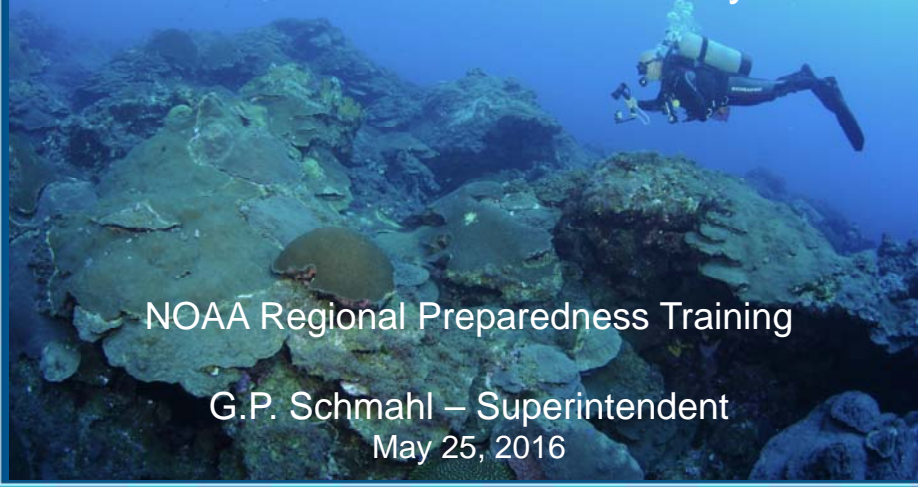


AMERICA'S UNDERWATER TREASURES



Flower Garden Banks National Marine Sanctuary



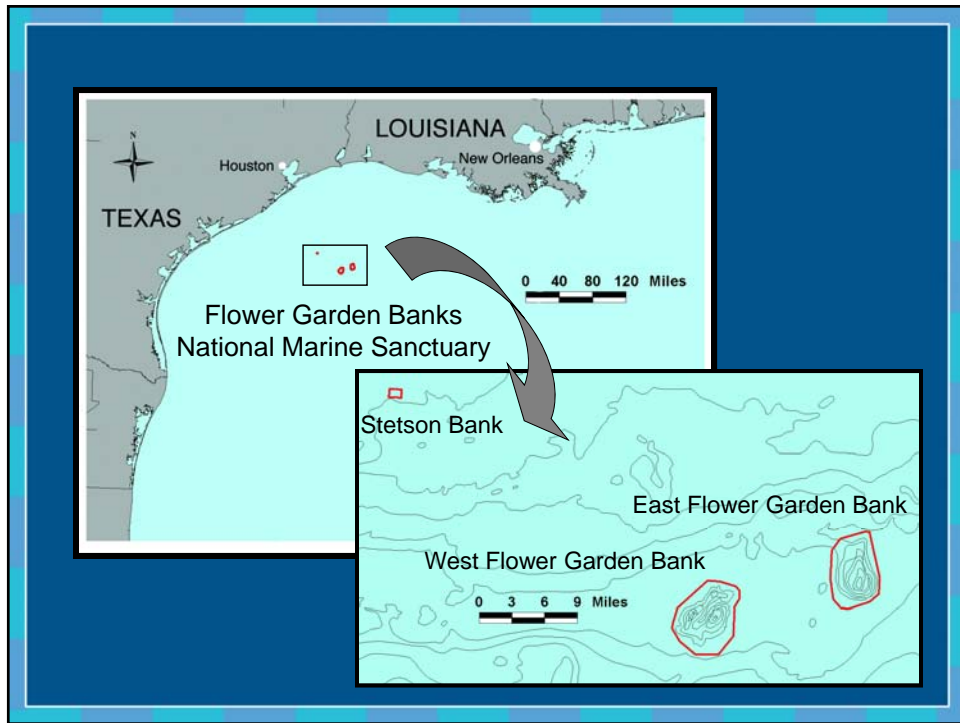
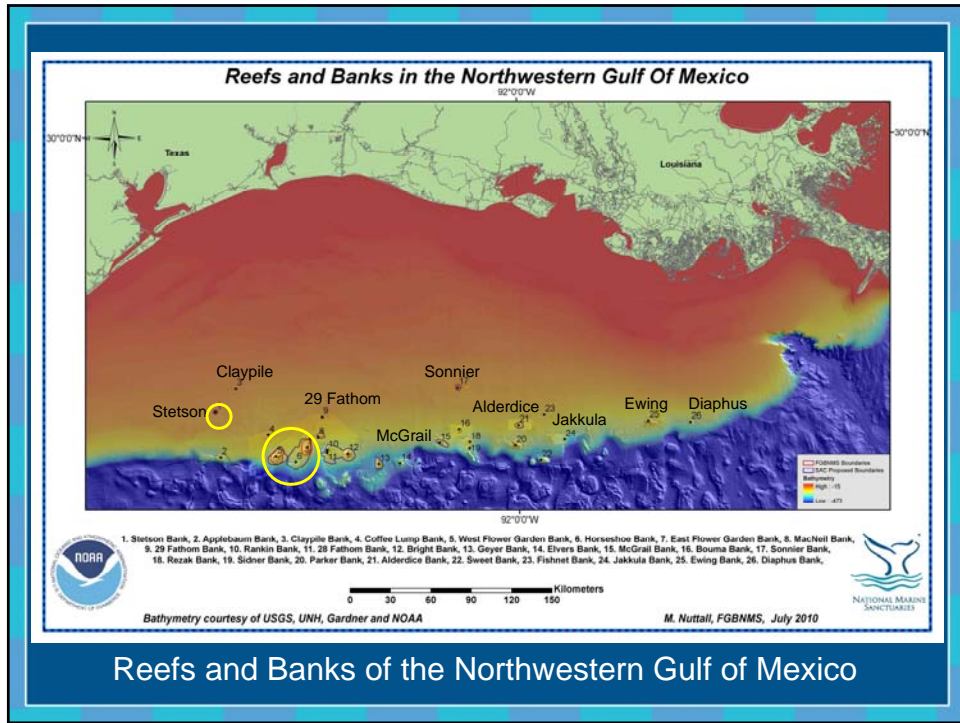
NOAA Regional Preparedness Training

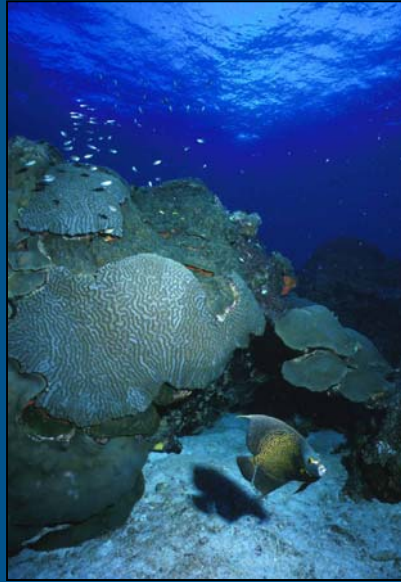
G.P. Schmahl – Superintendent
May 25, 2016

National Marine Sanctuaries
National Oceanic and Atmospheric Administration

NATIONAL MARINE SANCTUARY SYSTEM







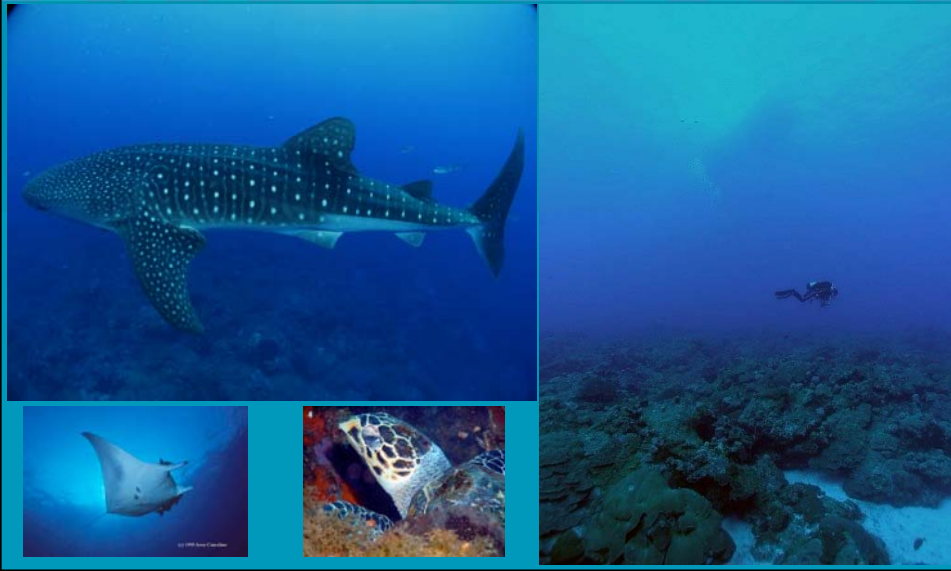
Flower Garden Banks National Marine Sanctuary

- Northernmost coral reef in the continental United States
- Includes: East and West Flower Garden and Stetson Banks
- Located 93 to 104 nautical miles offshore in the Gulf of Mexico
- Area: 145 square kilometers (56 square statute miles)
- Water Depth: 17 – 152 meters

Remarkable Reefs of the Flower Garden Banks



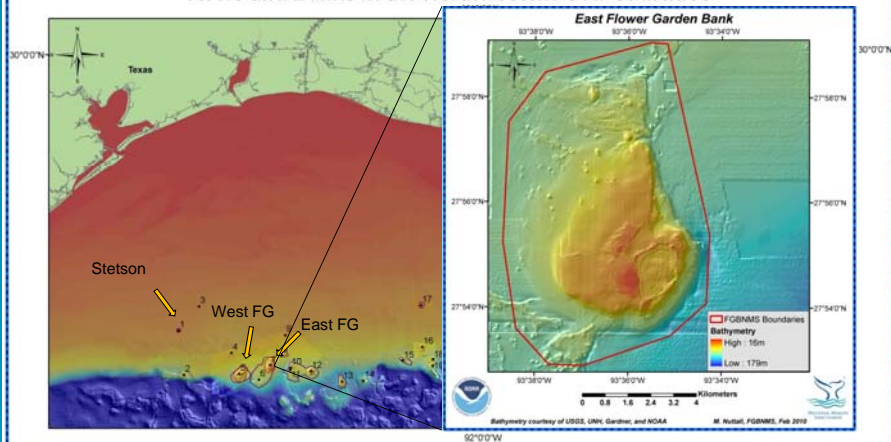
Flower Garden Banks National Marine Sanctuary



