

# Southeast Regional Efforts to Build a Foundation for the Fishery Ecosystem Plan

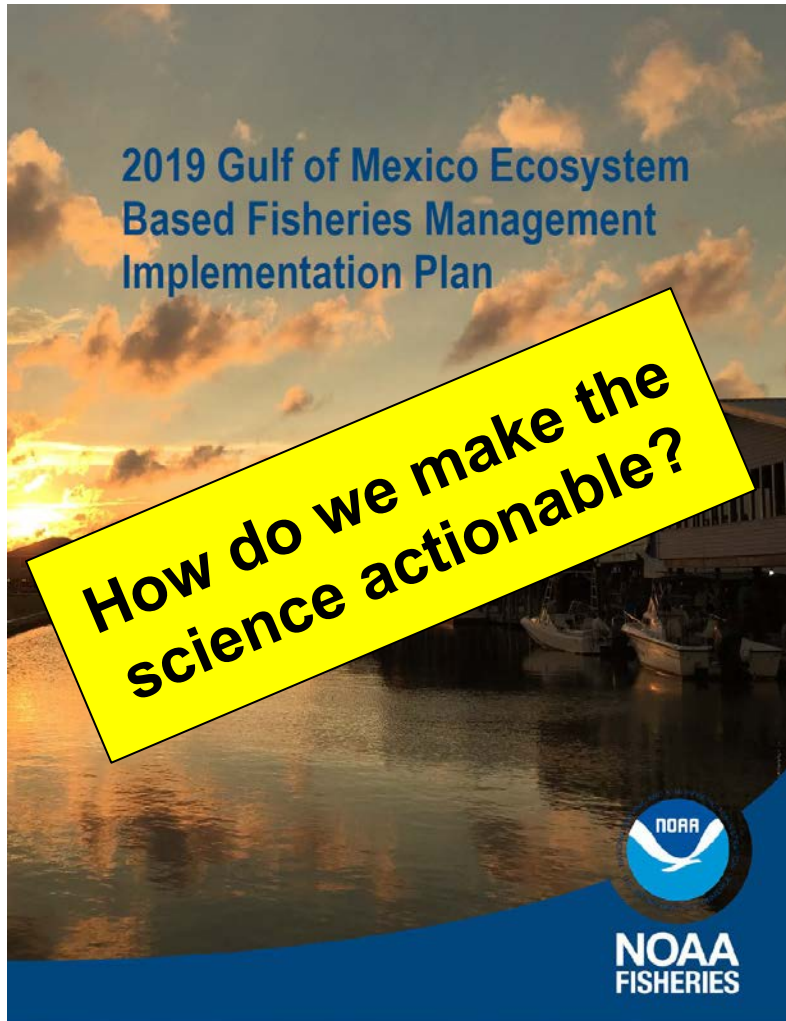
Mandy Karnauskas

Gulf Council Meeting  
August 27, 2020



**NOAA**  
**FISHERIES**

# Where we left off...the EBFM Road Map

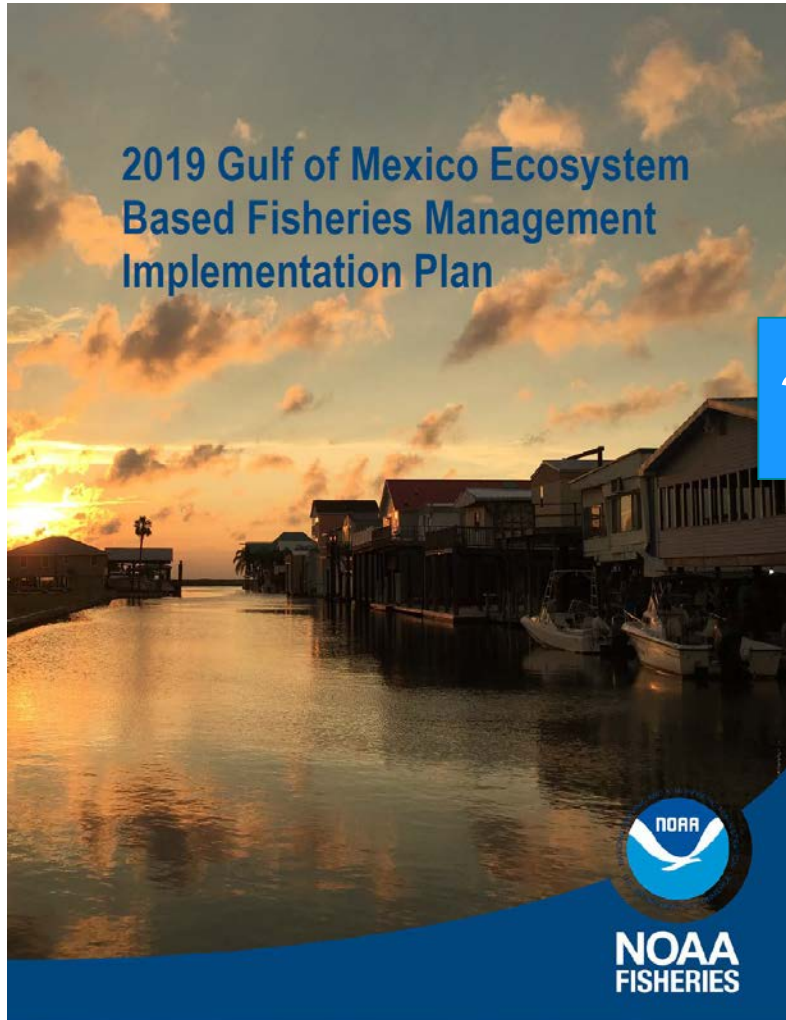


Overall objective was to motivate a dialogue on how EBFM can be effectively applied in the Gulf of Mexico, taking into account stakeholder views, regional capacity, and the current state of the science.

