Summary of Ecosystem SSC meeting on Feb. 25, 2015 in Tampa, FL

Wei Wu

March 30, 2015 in Biloxi

Who were there

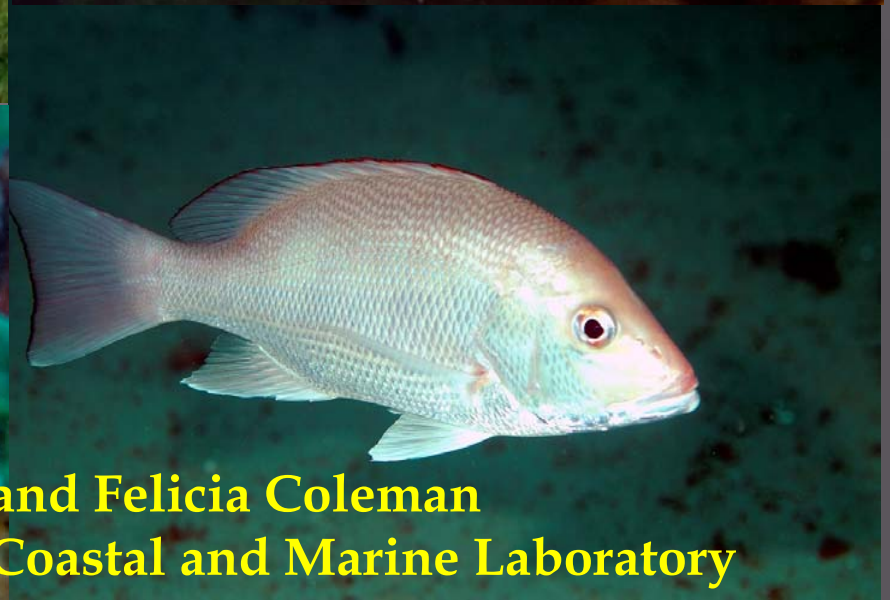
Members Present	NMFS-SERO Staff
Cameron Ainsworth, Vice-chair	Nick Farmer
Joan Browder	
Columbus Brown	Others present
Stephen Holiman	J.P. Brooker
Alan Matherne	Felicia Coleman
Glenn Thomas	Chad Hanson
Wei Wu	Frank Helies
	Will Heyman
Council Staff	Chris Koenig
Morgan Kilgour	Tom Wheatley
Charlotte Schiaffo	
Council Member	
Roy Williams	

Madison-Swanson and Steamboat Lumps Marine Reserves Reports

The Ecosystem SSC was presented information on the shelf-edge fishing reserves in the Southeastern U.S. from 2003-2009.

Highlights

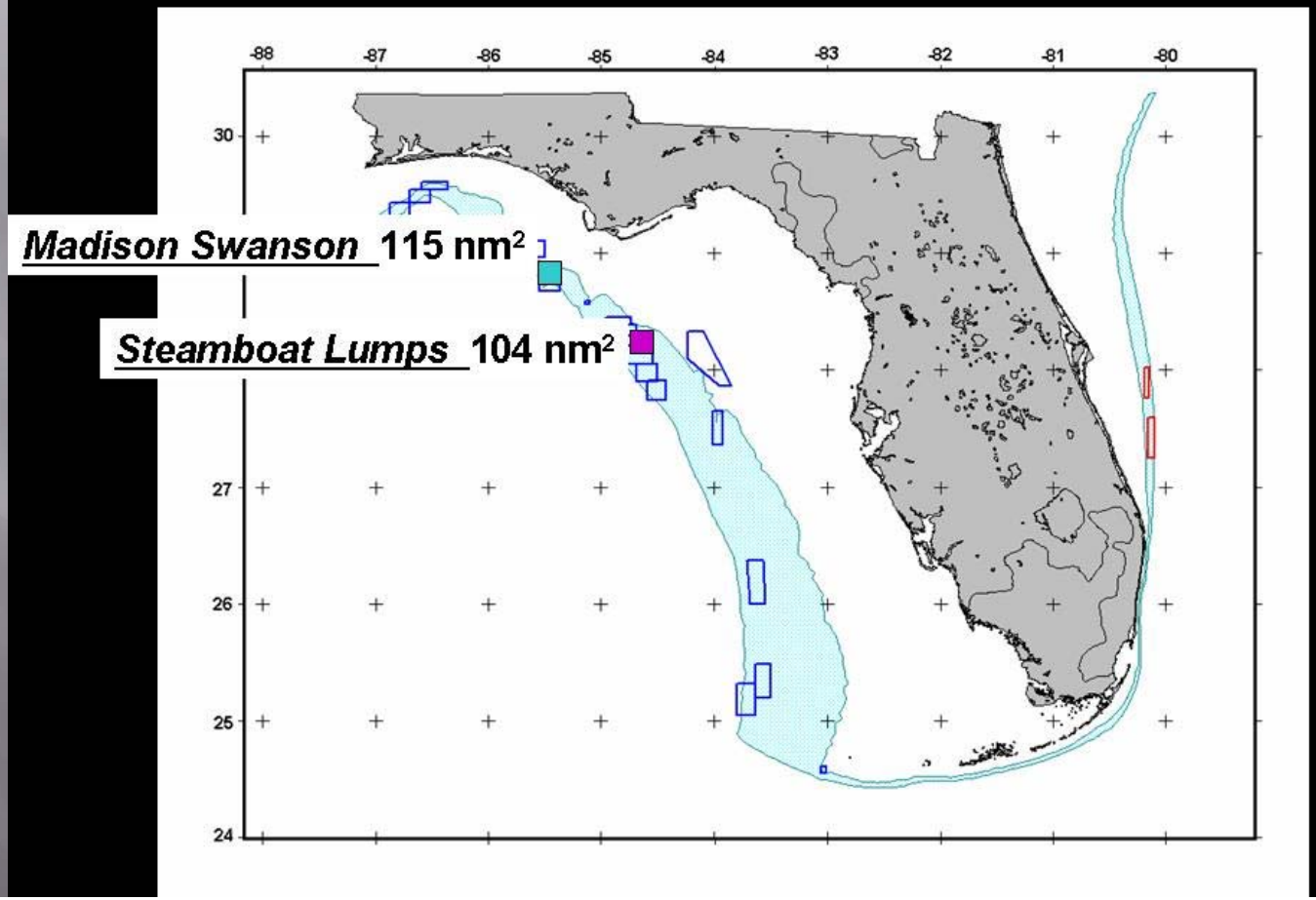
Shelf-edge fishing reserves in the southeastern US.

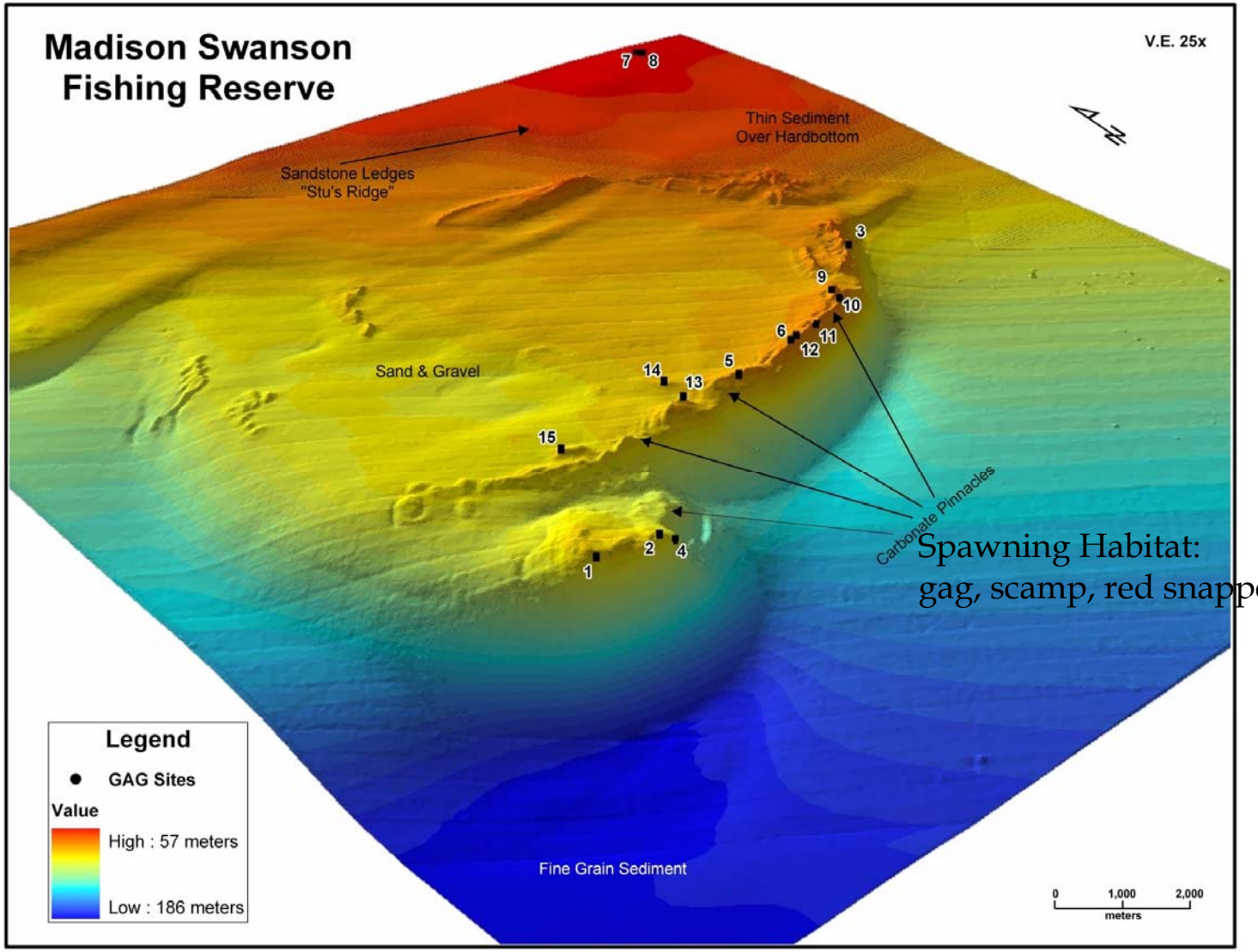


Chris Koenig and Felicia Coleman
Florida State University Coastal and Marine Laboratory

