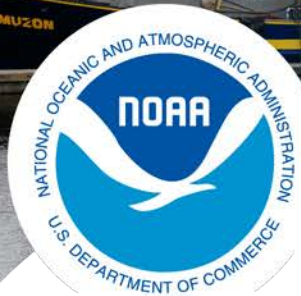


Bycatch and Ecosystem-Based Management in the Southeast United States



NOAA
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NOAA Fisheries Southeast Fisheries Science Center
Clay Porch

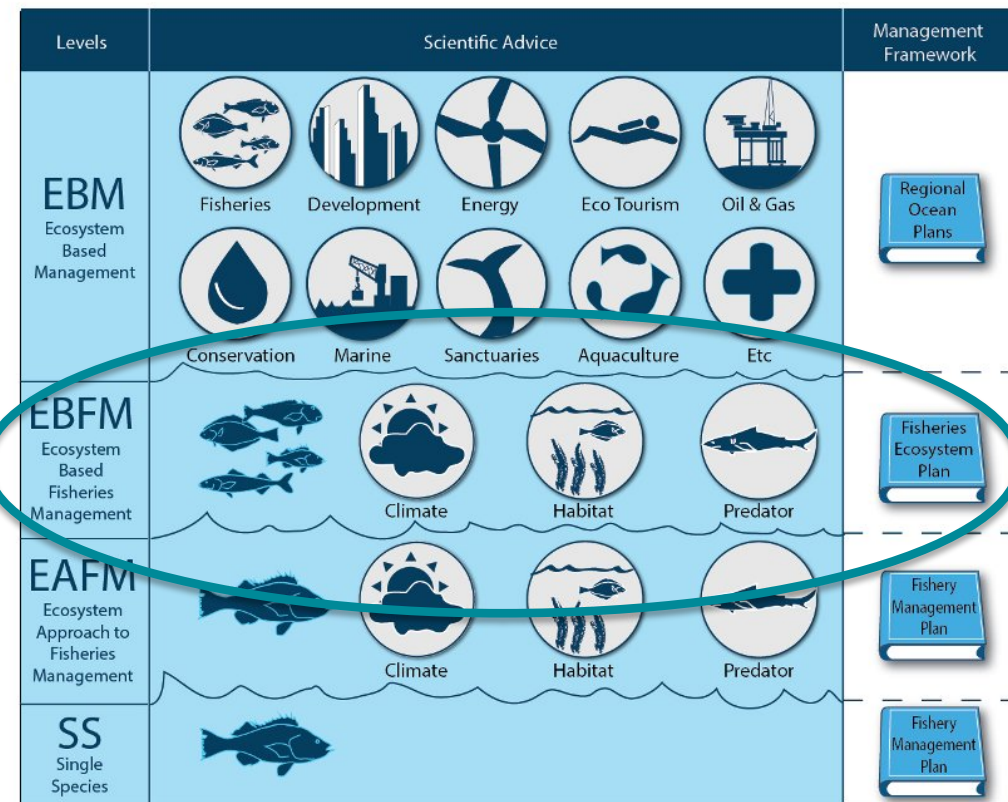
Indian Ocean Tropical Tuna Commission
September 2019



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What is EBM?

Can be considered within a spectrum of approaches



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RESEARCH ARTICLE

Ecosystem-based fisheries management: Perception on definitions, implementations, and aspirations

John T. Trochta¹, Maite Pons¹, Merrill B. Rudd¹, Melissa Krigbaum¹, Alexander Tanz², Ray Hilborn¹

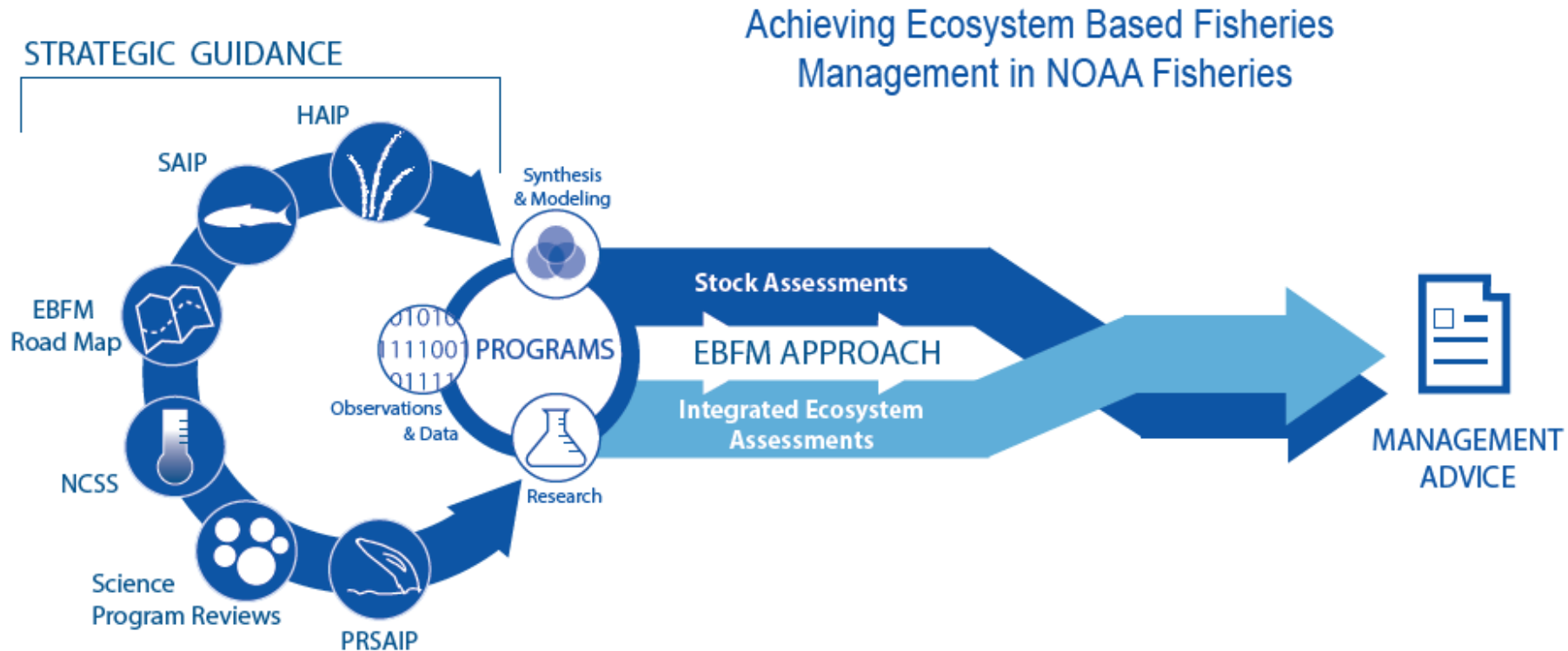
"We highlight the lack of consensus in the interpretation of EBFM amongst professionals in marine science...it is unnecessary for management to practice all the traits of EBFM, as some may be disparate from the ecosystem attributes or fishery goals. Instead, incorporating some ecosystem-based considerations to fisheries management that are context-specific is a more realistic and useful way for EBFM to occur in practice."