Flower Garden Banks National Marine Sanctuary



Reefs and Banks in the Northwestern Gulf Of Mexico



1. Stetson Bank, 2. Applebaum Bank, 3. Claypile Bank, 4. Coffee Lump Bank, 5. West Flower Garden Bank, 6. Horseshoe Bank, 7. East Flower Garden Bank, 8. MacNeil Bank,
9. 29 Fathom Bank, 10. Rankin Bank, 11. 28 Fathom Bank, 12. Bright Bank, 13. Geyer Bank, 14. Elvers Bank, 15. McGrail Bank, 16. Bouma Bank, 17. Sonnier Bank,
18. Rezak Bank, 19. Sidner Bank, 20. Parker Bank, 21. Alderdice Bank, 22. Sweet Bank, 23. Fishnet Bank, 24. Jakkula Bank, 25. Ewing Bank, 26. Diaphus Bank,



0 30 60 90 120 150 Kilometers

Bathymetry courtesy of USGS, UNH, Gardner and NOAA

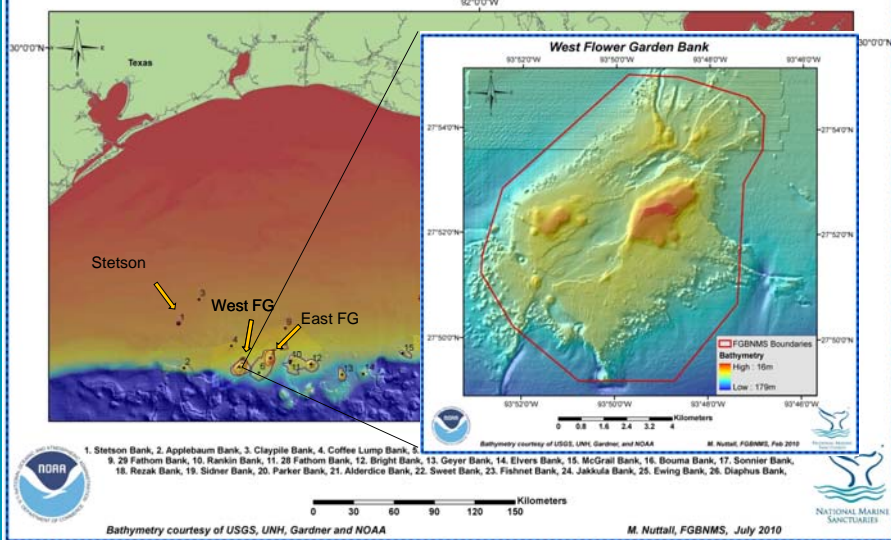
M. Nuttall, FGBNMS, July 2010



Flower Garden Banks National Marine Sanctuary



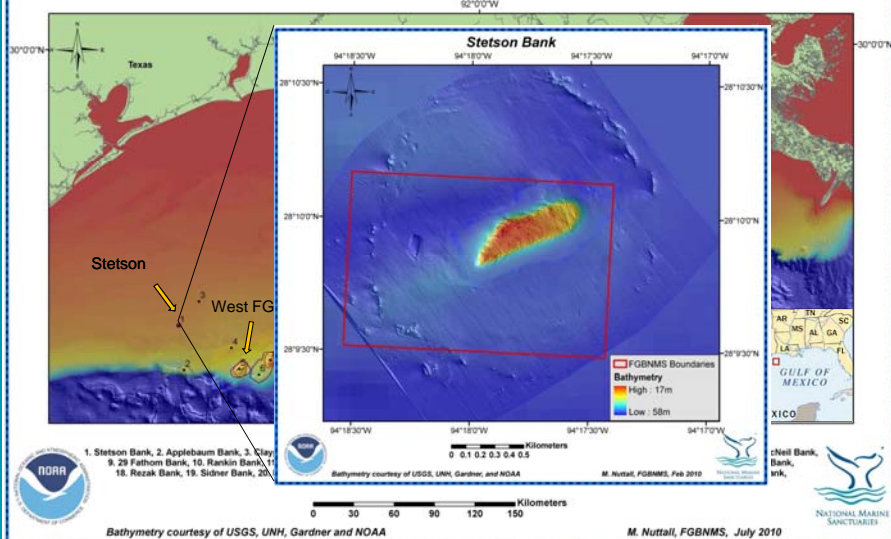
Reefs and Banks in the Northwestern Gulf Of Mexico



Flower Garden Banks National Marine Sanctuary

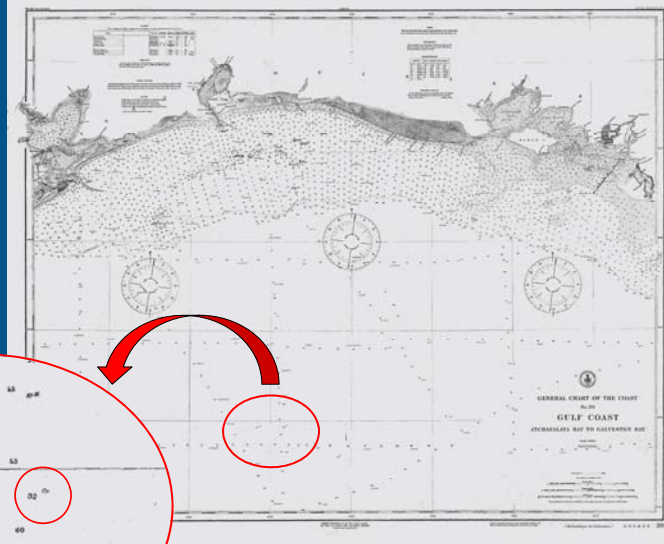


Reefs and Banks in the Northwestern Gulf Of Mexico

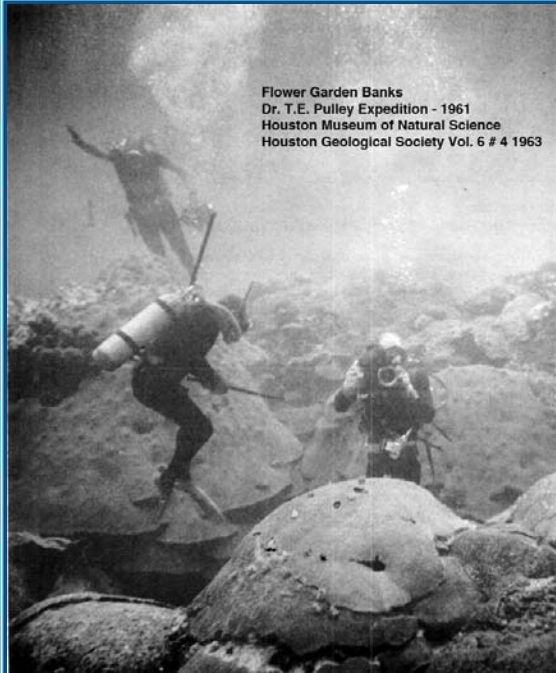


“Co” does not appear on versions from 1892, 1878 or previous years

“Co” = Coral



General Chart of the Gulf Coast
1910

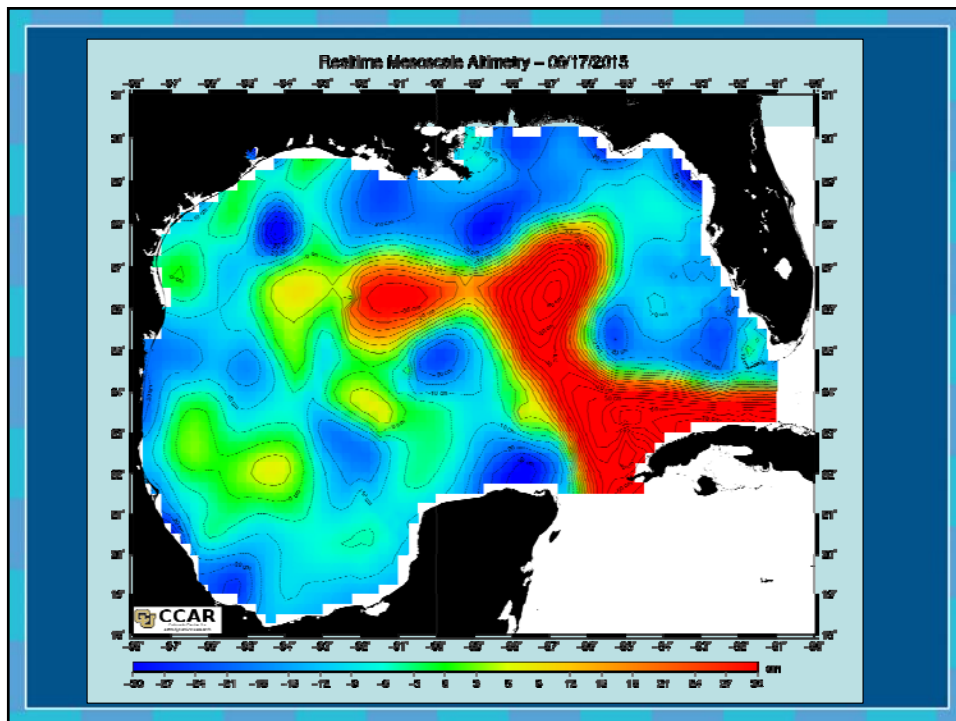
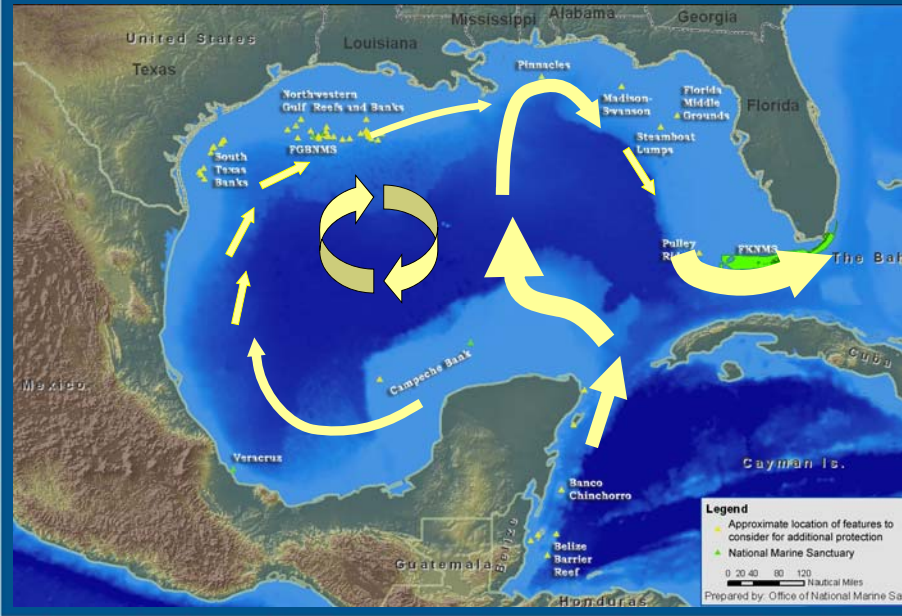