Both reserves were established in 2000.

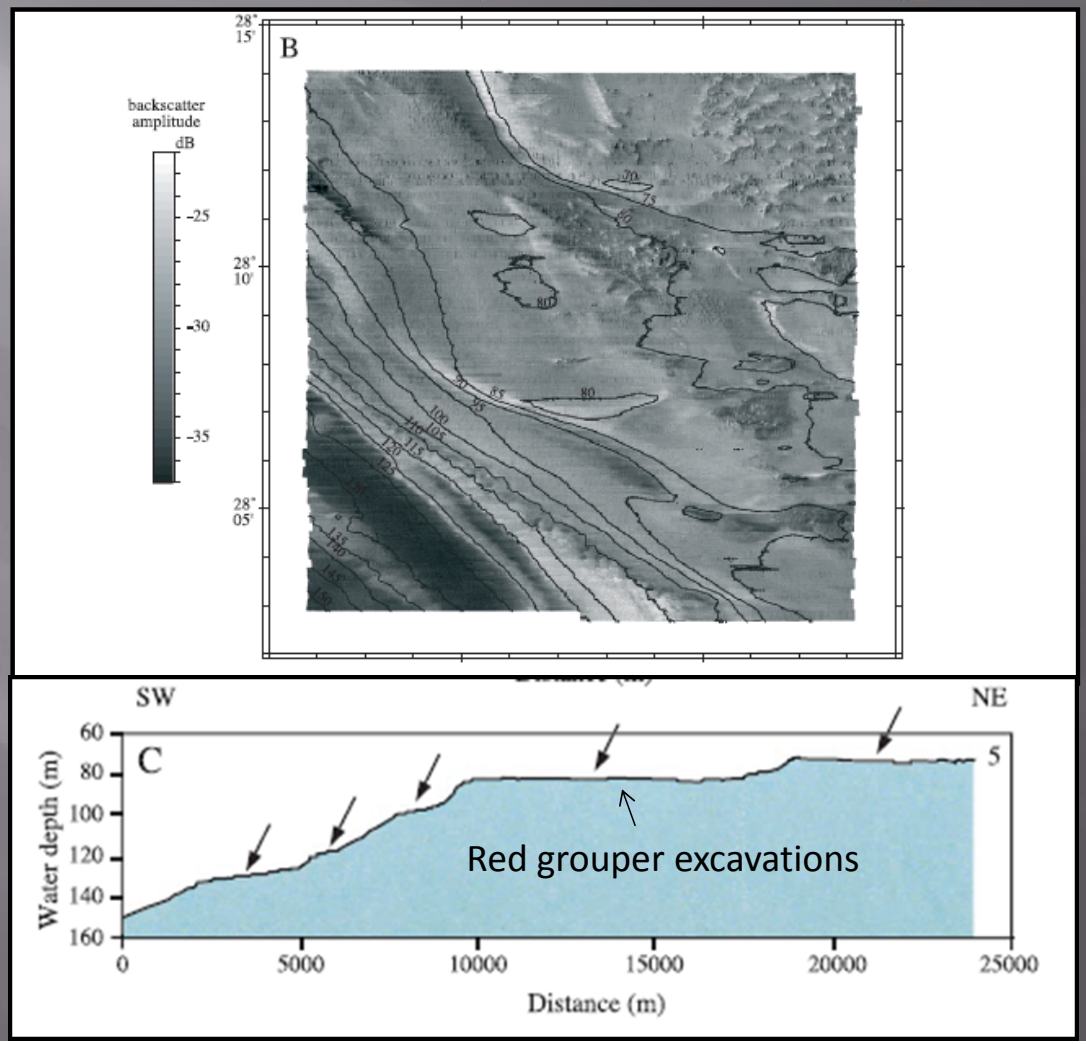
Primary purpose: study decline in % male Gag





Spawning Habitat:
gag, scamp, red snapper

Steamboat Lumps (not gag habitat)



Shelf-edge (50-120m) Habitat

- Why are these areas important for spawning?
  - High-relief rocky reefs.
  - Deep (50-120m deep)—below storm surge.
  - Rocky ridges and adjacent drop-offs are common reef fish spawning habitat.

The Gag problem: low % males


Male Gag

- % males declined relative to fishing pressure.
- We needed a no-fishing zone to figure out why.
- Petitioned the Gulf Council to establish an area closed to fishing (4 yrs, 10 yrs, now- in perpetuity).

The question: If gag changes sex from female to male, then why doesn't the population just compensate for the loss of males by producing more?

(Note: all studied species of reef fish have socially mediated sex change, not triggered by size or age).

Decline in Percentage of Gag Males.

Time Period	NE Gulf of Mexico	South Atlantic Bight
1970s	15 – 25 %	15 – 25 %
1990s to pres.	1 – 5 %	3 – 5 %

Supporting Data

1. **1970s, Gulf: Hood and Schlieder 1992**
2. **1970s, S. Atl.: Collins et al. 1987**
3. **1990s, Gulf: Koenig et al. 1996**
4. **1990s, Gulf: Collins et al. 1998**
5. **1990s, Gulf: NMFS Panama City Lab, Unpublished**
6. **1990s, S. Atl.: McGovern et al. 1998**

Recovery of the sex ratio of Gag

- Percentage of males increased to 12% by 2010, while the % males outside remained ~2%.
- Year-round closures protect males because males remain on spawning sites year-round.

Percent males and transitionals in the Gag population inside MSMR. Fish collected from Dec. 2007 to Dec. 2010. F=female, T=transitional, M=male.

Periods	F	T	M	total	% T	% M+T
Agg, Dec-Mar	19	0	1	20	0	5.0 [a]
Post agg, Apr-Jul	70	4	9	83	4.8	15.6 [b]
Pre agg, Aug-Nov	72	0	8	80	0	10.0 [c]
Overall	161	4	18	183	2.2	12.0 [b]

[a] Not significantly different between inside and outside MSMR ($p>0.05$)

[b] Significantly different between inside and outside MSMR ($p<0.0001$)

[c] Significantly different between inside and outside MSMR ($p<0.003$)

From: Koenig and Coleman 2011, MARFIN final rpt.

What else did we learn from the no-fishing zones?

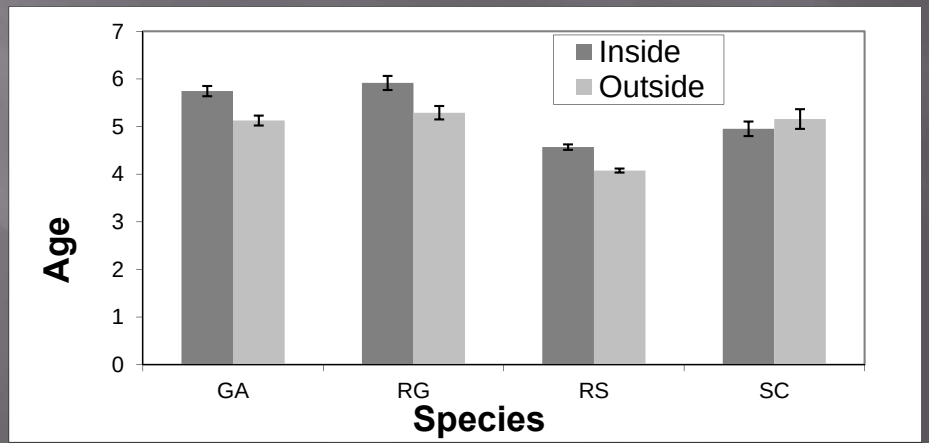
1. Red Snapper use the same sites as Gag for spawning and have strong spawning site fidelity, as male Gag do.
2. Age, size and CPUE increased significantly within MSMR.
3. Critically endangered and threatened groupers (Warsaw Grouper, Speckled Hind and Snowy Grouper) are protected.
4. Direct benefit to fishers via 'spillover'.
5. Red Grouper is an 'ecological engineer'.

