

Flower Garden Banks National Marine Sanctuary



Office of National Marine Sanctuaries
National Oceanic and Atmospheric Administration



FLOWER GARDEN BANKS NATIONAL MARINE SANCTUARY

DRAFT ENVIRONMENTAL IMPACT STATEMENT: SANCTUARY EXPANSION VOLUMES I & II



June 2016

<http://flowergarden.noaa.gov>

DRAFT ENVIRONMENTAL IMPACT STATEMENT

SANCTUARY EXPANSION

DATE OF RELEASE: June 10,
2016

PUBLIC COMMENT PERIOD:
June 10 – August 19, 2016

NATIONAL MARINE SANCTUARY SYSTEM

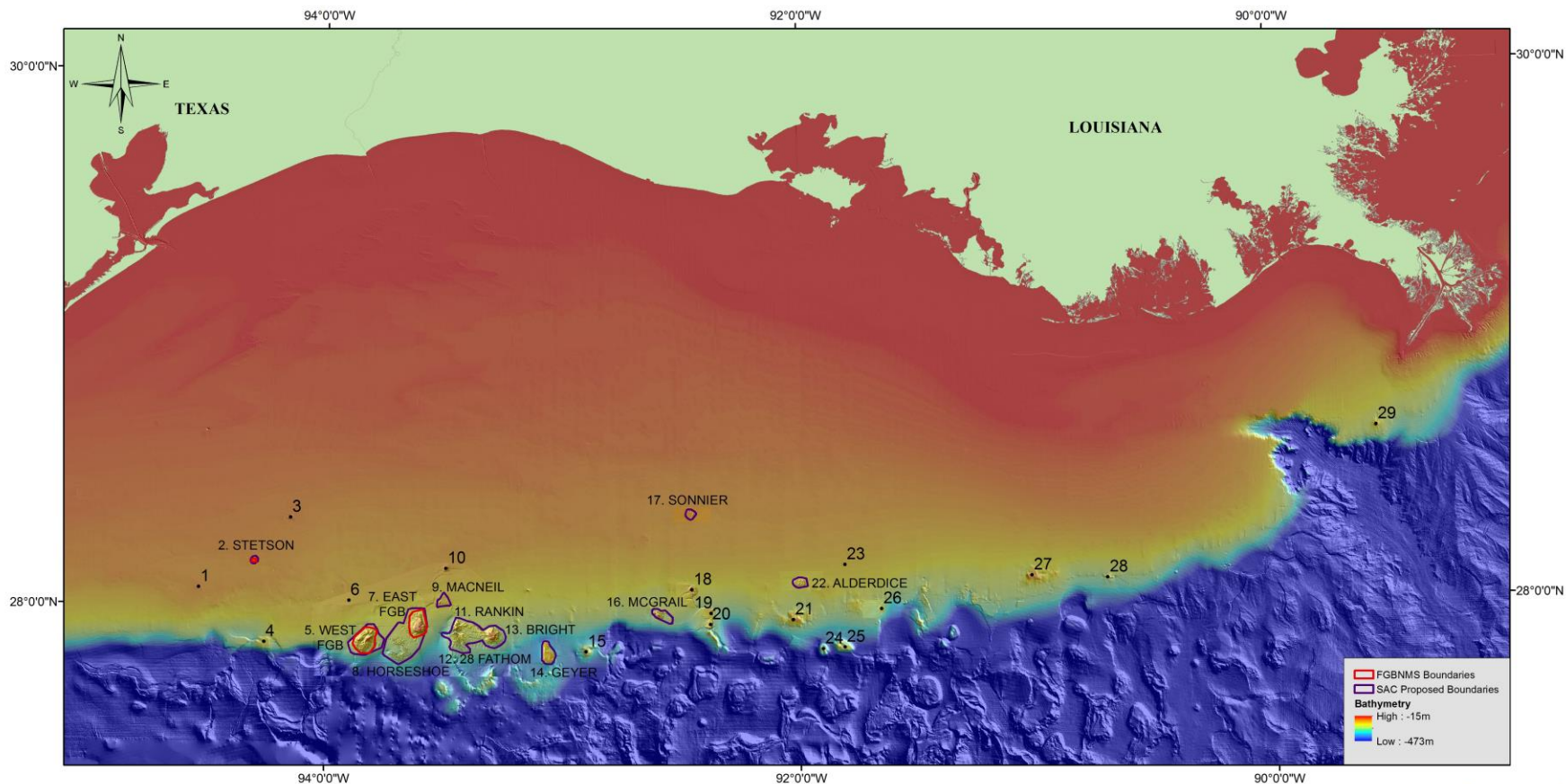


Image reproduced from the GEBCO world map, <http://www.gebco.net/>

Customized by Matt McIntosh, NOAA's Office of National Marine Sanctuaries



Reefs and Banks in the Northwestern Gulf Of Mexico



1. 32 Fathom Bank, 2. Stetson Bank, 3. Claypile Bank, 4. Applebaum Bank, 5. West Flower Garden Bank, 6. Coffee Lump Bank, 7. East Flower Garden Bank, 8. Horseshoe Bank, 9. MacNeil Bank, 10. 29 Fathom Bank, 11. Rankin Bank, 12. 28 Fathom Bank, 13. Bright Bank, 14. Geyer Bank, 15. Elvers Bank, 16. McGrail Bank, 17. Sonnier Bank, 18. Bouma Bank, 19. Rezak Bank, 20. Sidner Bank, 21. Parker Bank, 22. Alderdice Bank, 23. Fishnet Bank, 24. Phleger Bank, 25. Sweet Bank, 26. Jakkula Bank, 27. Ewing Bank, 28. Diaphus Bank, 29. Sackett Bank

