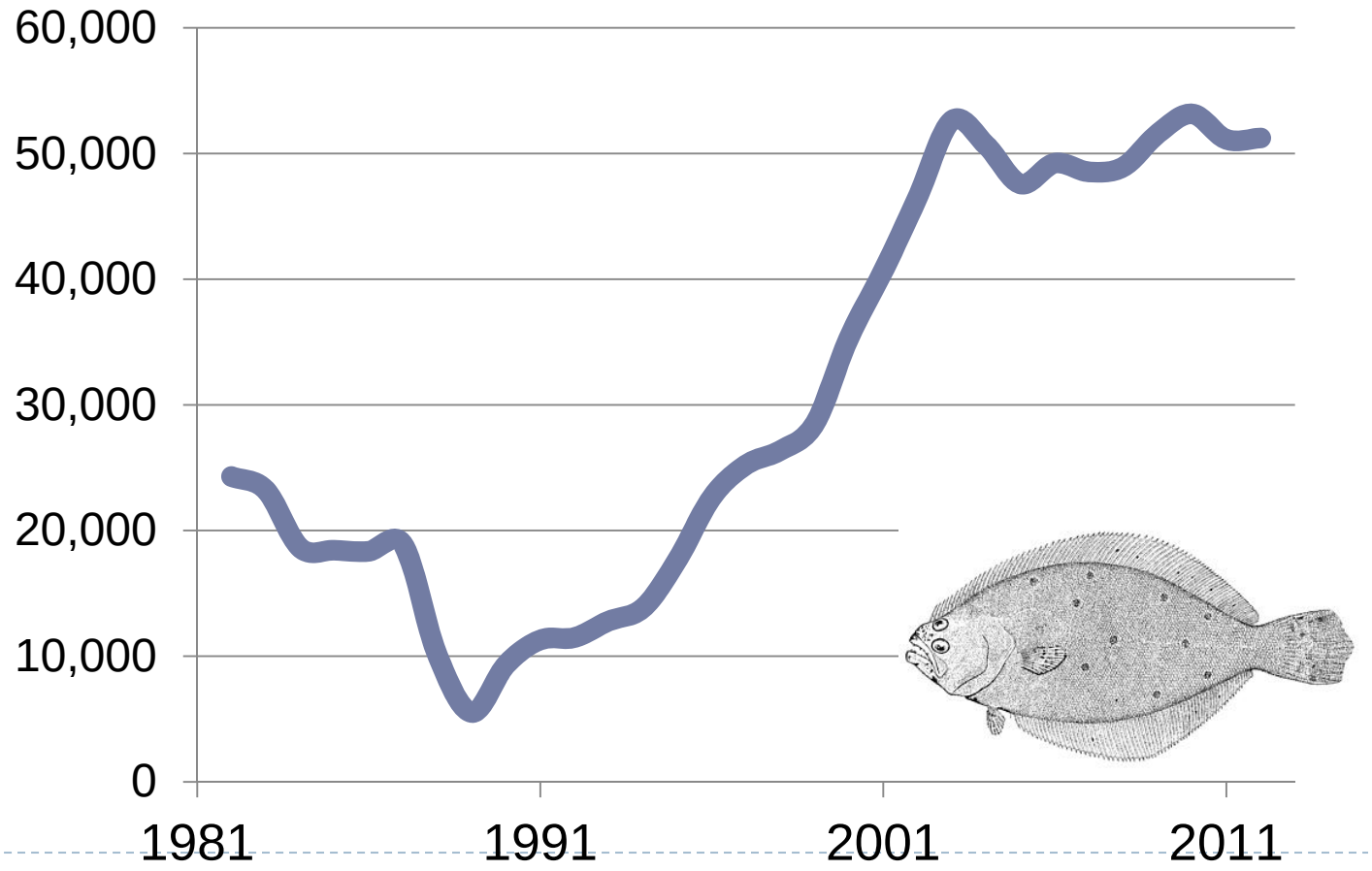
- Increasing temperature?
  - -Species tend to move north as temperatures warm
- Changes in population abundance?
  - -Populations tend to occupy a larger area as their numbers increase
- Changes in population size structure?
  - -Larger fish often occur further north than smaller fish
  - -Reducing fishing pressure tends to result in larger fish

