Cooperative Monitoring Program for Spawning Aggregations in the Gulf of Mexico:

An assessment of existing information, data gaps, and research priorities

NOAA RESTORE Act Science Program

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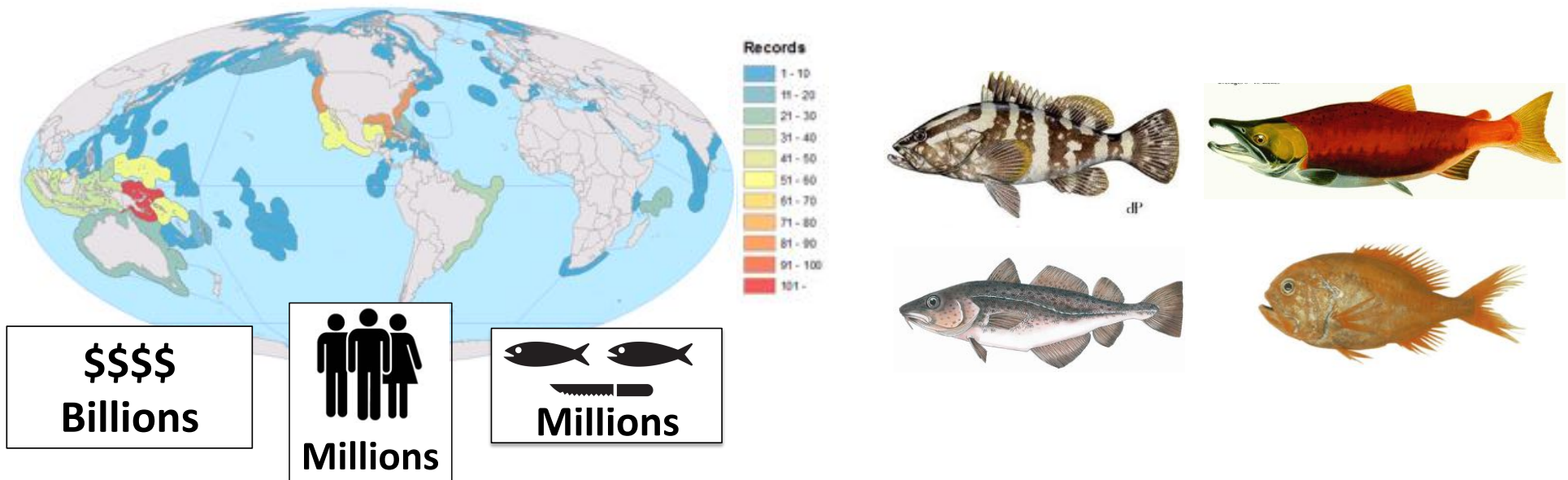
Fish Spawning Aggregations (FSAs)

Temporary, large gatherings of fish that form for the purpose of reproduction, are predictable in time and space, and involve densities higher than non-reproductive periods
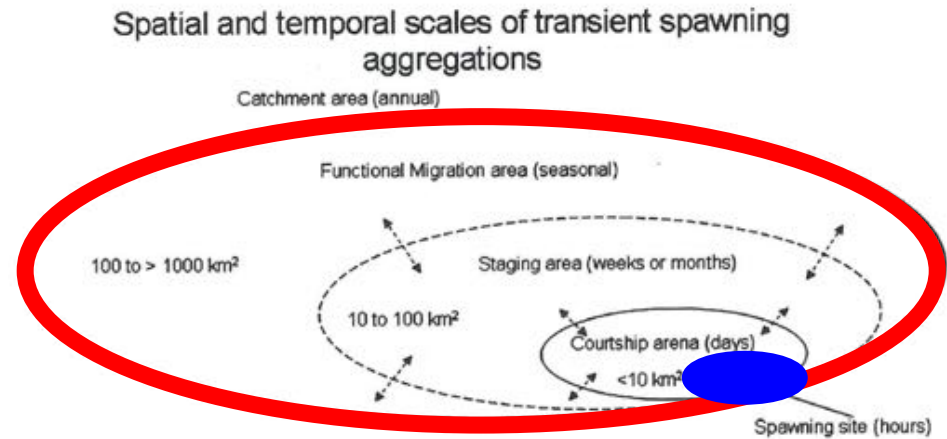
- Critical events for reproductive success
- Represent Essential Fish Habitat (EFH)
- Important for Ecosystem structure/function