Age structure in Madison Swanson from dorsal fin rays

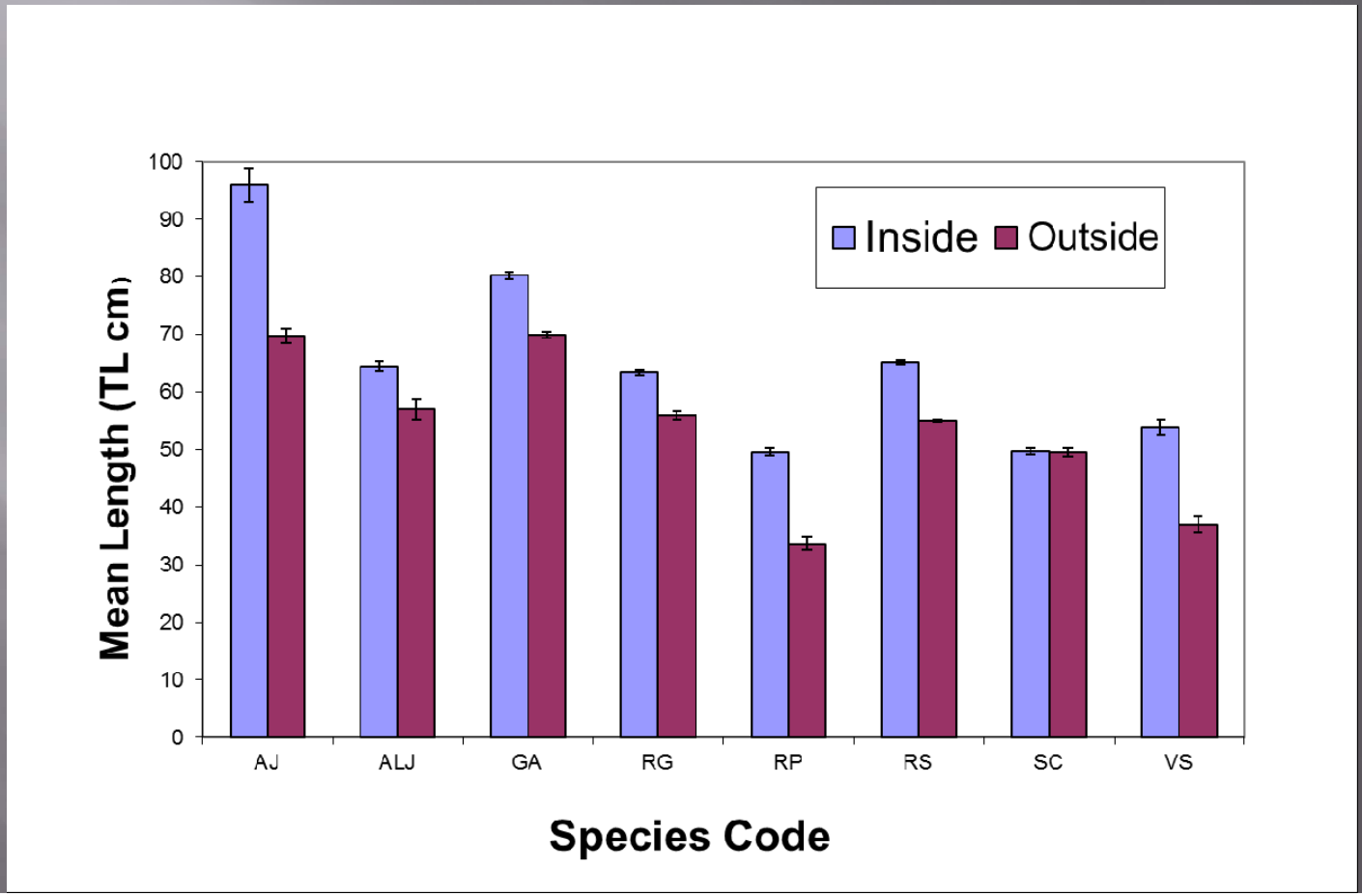
Red snapper dorsal fin ray cross section

Table 1. Differences in mean age of dominant reef fish fishery species between inside and outside MSMR. GA = gag, RG = red grouper, RS = red snapper, SC = scamp.

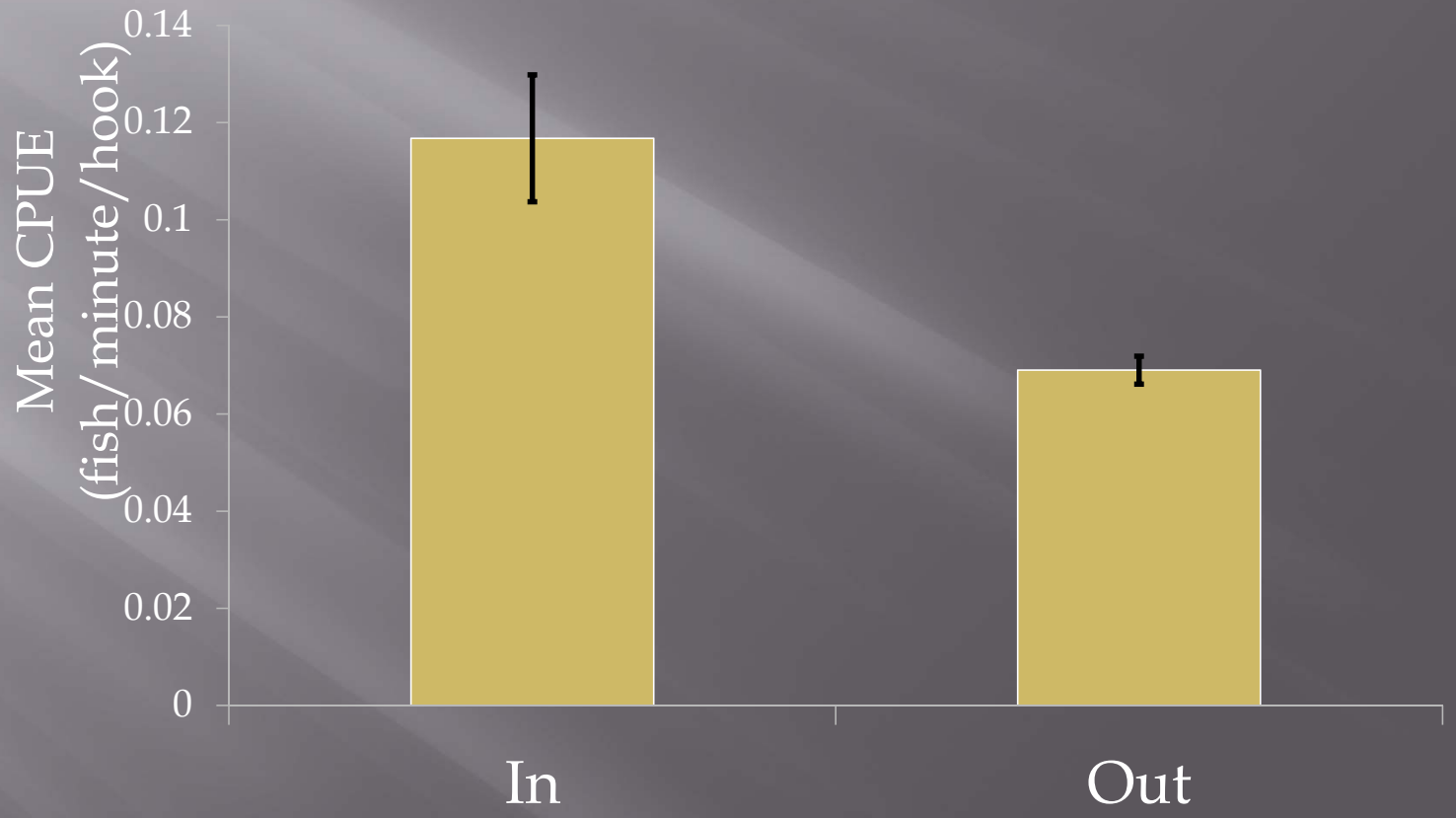
Species	Mean Age in (N; SE)	Mean Age out (N; SE)	Signif. (t-test)
GA	5.7 (227; 0.107)	5.1 (214; 0.105)	$P < 0.001$
RG	5.9 (83; 0.148)	5.3 (83; 0.141)	$P < 0.01$
RS	4.6 (297; 0.056)	4.1 (382; 0.041)	$P < 0.001$
SC	4.9 (63; 0.152)	5.1 (19;0.206)	$P > 0.05$