0 30 60 90 120 150
Kilometers

Bathymetry courtesy of USGS, UNH, Gardner and NOAA

M. Nuttall, FGBNMS, Feb 2015



Regulated Activities

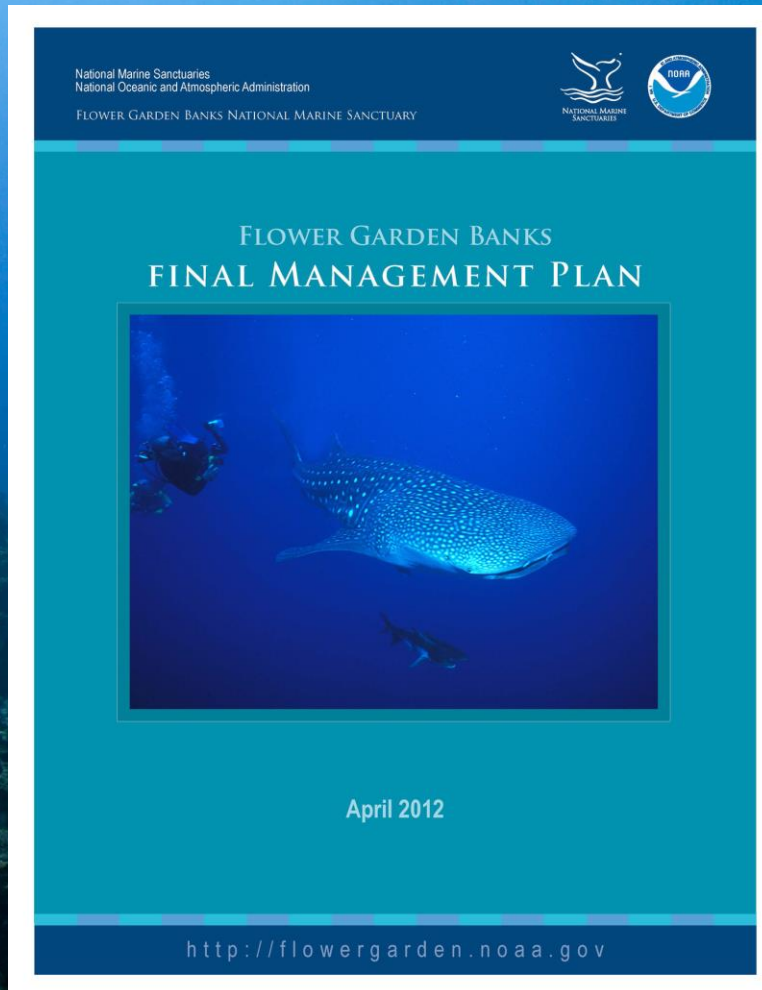
- Anchoring - all anchoring prohibited
 - Mooring buoys provided on coral reef cap
 - Vessels over 100 ' cannot use mooring buoys
- Discharges - prohibited, with some exceptions
- Taking coral or invertebrates - prohibited
- Fishing - only hook and line fishing allowed
 - Spearfishing is prohibited
 - Possession of unauthorized gear prohibited
 - Vessels with unauthorized gear (shrimpboats, longliners) cannot stop or moor within the sanctuary

NATIONAL MARINE SANCTUARY ACT (16 U.S.C. 1431)

SECTION 304 (a) (5):

FISHING REGULATIONS - “The Secretary shall provide the appropriate Regional Fishery Management Council with the opportunity to prepare draft regulations for fishing within the Exclusive Economic Zone as the Council may deem necessary to implement the proposed designation.”

In preparing the draft regulations, a Regional Fishery Management Council shall use as guidance the national standards of section 301(a) of the Magnuson-Stevens Act (16 U.S.C. 1851) to the extent that the standards are consistent and compatible with the proposed designation.