Science theme areas:

- Advancing stock assessments
- Tracking ecosystem trends
- Climate change
- Habitat considerations
- Multi-species interactions
- Spatial scales and connectivity
- Human dimensions

# Where we left off...the EBFM Road Map



## What is our destination?



A Fishery Ecosystem Plan (FEP) outlines the social, ecological, institutional or economic objectives for the region, and provides a decision framework for meeting these objectives

# EBFM and FEPs

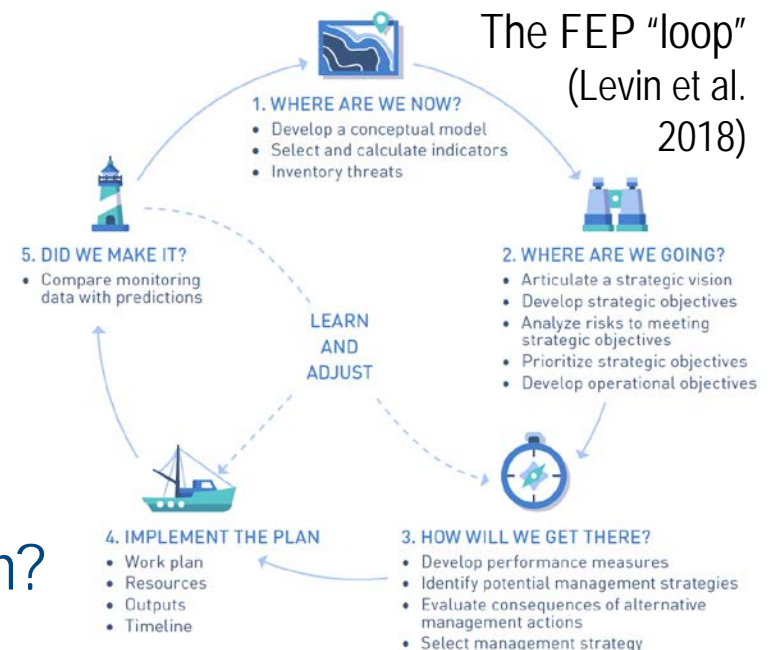
EBFM is “a systematic approach to fisheries management...that contributes to the resilience and sustainability of the ecosystem; recognizes the physical, biological, economic, and social interactions among the affected fishery-related components of the ecosystem, including humans; and seeks to optimize benefits among a diverse set of societal goals” (NOAA 2017)

FEP provides a statement of those goals, and a framework for addressing them

## Today:

1 - We have a good foundation for an FEP

2 - How can we put the foundation in action?



# FEP foundations – historical context

Ecosystem Management Survey  
Help us improve fisheries management.



ECOSYSTEM FISHERIES MANAGEMENT: A  
SUMMARY OF WORKSHOPS CONDUCTED  
ALONG THE GULF COAST



**GULF OF MEXICO  
FISHERY  
MANAGEMENT  
COUNCIL**

A REPORT PREPARED FOR THE GULF OF MEXICO  
FISHERY MANAGEMENT COUNCIL

11/01/05

by

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**Gulf of Mexico Fishery  
Management Council**

FINAL REPORT - ECOLOGICAL  
PILOT PROJECT

Rev Fish Biol Fisheries (2018) 28:667–691  
<https://doi.org/10.1007/s11160-018-9525-2>



REVIEWS

## Monitoring programs of the U.S. Gulf of Mexico: inventory, development and use of a large monitoring database to map fish and invertebrate spatial distributions

Arnaud Grüss<sup>a</sup> · Holly A. Perryman · Elizabeth A. Babcock · Skyler R. Sagarese · James T. Thorson · Cameron H. Ainsworth · Evan John Anderson · Kenneth Brennan · Matthew D. Campbell · Mary C. Christman · Scott Cross · Michael D. Drexler · J. Marcus Drymon · Chris L. Gardner · David S. Hanisko · Jill Hendon · Christopher C. Koenig · Matthew Love · Fernando Martinez-Andrade · Jack Morris · Brandi T. Noble · Matthew A. Nuttall · Jason Osborne · Christy Pattengill-Semmens · Adam G. Pollack · Tracey T. Sutton · Theodore S. Switzer

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*Last 5  
years*

Contents lists available at ScienceDirect



ELSEVIER

Marine Policy

journal homepage: [www.elsevier.com/locate/marpol](http://www.elsevier.com/locate/marpol)



## Management challenges are opportunities for fisheries ecosystem models in the Gulf of Mexico

David Chagaris<sup>a,\*</sup>, Skyler Sagarese<sup>b</sup>, Nick Farmer<sup>c</sup>, Behzad Mahmoudi<sup>d</sup>, Kim de Mutsert<sup>e</sup>, Steven VanderKooij<sup>f</sup>, William F. Patterson III<sup>g</sup>, Morgan Kilgour<sup>h</sup>, Amy Schueller<sup>i</sup>, Robert Ahrens<sup>e</sup>, Matthew Lauretta<sup>b</sup>