Flower Garden Banks
Dr. T.E. Pulley Expedition - 1961
Houston Museum of Natural Science
Houston Geological Society Vol. 6 # 4 1963

Texas to the Tropics

“125 miles SSE of Galveston, and in the same latitude as Aransas Pass, are two tropical West Indian coral reefs. These reefs have been known for half a century as Flower Garden Banks to the snapper fishermen because of the colorful specimens they occasionally brought up when their lines snagged the bottom.” Dr. Thomas Pulley, - 1963

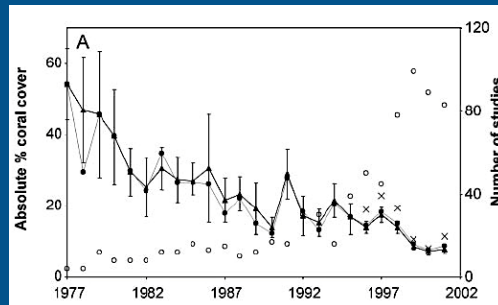
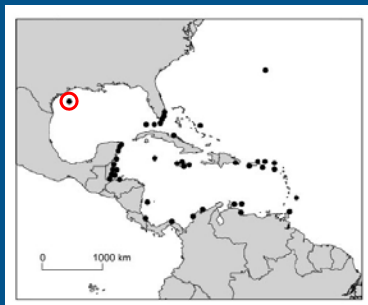
Gulf of Mexico "Loop Current" and Reef Features





Long-term region-wide declines in Caribbean Corals

Gardner, T.A. et al., 2003. *Science* 301:958

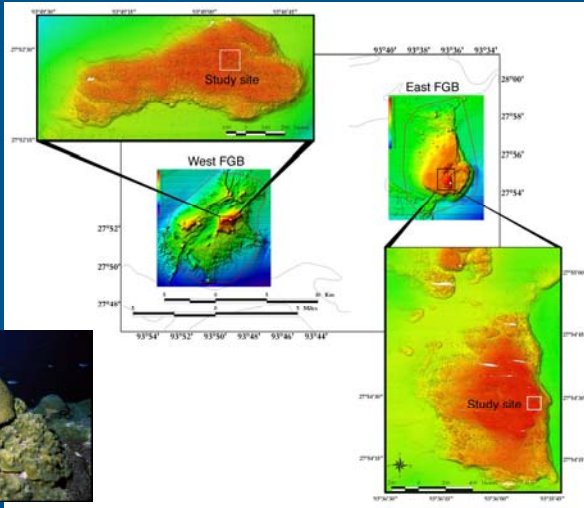


Average hard coral cover reduced by 80%
(from 50% to 10%) in 30 years

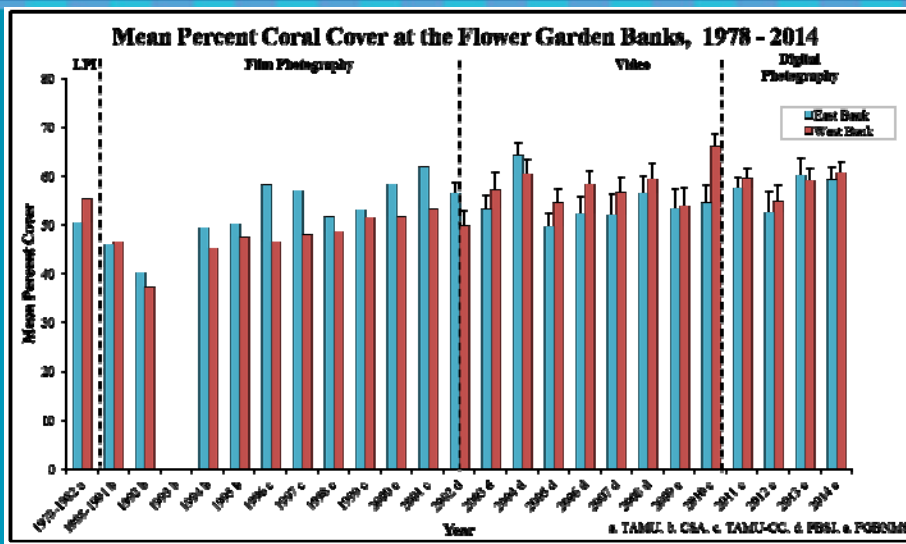
Flower Garden Banks Long-term Coral Reef Monitoring



Photo: G.P. Schmalz

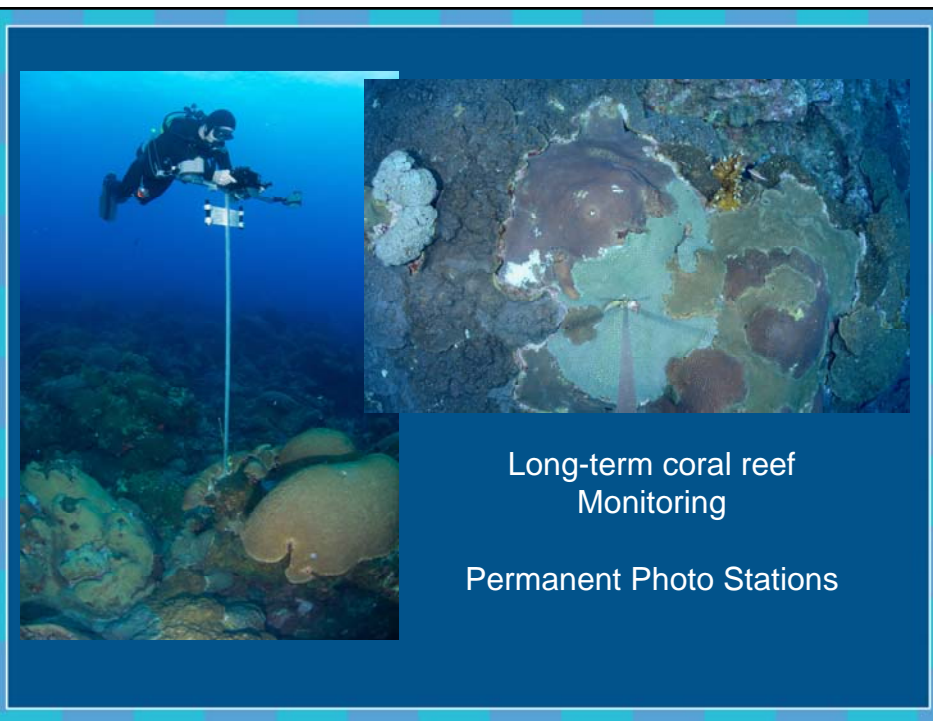


Historical Coral Cover Dataset

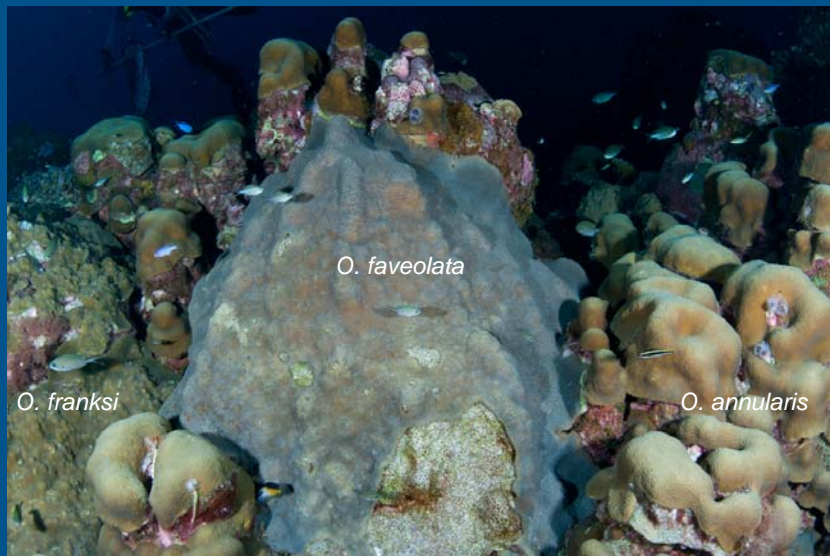
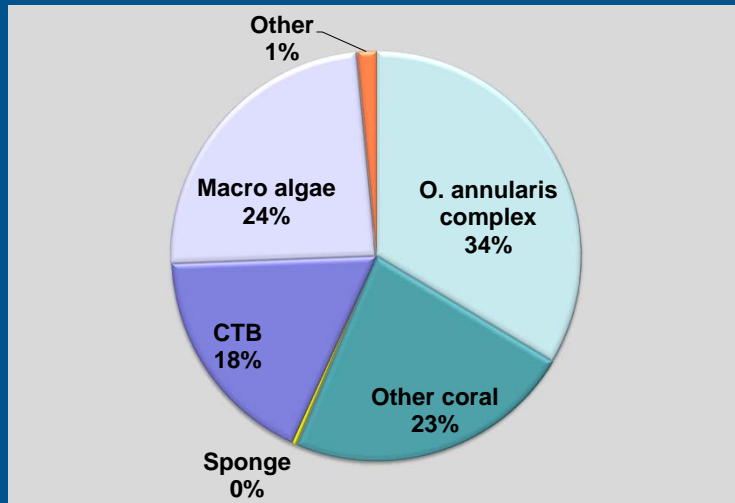


Major Reefs Living Coral Cover

Location	Percent Coral Cover	Source
Flower Garden Banks	54	Johnston et al. 2015
Bonaire	10-38	Steneck et al. 2011
Bermuda	35	Jackson et al. 2014
Puerto Rico	7-36	Waddell and Clark 2008
Navassa Island	10-25	Waddell and Clark 2008
Florida Keys NMS	3-20	ONMS 2011
Jardin de la Reina, Cuba	7-19	Pina Amargós et al. 2008
Pedro Bank, Jamaica	5-19	Bruckner 2013
Cay Sal Bank, Bahamas	7-9	Bruckner 2011