Annual Mean Temperature



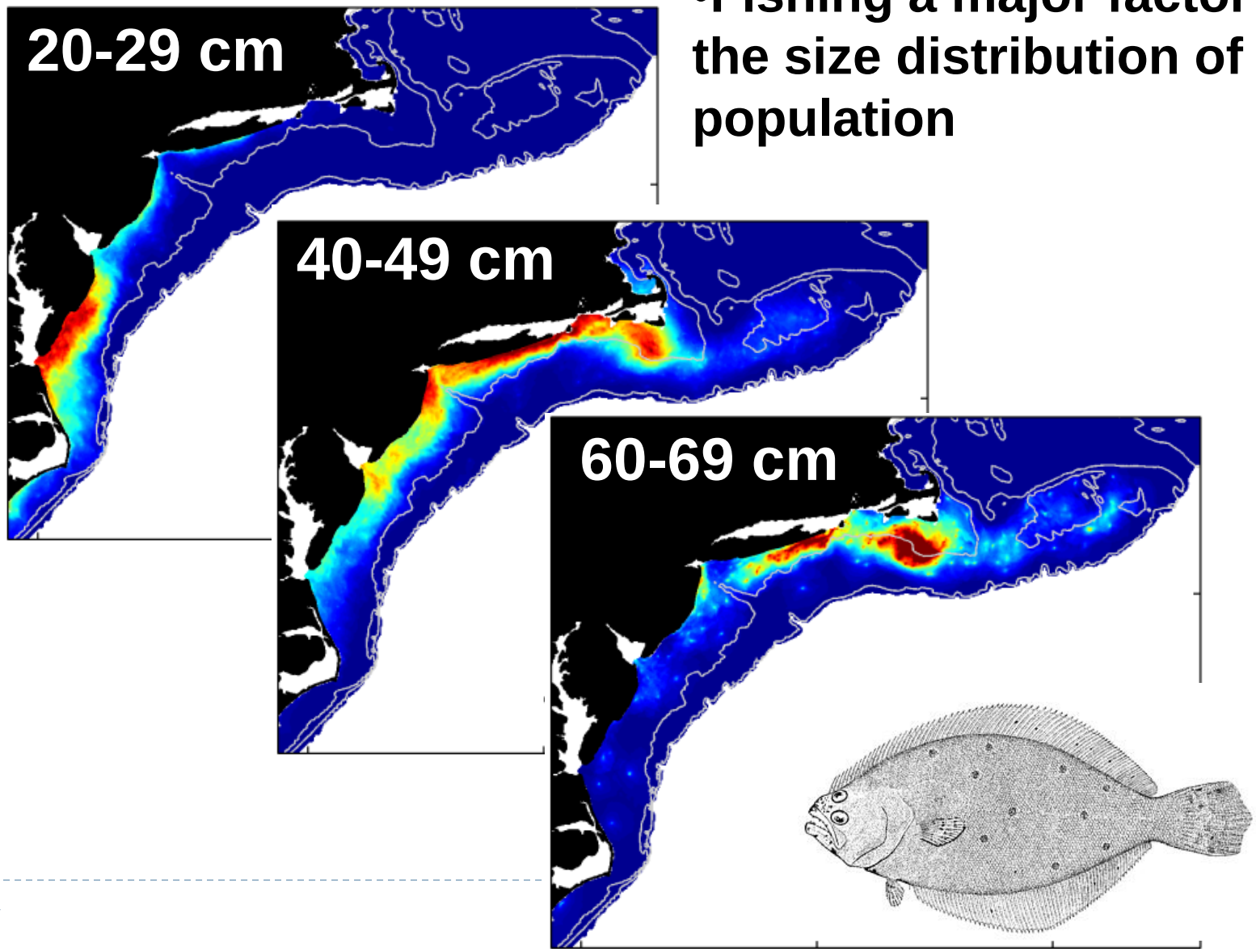
- Three month averaged temperature

Population abundance

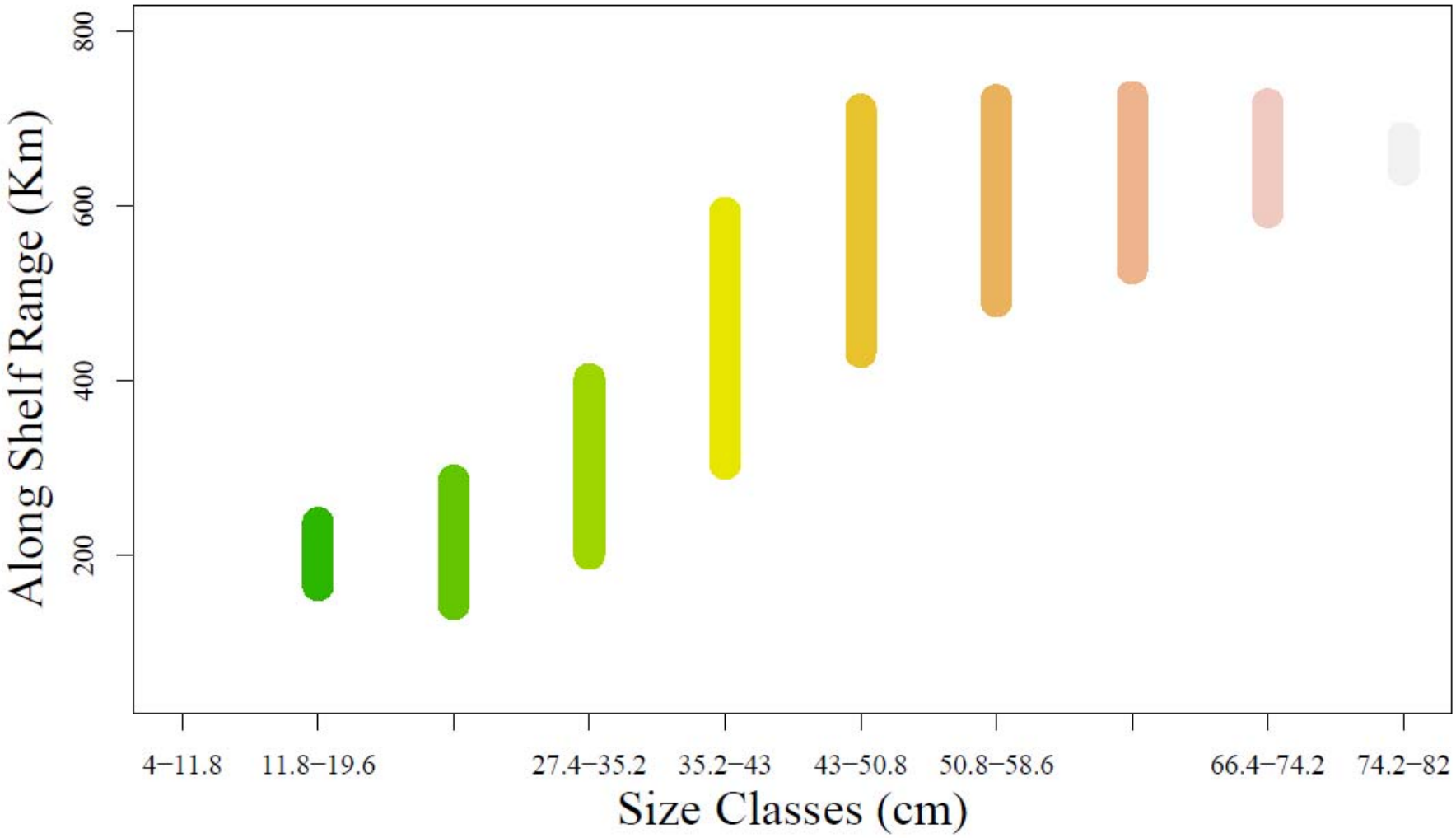


Size Structure

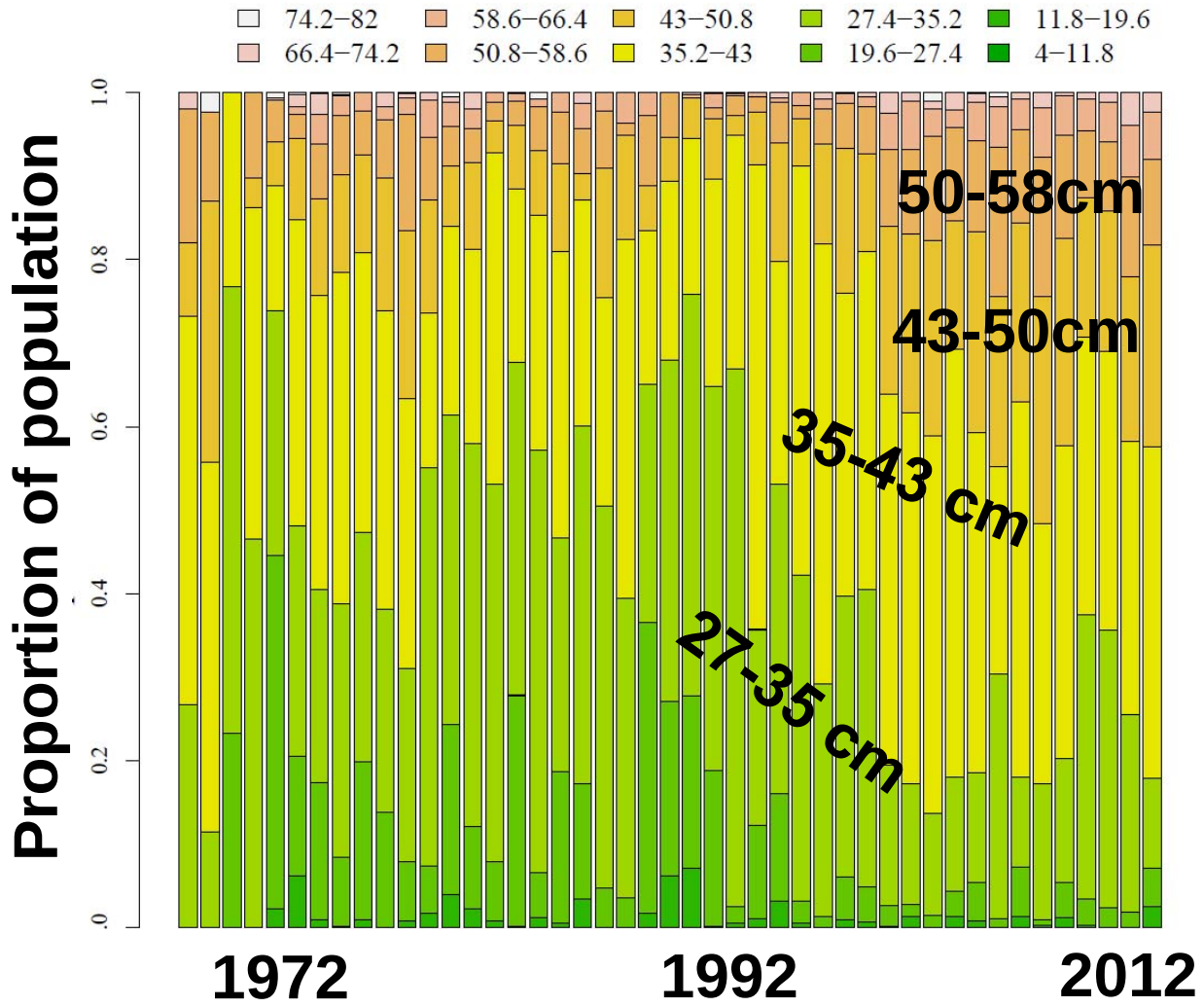
- Smaller fish further south
- Larger fish further north
- Fishing a major factor in the size distribution of a population



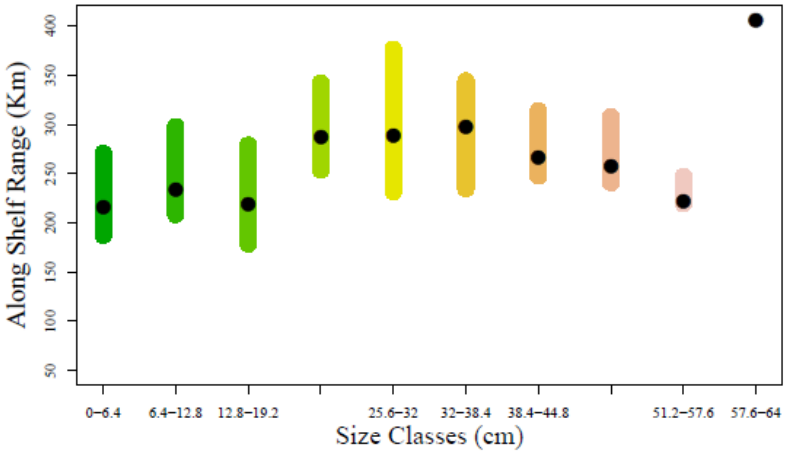
Summer Flounder Along-shelf center of abundance by size

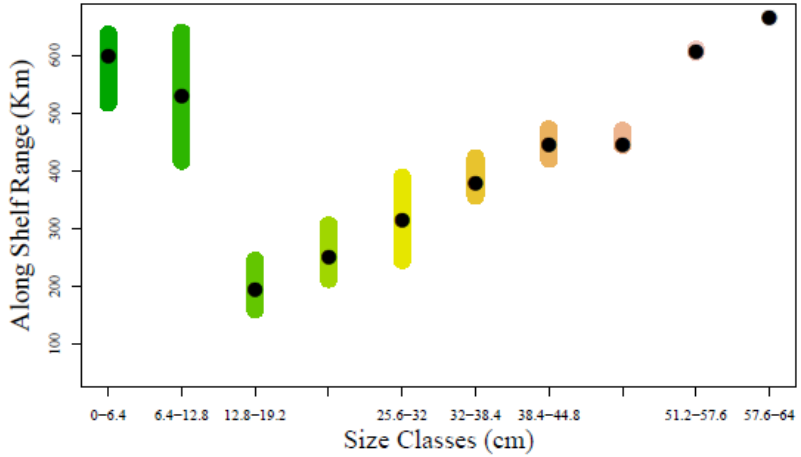


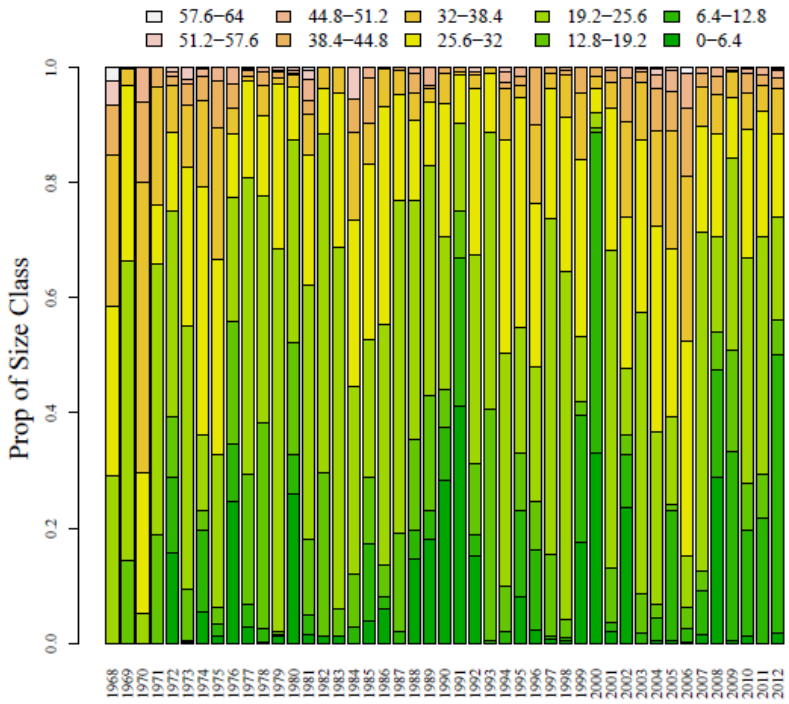
The proportion of each length class constituting total abundance