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<sup>b</sup>NOAA/National Marine Fisheries Service, Southeast Fisheries Science Center, 75 Virginia Beach Drive, Miami, FL 33149, USA  
<sup>c</sup>NOAA/National Marine Fisheries Service, Southeast Regional Office, St. Petersburg, FL 33701, USA  
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<sup>f</sup>Gulf States Marine Fisheries Commission, Ocean Springs, MS 39564, USA  
<sup>g</sup>SFRB Fisheries and Aquatic Sciences Program, University of Florida, Gainesville, FL 32611, USA  
<sup>h</sup>Gulf of Mexico Fishery Management Council, Tampa, FL 33607, USA  
<sup>i</sup>NOAA/National Marine Fisheries Service, Southeast Fisheries Science Center, 101 Pivers Island Road, Beaufort, NC 28516, USA

*mid-  
2000s*

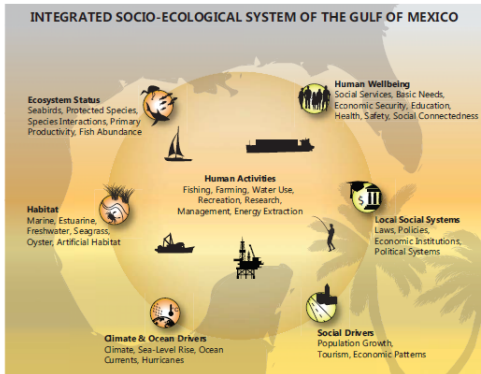
# FEP foundations – ecosystem status & trends



NOAA Technical Memorandum NMFS-SEFSC-706

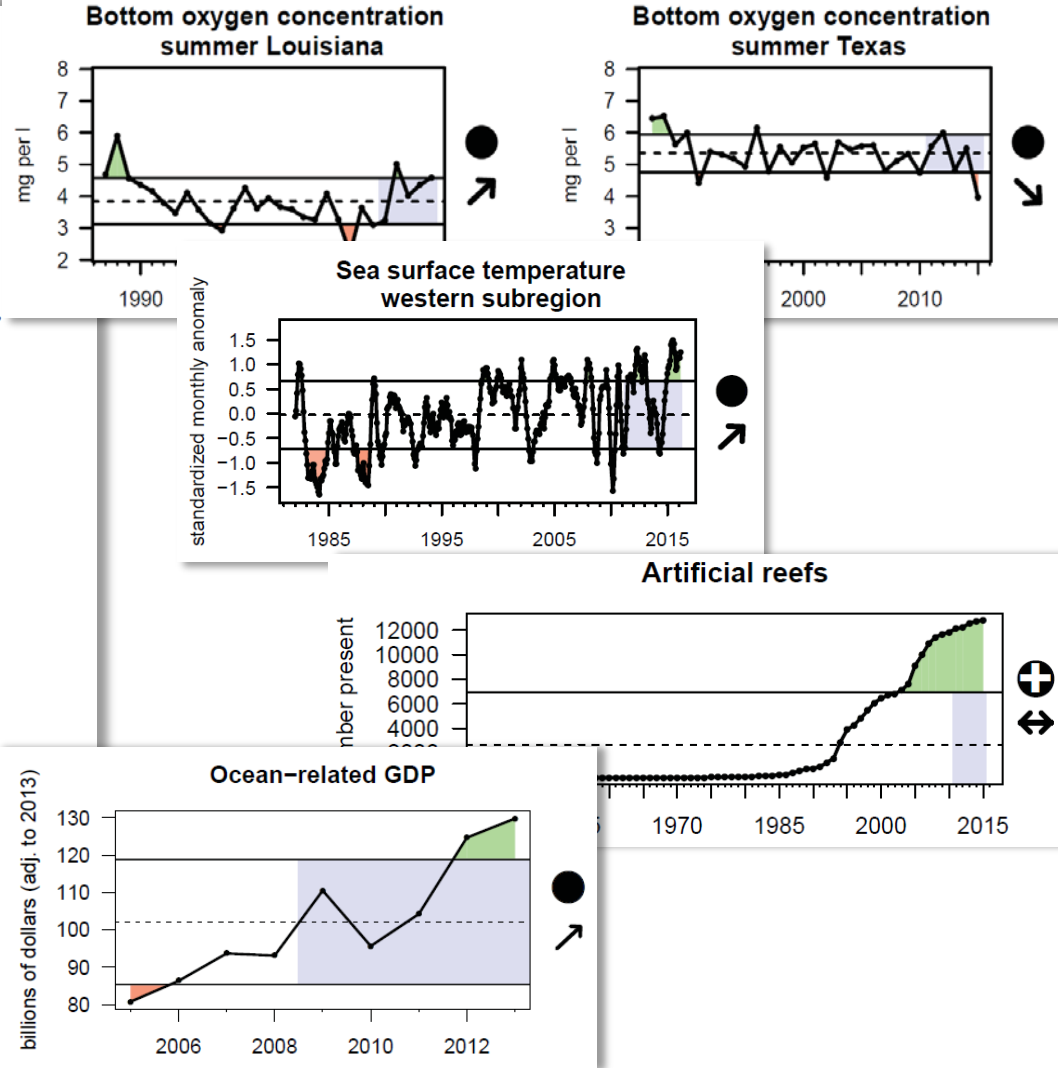
2017 ECOSYSTEM STATUS REPORT UPDATE FOR THE GULF OF MEXICO

Mandy Karnauskas, Christopher R. Kelble, Seann Regan, Charline Quenée, Rebecca Allee, Michael Jepson, Amy Freitag, J. Kevin Craig, Cristina Carollo, Leticia Barbero, Neda Trifonova, David Hanisko, and Glenn Zapfe



U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Southeast Fisheries Science Center  
75 Virginia Beach Drive  
Miami, Florida 33149