Percent Benthic Cover – East FGB



Flower Garden Banks – *Orbicella* (*Montastraea*) complex



Acropora palmata - May 2005

Mass spawning events



Emma Hickerson

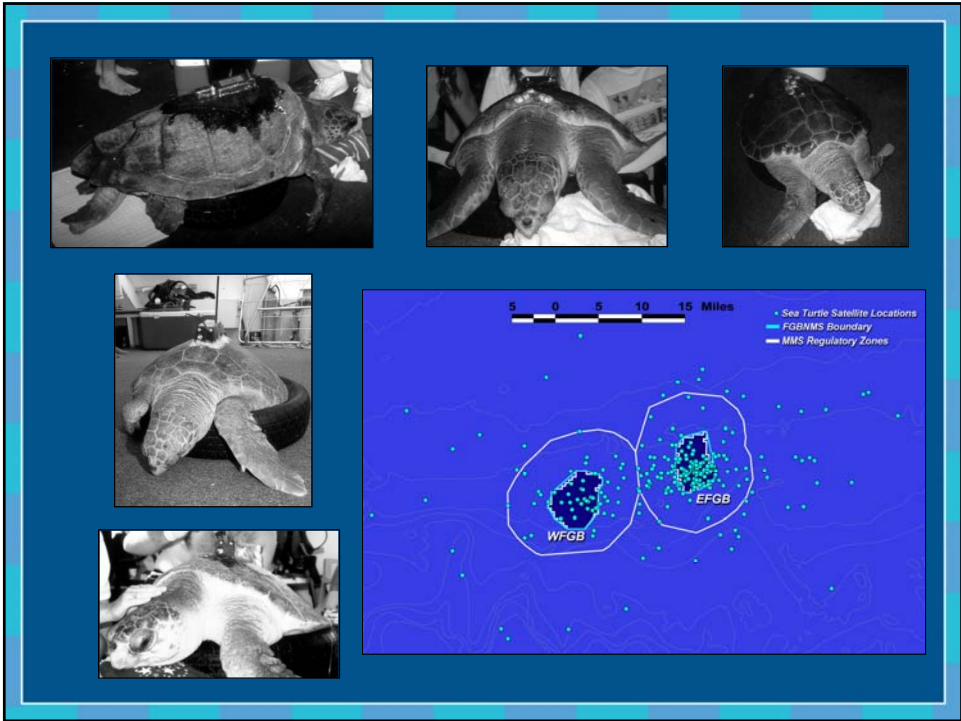


Emma Hickerson



G.P. Schmahl





“Mardi Gras Wrasse” – described from Flower Garden Banks






Manta Rays

of the Flower Garden Banks National Marine Sanctuary

Emma L. Rickerson and Marissa T. Pustul

Spots



Squares



We need your help! Please report Manta Ray Sightings from the Flower Garden Banks:

We continue to update the Manta Rays of the Flower Garden Banks Catalog with your sightings. To positively identify an individual, a photograph or video would be the most accurate method of providing information to the researchers.

STANDARD: - Most photographs/images are of the ventrals, where we are able to see their unique markings.

QUALITY: - photos taken of the ventrals that are not covered in dirt.

If you have sighted a manta ray, please report the date and location to the Sanctuary by contacting Emma Rickerson (emma.rickerson@noaa.gov) or 407-251-7111.

Spots and Squares

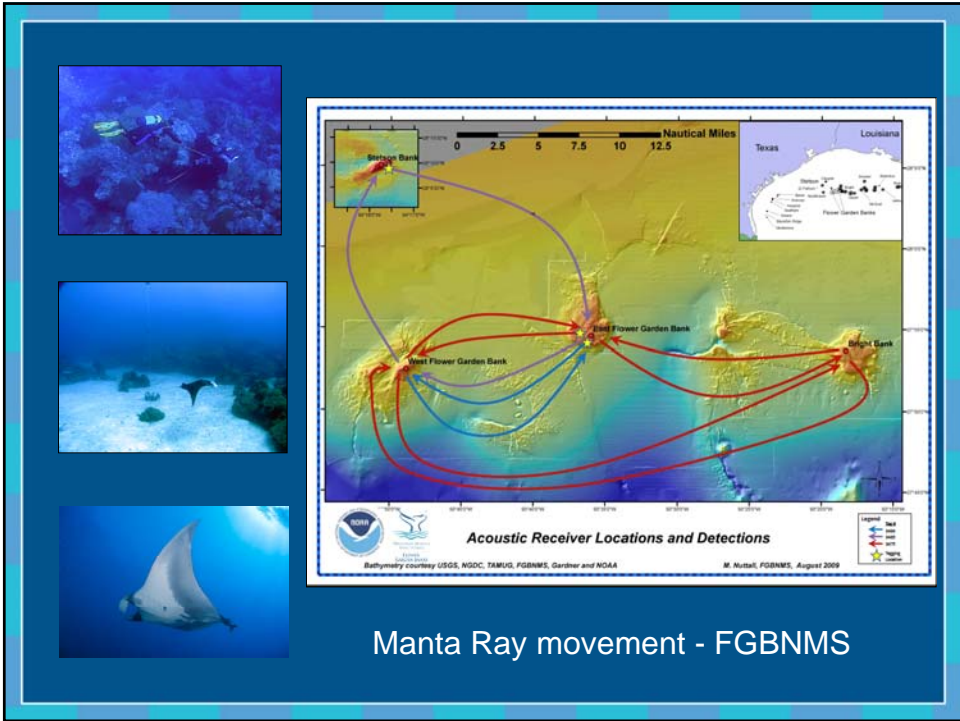


Mostly White



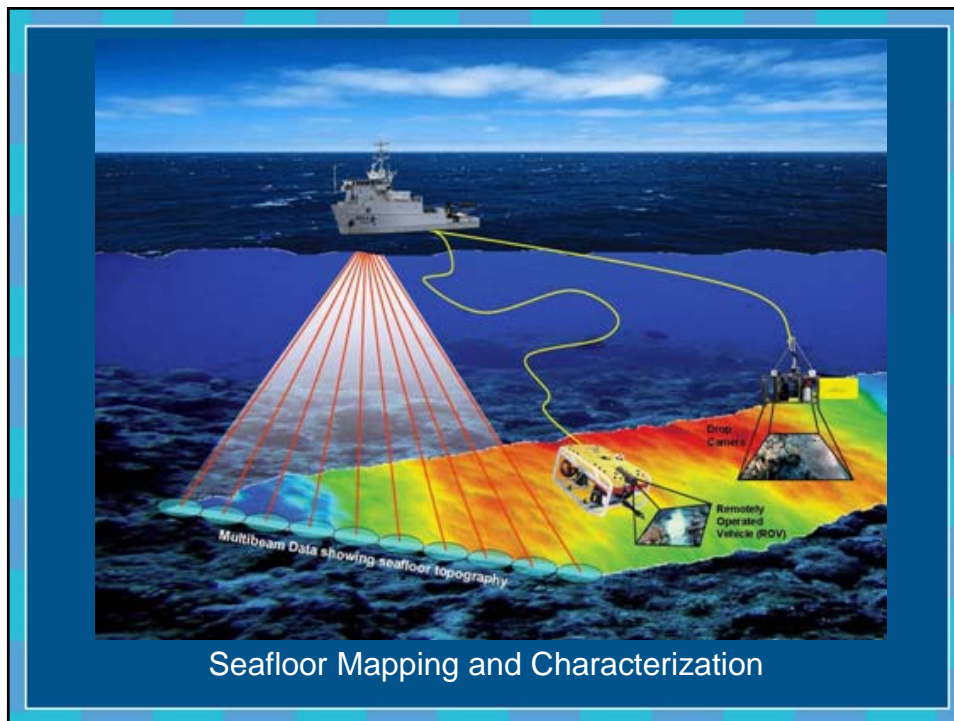
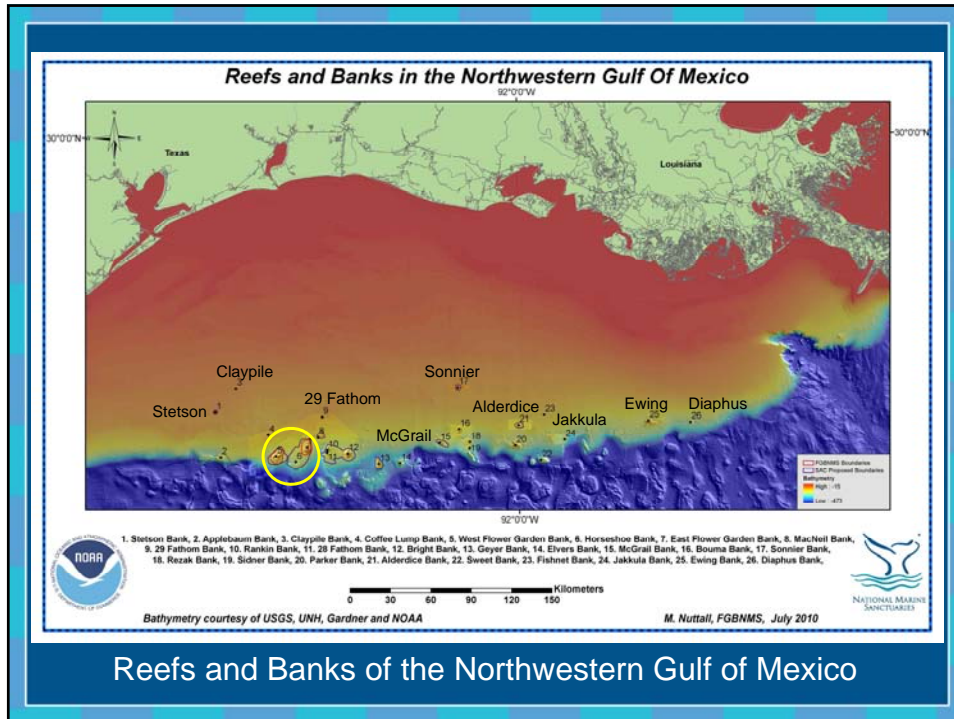
Mostly Black