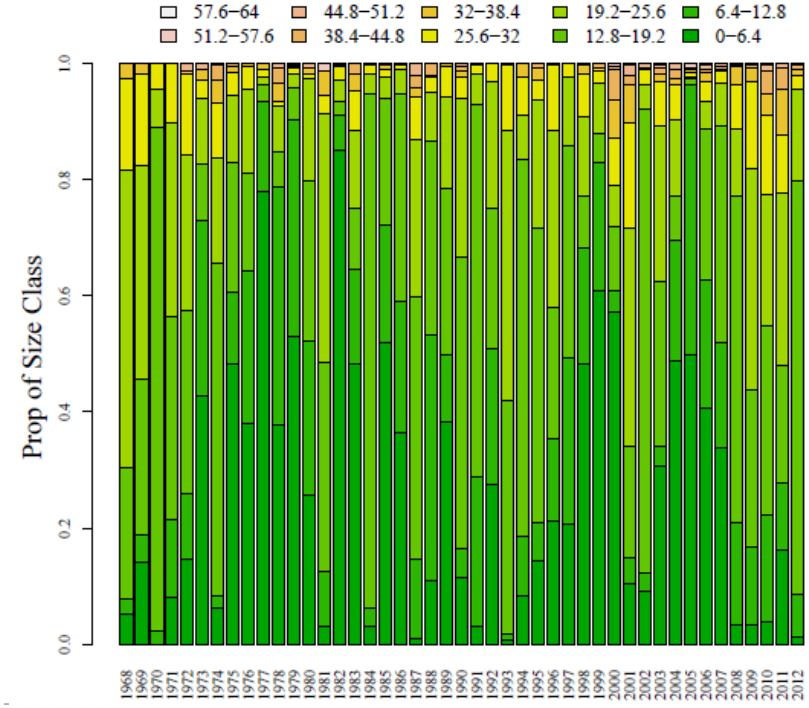


Black Sea Bass





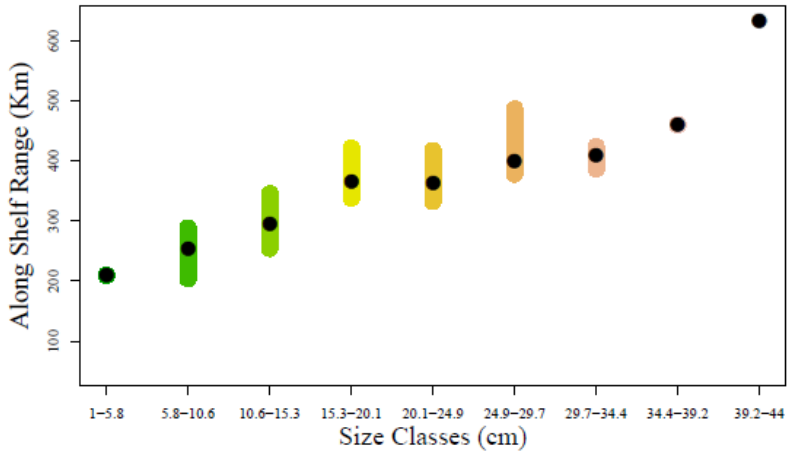


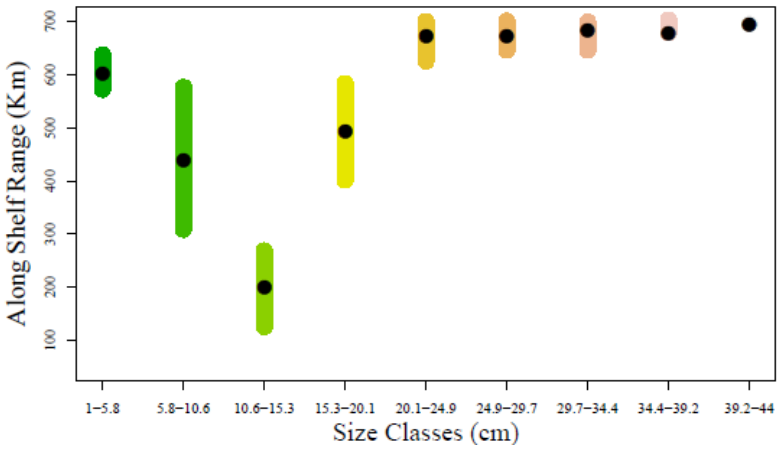


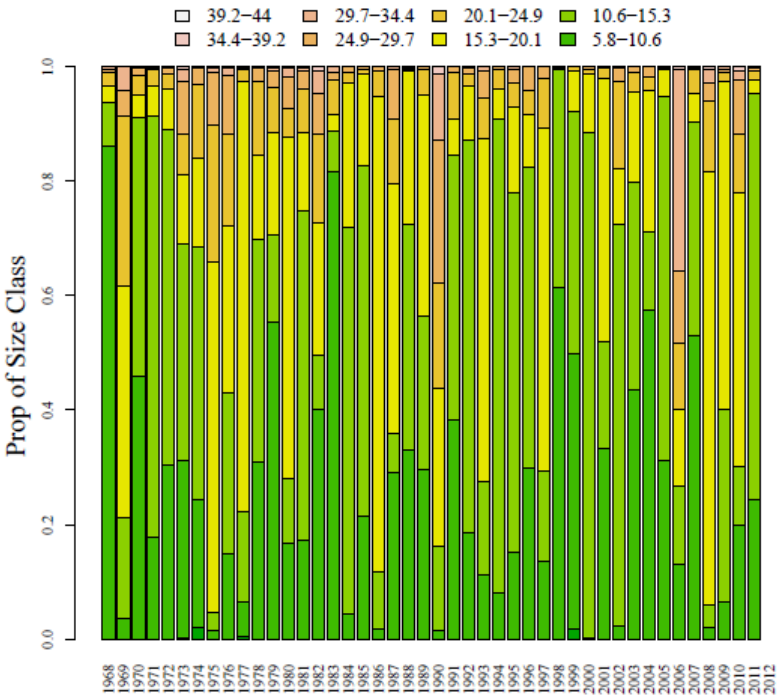
Spring

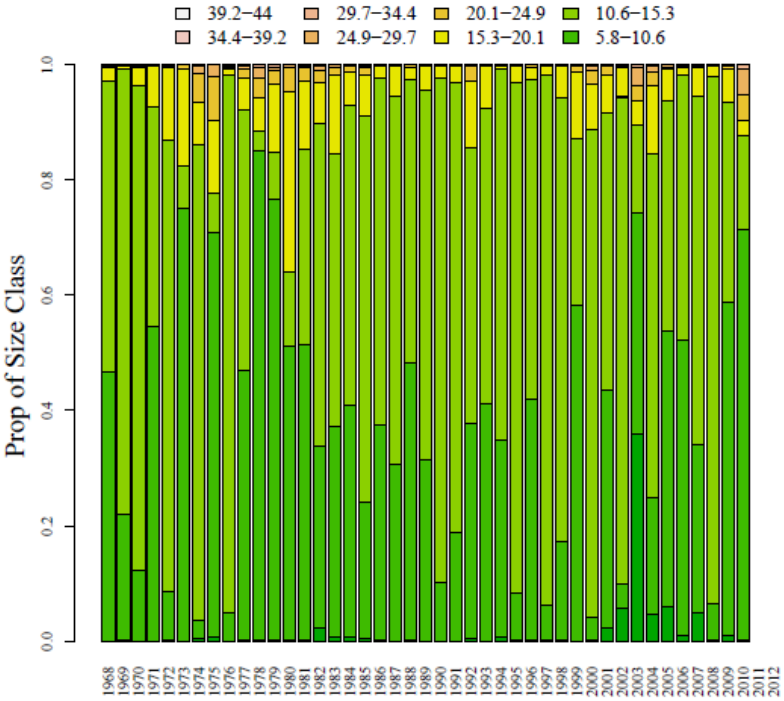
Fall

Scup









Spring

Fall

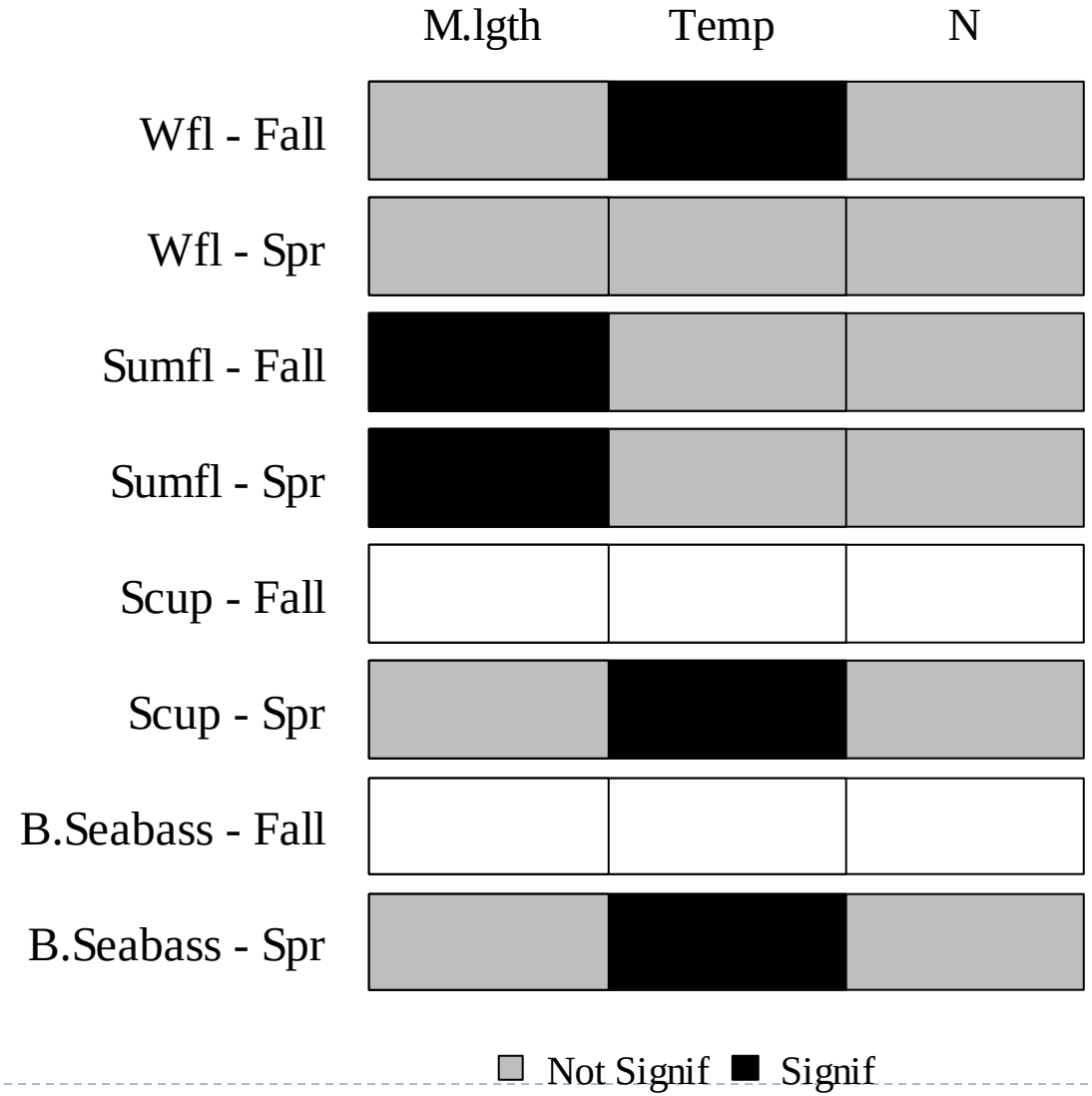
Generalized Additive Model (GAM)