March 2017



# FEP foundations – system conceptualization

Participatory system dynamics modeling  
EBFM scoping workshops

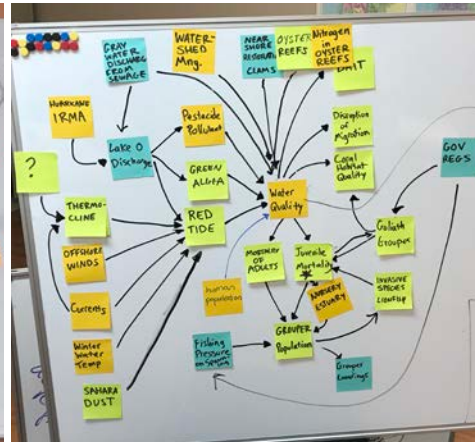
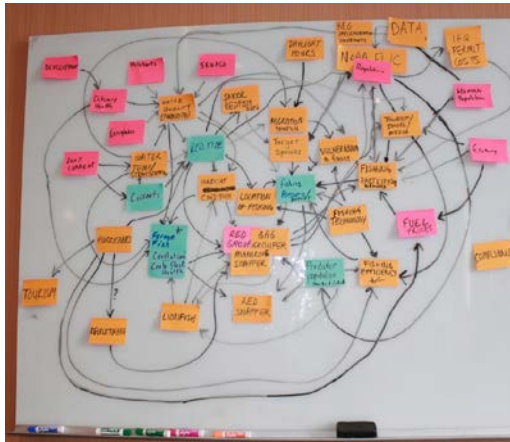
What exactly is the “ecosystem” we are trying to manage?

**Goal:** To increase information flow between scientists, managers, and stakeholders in support of improved stock assessment and EBFM

**Focus:** West Florida snapper-group complex



# Themes from participatory workshops

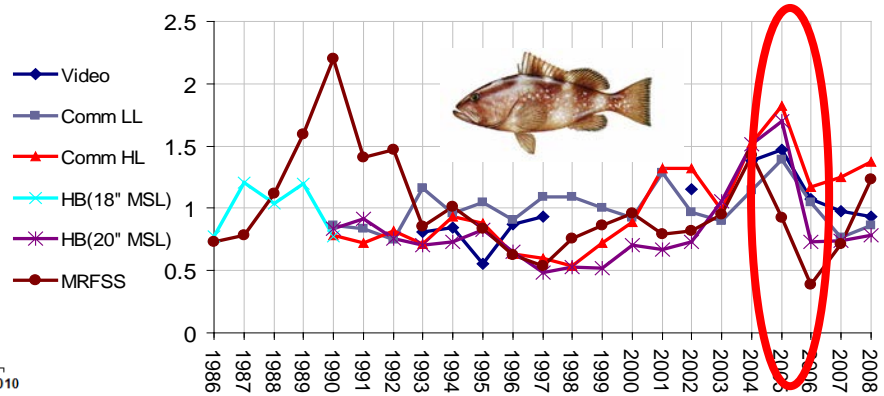
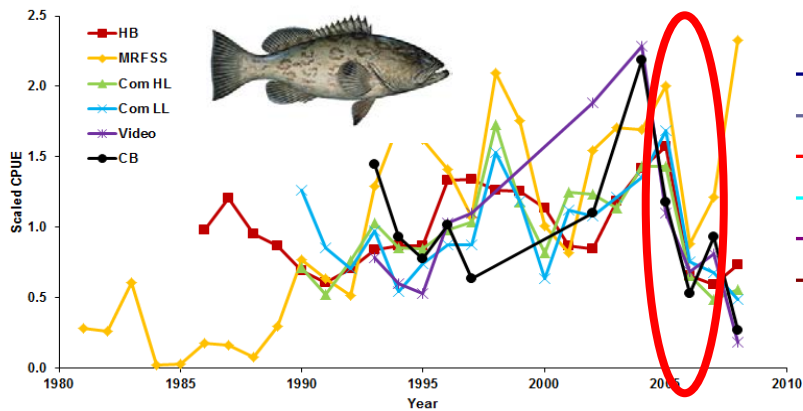


Factors affecting fisheries	Major concerns	Stakeholder values
Water quality and habitat	Water quality	Water quality and habitat
Bait and forage fish	Target fish populations	Abundant fish populations
Invasive species	Forage populations	Tourism
Predator populations	Economic impacts	Working water fronts
Practicality of regulations	Accountability	Presence of fishing community
Accountability	Perverse incentives	Fishing heritage
Technology / effort / participation	Opportunities for input	

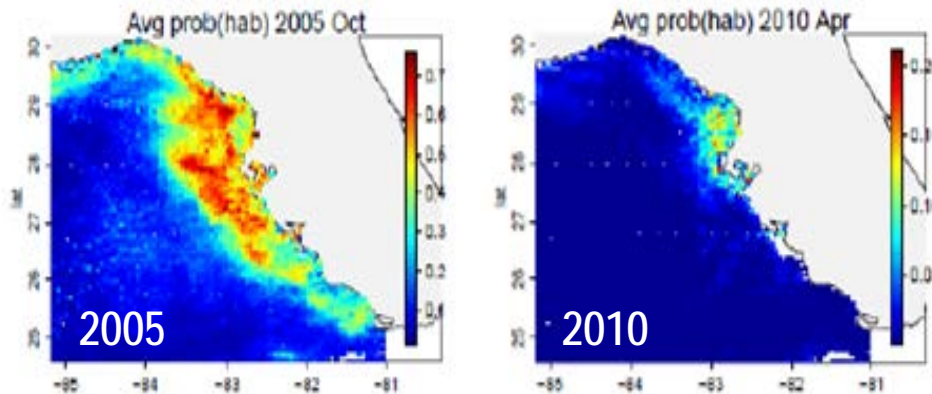


# A major concern: water quality / red tide

Red and Gag grouper abundance indices declined 50% from 2005-2006



Index of red tide based on satellite data and cell counts



Science, Service, Stewardship

**Incorporating indices of red tide severity into red and gag grouper stock assessments**

John Walter<sup>1</sup>, Brian Linton<sup>1</sup>, Jan Landsberg<sup>2</sup>, Karen Steidinger<sup>2</sup>, Mary Christman<sup>3</sup> and Richard Stumpf<sup>4</sup>