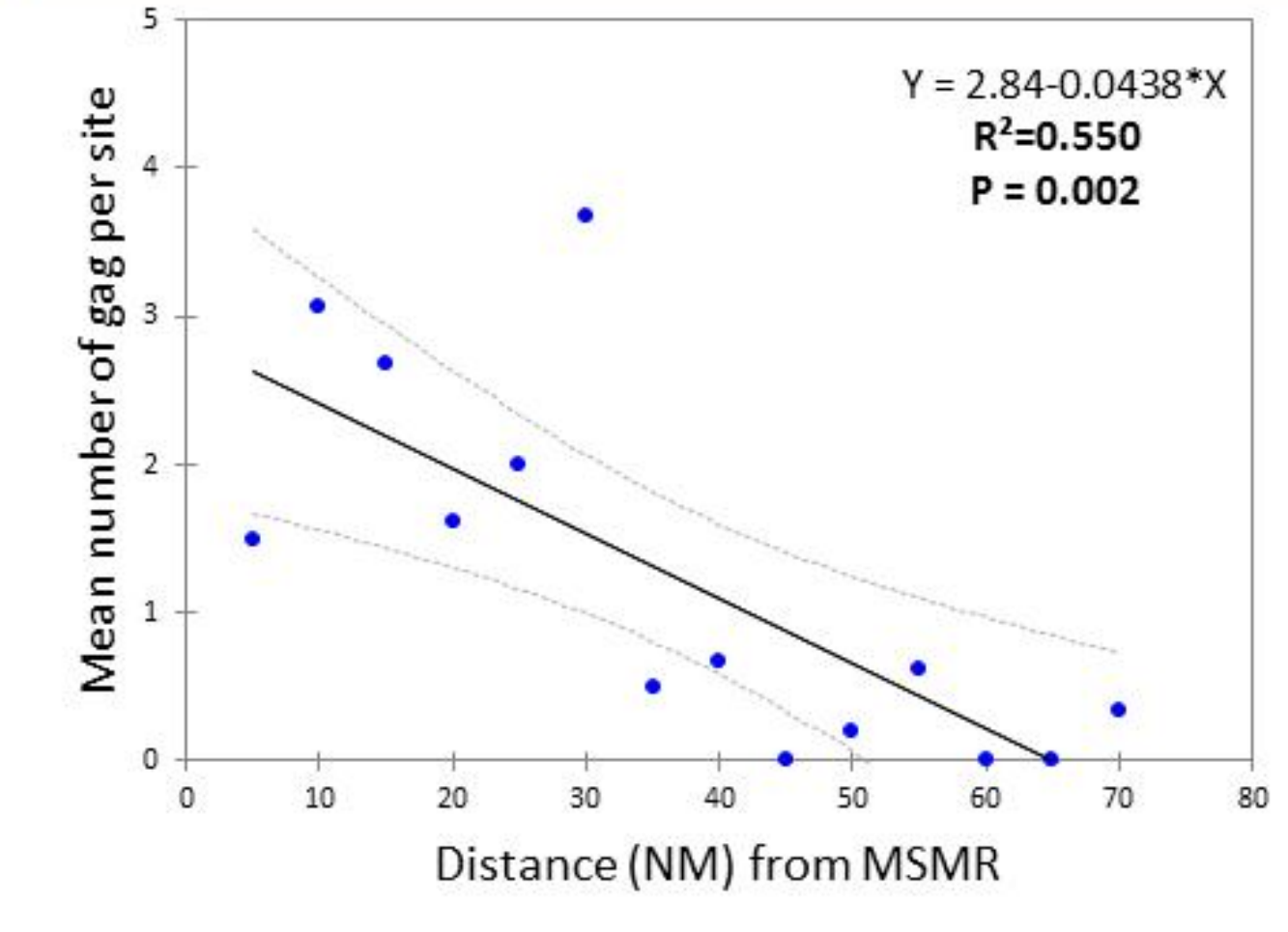
Size Structure in Madison Swanson



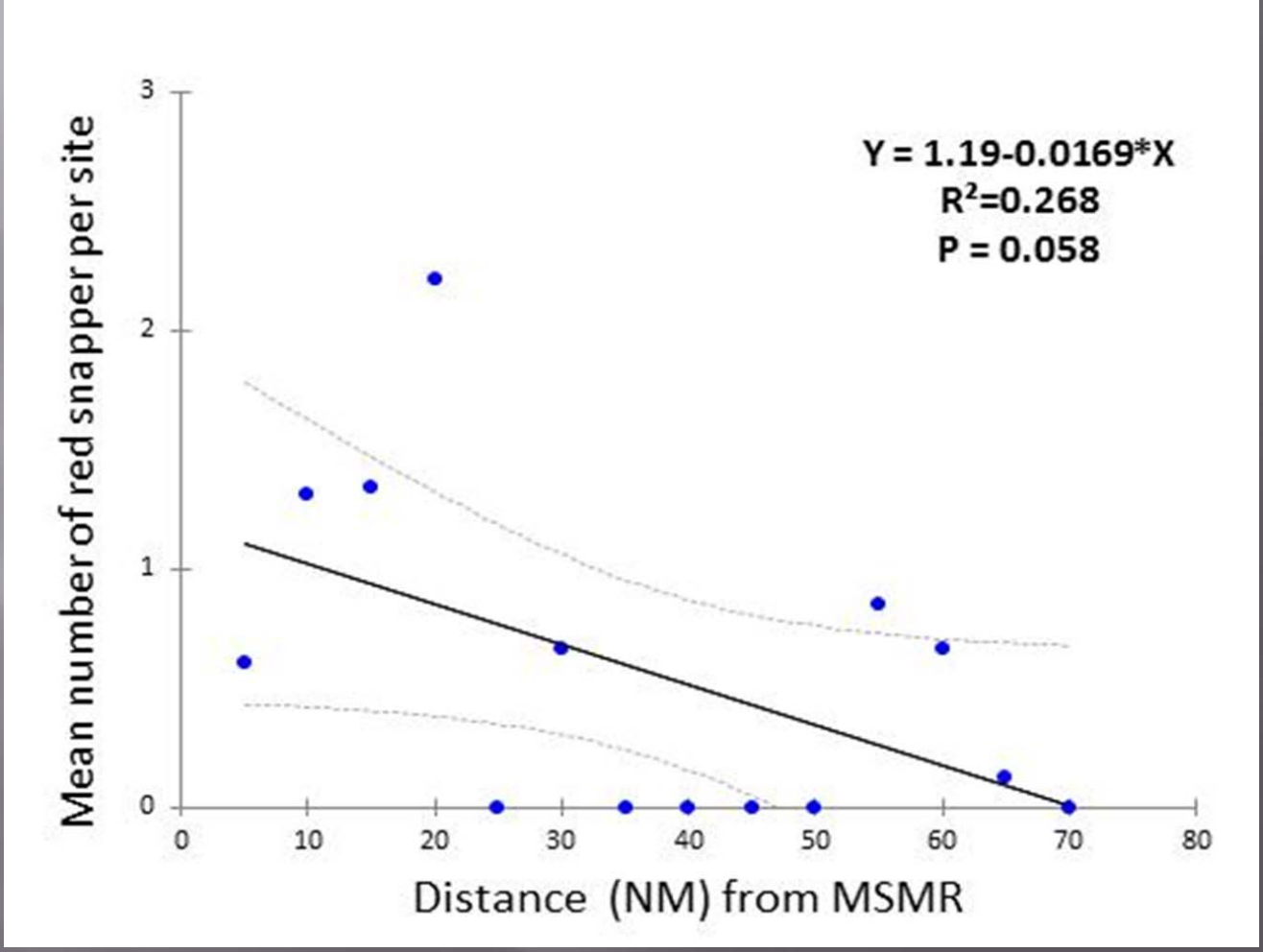
Catch-per-effort abundance in Madison Swanson



Commercial Catch of Gag



Commercial Catch of Red Snapper



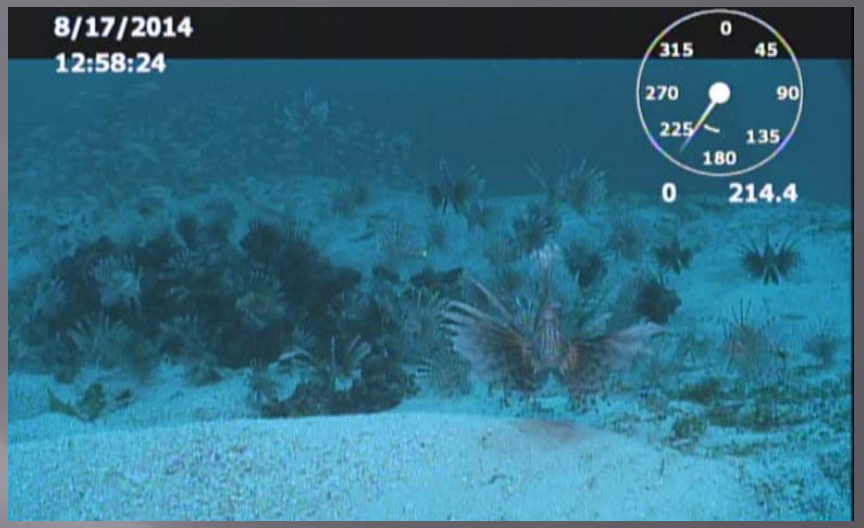
Red Grouper excavations are biodiversity hotspots, but Lionfish and overfishing may change that.