GAM's are linear models – Independent variables are smooth function

$$COB_{yr} = f(MeanLgth_{yr}) + f(Temp_{yr}) + f(N_{yr})$$

Three term model

GAM Output – Significant terms



Conclusions

- Distribution shifts (the impact of climate change) are COMPLICATED
- Evidence of poleward shift in black sea bass, scup and summer flounder
- Significant impact of temperature on shift in black sea bass and scup
- Shift in summer flounder largely driven by recovery and expansion of the length distribution
- SNE/MAB winter flounder stock not shifting
- Fishing pressure and climate impact abundance and distribution

Fisheries Reallocation and MSC Recommendations

MANAGEMENT AND SCIENCE COMMITTEE

ISFMP POLICY BOARD PRESENTATION, MAY 14TH 2014

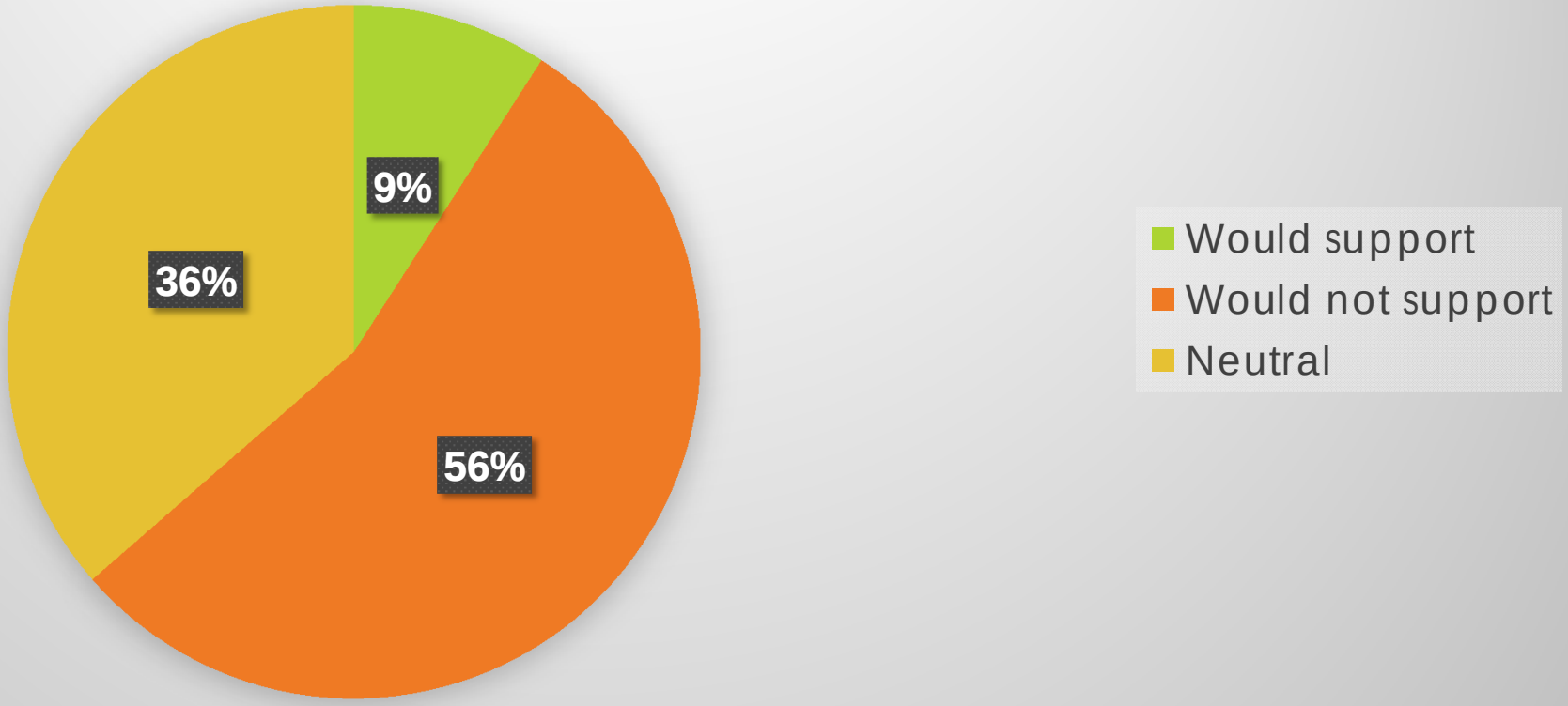
Introduction

- ISFMP Policy Board charged the Management and Science Committee with investigating whether climate change and warming coastal water temperatures are causing shifts in the geographic distributions of several stocks. And, where shifts are occurring, to reconsider the state-by-state allocation schemes and need for adjustment.
  - Define focal species to investigate, based on state allocation scheme and region of distribution
    - Summer flounder, black sea bass, and scup
  - Summarize the state of knowledge for focal species, define criteria for a significant stock distribution shift, and demonstrate distribution shifts for stocks where it is occurring.
    - Bell et al. 2014
  - Define the methods for possibly adjusting state-by-state allocations and define the frequency for re-evaluating stock distribution changes and allocations
    - Fisheries Reallocation Survey

Survey respondents

Respondent State	Responses	Respondent State	Responses
Maine	3	New Jersey	1
New Hampshire	3	Delaware	2
New York	1	Virginia	1
Massachusetts	2	North Carolina	2
Maryland	1	South Carolina	1
Connecticut	1	Georgia	1
Rhode Island	1	Florida	1
Pennsylvania	1	**Total**	**22**

Status Quo – Do not change the current percent allocations by state that are based on catches during the historical ranges of years.



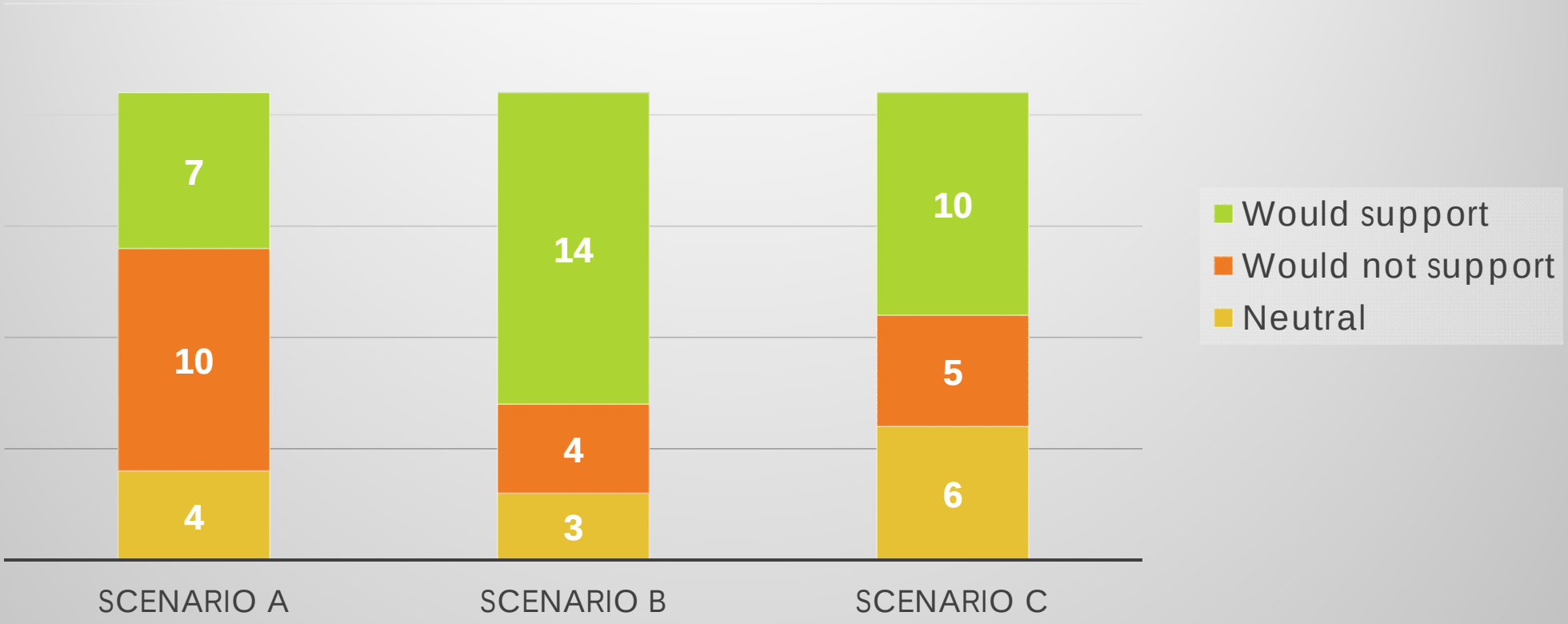
Status Quo – Do not change the current percent allocations by state that are based on catches during the historical ranges of years.

- Many comments indicated that species are shifting, and ASMFC should be responding to each change accordingly.
- Some comments noted that evidence for shift in biomass is strong, but not enough to make a permanent change.
- Many cited the need for specific information on how climate change may or may not be influencing species distribution, to what degree is the population shifting and also how a species' biology may be modified (recruitment, spawning potential, survivability etc.)

Cause/Effect Scenarios – Several allocation schemes could be created based on cause/effect scenarios that are established.

- A. Change allocations proportionally. E.g., if an area has seen a 34% increase in biomass since the historical allocation reference period, then states in the area should see a 34% increase in quota.
- B. Compare the relative biomass, keep the historical allocation for 50% of the quota, and re-allocate the remaining 50% of quota based on new biomass. E.g., when a certain percentage of catch in fisheries independent surveys is found north of a defined latitude, then allocations are automatically adjusted to reflect current distribution and biomass, while preserving part of the historical quota.
- C. A portion of the quota could be allocated based on the states recent fisheries performance. A set of parameters (e.g. retention rates, regulations, catch rates) can be used to create allocations to allow for equitable harvest opportunities.

Cause/Effect Scenarios – Several allocation schemes could be created based on cause/effect scenarios that are established.