**NOAA FISHERIES SERVICE**

<sup>1</sup> Southeast Fisheries Science Center, <sup>2</sup> Fish and Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission, <sup>3</sup> Department of Statistics, Institute of Food and Agricultural Science, University of Florida, <sup>4</sup> NOAA, National Ocean Service.

# Led to expanded red tide research: ecosystem impacts, management strategies, episodic events



Contents lists available at ScienceDirect

Ecological Modelling

journal homepage: [www.elsevier.com/locate/ecolmodel](http://www.elsevier.com/locate/ecolmodel)

Effects of *Karenia brevis* harmful algal blooms on fish community structure on the West Florida Shelf

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<sup>b</sup> University of South Florida College of Marine Science, 140 7th St. Petersburg, 33701 FL, USA



Estuarine, Coastal and Shelf Science

Volume 168, 5 January 2016, Pages 40-49



Environmental conditions and catch rates of predatory fishes associated with a mass mortality on the West Florida Shelf

W.B. Driggers III<sup>a,\*,</sup> M.D. Campbell<sup>a,</sup> A.J. Debose<sup>a,</sup> K.M. Hannan<sup>a,</sup> M.D. Hendon<sup>a,</sup> T.L. Martin<sup>b,</sup> C.C. Nichols<sup>b</sup>

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FEATURE

## Handle with Care: Establishing Catch Limits for Fish Stocks Experiencing Episodic Natural Mortality Events

William J. Harford | Cooperative Institute for Marine and Atmospheric Studies, Rosenstiel School of Marine and Atmospheric Science, University of Miami, 4600 Rickenbacker Causeway, Miami, FL 33149. E-mail: [william.harford@noaa.gov](mailto:william.harford@noaa.gov)

Arnaud Grüss | Department of Marine Biology and Ecology, Rosenstiel School of Marine and Atmospheric Science, University of Miami, Miami, FL

Michael J. Schirripa and Skyler R. Sagarese | National Oceanic and Atmospheric Administration, Southeast Fisheries Science Center, Sustainable Fisheries Division, Miami, FL

Meaghan Bryan | National Oceanic and Atmospheric Administration, Alaska Fisheries Science Center, Seattle, WA

Mandy Karnauskas | National Oceanic and Atmospheric Administration, Southeast Fisheries Science Center, Sustainable Fisheries Division, Miami, FL



Ecological Modelling

Volume 340, 24 November 2016, Pages 86-105



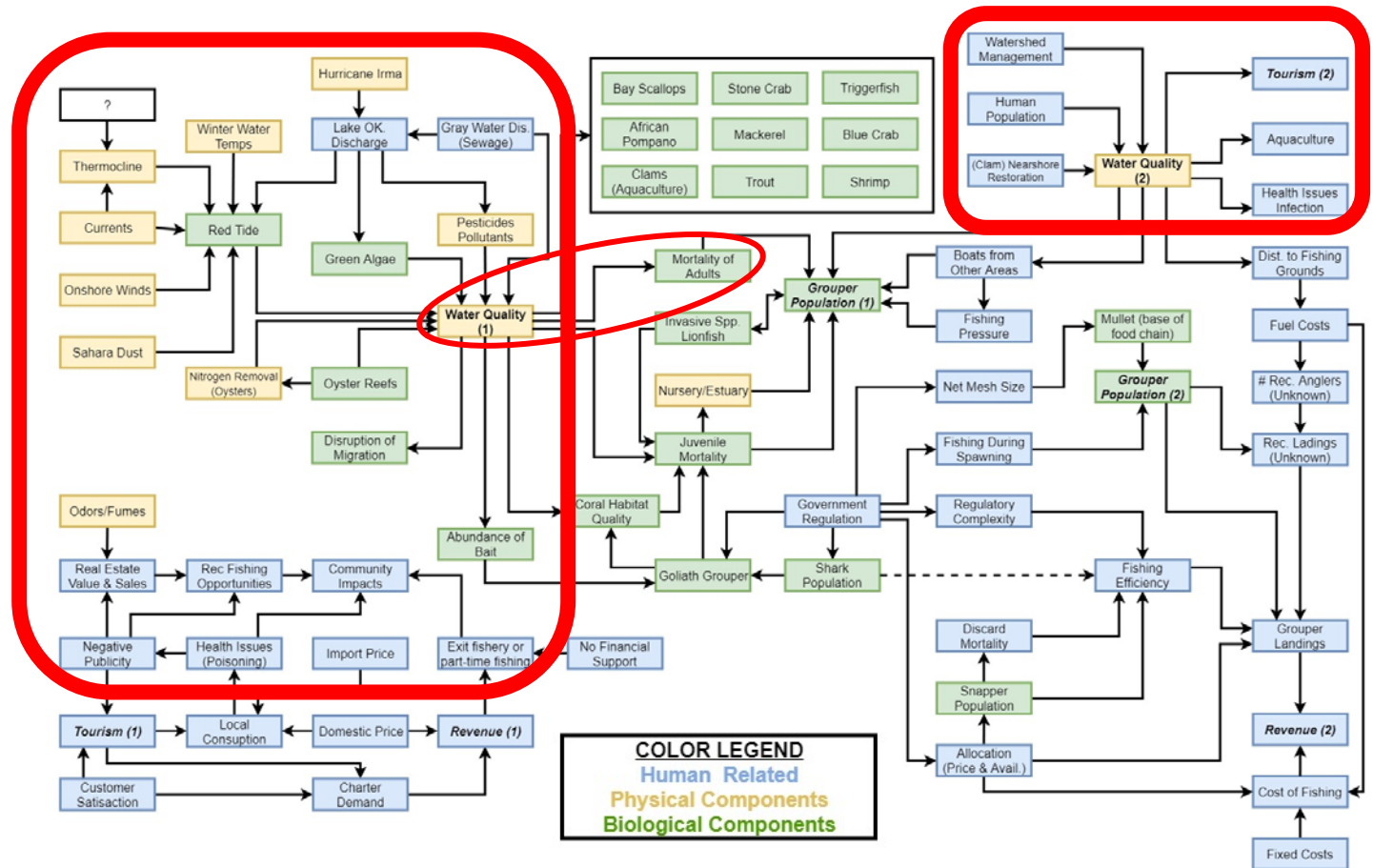
Management strategy evaluation using the individual-based, multispecies modeling approach OSMOSE