U.S.A. Regulatory Framework Related to Bycatch and Ecosystem-based Management

- Magnuson-Stevens Fishery Conservation and Management Act
 - National Standard 9: Fishery conservation and management measures shall, to the extent practicable, minimize bycatch and minimize the mortality of bycatch that cannot be avoided.
- Marine Mammal Protection Act
- Endangered Species Act
- Environmental Protect Act



NOAA Fisheries Response



Ecosystem-based fisheries management is a holistic way of managing fisheries and marine resources by taking into account the entire ecosystem of the species being managed. The goal of ecosystem-based management is to maintain ecosystems in a healthy, productive, and resilient condition so they can provide the services humans want and need...

NOAA Fisheries EBFM Road Map Policy

May 2016

National EBFM Policy
released

June 2017

Regional Road Map
development initiated

June - September 2018

Public comment period

December 2018

Final Road Maps
released

EBFM Guiding Principles



Development of the Southeast EBFM Road Map(s)



Figure 1. SEFSC's laboratory locations and jurisdictions that cover areas of responsibility for three Fishery Management Councils and Atlantic Highly Migratory Species. Inshore and coastal habitats are under the jurisdiction of eight southeastern states, Puerto Rico, and the U.S. Virgin Islands.

Goals of the Southeast EBFM Road Map(s)

- Improve baseline monitoring
- Define and quantify optimum yield
- Reduce bycatch
- Preserve habitat
- Understand multi-species interactions and connectivity
- Understand key ecosystem drivers
- Understand effects of climate change
- Engage the public

We need help!

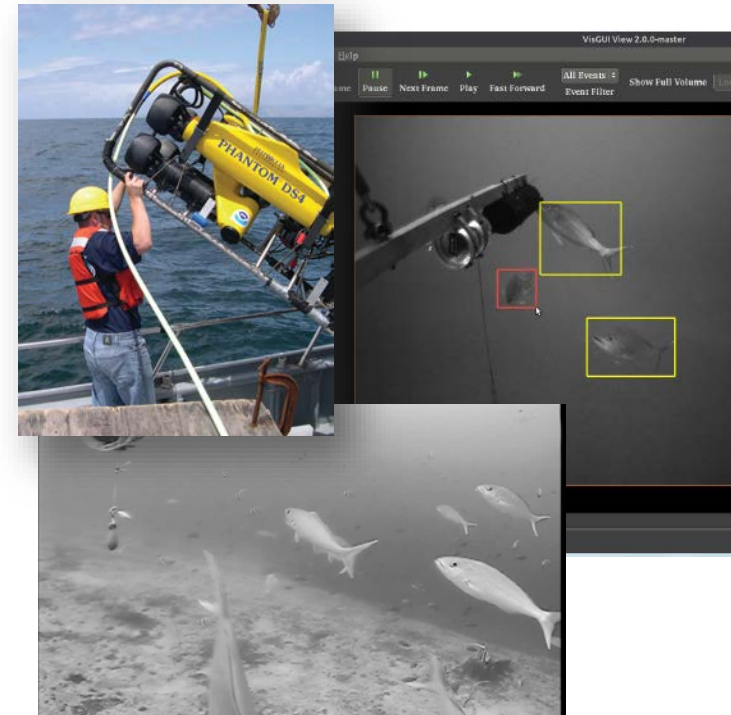
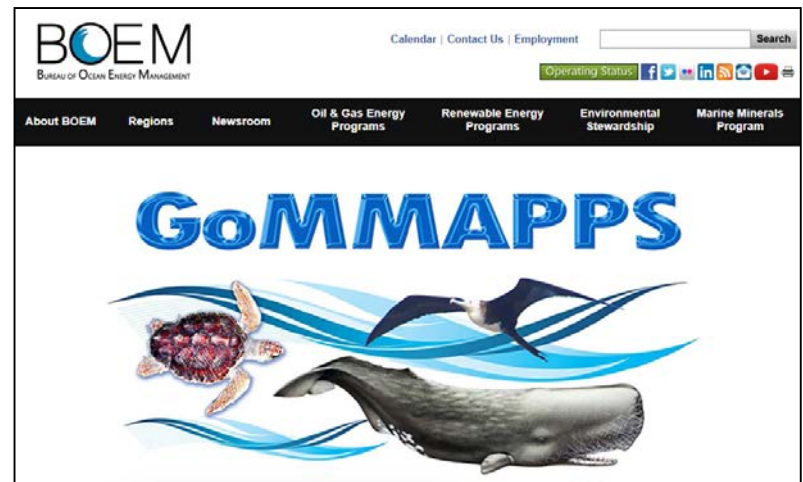
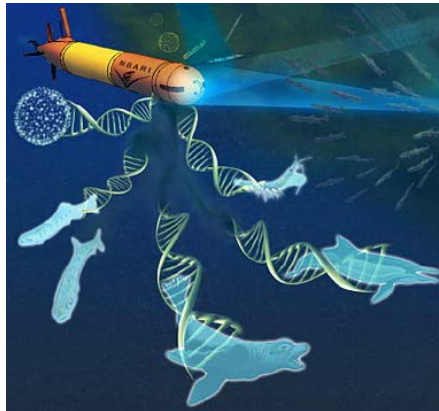
No single institution will be able to implement EBFM