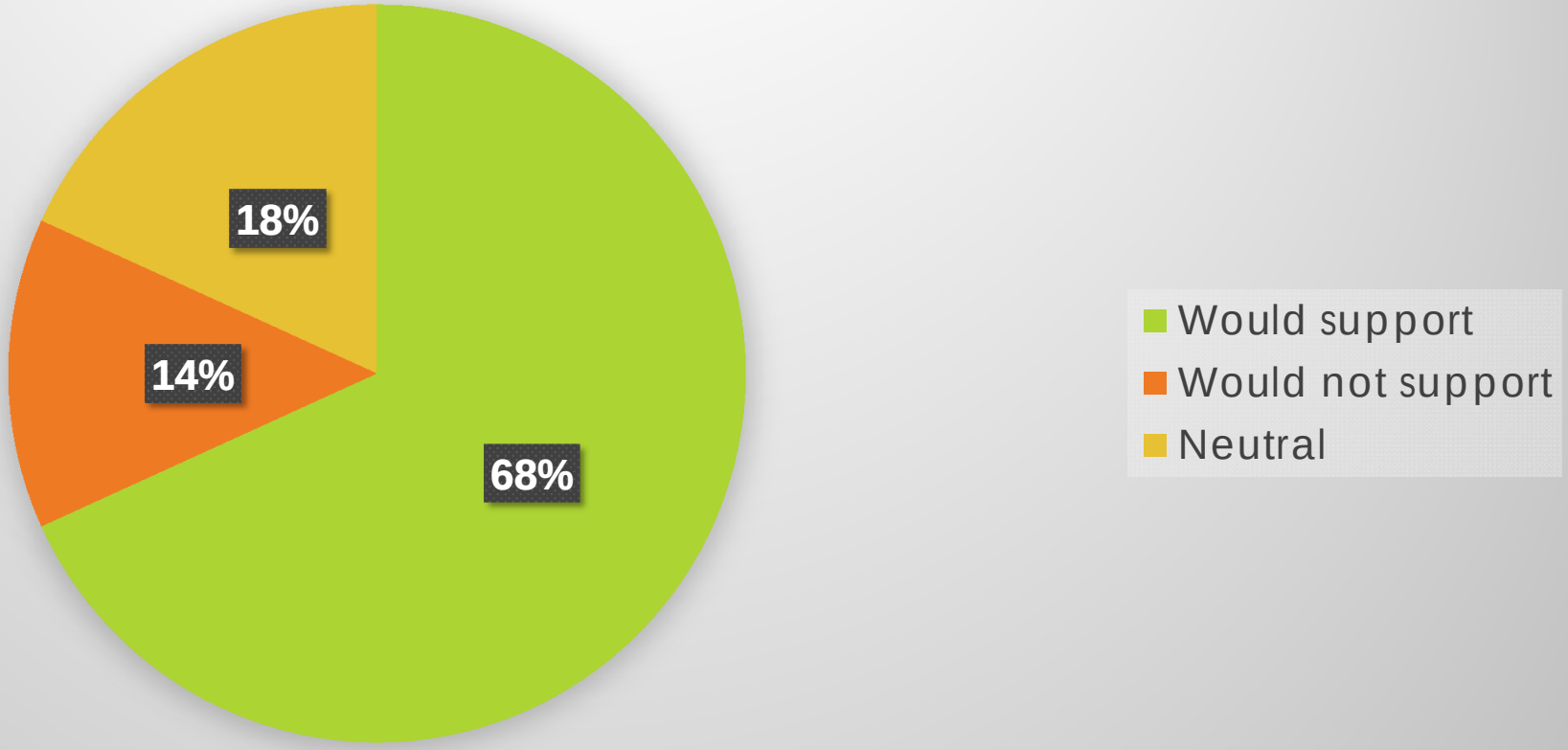
Cause/Effect Scenarios – Several allocation schemes could be created based on cause/effect scenarios that are established.

- Option A was generally unpopular, since most respondents felt that shifts in populations were not established enough to warrant such a strong change in quota.
- Option B was said to strike a balance between the historical fishery and the population shift seen the available data. Many respondents agreed that historical allocations should still account for part of the quota, so this was a gradual shift that was diplomatic, but still addressed the need for reallocation.
- Option C was viewed as practical but many comments were concerned with how the data for this option was going to be collected (i.e. MRIP).

Flexible Landing Options: a. Fishermen harvest in the waters where the fish are (E.g. land fish in an adjacent state) and those landings count toward the state quota the fisherman IS LICENSED IN. b. Fishermen harvest in the waters where the fish are and those landings count toward the state quota the fisherman LANDED THE FISH IN.

- Most respondents spoke strongly against Option A. Some of the reasons being that recreational fisherman already possess licenses in multiple states. There was also concern about fishermen in a state with a small share. For example, if a state with a small quota has already met it's quota and has shut down, fisherman from a state with a larger quota could still pull fish from the closed-down, small-quota state.
- Quite a few comments sited enforcement issues in general for either flexible landing scheme.

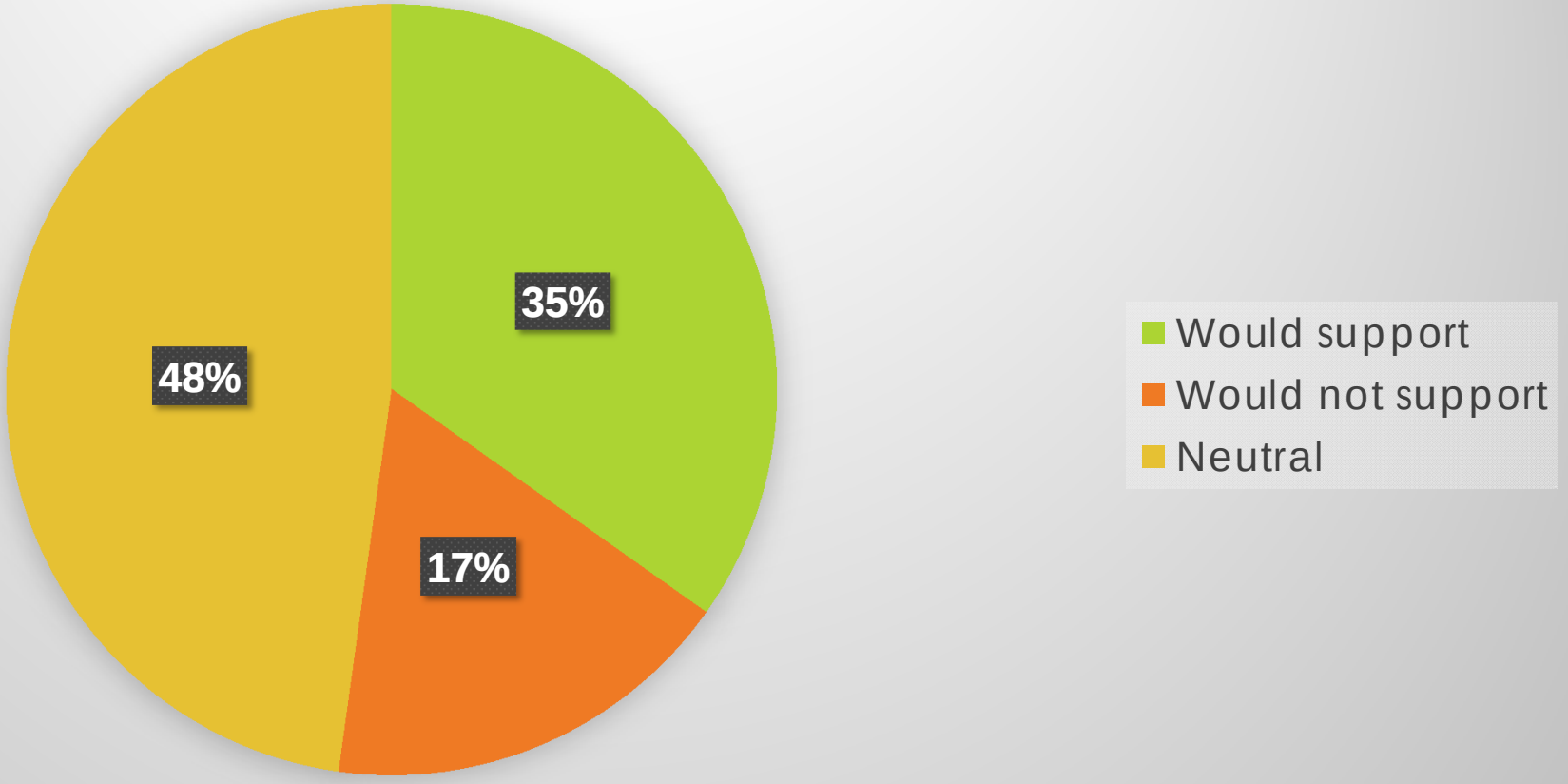
Establish a baseline abundance or biomass where the stock is considered recovered. The remaining "surplus" beyond that point is proportionally distributed to the states which are experiencing abundance increases associated with a shifting stock.



Establish a baseline abundance or biomass where the stock is considered recovered. The remaining "surplus" beyond that point is proportionally distributed to the states which are experiencing abundance increases associated with a shifting stock.

- Many respondents thought that this was a good approach to consider. People favored the fact that it keeps historical reference but allows for expansion for after a stock is rebuilt and to those states that are experiencing the increase in abundance/biomass.
- Comments indicated that we would need to be cautious that we were not experiencing a short-lived surplus.
- Some comments worried that we should not be harvesting a surplus at all, and should perhaps "stock-pile" to cover those years when recruitment is poor or overfishing might be occurring on a local level.

Establish a coast wide quota for part of the year, and state-by-state allocations for other parts (e.g., scup commercial fishery).