Arnaud Grüss<sup>a,\*,</sup> William J. Harford<sup>b,\*,</sup> Michael J. Schirripa<sup>c,</sup> Laure Velez<sup>d,\*,</sup> Skyler R. Sagarese<sup>c,</sup> Yunne-Jai Shin<sup>d,\*,</sup> Philippe Verley<sup>d,</sup>

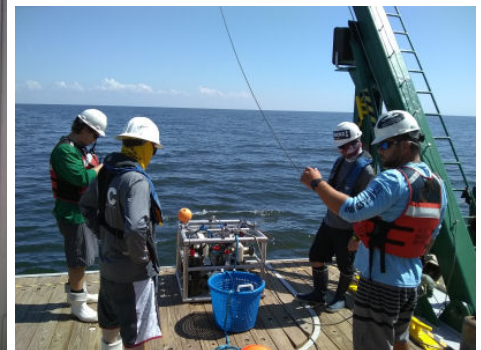
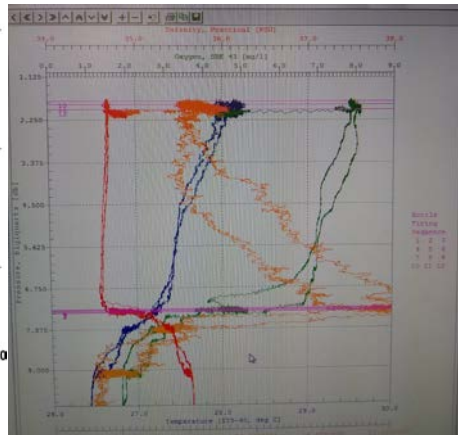
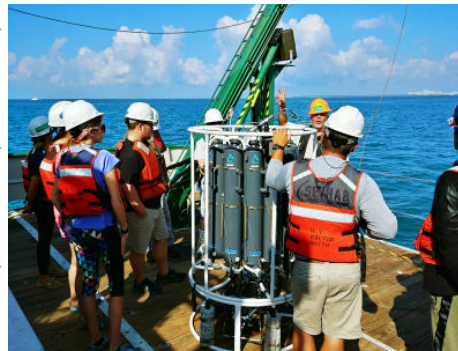
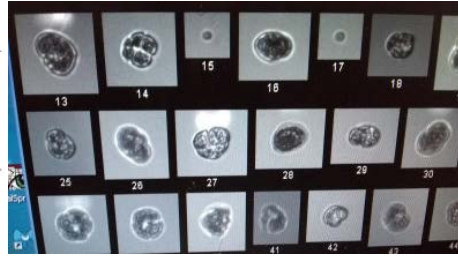
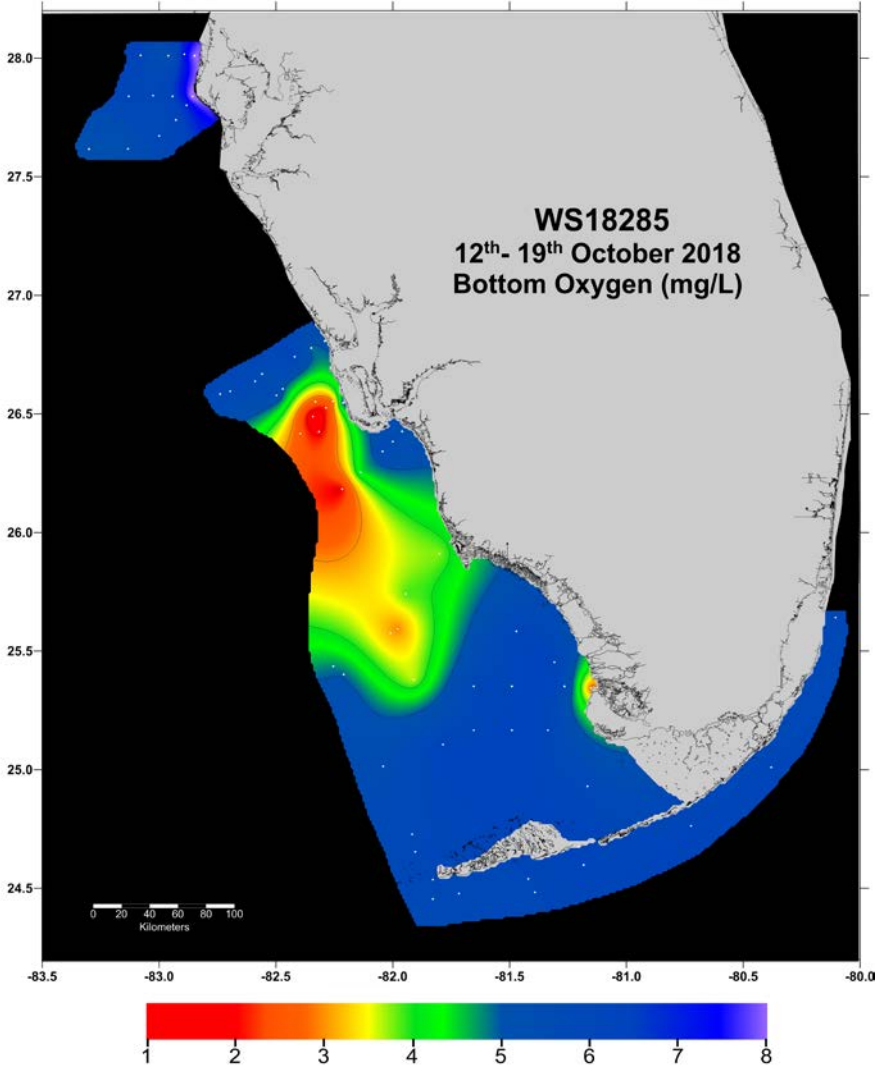
# Addressing red tide from EBFM perspective