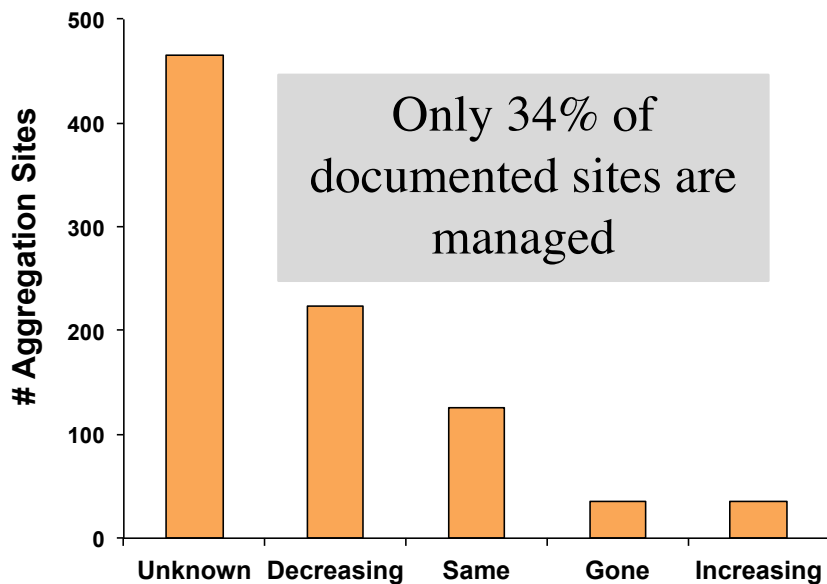## Fish Spawning Aggregations (FSAs) are important to global fisheries...

Records
- 1 - 10
- 11 - 20
- 21 - 30
- 31 - 40
- 41 - 50
- 51 - 60
- 61 - 70
- 71 - 80
- 81 - 90
- 91 - 100
- 101 -

$$$$
Billions

Millions

Millions

Global Challenge

FSAs can be vulnerable to overfishing...fishing effects "scale up"

Spatial and temporal scales of transient spawning aggregations

Catchment area (annual)

Functional Migration area (seasonal)

100 to > 1000 km²

Staging area (weeks or months)

10 to 100 km²

Courtship arena (days)

<10 km²

Spawning site (hours)

FSAs are declining globally...few are monitored, assessed or managed

Only 34% of documented sites are managed

Inclusion within management works

- Increased reproductive output
- Stabilized population structure
- Practical for monitoring
- Improved stock assessments
- Increased catches and CPUE
- Supports ecosystem-based management

(Erisman et al. 2015, Fish & Fisheries)