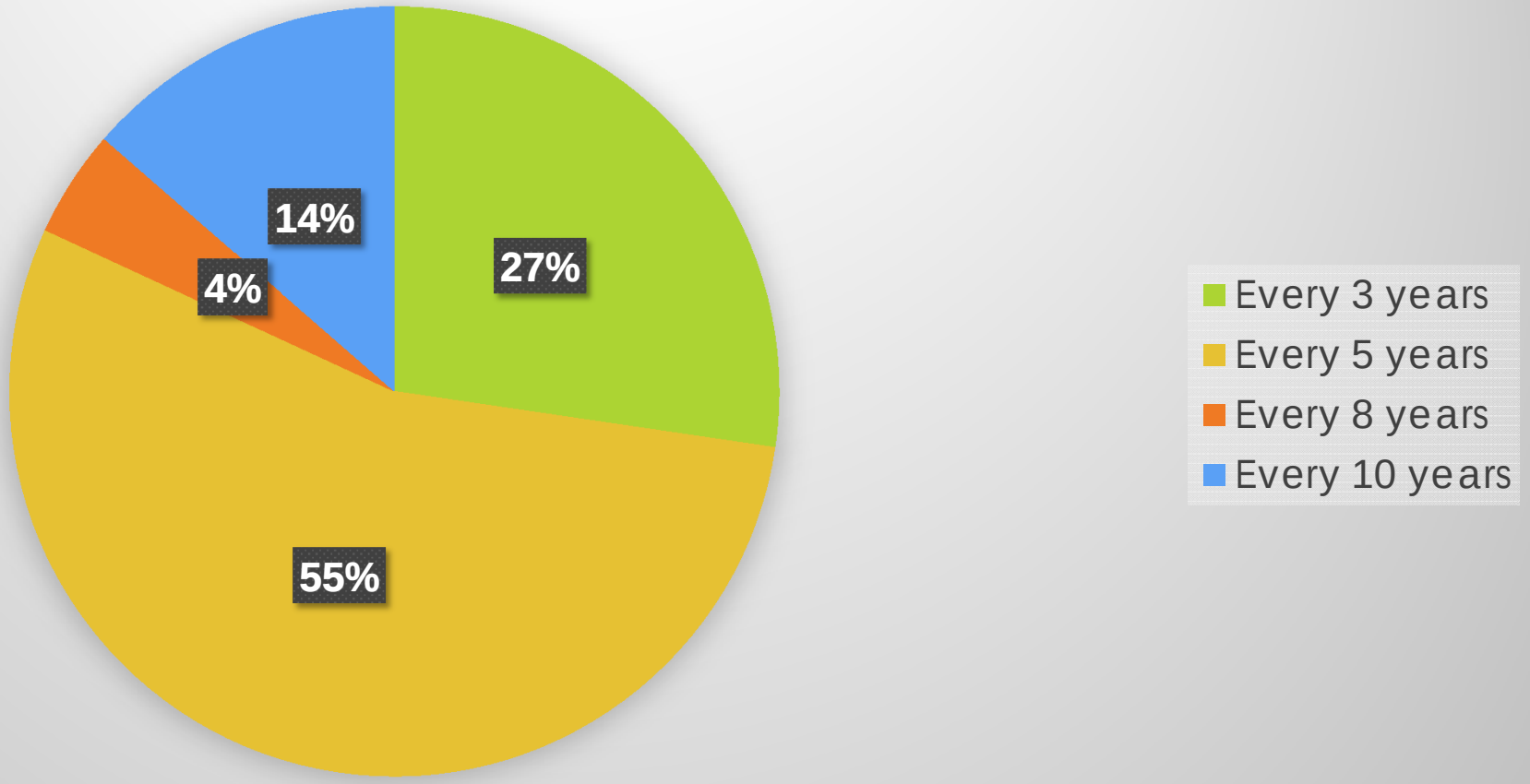
Establish a coast wide quota for part of the year, and state-by-state allocations for other parts (e.g., scup commercial fishery).

- Some comments cited that this approach may make sense for stocks that are available to different states at different times of the year.
- Most respondents said they believed this type of allocation would be difficult to enforce.
- Other comments noted that shifting regulations within a year is not really feasible.

Do away with state-by-state allocations. Change to coast-wide or regional quotas.

- Many comments reacted negatively to this allocation option, noting that the state by state quota system was “the easiest” management technique and that regional management may not be a successful management tool. Respondents also worried this would lead to a derby-style fishery and concentration of the catch in states/sectors with max access and capacity.
- The few that reacted positively said they were waiting to see how a regional approach worked for summer flounder and thought it may also be appropriate for scup and black sea bass to switch to a coast-wide allocation.

Given possible future shifts in stock distributions due to climate change, how frequently should allocation adjustments be considered?



Given possible future shifts in stock distributions due to climate change, how frequently should allocation adjustments be considered?

- Many respondents noted that reallocation is probably better done sooner than later. They thought the more frequently quotas were revisited, the more amenable states would be to adjustments in allocation.
- Many comments noted that the reaction of management is sometimes too slow to meet actual status of the stock and the more frequently we can reassess allocations, the more realistic and equitable they will be.
- Some comments noted that it takes at least five years to be confident in discerning a trend.

Which reallocation options would you support for black sea bass, summer flounder, and scup?

- **Surplus distribution-** Establish a baseline abundance or biomass where the stock is considered recovered. The remaining "surplus" beyond that point is proportionally distributed to the states which are experiencing abundance increases associated with a shifting stock.
- **Historical/Current Combination-**Use the historical allocation for 50% of the quota, and re-allocate the remaining 50% of quota based on new biomass. E.g., when a certain percentage of catch in fisheries independent surveys is found north of a defined latitude, then allocations are automatically adjusted to reflect current distribution and biomass, while preserving part of the historical quota.

Surplus Distribution

General ideas:

- Based on stock status/stock assessment results.

Cons:

- Will not address the issues with a stock that is expanding, but not increasing in abundance.
- Based on a "boom or bust" scenario. If stocks experience a boom, states receive surplus. However, if the stock crashes the next year, the states that might be anticipating a surplus will not receive one. This could have negative socioeconomic implications for the fishery.

Historical/Current Combination

General ideas:

- Not tied to stock assessment results, but to changes in relative distributions.

Pros:

- Flexible, can adjust the percentages for historical vs. current quota.
  - Percentages can be species-specific.
- Management advantages, both equitably for the states as well as biologically for the stocks.
- Will address changes for a stock that is expanding in range, increasing in abundance, or both.
- Represents a gradual shift in allocations, states still keep some historical quota, while still addressing the issues of changing stock distribution/and abundances.

MSC Recommendations

- These are basic ideas on how to start thinking about re-allocating catches
- Based on the survey, there is interest in looking further at options.
- In-depth work will be needed to establish specific reallocation schemes and determine the most appropriate data sets to use.
- The 50/50 in the Historical/Current Combination option is adjustable, not a fixed recommendation, and the percentages should be species-specific.
- Historical allocations were accomplished using the available landings information, and landings are in weight. Commercial landings are given in terms of gutted pounds, recreational landings are usually in whole pounds. When considering reallocation options, it would be useful to work in either gutted or whole weight with agreed upon average conversion factors.

MSC Recommendations

- **Robust data sets are critical to making reallocation decisions.**
  - **Fishery dependent and independent survey data have different caveats that should be taken into account.**
- **Create multiple examples to explore how a chosen reallocation option might function.**
  - **Stock-by-stock basis**
  - **Flexible, to show multiple abundance and distribution shifts**
  - **Commercial/recreational fisheries**
  - **Varying percentages of historical/current**

Next steps:

- **Use TC expertise to explore reallocation options by species and assist in the creation of example scenarios.**
- **How does the Policy Board want to incorporate the MSC recommendations into ASMFC's FMPs?**
  - **Universally apply a reallocation option/s across all Commission quota managed species.**
  - **Ask individual species Boards to further explore a reallocation option/s.**

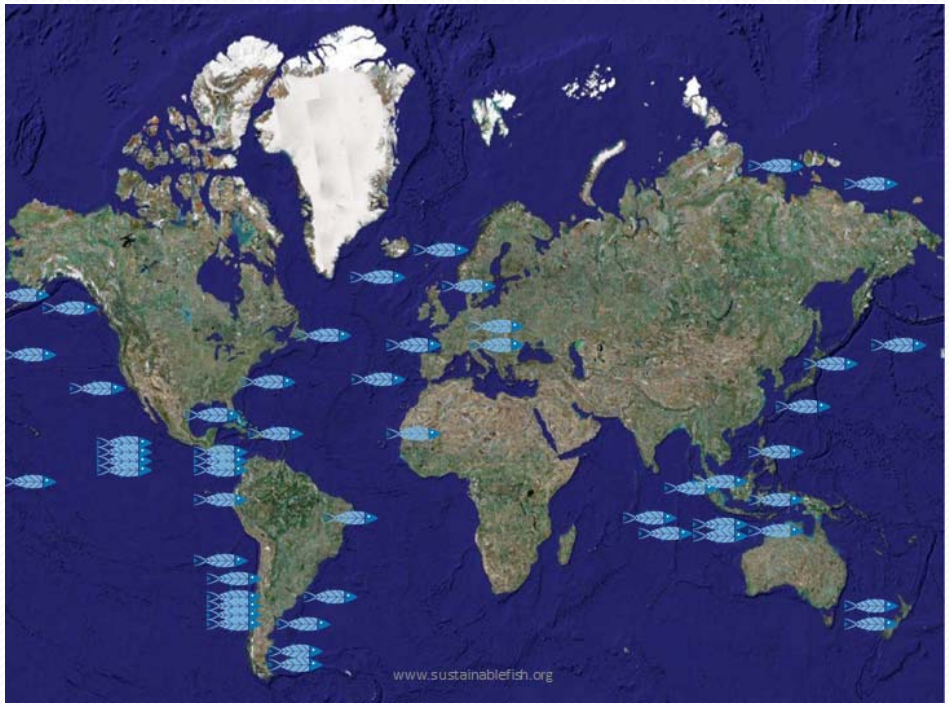
Jonah Crab Fishery Improvement Project

Recommendations to the Atlantic States Marine Fisheries Commission

May 14, 2014

What is a Fishery Improvement Project (FIP)?

A FIP is an **alliance of stakeholders** – retailers, processors, producers, and/or catchers that comes together to resolve problems within a specific fishery or improve some specific aspect of the fishery that requires attention.



The focus of a FIP's work plan is the environmental integrity and long-term sustainability of a fishery.

Jonah Crab FIP Work Group

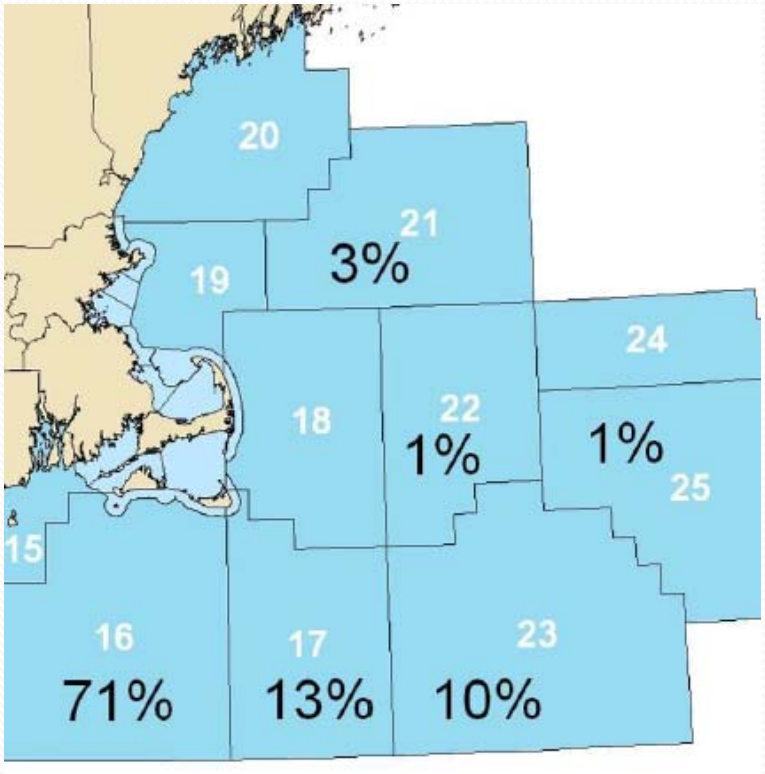
- Chair: Ray Swenton, Bristol Seafood
- David Borden, Atlantic Offshore Lobstermen's Association
- Josanna Busby, Delhaize America
- Lanny Dellinger, Rhode Island Lobstermen's Association
- Bill Gerencer, M.F. Foley Company
- Adam LaGreca, Rome Packing
- Derek Perry, Massachusetts Division of Marine Fisheries
- David Spencer, F/V Nathaniel Lee
- Steve Train, Atlantic States Marine Fisheries Commission
- Rick Wahle, University of Maine
- Jon Williams, The Atlantic Red Crab Company