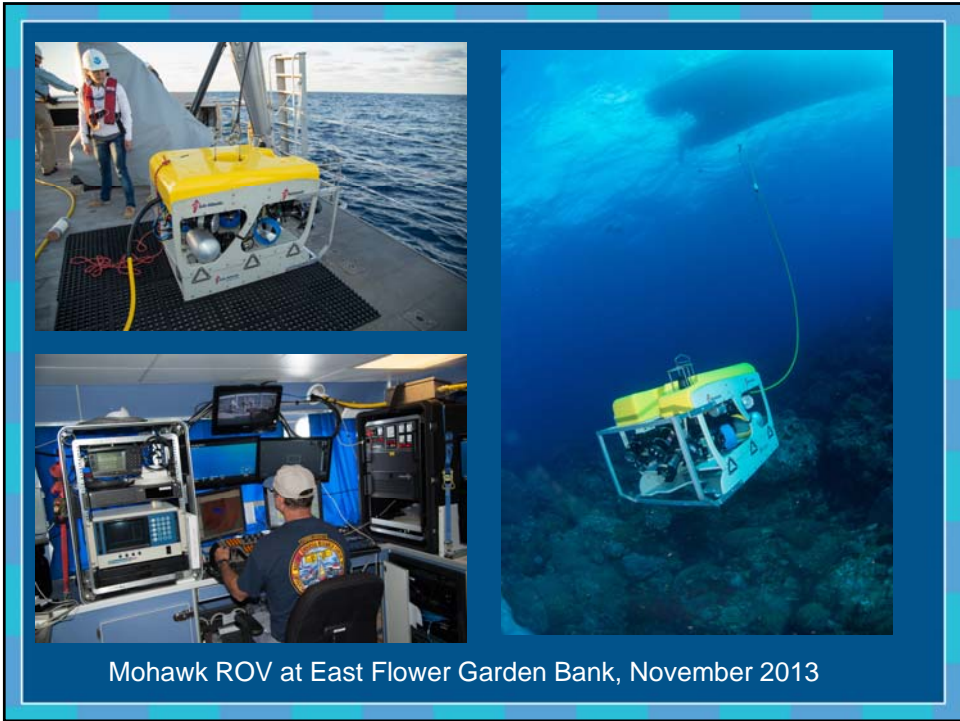


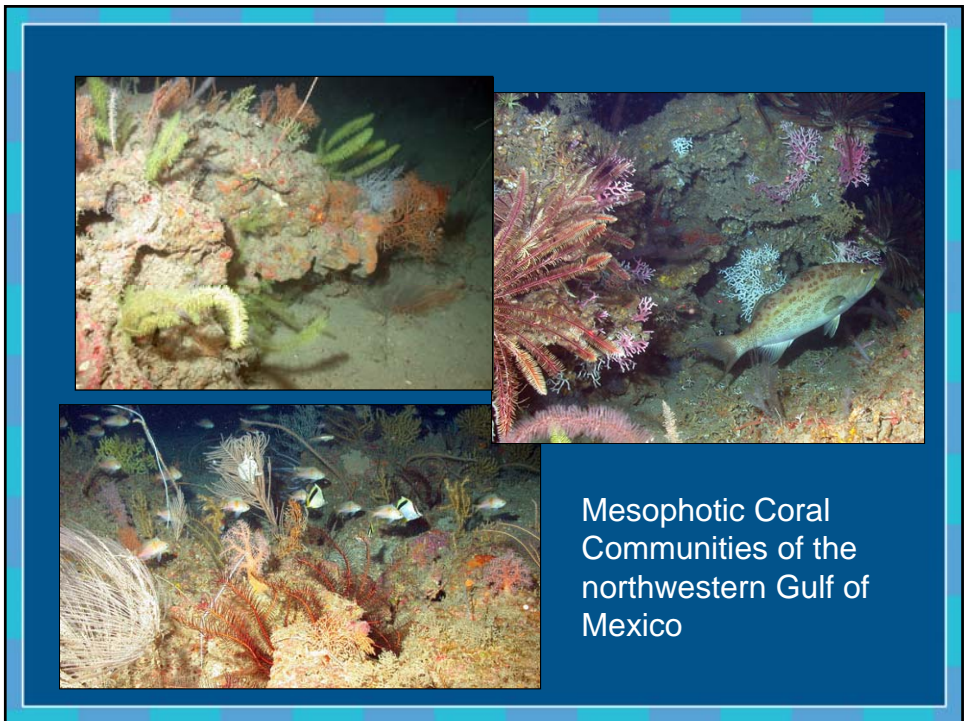
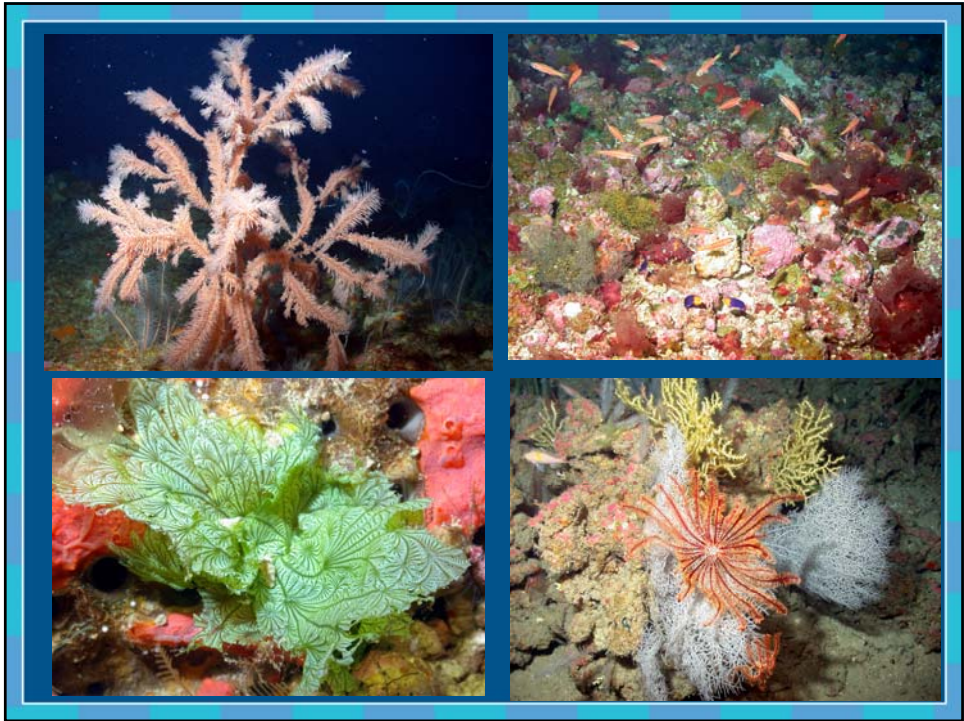


Manta Ray movement - FGBNMS



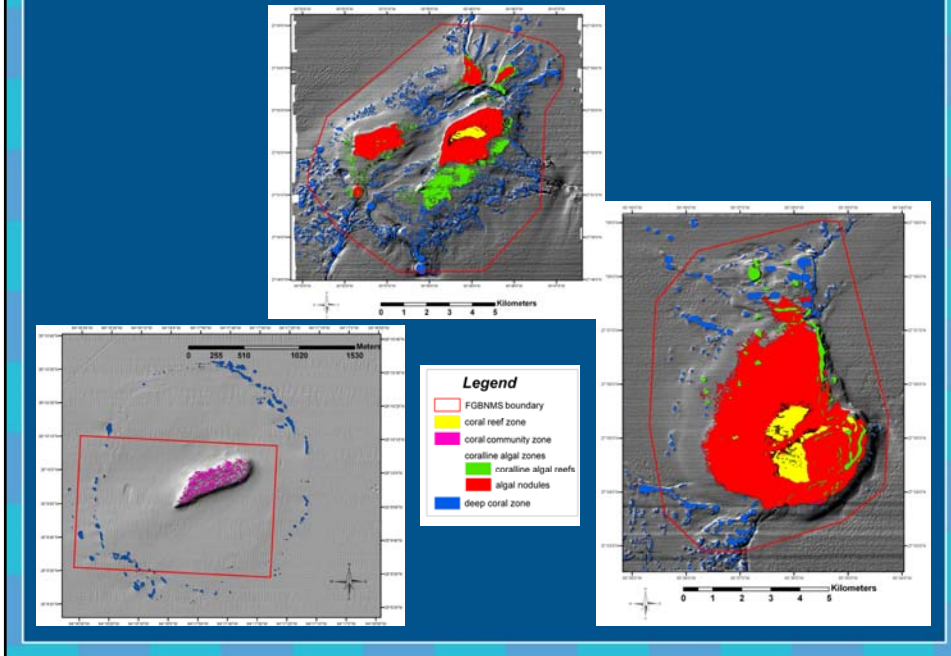


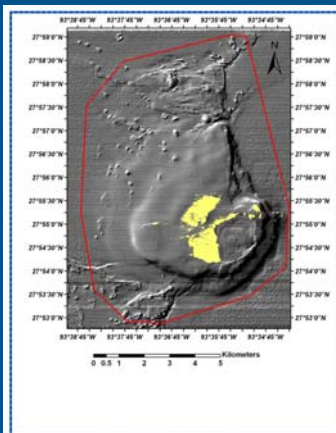




Mesophotic Coral
Communities of the
northwestern Gulf of
Mexico

Biological Habitat Classification Scheme - FGBNMS






Map showing the Coral Reef/Coral Community Zone with a yellow highlighted area. The map includes a scale bar (0 to 5 Kilometers) and a north arrow.

Dominated by brain and star coral boulders:


- Montastraea franksi*
- M. faveolata*
- M. annularis*
- M. cavernosa*
- Diploria strigosa*
- Colpophyllia natans*
- Siderastrea siderea*
- Porites astreoides*

85'



Frank and Joyce Burek

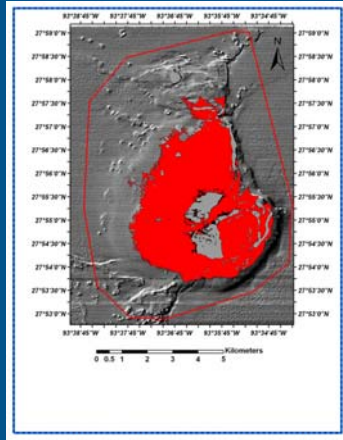
110'



G.P. Schmalz

Coral Reef/Coral Community Zone includes the following habitats:

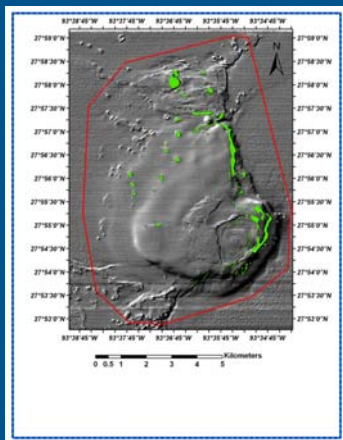
Montastraea, *Stephanocoenia*, *Madracis*, sand community, mixed coral.