Must tackle manageable problems with high perceived value



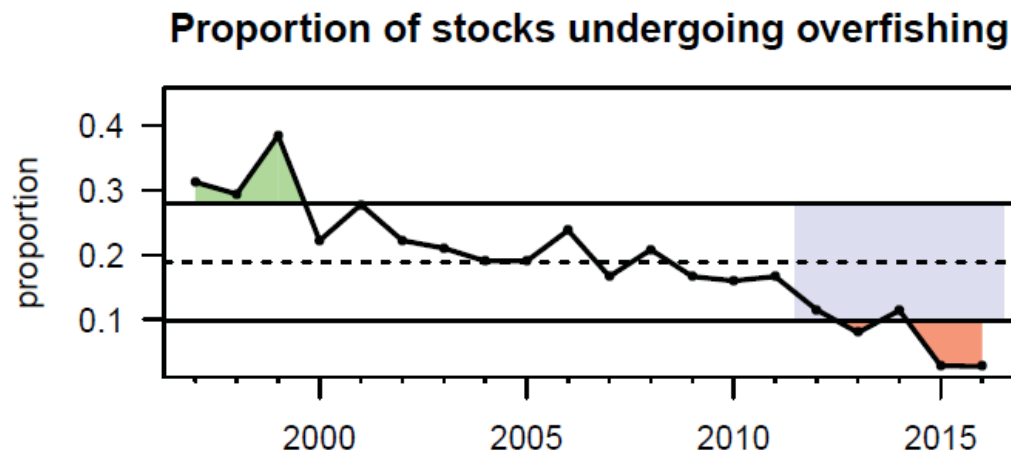
Baseline monitoring

- Existing long-term monitoring activities
- More environmental data
- New surveys using new technology
- eDNA



Define and Quantify Optimum Yield

Single species stock assessments have been highly successful in ending overfishing



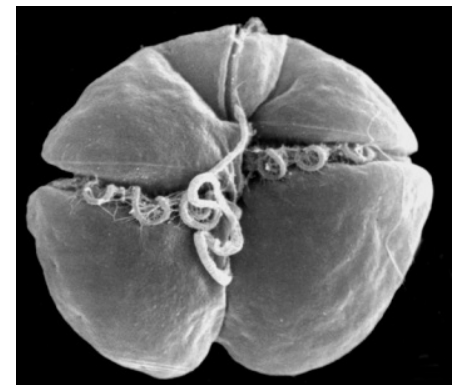
Now, the challenging part: what is **optimum yield**?

MSY

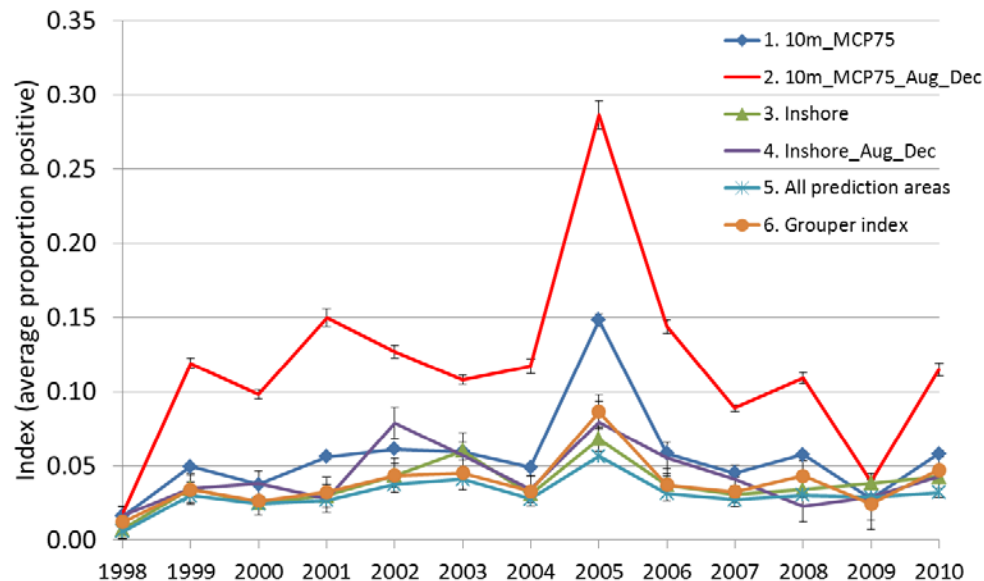
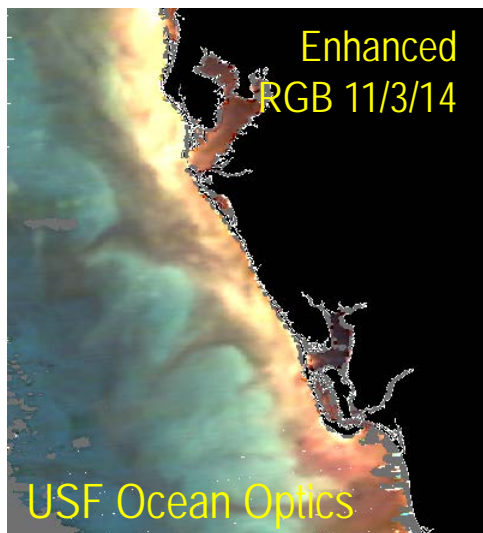
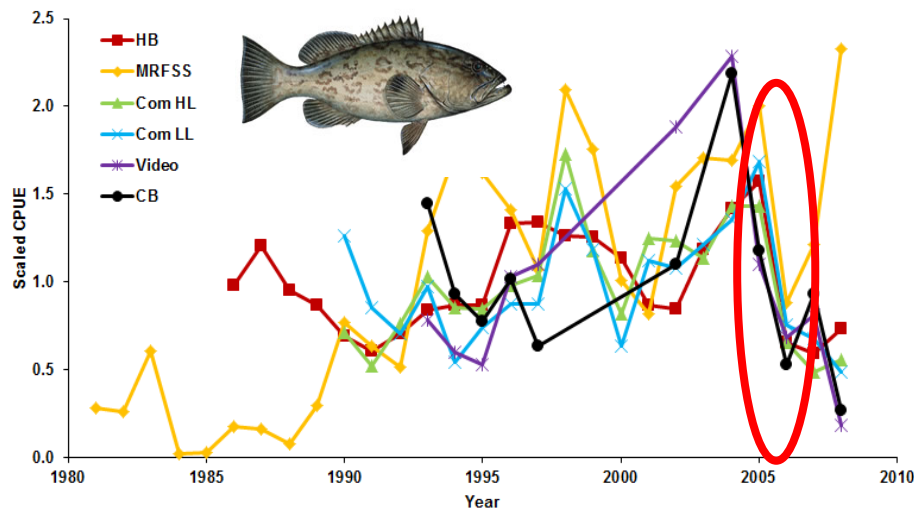
as reduced by economic, social, ecological factors