Flower Garden Banks National Marine Sanctuary Revised Management Plan

- Process began in 2007
- Draft released October 2010
- Final Plan released April 27, 2012
- Regulations effective May 29, 2012
 - **Sanctuary Expansion**
 - Education and Outreach
 - Research and Monitoring
 - Resource Protection
 - Visitor Use
 - Operations and Administration

“Action Plan” Implementation

Sanctuary Expansion Action Plan

Strategy: SE.1 “Evaluate and expand, as appropriate, the network of protected areas within the sanctuary to include 5-12 additional reefs and banks, and to modify the existing boundary of East and West Flower Garden and Stetson Banks to include critical adjacent habitat.”

Activity: 1.1 “Develop a draft environmental impact statement (DEIS) to evaluate alternatives for incorporating additional reefs and banks in the northwestern Gulf of Mexico into FGBNMS, and identify a preferred alternative.”

Regulatory: This activity implemented through a public rule-making process, and must follow NEPA guidelines.

Sanctuary Advisory Council

- Recreational Diving
- Dive Operators
- Oil and Gas Industry
- Recreational Fishing
- Commercial Fishing
- Education
- Research
- Conservation

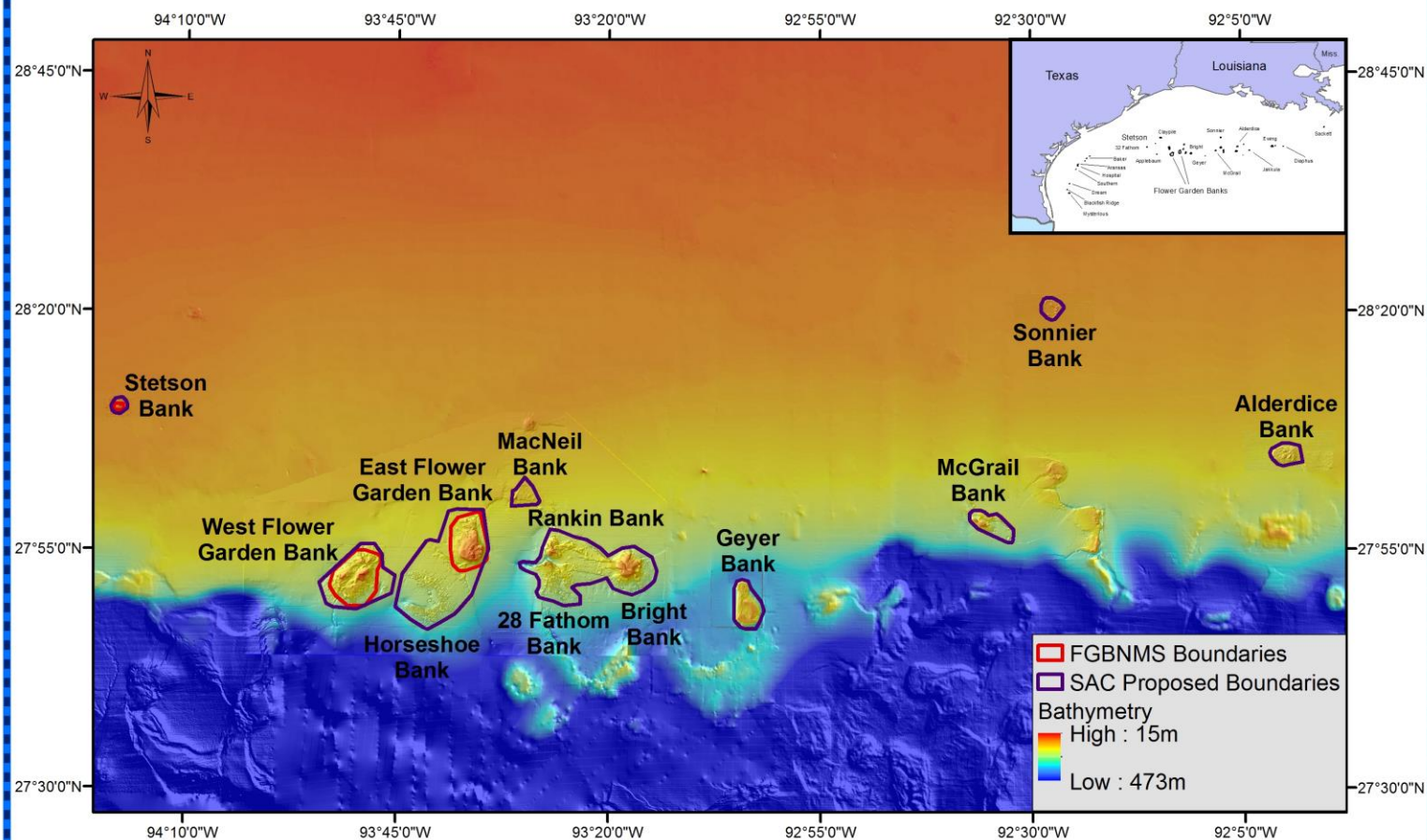


AGENCY (NON-VOTING)