Regional Challenge

Many species of exploited and protected fishes are known to or likely form FSAs In the Gulf of Mexico
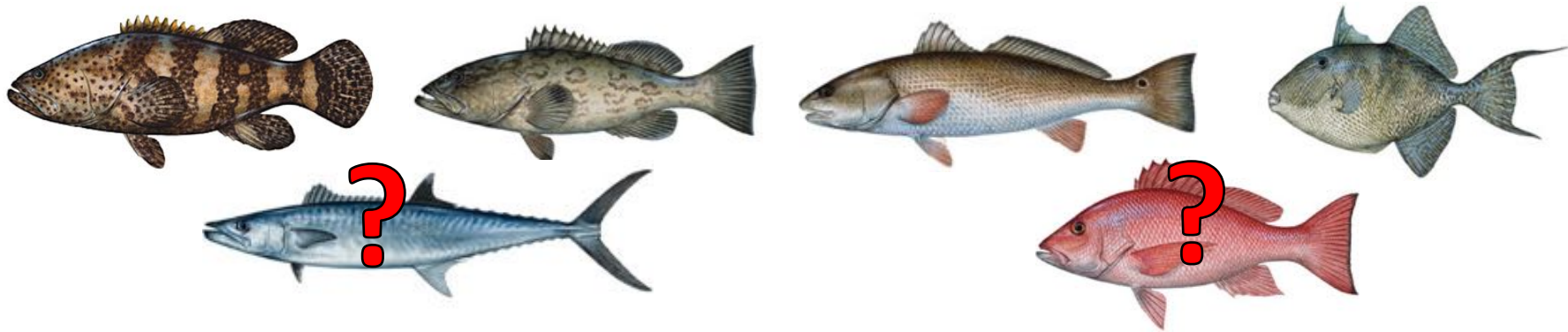
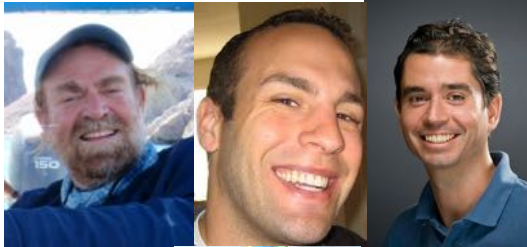...BUT it is one of the world's least studied areas for the biology and fisheries of FSAs

Despite a wealth of scientific information and regional knowledge on the biology and fisheries on aggregating species

Our Team
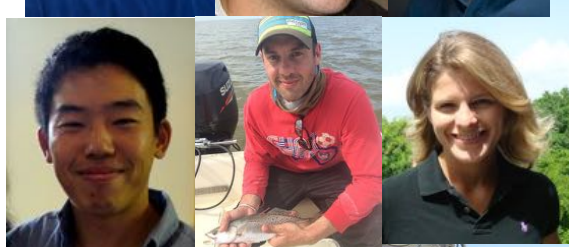
Support provided by:
Scott Hickman (CFA) & Roy Williams
Chris Taylor (NOS/NCCOS/CCFHR)
Todd Kellison (NOAA SEFSC – Beaufort)
John Froeschke (GMFMC)
Martin Russell (SCRFA)
NOAA Southeast Regional Office
Chris Koenig (FSU)
Many, many fishermen

Objectives

1. Compile and evaluate existing information on fish spawning aggregations in the GOM as the basis to design a cooperative monitoring program for FSAs.

2. Engage in a comprehensive outreach and data-sharing program to ensure all data and project outputs are available to inform management.

Objective #1: Outputs

30 species
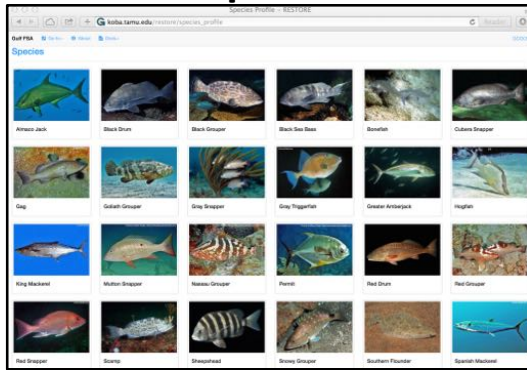
Database of 800 refs.
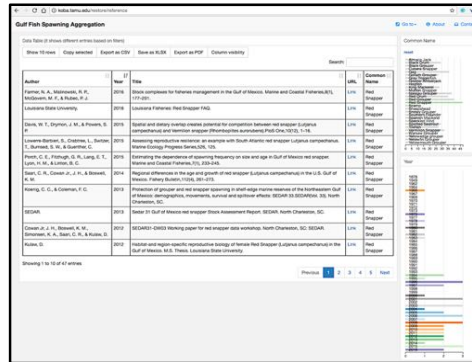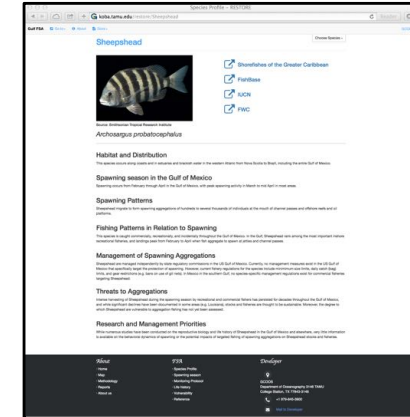
Species Profiles