Table 5. Species composition of 8 red grouper pits in SLMR, observed on the JSL II cruise made in July 2010, 3 months after the Deepwater Horizon oil spill. Compare with data from Coleman et al. 2010.

Common Name	Species	Abundance
Yellowtail Reef fish	Chromis enchysura	388
Red Barbier	Hemanthisa vivanus	148
Yellowfin Bass	Anthias nicholsi	60
Striped Grunt	Haemulon striatum	48
Bank Butterflyfish	Chaetodon aya	37
Squirrelfish	Sarocenton bullisi	36
Bank Seabass	Centropristis ocyurus	33
Roughtongue Bass	Pronotogrammus martinicensis	29
Two-spot cardinalfish	Apagon pseudomaculatus	26
Tattler	Serranus phoebe	21
greenband wrasse	Halichoeres bathyphilus	19
Tomtate	Haemulon aurolineatum	13
Red Grouper	Epinephelus morio	8
Flame fish	Apogon maculatus	5
Scamp	Mycteroperca phenax	5
Reticulate moray	Muraena retifera	3

Lionfish invasion of Pulley Ridge Red Grouper excavations

What will be the Impact on the Red Grouper population?



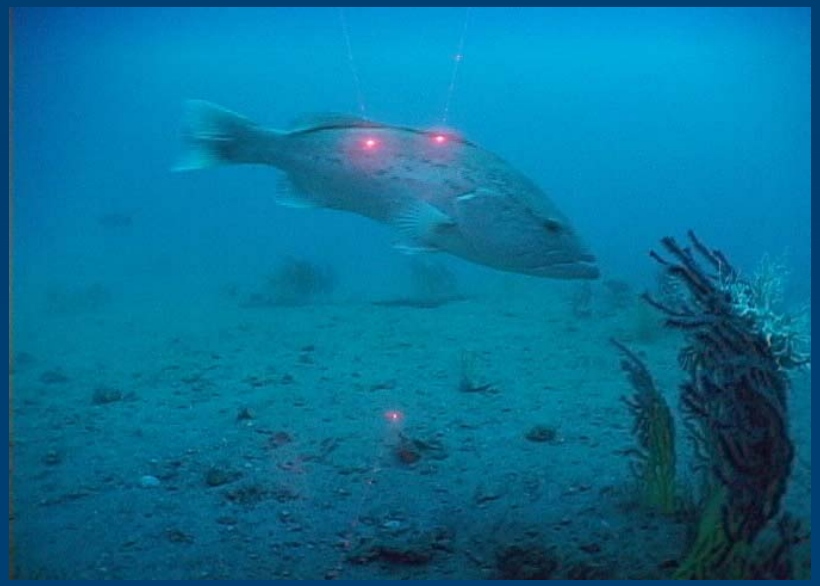
Shelf-edge reserves can protect threatened reef fish species and fishery production.

- Benefits for threatened & critically endangered species:
  - Protect juvenile, adult and spawning habitat
  - Provide research opportunities to increase protection & recovery.
- Benefits for shallow water species.
  - Protect sex ratios, and reproductive output of Gag
  - Protect age & size structure of spawners (BOFFS).
  - Protect reproductive output of other species (e.g., Red Snapper)
- Benefits to fishermen
  - Spillover: increase fishery production around reserves.
  - Protection of future recruitment.
- Benefits to scientific research and management
  - Monitor shifting baselines (reserves must be large enough)
  - Habitat protection
  - Controls for environmental impacts (e.g., oil spills)
  - Ecology of exploited species
  - Fishery impacts on trophic cascades etc.
  - Impacts of invasive species (e.g., Lionfish)

Science, Service, Stewardship

Northeast Gulf of Mexico Reserve Program:

Monitoring changes in reef fish populations



NOAA FISHERIES SERVICE

Andrew David

Panama City, FL

History of Program: Decision Process

Faced with:

- Increasing landings
- Catch with smaller size structure
- Protogynous hermaphrodite
- Haremic spawning with strong site fidelity
- Sex ratio reduced below historical levels

GMFMC selected partial closure of shelf-edge spawning sites as a management strategy

Two sites were selected in 2000: Madison-Swanson and Steamboat Lumps

Madison-Swanson & Steamboat Lumps

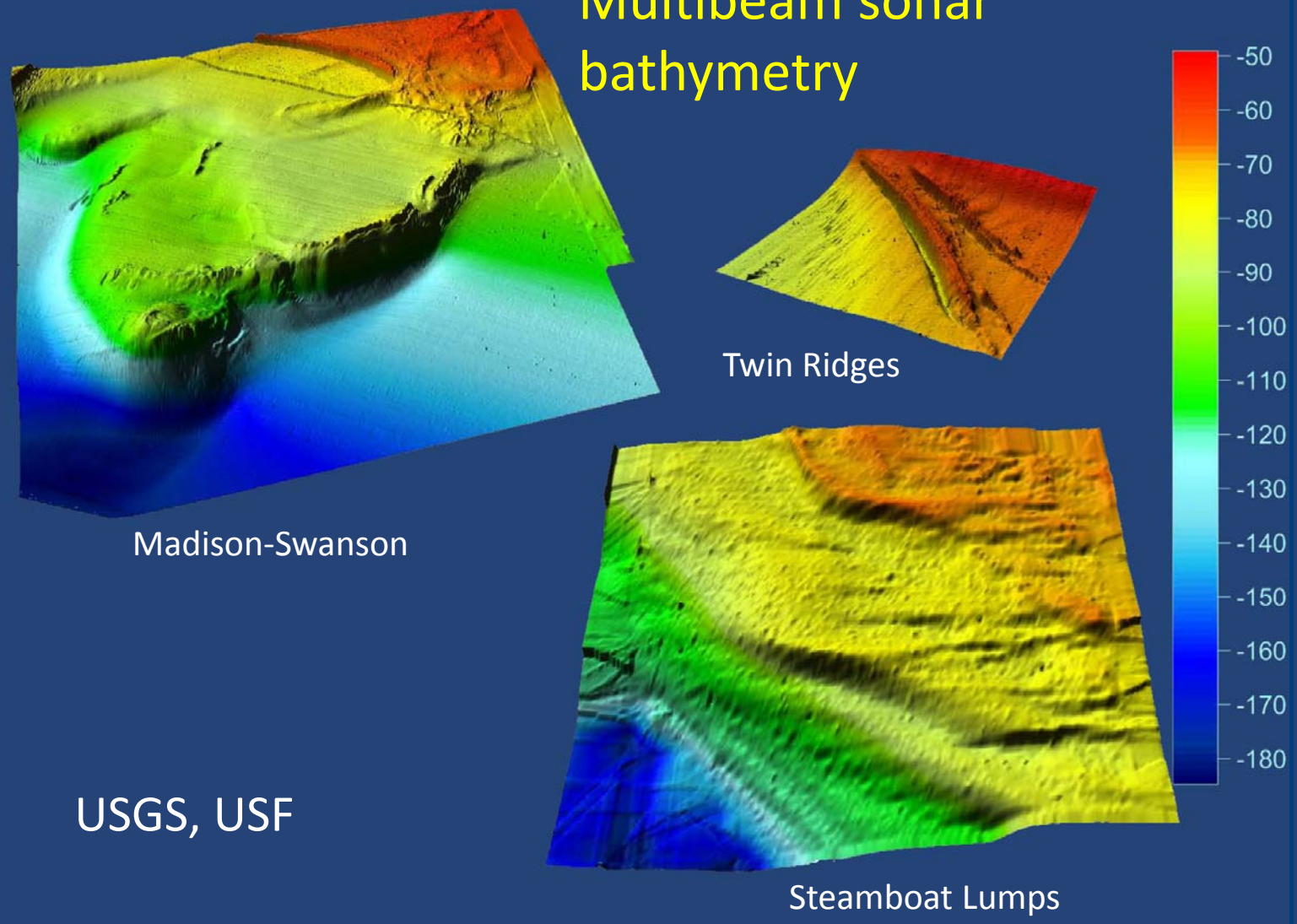
- Closed to all fishing 1 Nov – 30 Apr
- Open to surface trolling 1 May - 31 Oct