- NOAA Fisheries
- Bureau of Ocean Energy Management
- Bureau of Safety & Environmental Enforcement
- U.S. Coast Guard
- NOAA Law Enforcement

Flower Garden Banks NMS Management Plan

Sanctuary Advisory Council Recommendations for Sanctuary Expansion



Bathymetry courtesy of USGS, UNH, Gardner and NOAA



M. Nuttall, FGBNMS, Feb 2015

Sanctuary Expansion Process

2/3/15

Federal Register Notice

4/6/15

Scoping / Public Comment

Issue Analysis & Recommendations

Prepare Draft EIS

6/10/16

Publish Draft EIS / Public Review

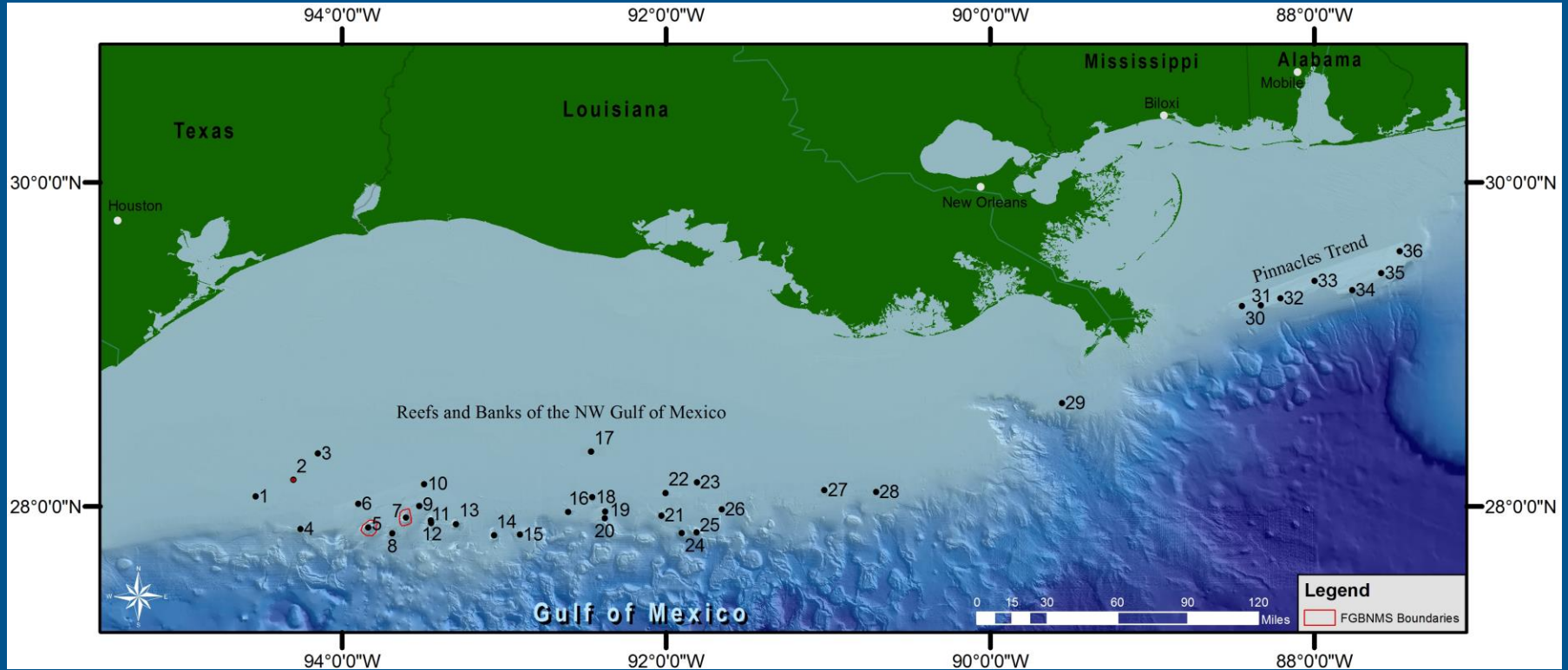


Public Comment Overview

Notice of Intent (NOI)