Life history and spawning behavior

Spawning Seasons

Bathymetric and FSA maps
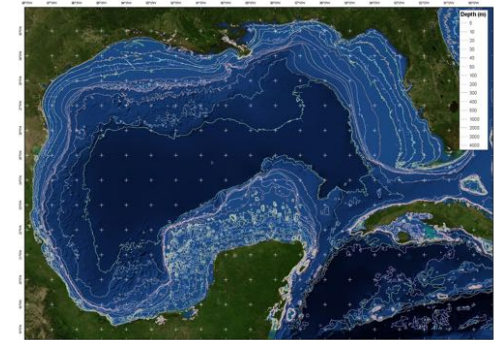
Fisheries interactions and mgmt.

Vulnerability Assessments
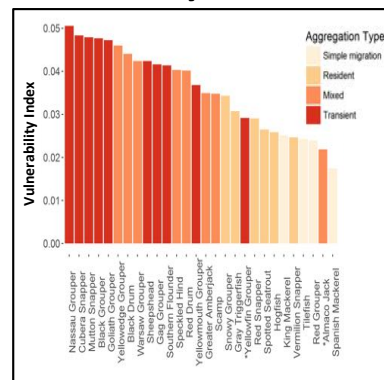
Monitoring Protocol
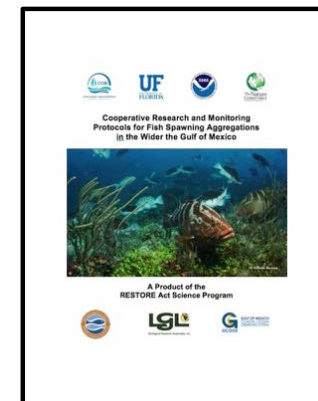
Take-Home Messages