A third site was added in 2009:
The Edges

The Edges

- Closed to all fishing 1 Jan – 30 Apr
- Open to fishing 1 May - 31 Dec

Multibeam sonar bathymetry



Madison-Swanson

Twin Ridges

Steamboat Lumps

USGS, USF

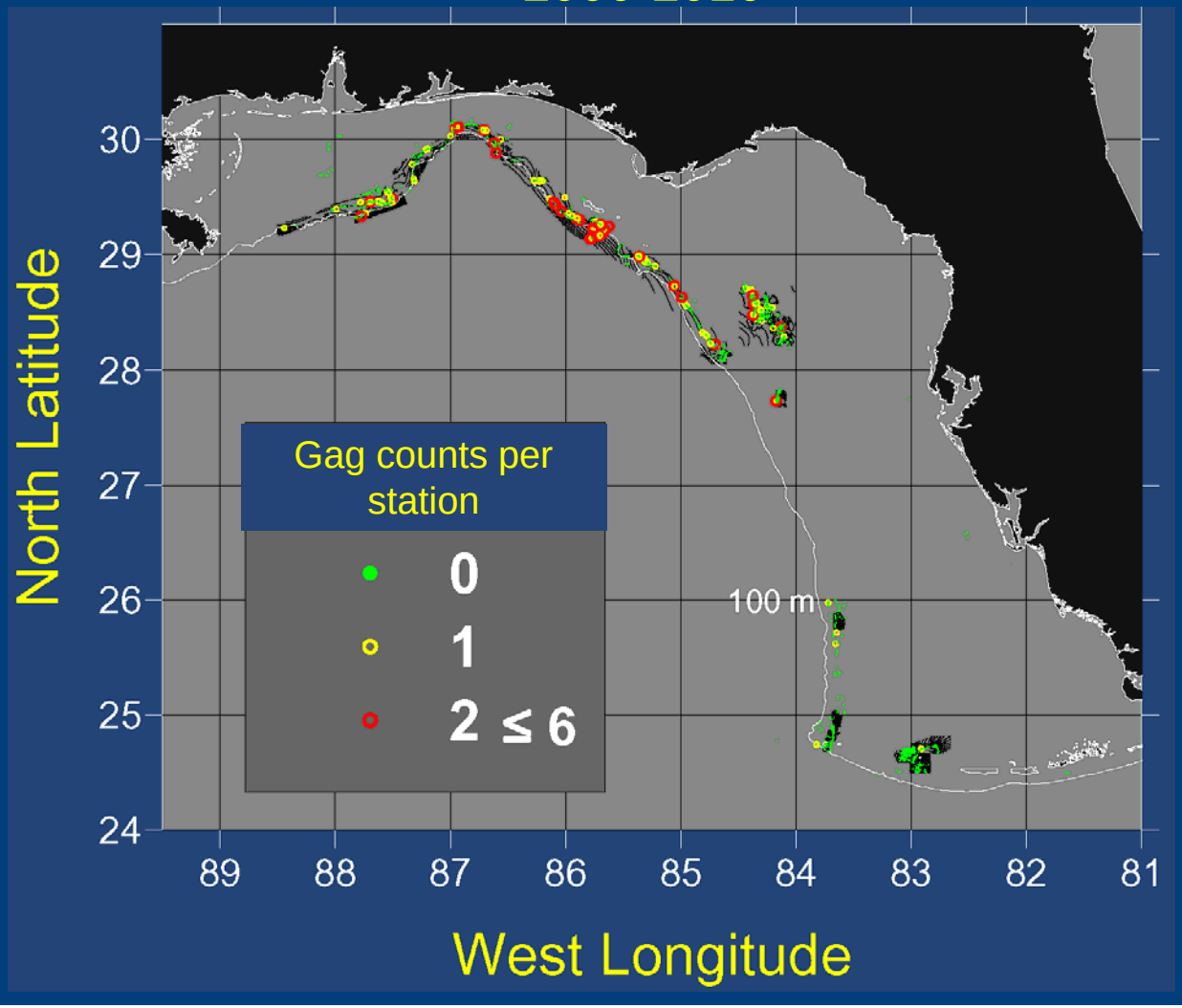
Species most frequently observed 2001-2014

Total number of species = 106	Madison Swanson (n=640)	Steamboat Lumps (n=207)	Twin Ridges (n=151)	The Edges (n = 41)
Scamp	0.59	0.21	0.83	0.17
Red porgy	0.59	0.31	0.52	0.37
Almaco jack	0.51	0.14	0.68	0.15
Red snapper	0.50	0.17	0.65	0.15
Greater amberjack	0.47	0.20	0.52	0.10
Gag	0.42	0.08	0.26	0.00
Red grouper	0.41	0.27	0.54	0.10
Blue angelfish	0.35	0.15	0.72	0.17
Calumus porgy	0.18	0.12	0.90	0.22
Vermilion snapper	0.17	0.10	0.13	0.22
Gray triggerfish	0.15	0.16	0.43	0.02
Tattler	0.14	0.14	0.12	0.27
Speckled hind	0.12	0.00	0.00	0.00

Values are fractional number of stations where each species was observed

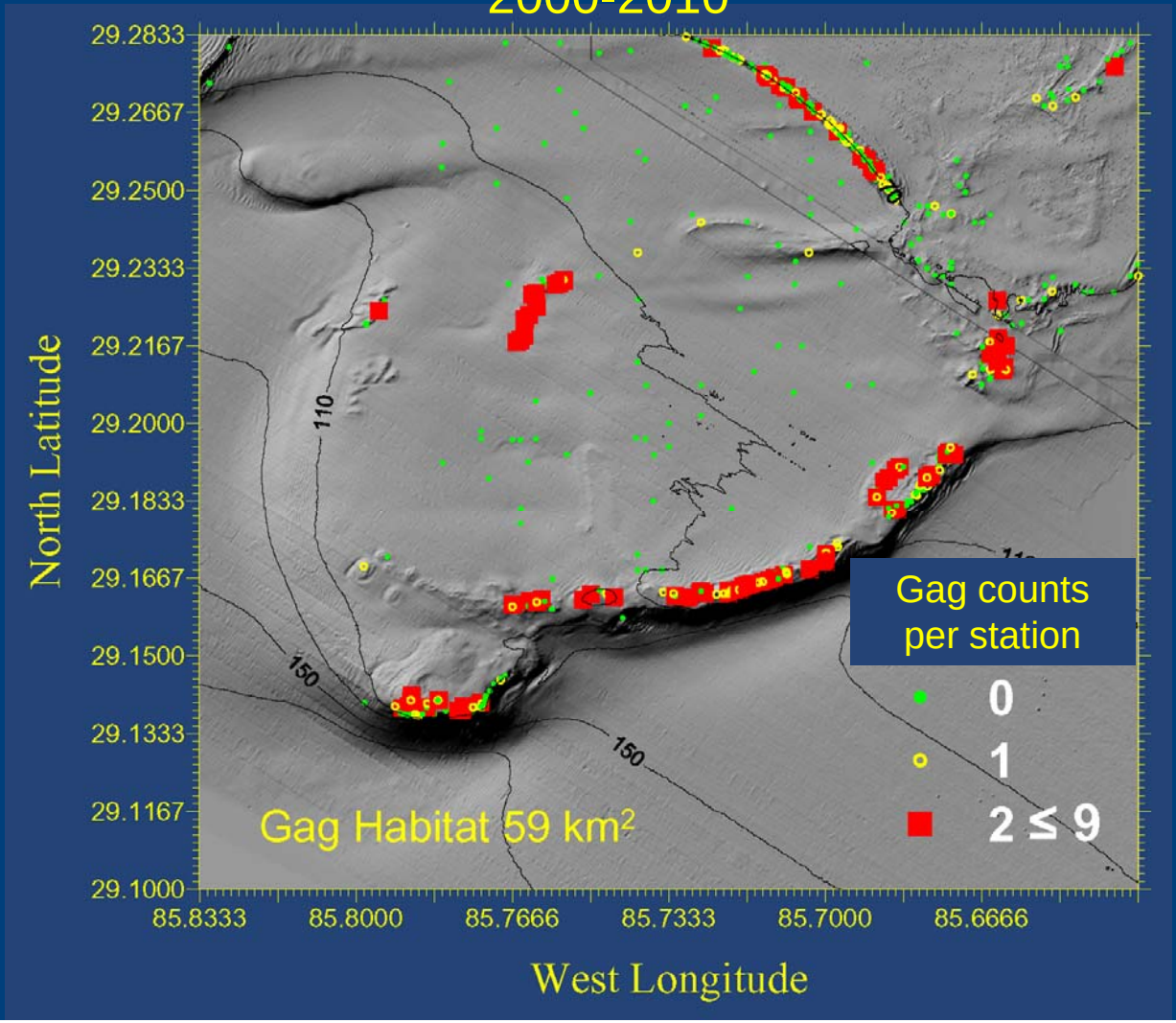
Gag Distribution along the West Florida Shelf