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

Flower Garden Banks National Marine Sanctuary



Sanctuary Expansion Study Area

Summary of expansion alternatives evaluated in DEIS

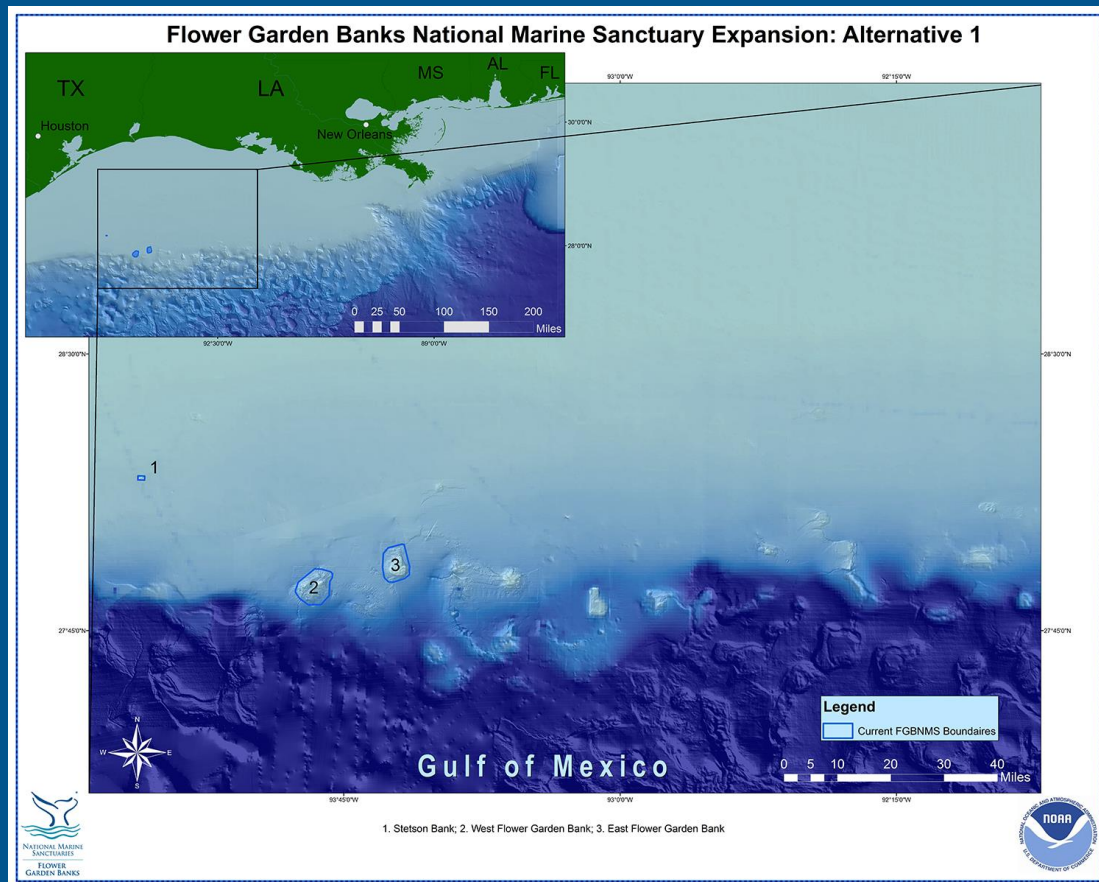
	Resources Present	Subregions of the North Central Gulf of Mexico	Total Area (sq. mi.)
Alternative 1: No Action, retain current boundary	Coral reef/coral community;mesophotic coral habitats	NW banks	56.21
Alternative 2: 2007 Sanctuary Advisory Council recommendation	Coral reef/coral community;mesophotic coral habitats	NW banks, continental slope	281.15
ALTERNATIVE 3: 2015 FGBNMS STAFF RECOMMENDATION, NOAA'S PREFERRED ALTERNATIVE	CORAL REEF/CORAL COMMUNITY; MESOPHOTIC CORAL HABITATS	NW BANKS, CONTINENTAL SLOPE	383.19
Alternative 4: NOAA's preferred alternative plus high priority mesophotic and deep coral sites	Coral reef/coral community;mesophotic coral habitats; deep coral ecosystems	NW banks, Pinnacles; continental slope	633.76
Alternative 5: Comprehensive protection for known high value north central Gulf of Mexico benthic habitats and cultural resources	Coral reef/coral community;mesophotic coral habitats; deep coral ecosystems; shipwrecks	NW banks, Pinnacles; continental slope	935.18