1. Lack of information on locations of spawning aggregations in the Gulf of Mexico.

2. Lack of information on behavioral dynamics of FSAs in space and time (e.g. density change, periodicity, etc.).

3. Commercial fisheries target the spawning season and FSA sites (inferred) of most species.

4. Lack of information on interactions between and impacts of fishing on FSAs.

6. The most vulnerable spp. have not been assessed

5. Transient FSAs are most vulnerable

Objective #2: Outputs

gcoos3.tamu.edu/restore

FSA Workshop
October 4-5 2016, NOAA SERO
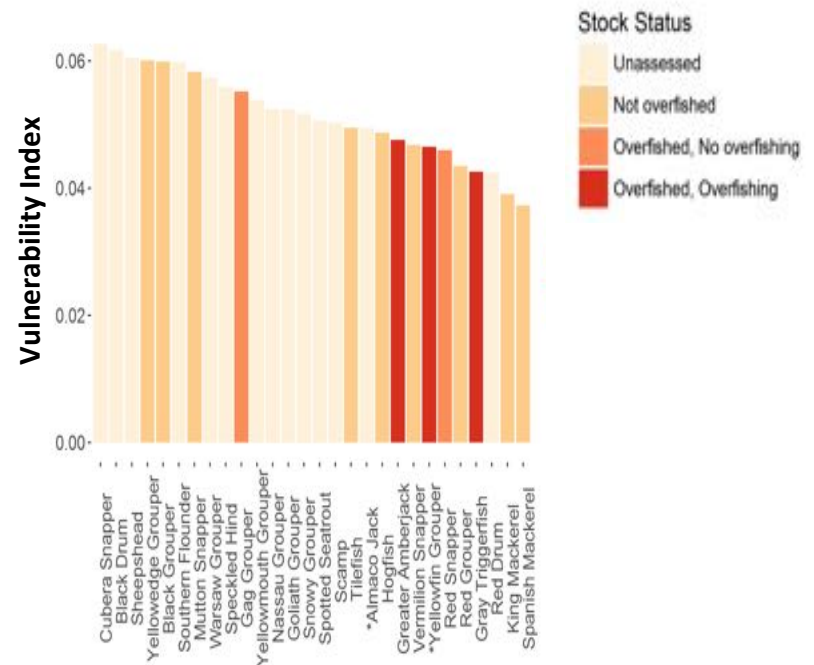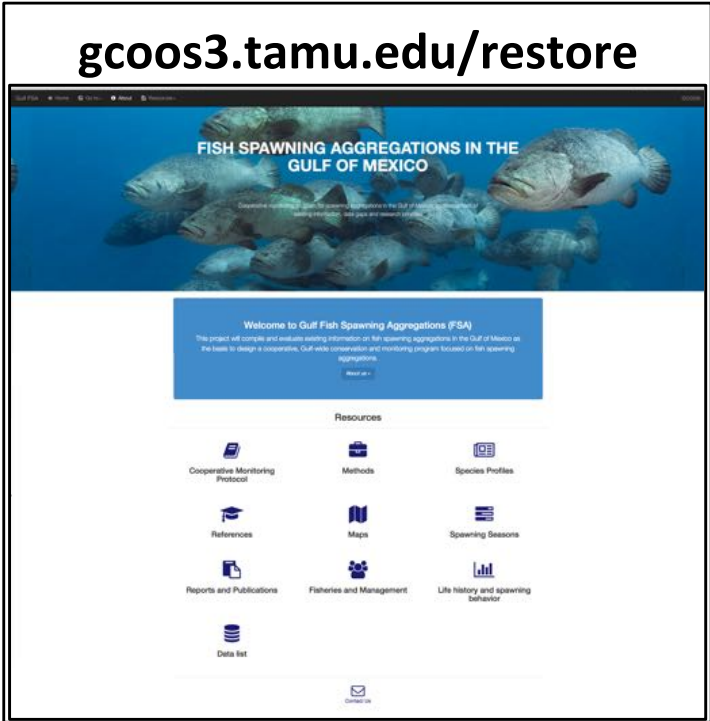
Research and Management Priorities

1) Mine existing data to assess interaction strengths between fishing and spawning to **identify and prioritize areas and species of highest vulnerability**

2) Work collaboratively with commercial and recreational fishers to identify, **characterize, assess, and monitor key spawning areas**

3) Inform and **improve stock assessments** by incorporating spawning dynamics into existing assessment models

4) Develop **management frameworks** for FSAs and aggregating species through the Fisheries Management Council process

Next Steps

Short-term (1-2 yrs @ $250k/yr) = continue within scope of current project
- Enhance visibility, access, and capability of website, profiles, databases
- Update GOM bathymetric map (< 200m) and make available on GCOOS/NOAA
- Continue vulnerability assessment and fishing interaction/impact analyses
- Workshops: (1) FSA stock assessments; (2) regional FSA monitoring protocol
- Engage recreational fishing sector
- Increase existing collaborations with commercial sector
- Add more species (bonefish, tarpon, gray snapper, etc.)

Long-term (5-10 yrs @ $1m/yr)
- Develop a network of fishermen, scientists and managers who cooperatively predict, characterize, and monitor multi-species FSAs throughout the GOM
- Develop methods to integrate FSAs into regional stock assessments
- Establish long-term monitoring sites for FSAs in the wider GOM
- Utilize advanced technologies to improve efficiency & quality of FSA monitoring
- Assess the importance of petroleum platforms as suitable FSA sites
- Model the potential effects of climate change and fishing pressure on the phenology, distribution, and productivity of FSAs