Identifying relevant spatial scales and priorities for ecosystem-based management in the Gulf of Mexico

Mandy Karnauskas, Matt McPherson, Adyan Rios, Skyler Sagarese, John Walter, Daniel Goethel, Suzana Blake, Amanda Stoltz
NOAA Southeast Fisheries Science Center, Miami, Florida

Chris Kelble
NOAA Atlantic Oceanographic and Meteorological Laboratory, Miami, Florida

Michael Jepson
NOAA Fisheries Southeast Regional Office, St. Petersburg, Florida

Casey Streeter
Florida Commercial Watermen’s Conservation, Matlacha, Florida

2nd EA Conference
25-27 June 2019
Bergen, Norway
Challenge #1: How do we effectively engage?

The IEA “loop”
Challenge #2: What is EBM and where do we start?

Gulf of Mexico Integrated Ecosystem Assessment Program

Mission:
Balancing the needs of nature and society through integrated science for current and future generations in the Gulf of Mexico.
Participatory system dynamics modeling

Fig. 1.5 Overview of the modeling process (Hovmand 2014)

Fig. 1.6 Overview of multiple projects in a community in CBSD (Hovmand 2014)
Initial focus: West Florida snapper-grouper fishery

**Goal:** To increase information flow between scientists, managers, and stakeholders, in support of improved stock assessment and ecosystem assessment in the Gulf of Mexico.
Participatory fisheries system modeling process
Participatory fisheries system model

Forces controlled by fishery management

Forces that affect the fisheries
Network analysis: which factors are influential?

Nodes sized by betweenness centrality - have considerable influence within a network, high number of pass-through linkages.
Water quality / red tide most influential node

Red tide perceived to negatively affect:

- Prey base
- Habitat
- Tourism
- Aquaculture
- Demand for the recreational sector
- Demand for local seafood
- Restaurant industry
- Real estate
- Human health

RESEARCH AND RESPONSE PLAN

DOCUMENT IMPACTS
• FISH & FISHING COMMUNITIES

UNDERSTAND
• BLOOM ECOLOGY

LEARN & PREPARE
• FUTURE RED TIDE EVENTS
Red tide response cruise – October 2018

Leveraged collaborations with other federal and state agencies, universities, and private institutions to fill identified information gaps within conceptual model.
Red tide local ecological knowledge initiative

- Document red tide locations, frequency and severity over time and space
- Document impacts on ecosystem
- Identify stakeholder-driven hypotheses on bloom ecology
- Document adaptation strategies
Stakeholder involvement in science
Conclusions: participatory fisheries system modeling

• Useful for defining discrete EBFM problems
• Effective for engaging both researchers and stakeholders
• Scientists inspired to redirect research towards user-inspired needs
• Stakeholders are engaged; by visualizing linkages are also motivated to help fill research gaps
• Beyond engagement and prioritization, other uses: indicator development, inform risk assessment and MSEs, quantitative tradeoff analysis
Acknowledgments

The stakeholders and fishermen who have participated in this project
Many, many collaborating scientists