160'

Algal Nodule Habitat, within the Coralline Algae Zone includes these habitats:

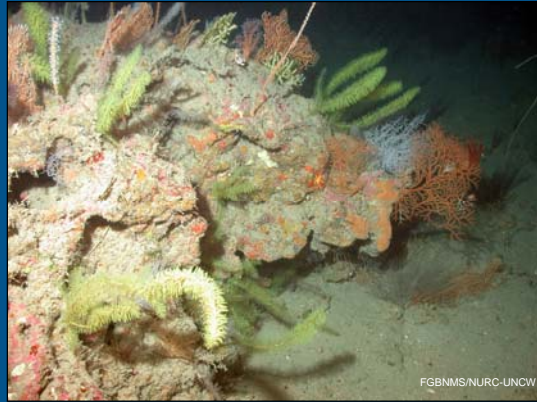
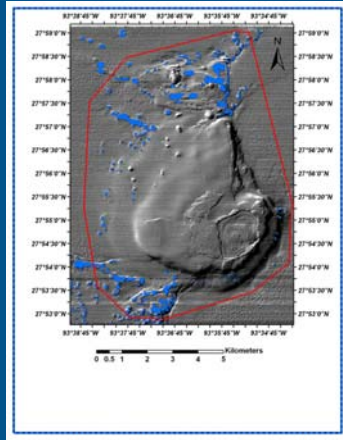
Sand communities, leafy algae/sponge, octocoral, algal pavements, mixed coral



265'

Coralline Algae Reefs within the Coralline Algae Zone, includes these habitats:

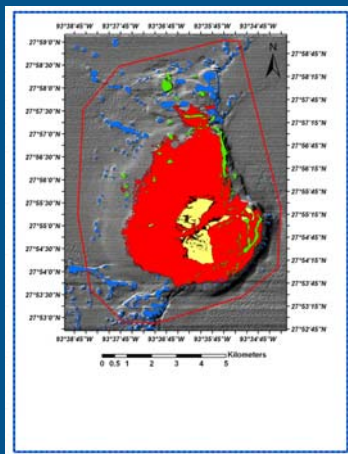
Sand communities, leafy algae/sponge, octocoral, algal pavements, mixed coral, antipatharians



FGBNMS/NURC-UNCW

332'

Deep Coral Zone, includes these habitats:
 Octocoral, antipatharian, mixed coral, stony coral

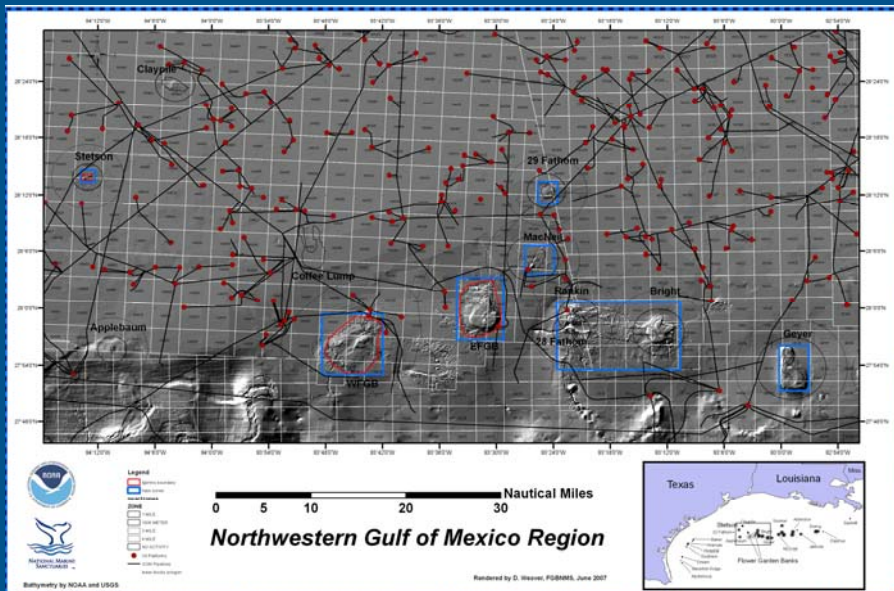
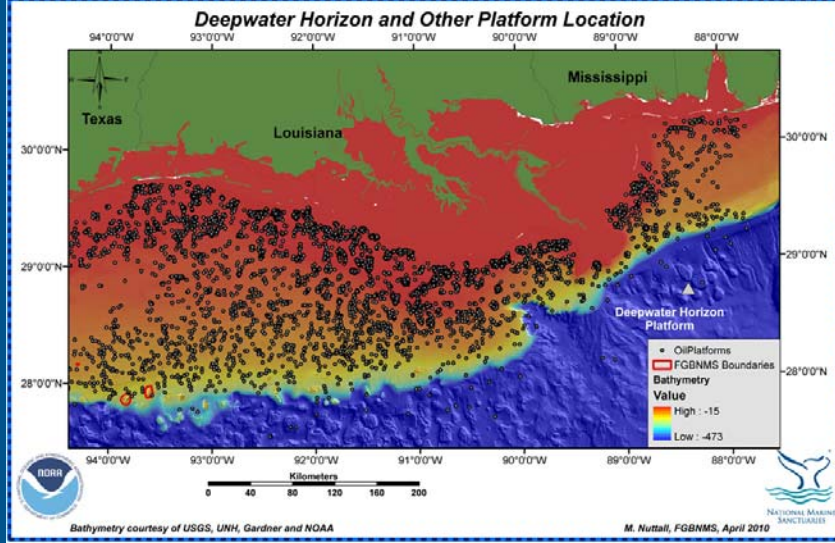


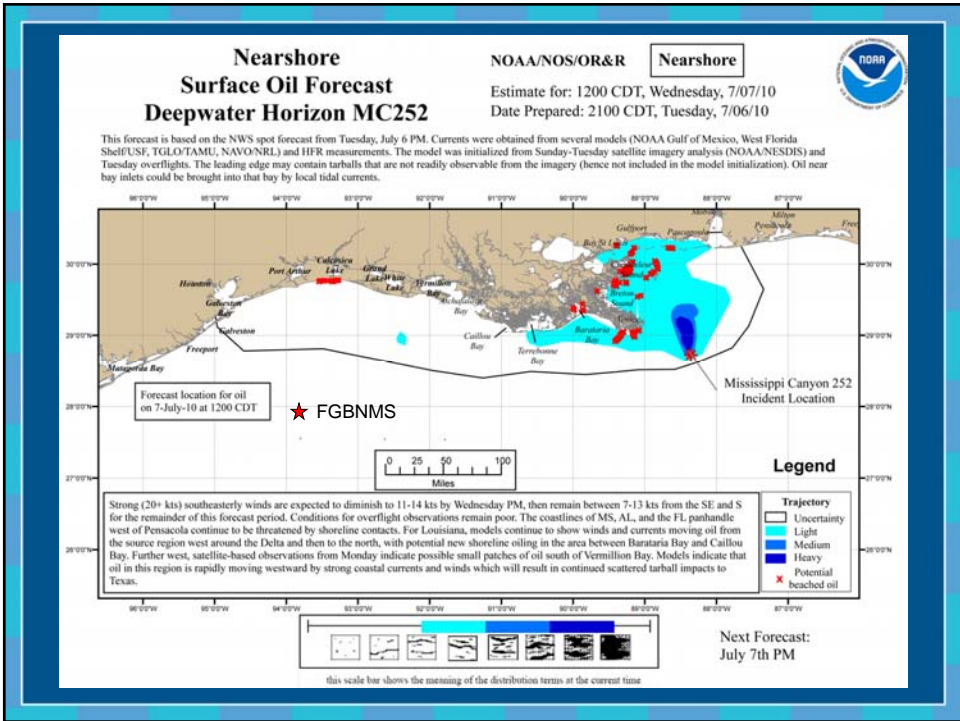
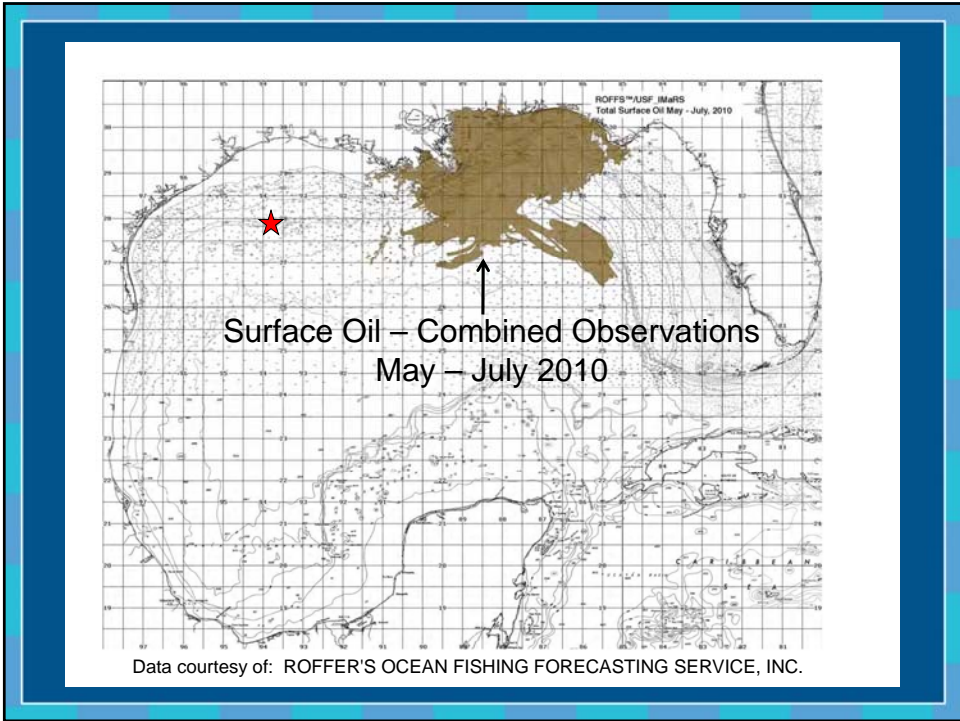
FGBNMS/NURC-UNCW