2000-2010



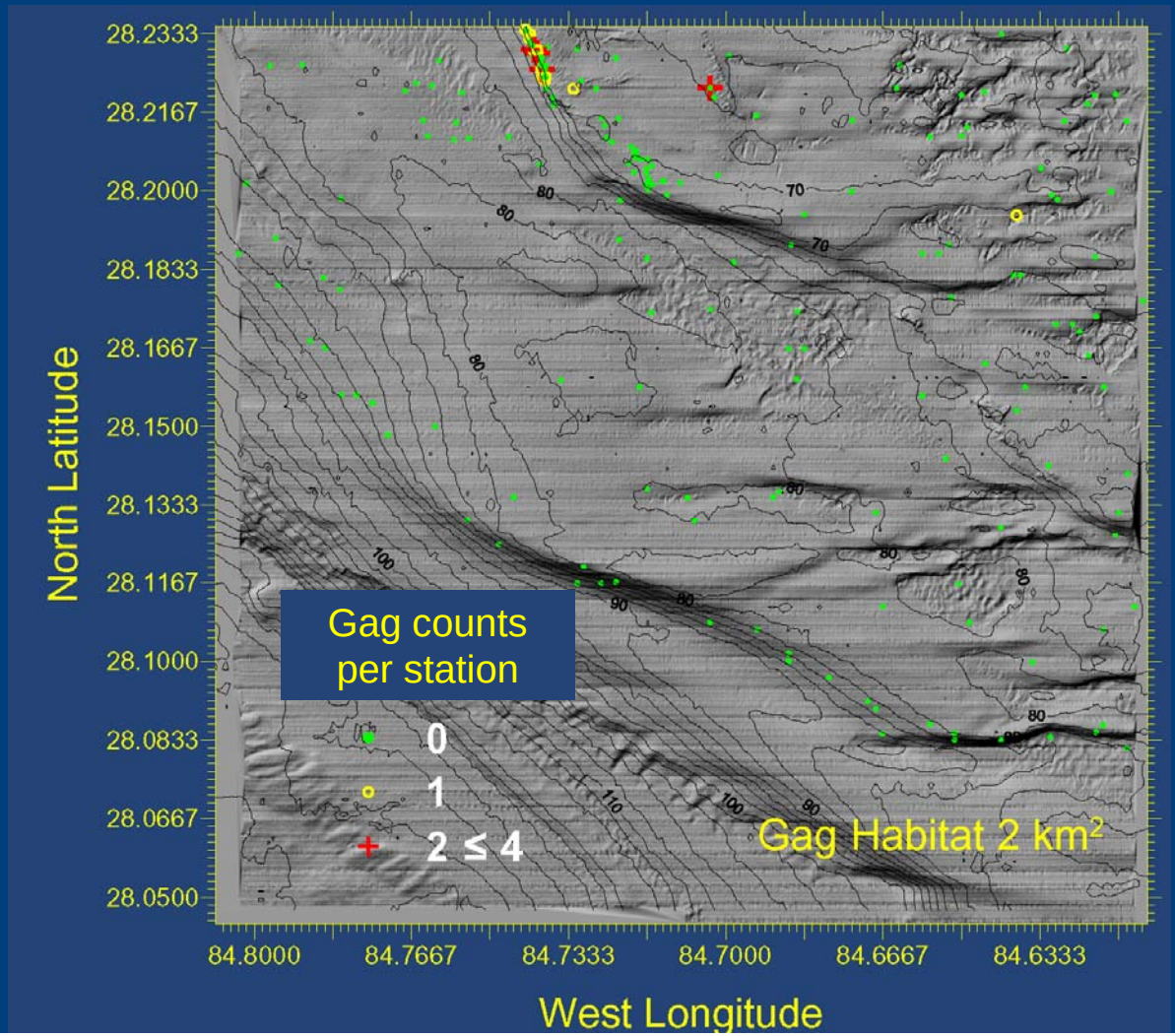
Gag Distribution within Madison-Swanson

2000-2010



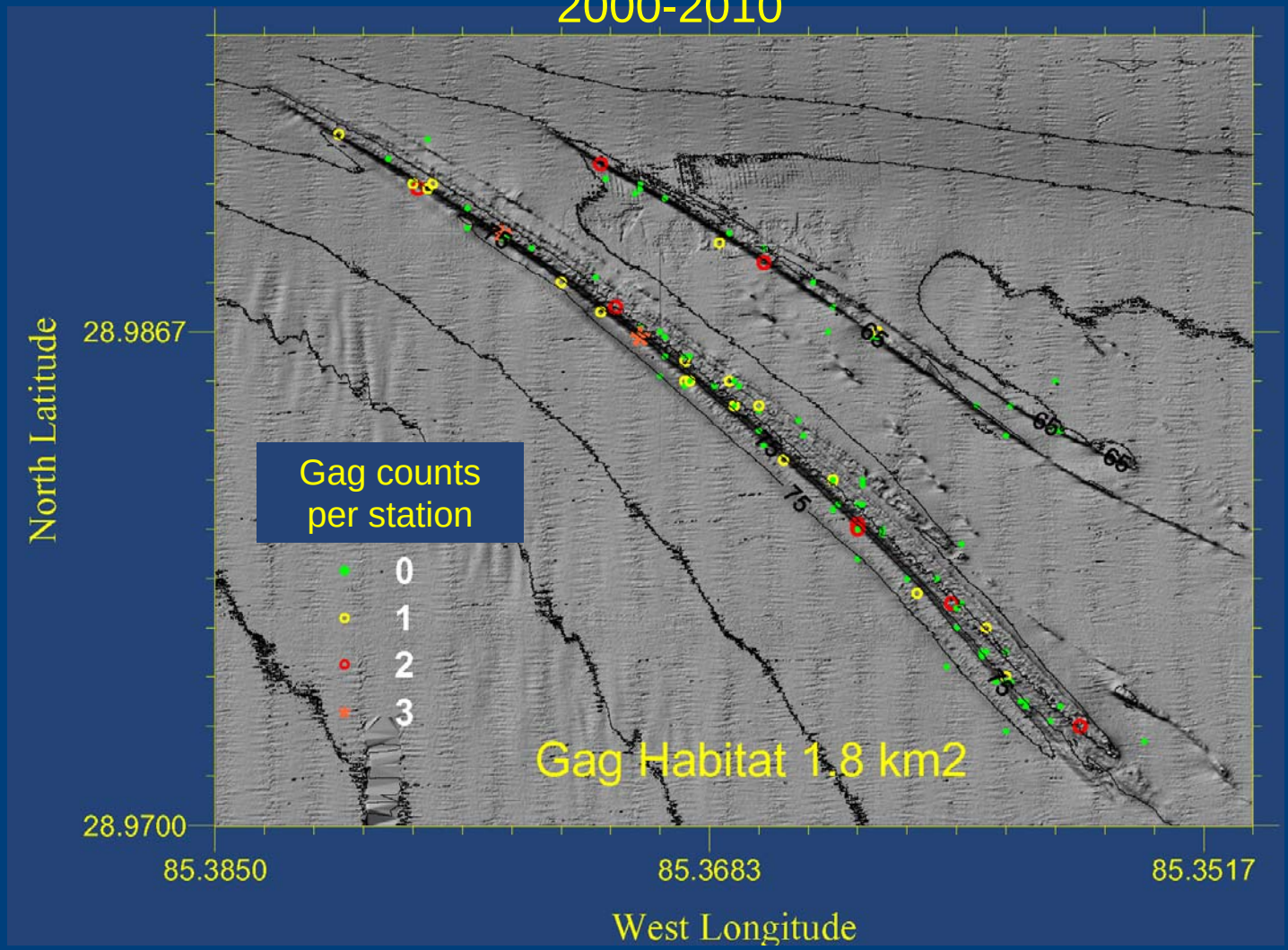
Gag Distribution within Steamboat Lumps

2000-2010



Gag Distribution within Twin Ridges

2000-2010



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Significance Testing for Length

Tests of location with all years combined

- Lengths in MPAs vs the Eastern Gulf
  - Gag are larger in MPAs, $P < 0.05$
  - Red Grouper are larger in MPAs, $P < 0.001$
  - Red Snapper are larger in MPAs, $P < 0.001$

SAS GLM model. Tukey's Studentized Range (HSD) Test for pairwise comparisons.

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- Lengths within MPAs vs adjacent control site Twin Ridges
  - Gag are larger in Madison-Swanson, $P < 0.05$
  - Red Grouper are larger in all MPAs, $P < 0.05$
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  - Red Grouper are larger in all MPAs, $P < 0.05$
  - Red Snapper are not different in MPAs
- Lengths within MPAs
  - Gag are not different between MPAs
  - Red Grouper are larger in Mad-Swan than Steamboat, $P < 0.05$
  - Red Snapper are not different between MPAs

SAS GLM model. Tukey's Studentized Range (HSD) Test for pairwise comparisons.

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Performance of MPAs

- Indices of abundance have a high variance so trends are difficult to detect. No statistically significant differences were detected between areas, however within areas some years were different from others.

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- The average abundance for gag appears to be higher in Madison-Swanson than the other survey areas, but is not significant. Similarly red grouper abundance appears higher in Steamboat Lumps than other areas, but is also not significant. Red snapper means show greater interannual variability.

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- Gag, red grouper and red snapper were larger within MPAs compared to the eastern Gulf. Within the MPAs, gag and red snapper lengths were similar, however red grouper were larger in in Madison-Swanson than Steamboat Lumps. All show apparent gradual increases during the survey period.

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- Compliance with fishing regulations has varied, along with the level of enforcement. VMS for commercial vessels was instituted in 2008.

Recommendation 1

To have the Council have the Law Enforcement Committee look at options for improving enforcement including looking at the tables of penalties for fishing in Marine Protected Areas and at problems associated with building viable cases for prosecution.

Motion carried with no opposition.