Jonah Crab FIP Effort To Date

- Pre-assessment against Marine Stewardship Council Criteria
- A Work Plan that outlines activities and a timeline for completion
- Recommendations document prepared for ASMFC
- A web site with all information available to the public: https://sites.google.com/site/jonahcrabfip/

Fishery Concerns

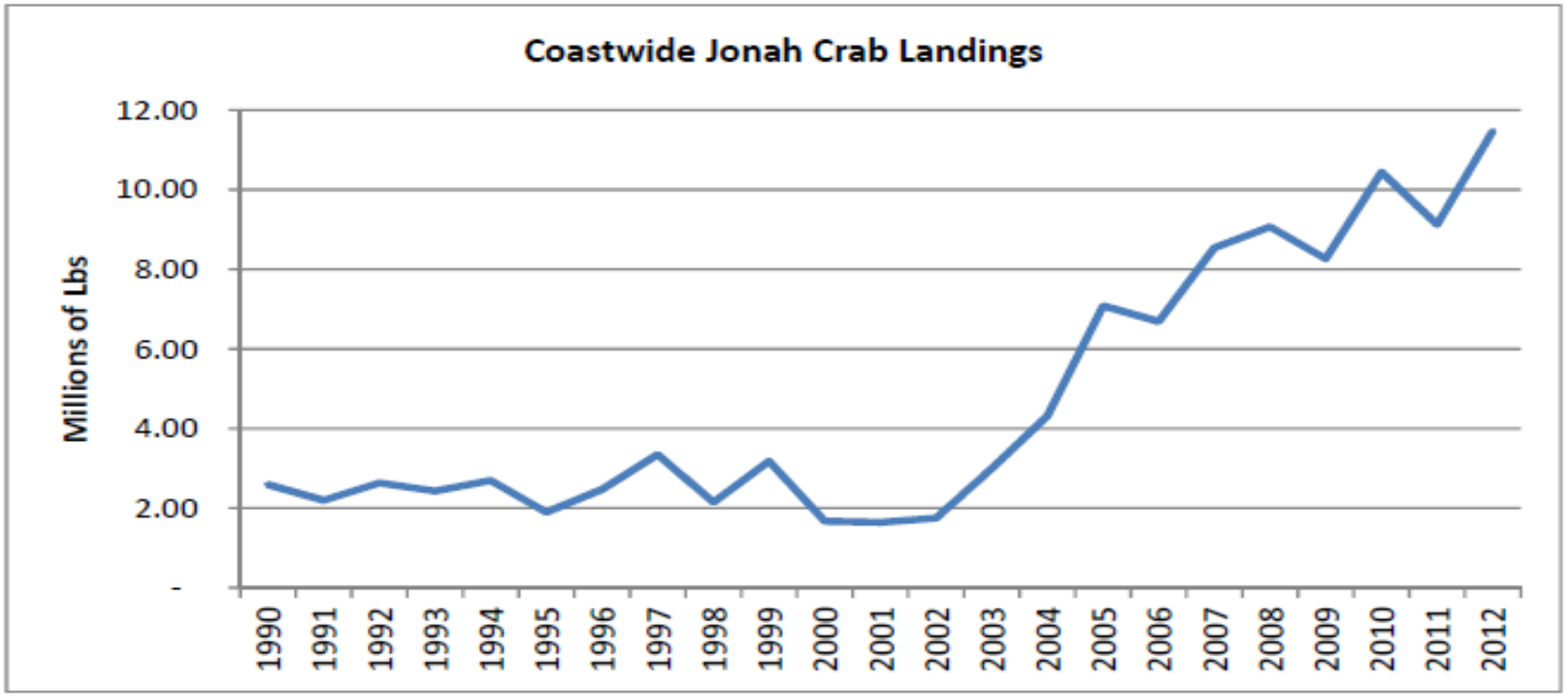
- The crab resource is unregulated in federal waters, with most of the landings coming from Area 3.



Percentage of Jonah crab landed in Massachusetts

Fishery Concerns

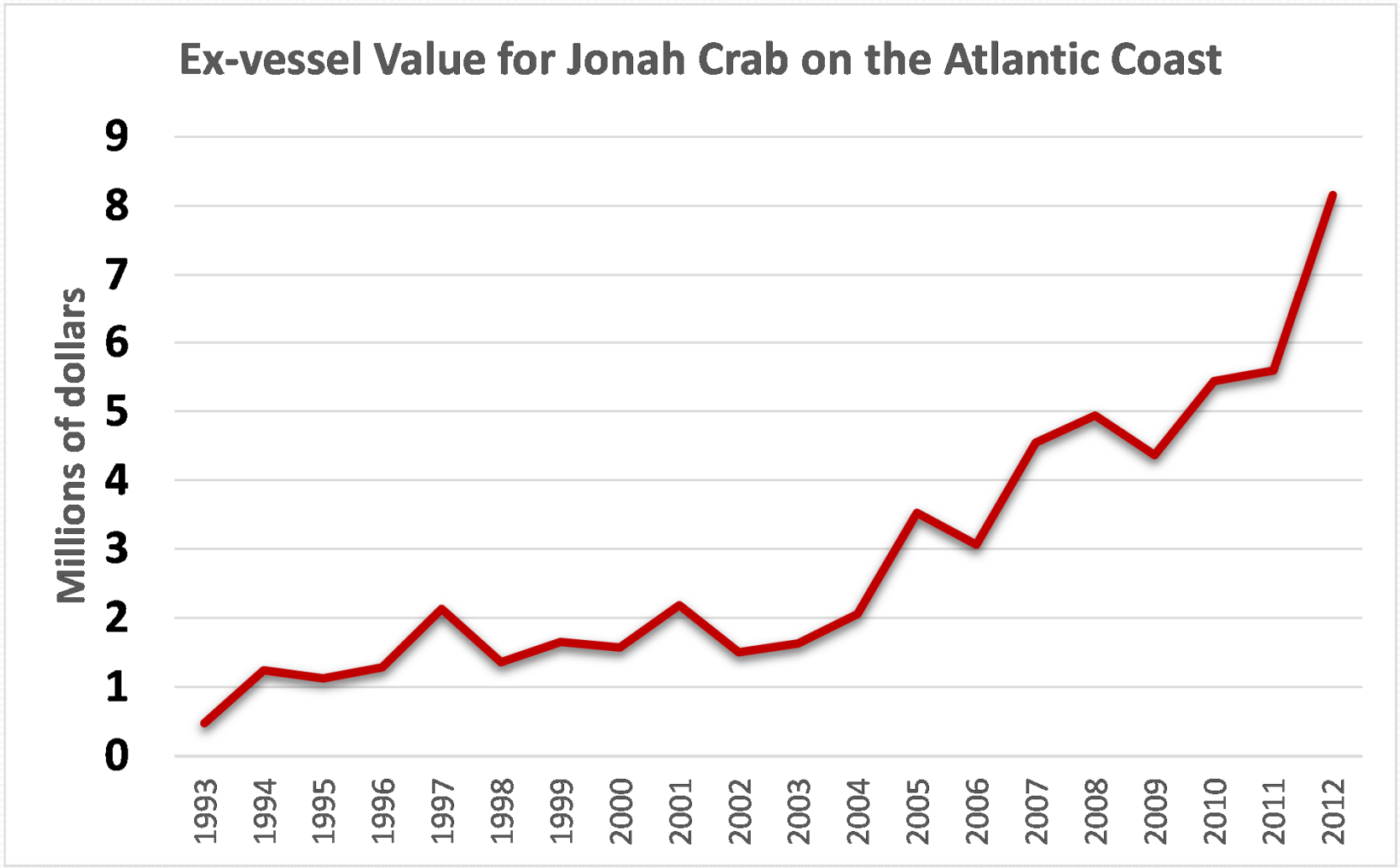
- Landings and effort are increasing rapidly and in an unregulated manner.



Fishery Concerns

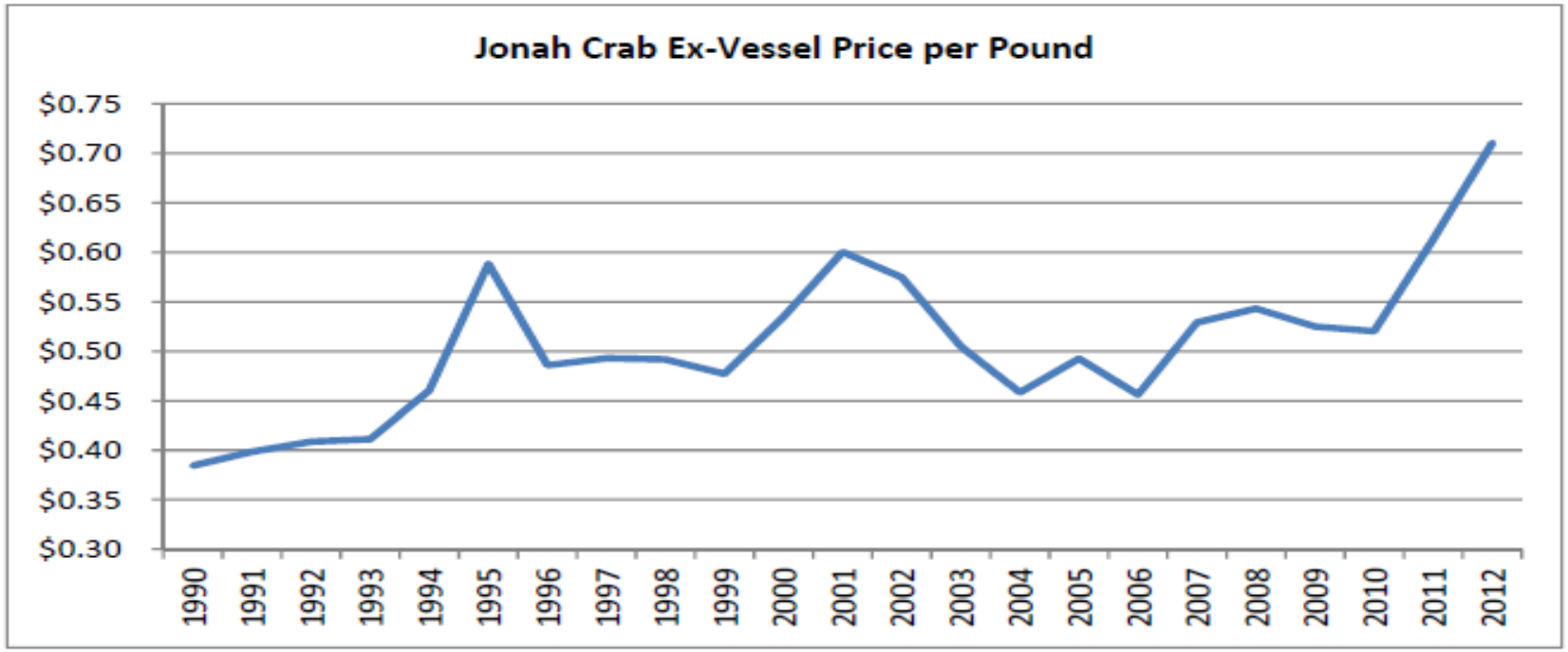
- No minimum size protections for Jonah crab
- No regulations to protect spawning biomass, including restrictions on the harvest of females.