ALTERNATIVE 1

No Action

Current sanctuary: 3 banks, 3 polygons

Current sanctuary area: 56.21 sq. miles



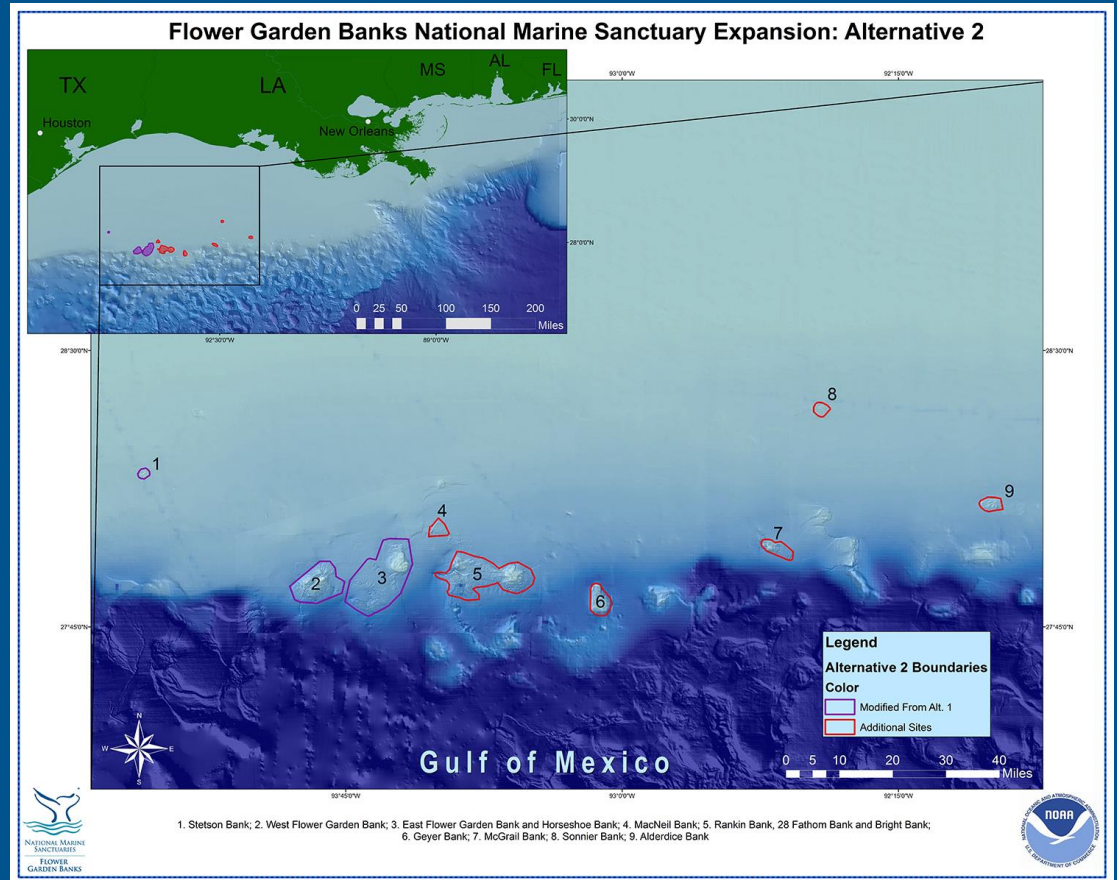
ALTERNATIVE 2

- FGBNMS Sanctuary Advisory Council Recommendation (proposed in 2007, published in 2012 Management Plan)
- Adjust current sanctuary boundaries to better encompass hard bottom habitat.
- 9 additional banks in 6 additional polygons compared with current sanctuary
- Including current sanctuary locations, total of 12 banks, in 9 polygons (2 multi-bank complexes)