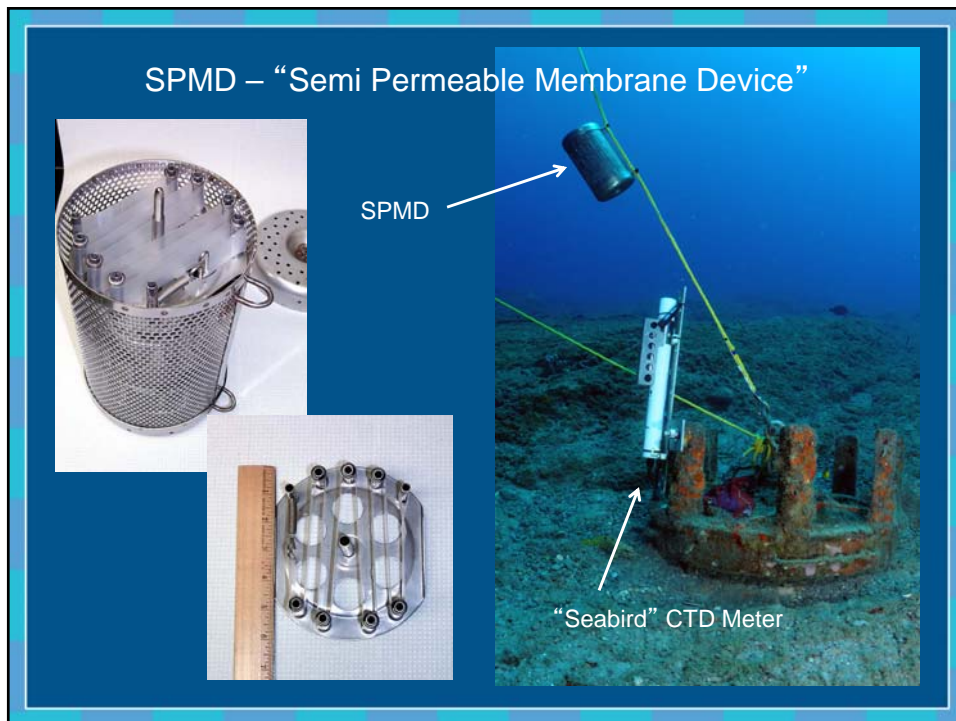
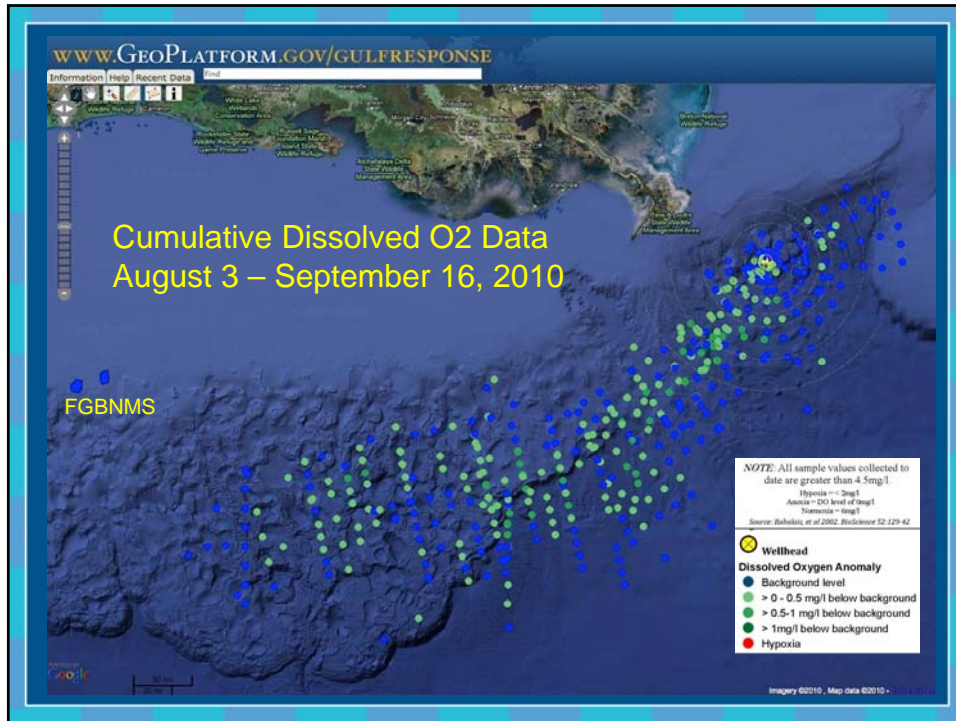
370'

Soft Bottom Community Zone, includes these habitats:
 silt, fine, coarse, rubble

Oil and Gas Infrastructure



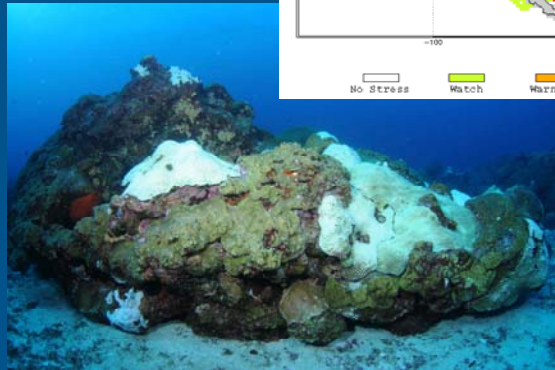
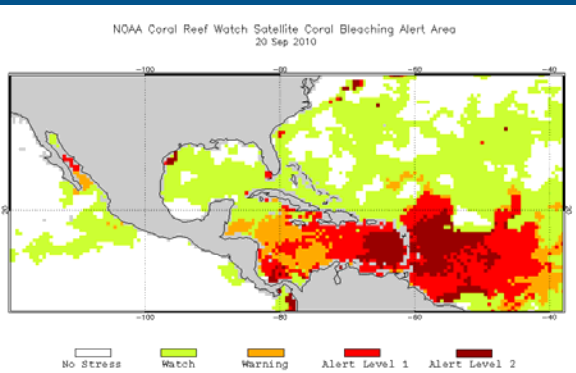
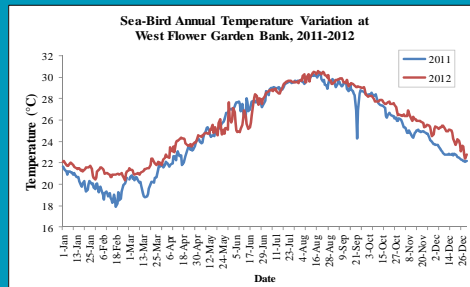
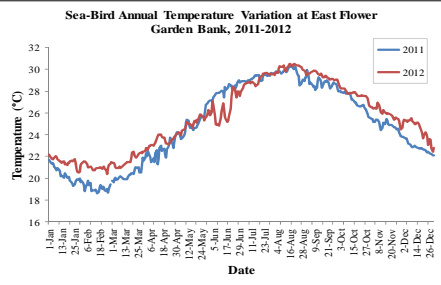






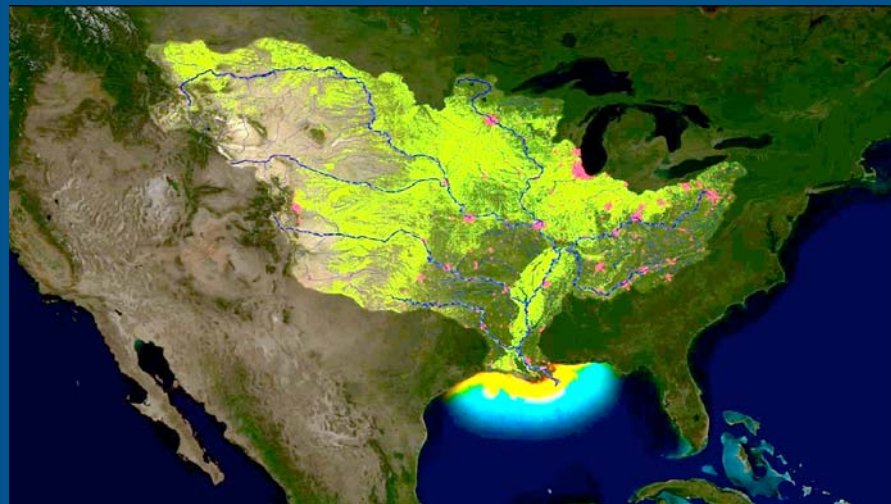
SPMD Maintenance – Flower Garden Banks - 2010

Water Quality Analysis

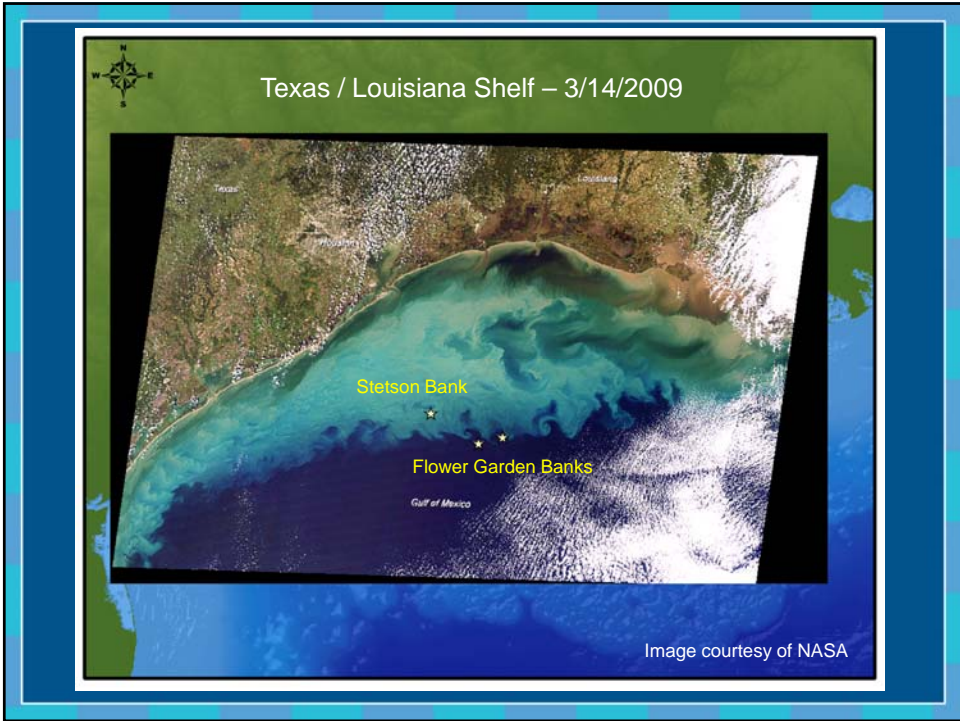


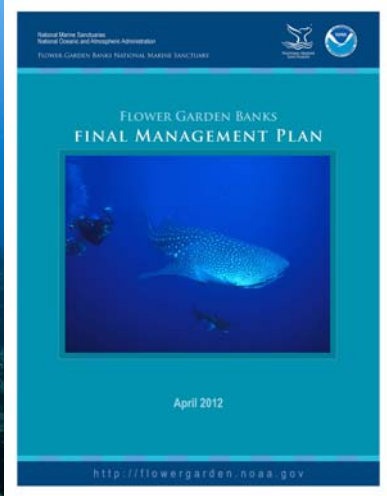
Coral Bleaching

West Flower Garden Bank – October 2010



Gulf of Mexico Watershed / "Dead Zone"