OY

Key Drivers: Harmful Algal Blooms (Red Tide)

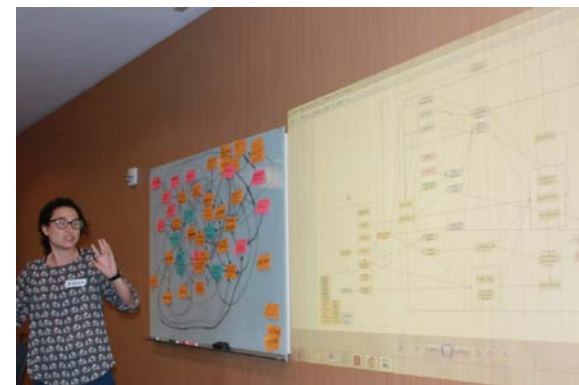
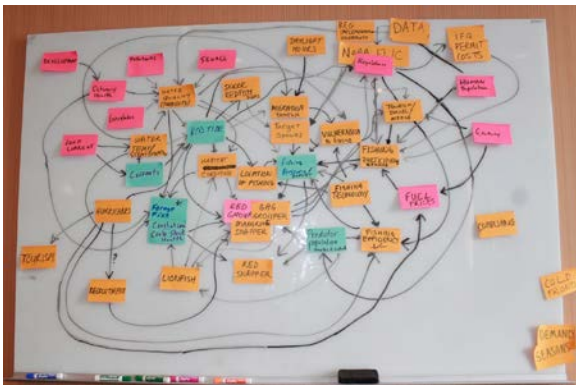