Recommendation 2

To have the Council have the Outreach & Education Committee review mechanisms for public outreach with respect to benefits of MPAs and compliance with MPA regulations.

Motion carried with no opposition.

Recommendation 3

On the basis of the encouraging news the SSC heard from two scientific studies on reef fish stock recoveries in Madison Swanson and Steamboat Lumps MPAs, the Ecosystem SSC recommends that the Council consider other opportunities to establish MPAs.

Motion carried with no opposition.

Recommendation 4

The Ecosystem SSC recommends that the Council establish year-round closures for all species in the Madison Swanson, Steamboat Lumps, and the Edges Reserves.

Approved by consensus.

Recommendation 5

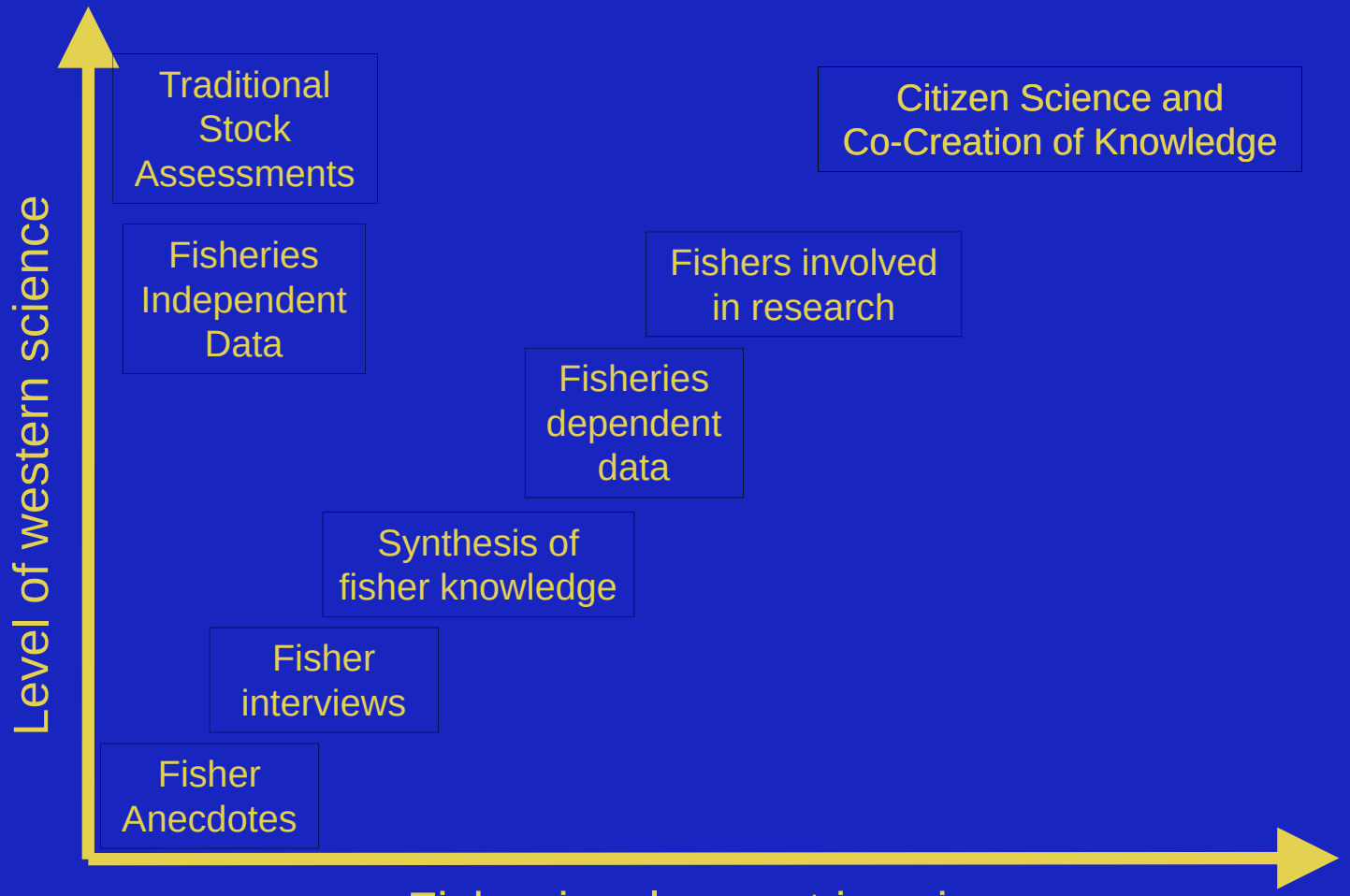
The Ecosystem SSC recommends that the Council recommend to the HMS Management Division that they close the following Reserves (Madison-Swanson, Steamboat Lumps, and the Edges) to fishing year round.

Approved by consensus.

Reinventing fisheries management in the Western Central Atlantic: Involving fishers in prediction, verification, monitoring and protection of spawning aggregations

William D. Heyman, PhD
LGL Ecological Research Associates
Ecosystem SSC GMFMC
25 February 2015

Maximizing legitimacy of information



Vision: Cooperative Monitoring and Conservation Program for Western Central Atlantic Spawning Aggregations (CMCP WCASA)

To catalyze development of a network of fishermen, scientists, and managers who cooperatively monitor and protect multi-species spawning aggregations throughout the Western Central Atlantic, thus supporting regional recovery and resilience of the snapper grouper complex.

Recommendation 6

Borrowing from a powerful approach to identifying and protecting spawning aggregations of reef fish and other associated species already implemented in Belize and elsewhere in the Caribbean and underway in the South Atlantic, the Ecosystem SSC recommends that the Council form an MPA Working Group made up of scientists, fishermen, law enforcement, managers and other stakeholders to work together, each using their best tools and knowledge, to make recommendations for the creation of an effective MPA network in the Gulf of Mexico.

Approved by consensus.

Recommendation 7

That the Ecosystem Based Fishery Management Working Group continue working on developing a set of suggested goals and objectives of an ecosystem based fisheries management plan that considers measurable targets.
Motion carried with no opposition.

Approved by consensus.

FISHERY ECOSYSTEM PLANNING IN THE GULF OF MEXICO

James D. Simons
Center for Coastal Studies
Texas A&M University-Corpus Christi

Lenfest Taskforce Presentation
February 4, 2015
New Orleans, LA

History of the GMFMC ESSC

- 1st meeting June 2005 – organizing meeting
- 2nd meeting, August 2005
- 3rd meeting, October 2005
- Conference call, April 2006
- 4th meeting, May 2007 – modeling workshop 1
- 5th meeting, September 2007 – modeling workshop 2
- 6th meeting, May 2008 – modeling workshop 3
- 7th meeting, December 2009
- Webinar, June 2010
- 8th meeting, November 2010
- 9th meeting, June 2011 – joint ESSC/Socio-economic workshop scoped and proposed
- Webinar, September 2011
- 10th meeting, March 2013 – joint SSC/mackerel/ESSC meeting
- 11th meeting, June 2014 - joint SSC/ESSC meeting
- EBFM working group meeting, September 2014

ESSC major initiatives

- Held nine public meetings around the Gulf on EBFM to get public input on the process;
- Did inventory of modeling efforts in the Gulf of Mexico;
- Conducted three modeling workshops;
- Scoped and proposed a joint ESSC and Socio-Economic SSC workshop

Modeling workshops

- Were focused on using Ecopath w/ Ecosim;
- Led by Carl Walters with help from others;
- Primary management issues addressed by the models:
  - Snapper-shrimp interactions
  - Multi-species (MPA) effects on snapper-grouper
  - Mississippi hypoxic area effects on demersal and pelagic ecosystems

Modeling workshops (cont.)

- Secondary focus of the modeling workshop was on:
  - Impacts of artificial reefs
  - Red tide
- Other modeling approaches were presented by:
  - Ken Rose – individual-based approach (red snapper)
  - Jerry Ault – spatial ecosystem (fishery and habitat)
  - Wei Wu – forested ecosystem and fishery management

Major shortfalls

- Relatively small attendance at the public meetings to discuss EBFM;
- Failure to get much movement from the Council on our modeling efforts;
- An FEP was started but never completed;
- Failure to get approval for a joint workshop of the ESSC and Socio/Economic Committee;

Frustrations toward progress

- Lack of good communication between the ESSC and the Gulf Council;
- Lack of knowledge of the SEDAR process by the ESSC;
- Lack of strong advocate on the staff to push the committee;
- Recent high turnover in membership with loss of much talent and historical perspective;
- Lack of major accomplishments;
- Shifted focus after Katrina and DWH

The way forward

- Restructuring of the ESSC and/or other committees?
- Re-purpose ESSC, and define EBFM better;
- More information and guidance from the Council EBFM staff;
- Understanding of what the Council expects from the ESSC;
- Better coordination amongst major Gulf efforts related to EBFM (e.g. GOMA, GCOOS, LME, etc.);
- Include Mexico and Cuba;
- Take network approach;
- Further development of GoMexSI database as a tool for model development and a data resource;
- Use of model ensembles to examine management scenarios