Red tide affects target fish stocks, but also prey base, habitat, aquaculture, publicity, tourism, seafood demand, real estate, health...

Red tide and its direct impacts on ecosystem



# Understanding ecological impacts of red tide



# Understanding human impacts of red tide



- 62 oral histories
- snowball sampling method
- commercial and for-hire fishermen

## Goals:

- How has red tide varied in time and space historically? (*\*used in SEDAR 61 red grouper*)
- What have been the impacts of red tides on fish populations, habitats and humans?
- How have fishermen and coastal communities adapted to red tide? (*\*\*of interest to Council?*)

# Improving resilience in the face of stressors

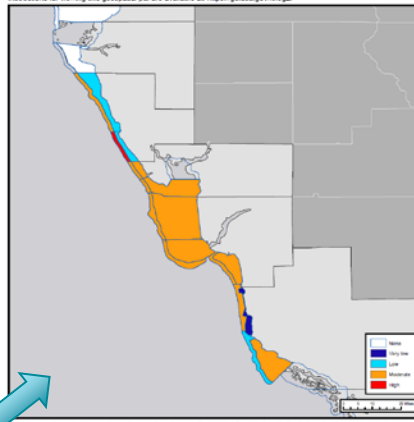
## Coordinated monitoring effort



### Gulf of Mexico Harmful Algal Bloom Bulletin

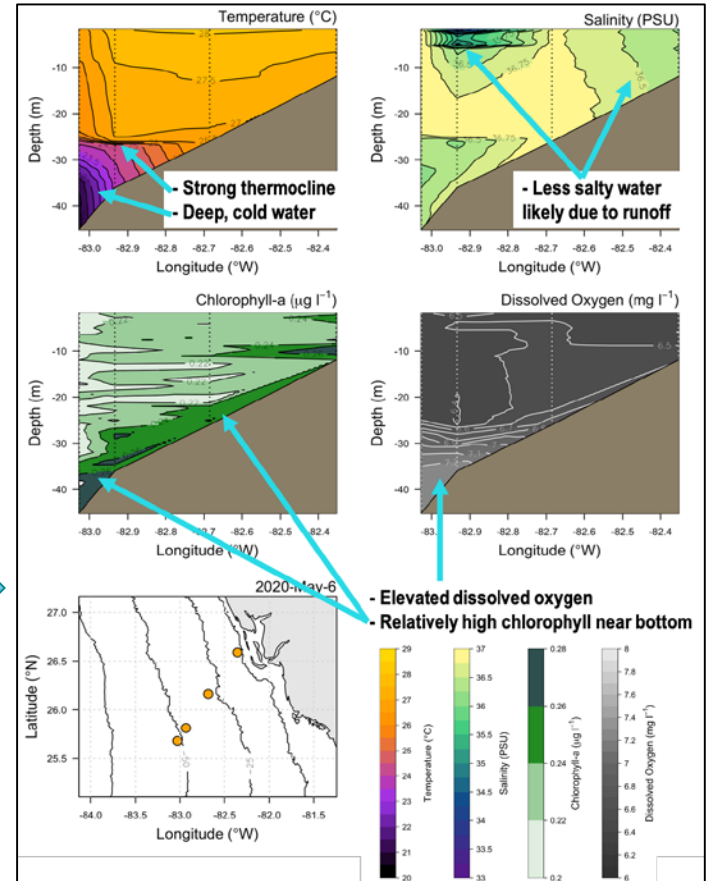
Monday, November 18, 2019  
 NOAA National Ocean Service  
 NOAA Satellite and Information Service  
 NOAA National Weather Service

Instructions for viewing this geospatial tool are available at: <https://goos.noaa.gov/rtg2/>