Fishery Value



Fishery Concerns

- With the loss of market access, the ex-vessel price of Jonah crab is likely to decline.



Fishery Concerns

- An expanded crab fishery would threaten the lobster industry's conservation measures to reduce traps in the water and avoid interactions with right whales.

Fishery Concerns

- Supermarkets and other major buyers may stop selling processed and whole Jonah crab unless it is managed sustainably.

CONSERVATION ALLIANCE FOR SEAFOOD SOLUTIONS

www.solutionsforseafood.org BLUE OCEAN INSTITUTE • DAVID SUZUKI FOUNDATION • ECOLOGY ACTION CENTRE ENVIRONMENTAL DEFENSE FUND • FISHCHOICE • FISHWISE • LIVING OCEANS SOCIETY • MONTEREY BAY AQUARIUM NATURAL RESOURCES DEFENSE COUNCIL • NEW ENGLAND AQUARIUM • OCEAN CONSERVANCY • SHEDD AQUARIUM SIERRA CLUB BC • SUSTAINABLE FISHERIES PARTNERSHIP • VANCOUVER AQUARIUM • WORLD WILDLIFE FUND—US

Guidelines for Supporting Fishery Improvement Projects

Ratified by: Blue Ocean Institute, David Suzuki Foundation, Ecology Action Centre, Environmental Defense Fund, FishChoice, FishWise, Living Oceans Society, Monterey Bay Aquarium, Natural Resources Defense Council, New England Aquarium, Ocean Conservancy, Shedd Aquarium, Sierra Club British Columbia, Sustainable Fisheries Partnership, Vancouver Aquarium Ocean Wise, World Wildlife Fund – U.S.

Fishery Concerns

- With continued unregulated harvest of Jonah crab, the long-term availability of this resource for harvest is compromised.

Recommendations

- Incorporate Jonah crab into the Lobster Management Plan.
- Tie the harvest of Jonah crab to the lobster license and trap tagging requirements as is currently done in Massachusetts, New Hampshire, and Maine. For states that do not have a lobster license, require a license and trap tags for the harvest of Jonah crab.

Recommendations

- Require a 5” minimum carapace width (CW), with an enforcement tolerance.
- Require full reporting of Cancer crabs by species to better understand the fishery and to establish baseline data.
- **Prohibit the harvest of female Jonah crabs.**


Thank you for your consideration.

Long-Term Benchmark Assessment and Peer Review Schedule

Updated May 2014

Species	2005	2006	2007	2008	2009	2010	2011	2012	2013		2014	2015	2016	2017	2018	SA Staff
American Eel	ASMFC							ASMFC						x		GN
American Shad			ASMFC					x								KD
American Lobster	ASMFC				ASMFC							ASMFC				GN
Atlantic Croaker						SEDAR 20							x			KD
Atlantic Menhaden		Update				SEDAR		Update			SEDAR			Update		GN
Atlantic Sea Herring		TRAC			Update			SARC 54								KD
Atlantic Striped Bass	Update		SARC-Fall		Update		Update		SARC 57			Update		Update		KD
Atlantic Sturgeon											ASMFC					KD, JK
Black Drum												ASMFC				JK
Black Sea Bass		SARC-Spring		DataPoor Wkshp	Update	Update	SARC-Fall	Update	Update		Update	Update	ASMFC	Update	Update	GN
Bluefish	SARC-Spring	Update	Update	Update	Update	Update	Update	Update	Update		Update	*SARC-Spring*	Update	Update	Update	KD
Horseshoe Crab					ASMFC				Update				Update			KD
Multispecies VPA	SARC-Fall				Update			Update			Update					GN, KD
Northern Shrimp	Update	Update	SARC-Spring	Update	Update	Update	Update	Update	Update		*SARC-Spring*	Update	Update	x	Update	KD
Red Drum					SEDAR							SEDAR				JK
River Herring								ASMFC						x		KD
Scup				DataPoor Wkshp	Update	Update	Update	Update	Update (x)		Update	*SARC-Spring*	Update	Update	Update	GN
Spanish Mackerel				SEDAR				SEDAR 28								KD
Spiny Dogfish	Update	SARC-Spring	Update	Update	Update	TRAC	Update	Update	Update		Update	Update	Update	Update	Update	GN
Large Coastal Sharks		SEDAR					SEDAR									GN
Small Coastal Sharks			SEDAR				SEDAR		SEDAR							GN
Spot													x			GN
Spotted Seatrout																KD
Summer Flounder	SARC-Spring	Update	Update	SARC-Spring	Update	Update	Update	Update	SARC 57		Update	Update	Update	Update	Update	GN
Tautog	ASMFC	Update					Update				ASMFC					KD
Weakfish		ASMFC		DataPoor Wkshp	SARC-Spring							ASMFC				KD
Winter Flounder	Update			SARC-Spring			SARC 52						x			KD

SEDAR External Review

ASMFC External Review

Fall SARC Review

Spring SARC Review

x = 5 year trigger date or potential review

Completed

Italics = under consideration, but not officially scheduled

2013 marks transitioning to the new NE Stock Assessment Process

Please note that all species scheduled for review must be prioritized by management boards and Policy Board for the type of review.

Additional Notes:

Black Sea Bass	Delayed to 2016 for new model development; was scheduled for Fall 2014 SARC
Horseshoe Crab	Update underway in 2013; TC recommends update in 2016.
Large Coastal Sharks	SEDAR 21-Sandbar (was LCS, now research); LCS-Dusky (prohibited); SCS-Blacknose (quota); DW Jun; AW Sep-Mar; RW Apr 2011
Small Coastal Sharks	SEDAR 34-HMS bonnethead and Atlantic sharpnose 2013
Spot	PRT annually reviews; recommended for assessment 2016
Spotted Seatrout	States conducting individual assessments

Comprehensive data for stock assessments

- Socioeconomic impacts of past regulations; history & importance of fishery
- Impacts on landings
- Trends in dockside, dealer, and market prices
- Fleet capacity and demographic shifts
- User conflicts/cooperation
- Community vulnerability or resilience, well-being

- What other information/data that is not now collected would be useful for decision-making?
  - Prioritize research needs
  - Suggest data sources

Case study progression

- At the 2013 ASMFC annual meeting:
  - Lobster
  - Eel
- A request for economic study was made by a Board member
  - Menhaden

- What species should CESS begin with?
- Determine what data is needed
- Develop a timeline and cost for any associated research needed

Artificial Reef Committee Update

Presented to

ASMFC ISFMP Policy Board

May 14, 2013


ASMFC - GSMFC
Joint Committee Meeting
February 24-26, 2014
Charleston, SC
Sauce: SC DNR

Meeting Summary

Discussion Topics

- **Fish aggregating devices in fishing tournaments**
- **MARAD's policy limiting use of pre-1985 vessels**
- **Rigs-to-Reefs Policy**
- **Lionfish (invasive species)**
- **State Updates**
  - **Marine Protected Areas, Special Management Zones**
  - **AR Reef Designs and Deployment**
  - **Permitting**
  - **Research & Monitoring**
  - **Interactive Online Tools**
  - **Budgets**

Meeting Summary

Products

- ***Guidelines for Marine Artificial Reef Materials*, 3rd ed.**
- **Whitepaper: Long-term economic benefits of artificial reefs**

Committee Business

- **Next Meeting**

  Florida Fish & Wildlife Conservation Commission's Artificial Reef Summit (January 2015)

- **New Chair: Erik Zlokovitz, MD DNR**

Habitat Committee Update

Presented to

ASMFC ISFMP Policy Board

May 14, 2013

ASMFC Habitat Committee
Spring Meeting
May 1, 2014
Annapolis, MD

Meeting Summary

Discussion Topics

- **New HC Members**
- **2014 Work Plan**
- **Climate Change**
  - **Governance**
  - **Fish Habitats**
- **Living Shorelines**
- **Habitat Limitations in Stock Assessments**
- **Fish Passage Working Group**
- **Winter Flounder EFH Proposal**
  - **NEFMC's Draft Omnibus Habitat Amendment 2**

Meeting Summary

Products

- ***Habitat Management Series***
  - **Nearshore and Estuarine Aquaculture**
  - **Sciaenid Habitat Source Document**
  - **Living Shorelines Guidance Document, 2nd ed.**
- ***Habitat Hotline Atlantic***
  - **Adaptations to Climate Change (habitat perspective)**

Committee Business

- **Next Meeting**
  - **ASMFC Annual Meeting (October 2014)**

Questions?

State Declaration of Interest for Species Board

ASMFC

May 2014

Changes to State Interest

- Spiny Dogfish: remove FL, GA, SC
- Horseshoe Crab: remove NH and add PRFC
- Black Sea Bass: add ME
- Lobster: remove VA and NC
- Coastal Sharks: remove NH

Policy Development Process

Stakeholder Input (Virtual)

- Website for public comment
- Host national town hall webinar
- MAFAC Subcommittee and RFWG call
- Host State Directors & Interstate Commissions webinar

Stakeholder Input (In Person)

Listening sessions:

- 6/9 SAFMC - Ponte Vedra Beach, FL
- 6/11 MAFMC - Freehold, NJ
- 6/17 NEFMC - Portland, ME
- 6/23 PFMC - Garden Grove, CA
- 6/25 WESPFMC - Honolulu, HI
- 8/11 CFMC (*tentative*)
- 8/25-8/29 GFMC - Biloxi, MS (*specific date tbd*)
- Alaska (TBD)
- Washington, DC (TBD)
- Atlantic Highly Migratory Species Advisory Panel (TBD)