Need for an index of red tide mortality

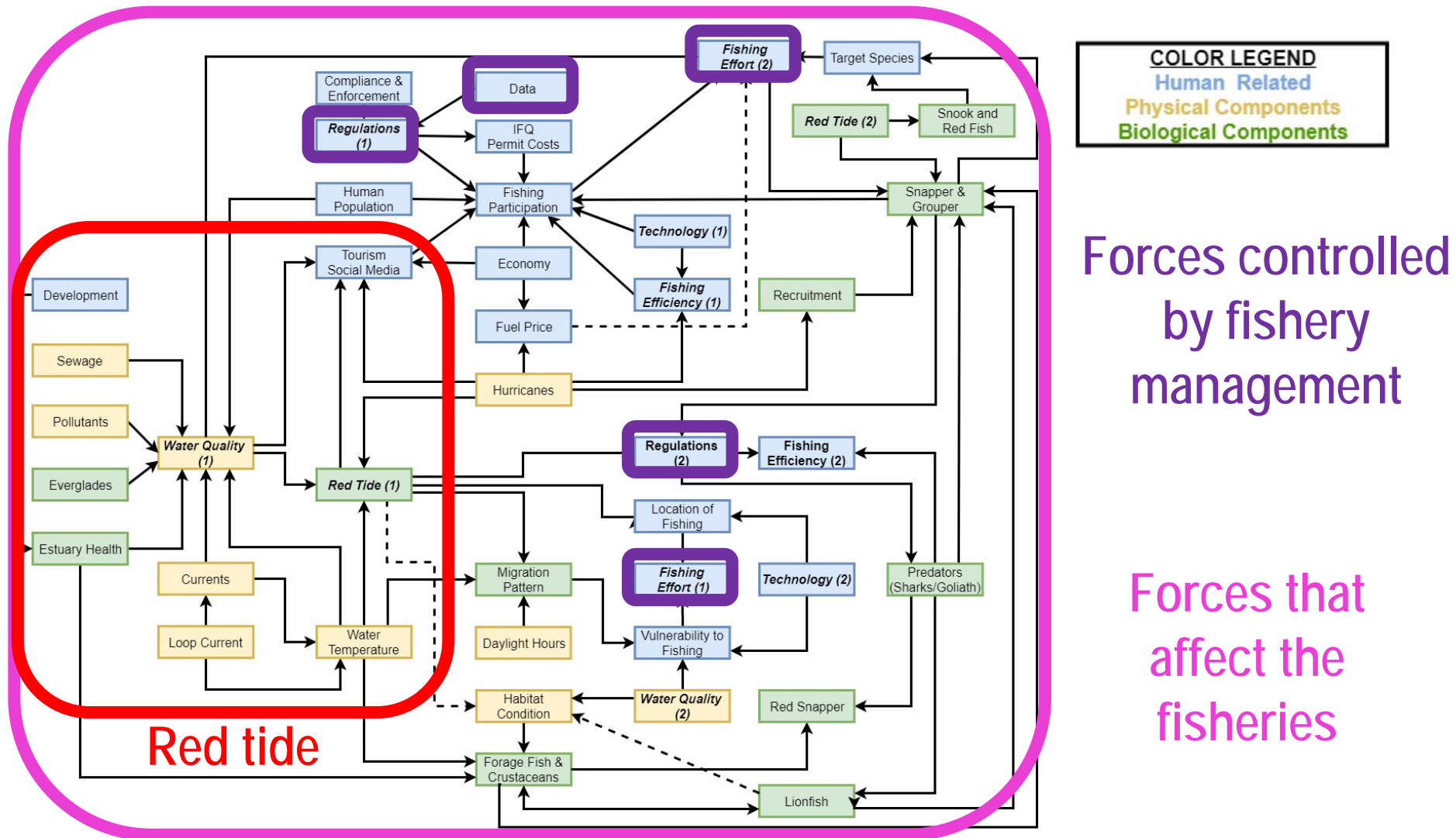


Engaging the public: Participatory fisheries system modeling

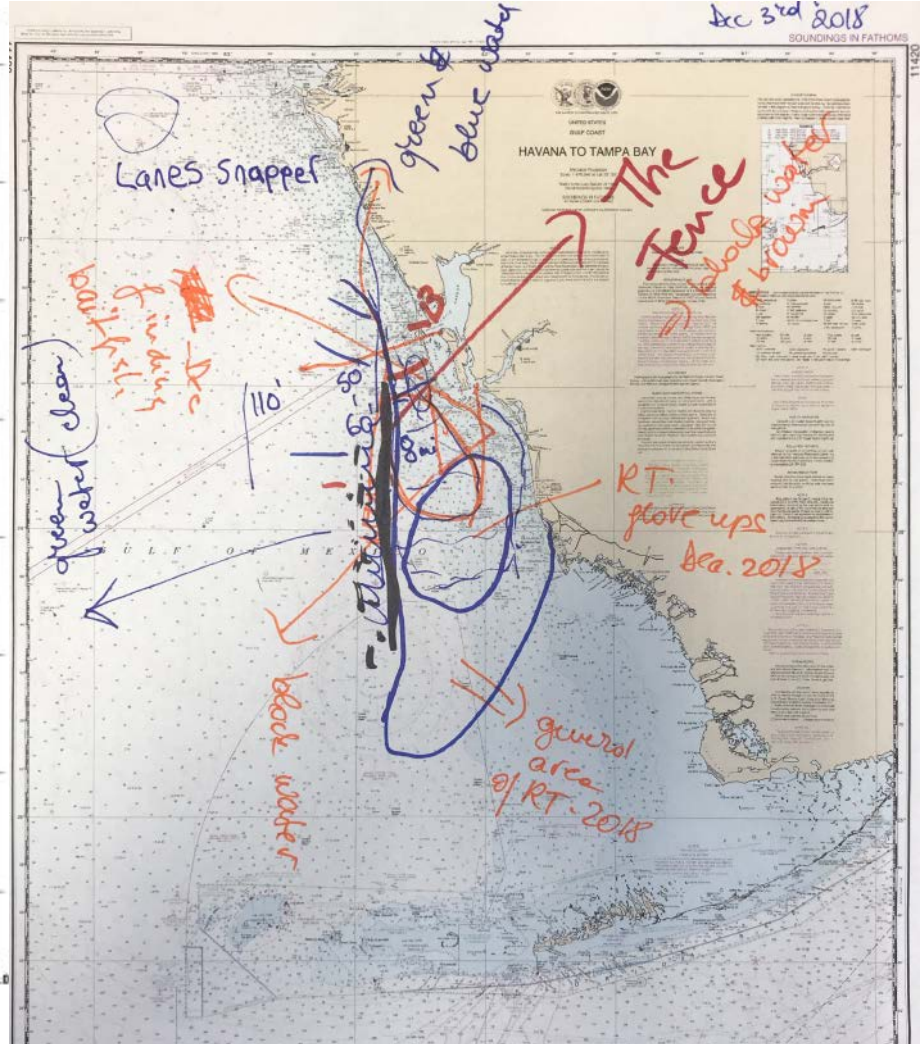
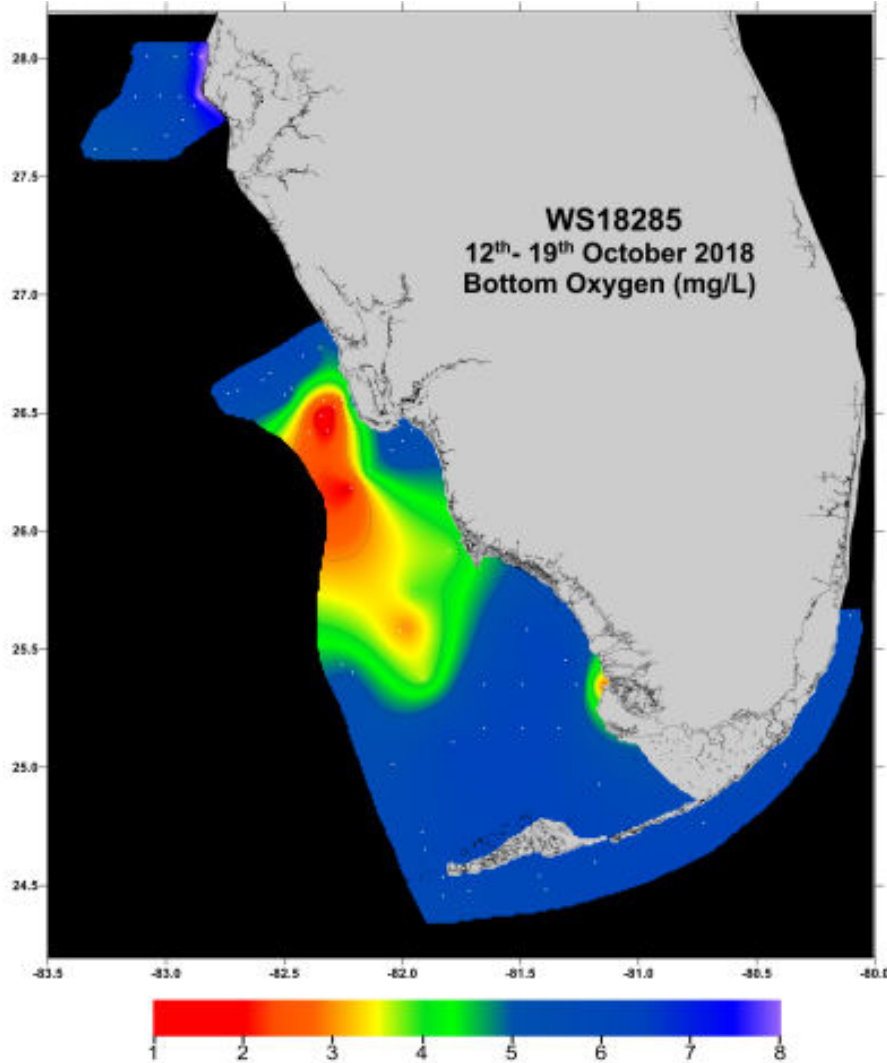
- What are the major factors affecting your fishery?
- Where do the major risks in the fisheries system lie?
- How do changes in ecosystems affect your businesses and communities?
- What do you value in the ecosystem?