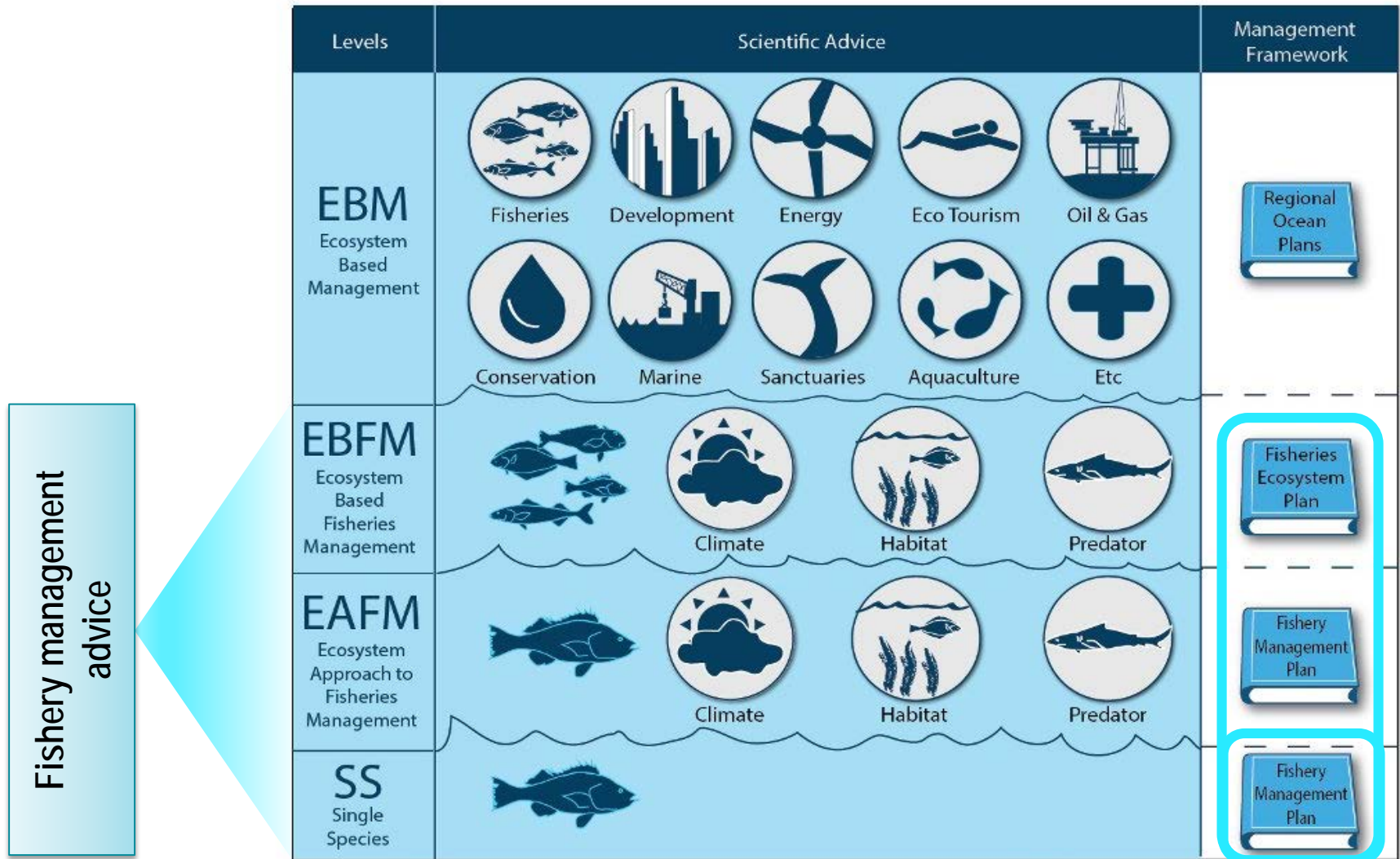


Seasonal forecast?

## Real-time conditions online



# What's the end goal?

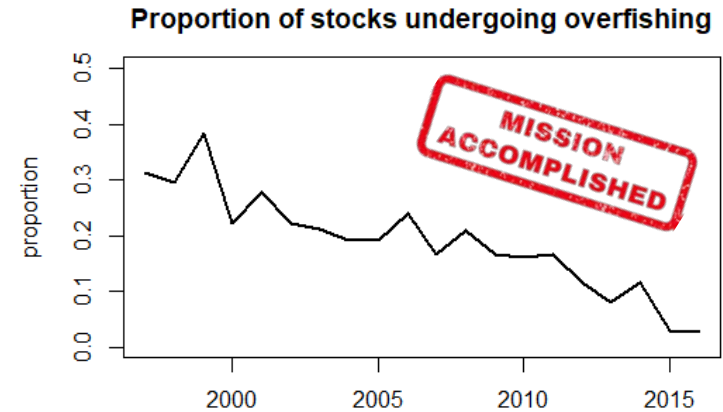


# What's the end goal?

- Are stocks overfished and are we overfishing?

## What stakeholders are asking us now:

- How can we mitigate the impacts of poor water quality on fish stocks?
- What are the impacts of increasing predator populations, loss of bait fish, and invasive species on our target species?
- How can we ensure regulations don't introduce perverse incentives and how do we reduce discarding rates?
- How can we improve accountability and increase access?
- How can we maintain coastal livelihoods despite repeated shocks (hurricanes, oil spills, red tides, COVID, etc...)?



How can we work together to address these questions?



# Thank you



Thank you to our many collaborators and funding sources on red tide and water quality research.

We appreciate all of the Gulf coast community members, fishermen, and other representatives of the fishing industry who took the time to share their knowledge and perspectives.