Current sanctuary area: 56.21 sq. miles

Net Increase Over Current Sanctuary:
224.94 sq. miles

Alternative 2 Area: 281.15 sq. miles

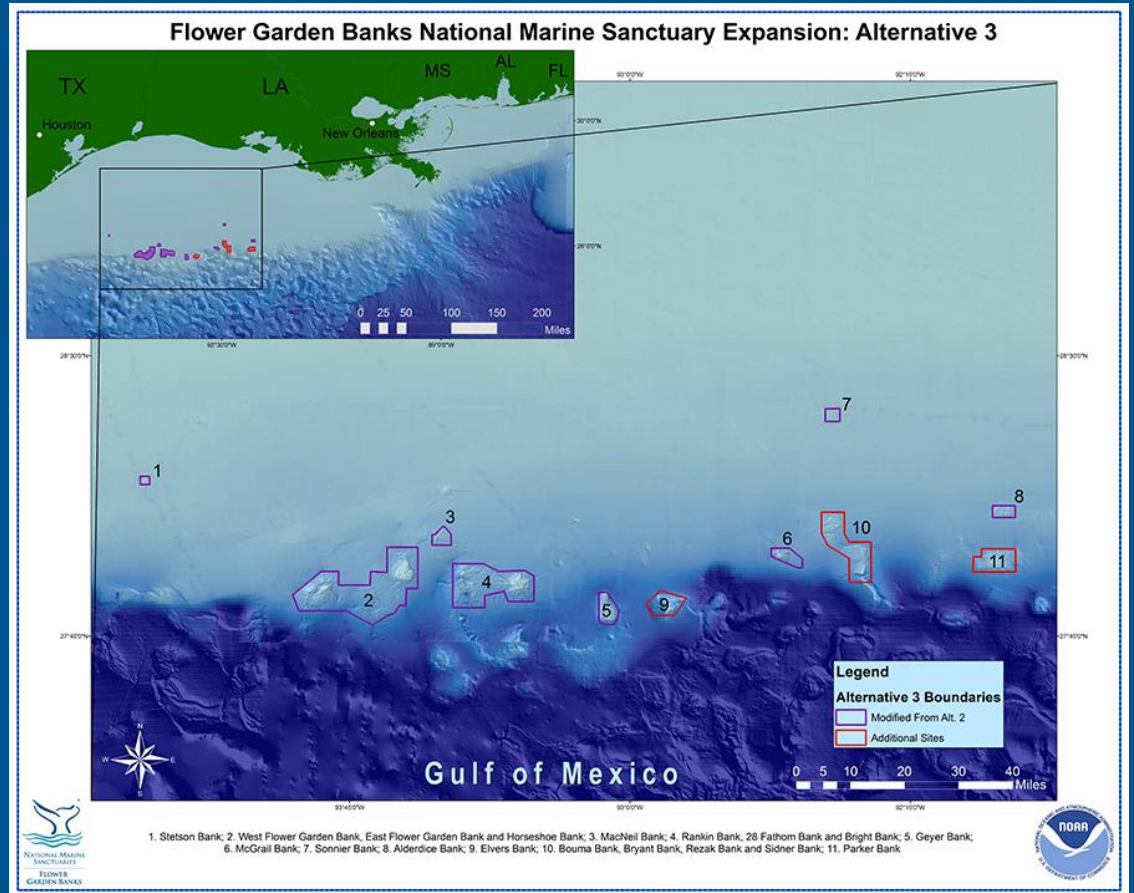


ALTERNATIVE 3

2015 Staff Recommendation PREFERRED ALTERNATIVE

- 15 additional banks in 8 additional polygons compared to current sanctuary
- Including current sanctuary locations, a total of 18 banks, in 11 polygons (3 multi-bank complexes).

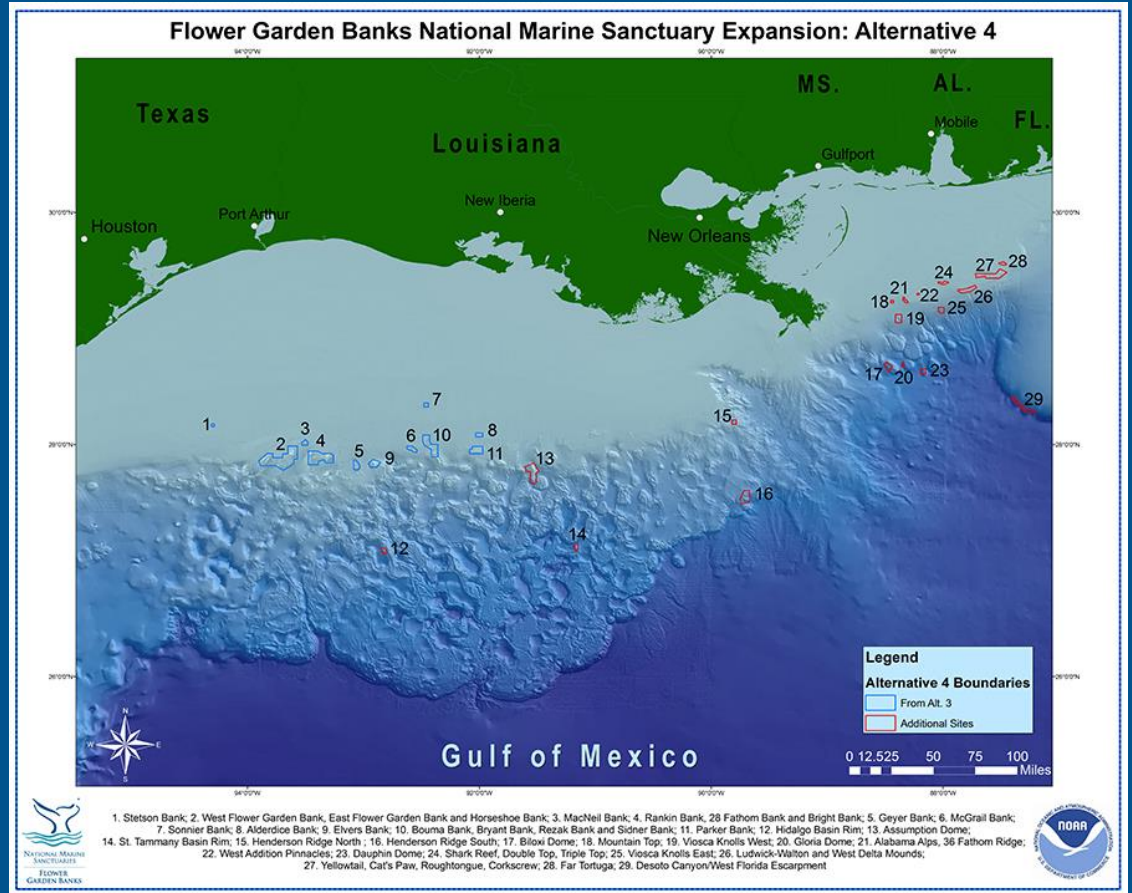
Current sanctuary area: 56.21 sq. miles
Net Increase Over Current Sanctuary:
326.98 sq. miles
Alternative 3 Area: 383.19 sq. miles