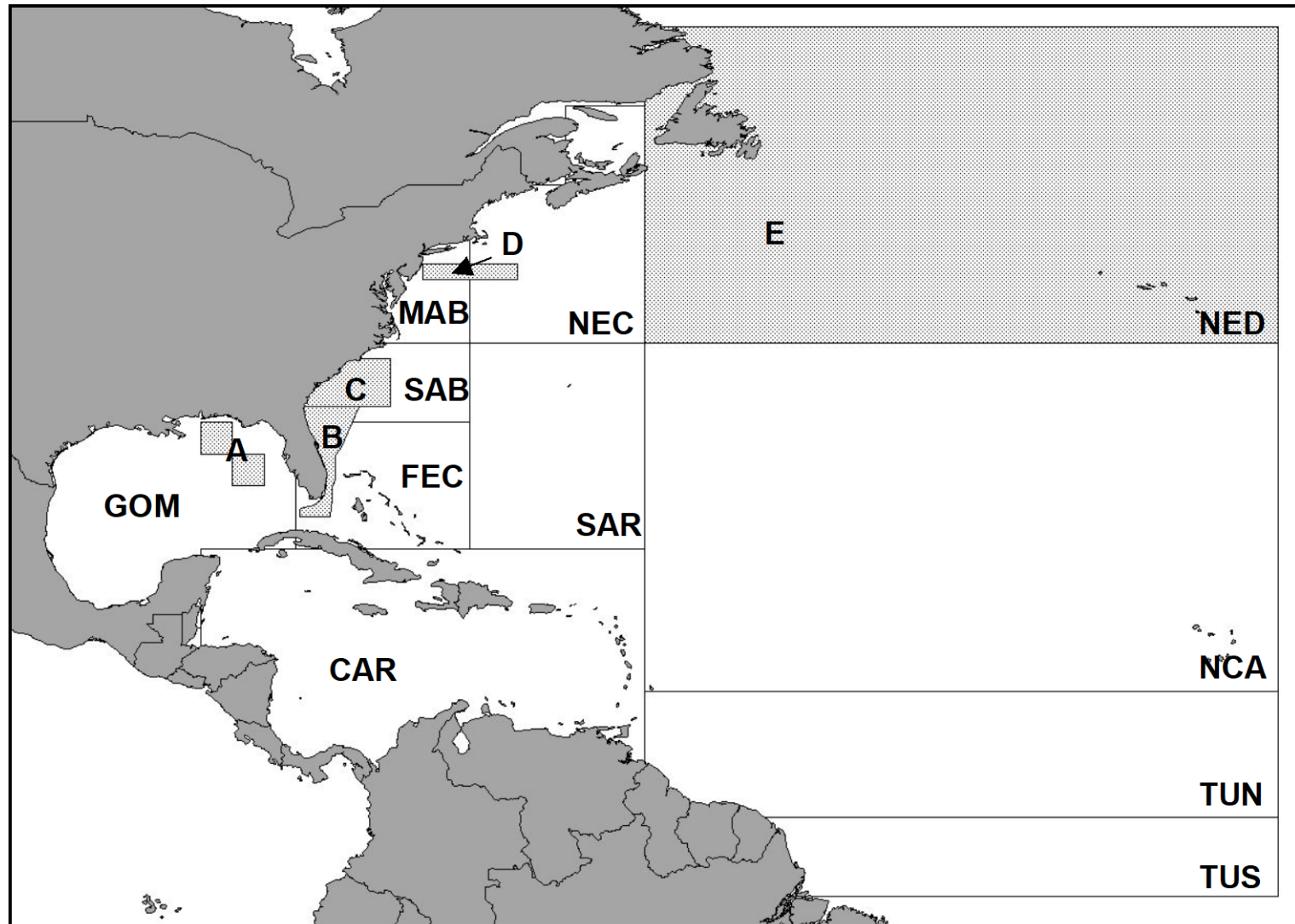
Participatory fisheries system modeling



Local Ecological Knowledge consistent with biological data



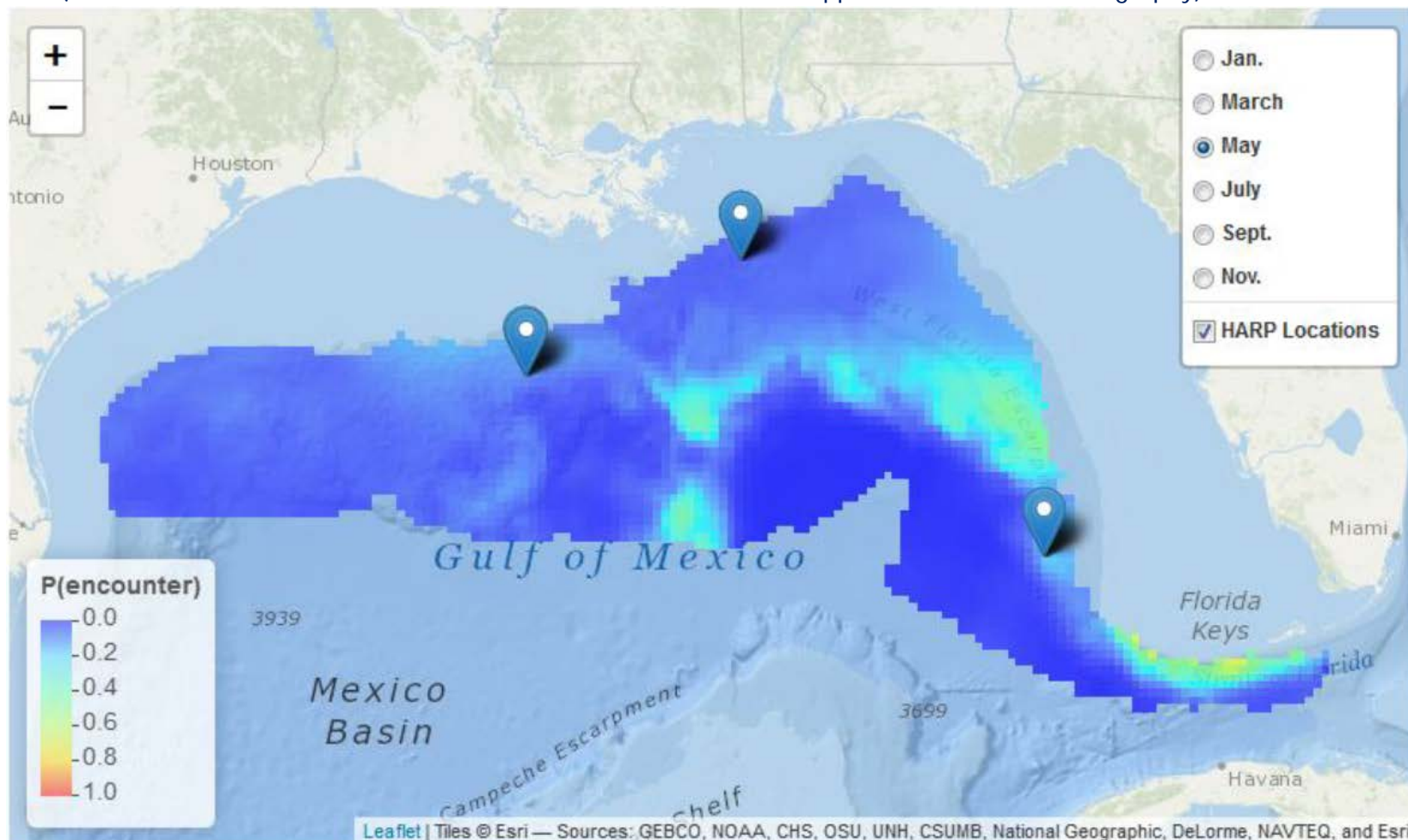
Bycatch Avoidance: Time/Area closures



Bycatch Avoidance

Predictions of mammal distributions from visual survey and acoustic data

(M. Soldevilla, L. Garrison, SEFSC; J. Hildebrand, K. Frasier, Scripps Institution of Oceanography)



Bycatch reduction: Shrimp Trawl Fishery

Turtle Excluder Devices Mandatory
in U.S. Trawl fisheries