Flower Garden Banks National Marine Sanctuary Revised Management Plan

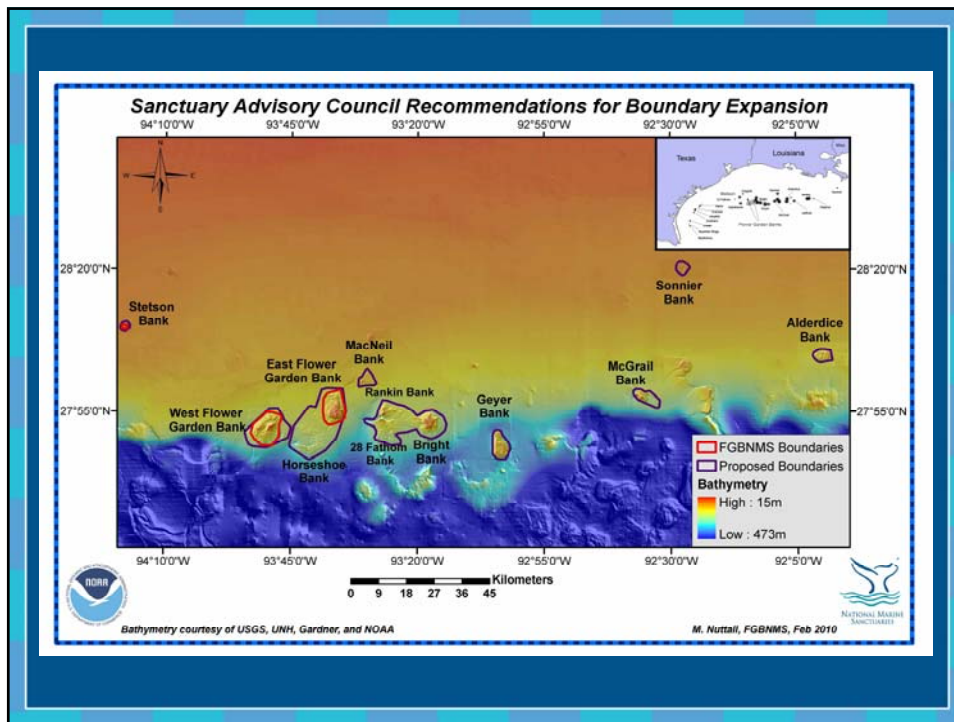
- Process began in 2007
- Draft released October 2010
- Final Plan released April 27, 2012
- Federal Register Vol. 77, No. 82
- Three Components:
 - Final Management Plan
 - Final Rule (New Regulations)
 - Environmental Assessment
- Regulations effective May 29, 2012


Management Action Plans:



- **Sanctuary Expansion**
- Education and Outreach
- Research and Monitoring
- Resource Protection
- Visitor Use
- Operations and Administration



 **FEDERAL REGISTER**
The Daily Journal of the United States Government

0 Sign in Sign up

Proposed Rule

Revisions of Boundaries for Flower Garden Banks National Marine Sanctuary; Intent To Prepare Draft Environmental Impact Statement

A Proposed Rule by the National Oceanic and Atmospheric Administration on 02/03/2015

Federal Register Vol. 80, No. 22 / February 3, 2015

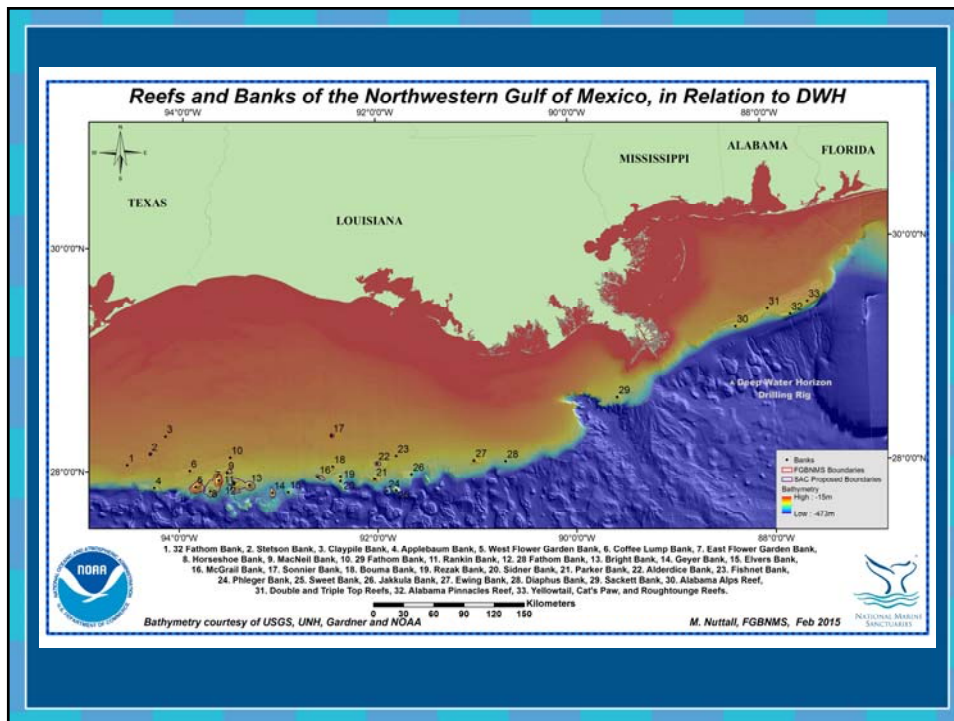
“Notice of Intent” – Public Scoping / Draft EIS

- New Orleans, LA – March 3rd / Airport Hilton
- Houston, TX – March 5th / Bayland Community Center
- Galveston, TX – March 11th / FGBNMS Office

Public Comment period closed: April 6, 2015

Public Comment Overview

Comment Category	Number of Comments
Individual	177
Organizational	23
General support	149
Resource-specific support	87
Use-specific support	54
Conditional support	15
Opposition	1



Deepwater Horizon Oil Spill
Final Programmatic Damage Assessment
and Restoration Plan and Final Programmatic
Environmental Impact Statement
FEBRUARY 2016

Deepwater Horizon Final
Programmatic Restoration Plan

Published February 2016

Outlines Restoration Strategies
for Injured Resources within
various categories

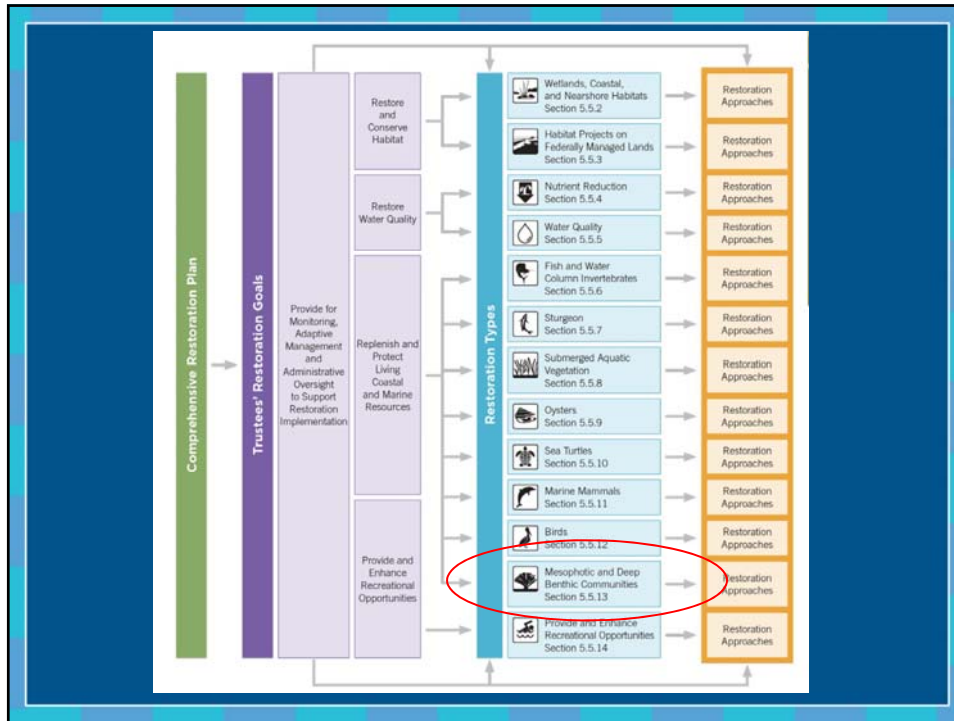
15 year timeframe

Injury Assessment Categories

- Human Use: Section 4.10
- Beach Habitat, in Nearshore Marine Ecosystem Injuries: Section 4.6
- Nearshore Marine Ecosystem: Section 4.6
- Birds: Section 4.7
- Sea Turtles: Section 4.8
- Water Column Species: Section 4.4
- Marine Mammals: Section 4.9
- Benthic Resources: Section 4.5

Mesophotic and deep benthic coral communities

© 2015 NOAA. Illustration by Kate Sweeney



design studies will ensure success of this technique by determining the optimal design for implementation and allowing responsive decision-making. Collateral injury to other natural resources is expected to be minimal due to the relatively small footprint of hard substrate placement on a vastly large expanse of soft sediment substrate. The Trustees do not anticipate that the approach will negatively affect public health or safety and consider it likely to benefit other natural resources. Although the Trustees find this overall restoration approach to be appropriate under OPA, they will ensure project appropriateness by ~~conducting and selecting projects based on a project-specific evaluation of the OPA evaluation standards found at 15 CFR § 990.54(a).~~

D.7.2 Protect and Manage Mesophotic and Deep Benthic Coral Communities

This restoration approach focuses on establishing areas for spatially discrete management of and protection for mesophotic and deep benthic communities and associated resources. For some natural resources, projects that manage and prevent future injuries from known threats can often have more certain outcomes and be more cost-effective than projects designed to create these resources (Chapman & Julius 2005). The acquisition of equivalent natural resources or services for public management has long been considered as a viable restoration option (Wickham et al. 1993). The mesophotic and deep benthic coral communities would particularly benefit from a preventive restoration project because they are sessile and therefore susceptible to threats such as oil and gas activities, fishing activities, and marine debris. An MPA is defined as "any area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein" (MPA Executive Order 13158). Examples of federal MPAs include national marine sanctuaries (NMS), Essential Fish Habitat, habitat areas of particular concern, and oil and gas no-activity zones. Establishing protections

5.D Restoration Approaches and OPA Evaluation

DWH Programmatic Restoration Plan, Chapter 5, Appendix D.7.2

National Marine Sanctuaries
National Oceanic and Atmospheric Administration



NATIONAL MARINE
SANCTUARIES

FLOWER
GARDEN BANKS

<http://flowergarden.noaa.gov>