Import of certain categories of
shrimp prohibited unless

- (1) the harvesting nation has adopted
a program ...comparable to the
program in effect in the United States
- (2) the harvesting nation or economy
does not pose a threat of the
incidental taking of sea turtles.

14 nations certified to date



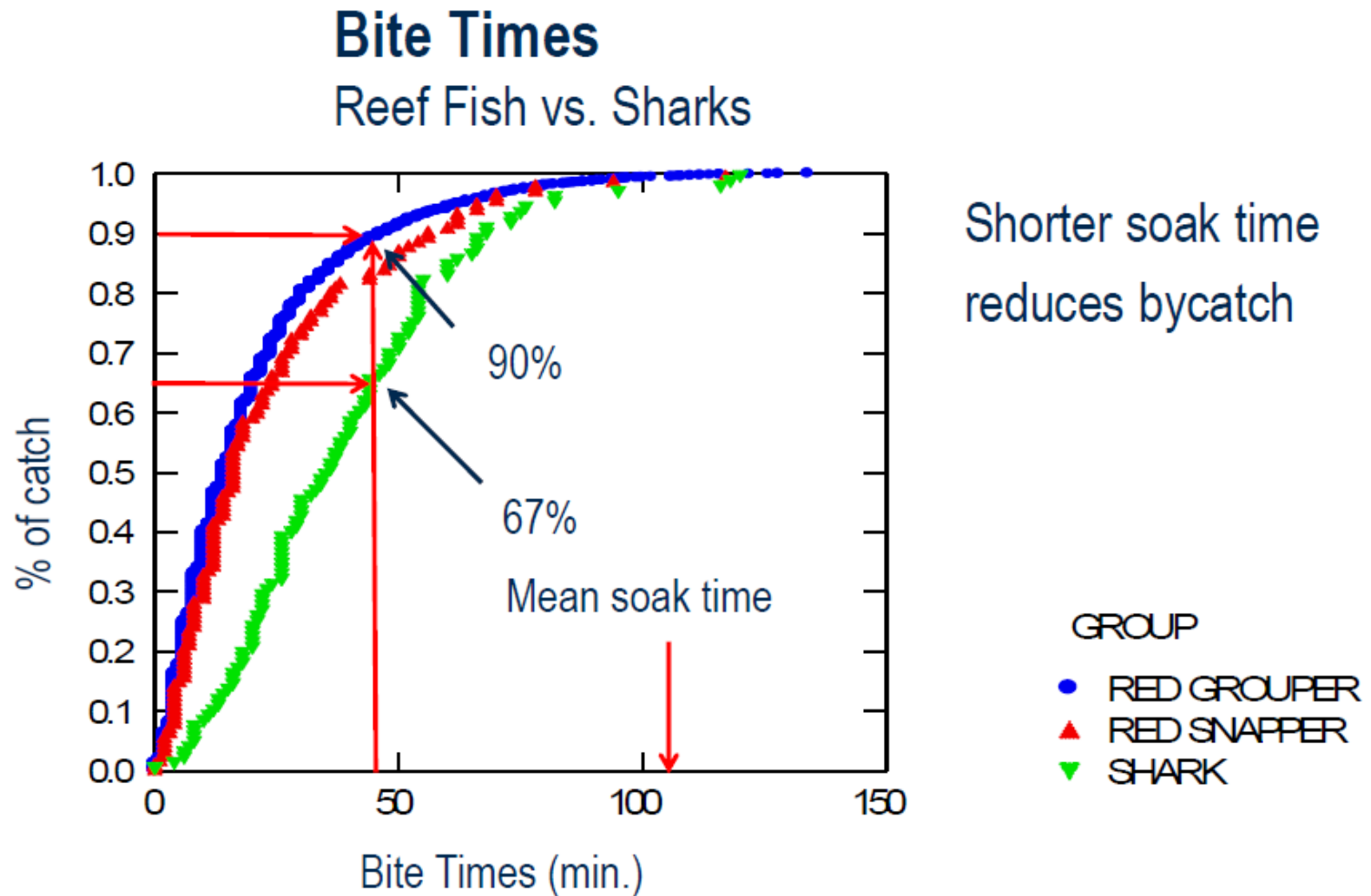
Bycatch reduction: Sharks on bottom longlines

All shark directed limited access permit holders in the bottom longline fishery are required to use corrodible (non-stainless steel) circle hooks.

- Circle hooks are defined as a fishing hook originally designed and manufactured so that the point is turned perpendicularly back to the shank to form a generally circular or oval shape.
- There is no minimum hook size requirement.



Bycatch reduction: Sharks on bottom longlines



Bycatch: Sea Turtles on pelagic longlines

Sea Turtle Bycatch Experiment NED Swordfish Fishery 2001-2003

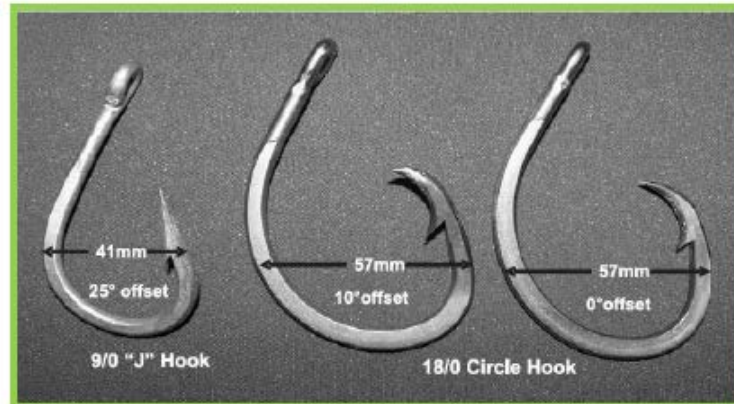
Bait Type:

Fish vs. Squid



Hook Type:

J-hook vs. circle hook



	% Difference
Loggerhead Turtles	- 88% (reduction)
Leatherback Turtles	- 63% (reduction)
Swordfish	+ 20% (increase)
Bigeye Tuna	- 80% (reduction)

Bycatch: Bluefin tuna on pelagic longlines

Weak Hook Experiment Results

- 8 commercial vessels involved in tests
- 418 pelagic longline sets completed
- 134 bluefin were caught during the experiment
- 47 caught on the experimental hook
- 46% reduction in bluefin with weak hooks
- 2,547 yellowfin tuna landed
- 6% reduction in yellowfin catch (ns)
- Majority of bluefin escapes took place in < 5 min.



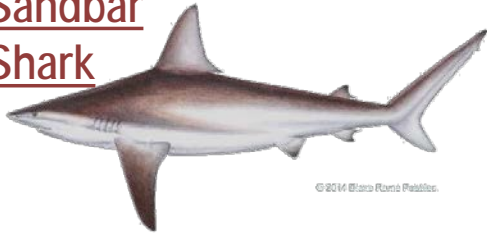
Bycatch Reduction - Pelagic Longline Fishery

- Bluefin tuna target catch requirements and quotas
- Prohibition of billfish possession and a number of sharks
- Time/area closures (VMS utilized), gear restricted areas
- Move 1-nm after interaction with marine mammals and dusky sharks
- Weak circle hooks, hook size and bait requirements, gangion length, corrodible hooks, limited mainline length
- Safe handling and release equipment, mandatory workshops, and guidelines
- Limited access



Bycatch: Commercially Prohibited Ridgeback Sharks (May Not Be Retained)

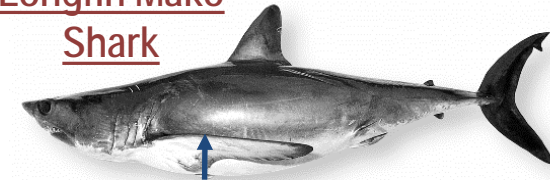
Sandbar Shark



Night Shark



Longfin Mako Shark



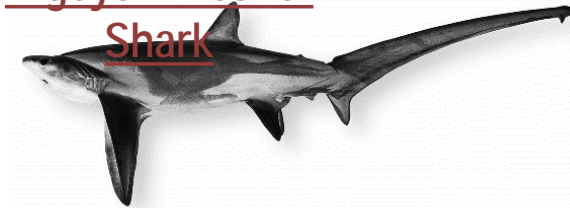
Dusky Shark



Sand Tiger Shark



Bigeye Thresher Shark



Bignose Shark



White Shark



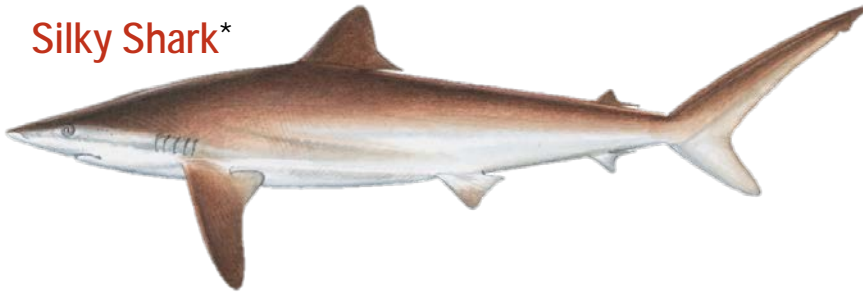
Atlantic Angel Shark



Sharks Prohibited in ICCAT Fisheries

Pelagic longline vessels are prohibited from retaining the following shark species:

Silky Shark*



All Hammerhead Sharks*, excluding bonnethead

- Great, smooth, scalloped




Oceanic Whitetip Shark*



Porbeagle

Shark art by Diane Peebles

* Bottom longline and gillnet vessels are allowed to retain these species

A large shark, likely a mako, is shown swimming underwater. It is surrounded by a large school of smaller fish, possibly sardines or anchovies, which are creating a splash of white water. The shark is positioned in the lower left, moving towards the right. The water is a deep blue color.

*Thank you
Questions?*

Acknowledgments

Mandy Karnauskas, Randy Blankinship,
Todd Kellison, Cisco Werner, David
Bernhart and many others!



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Approach to assessing status or generating management advice based on data availability