ALTERNATIVE 4

- High Priority Mesophotic and Deep Coral Sites
- 40 additional banks in 26 additional polygons compared to current sanctuary, for a total of 43 banks in 29 polygons (8 multi-bank complexes).

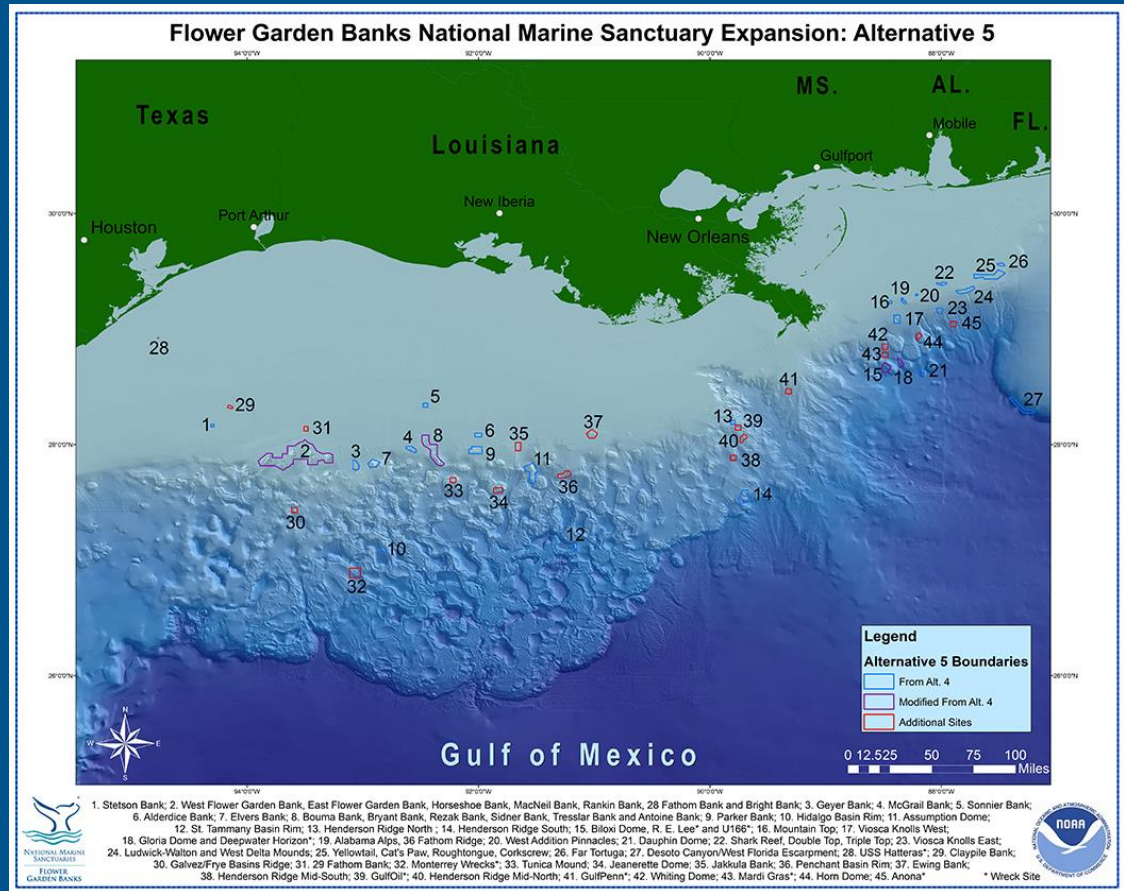
Current sanctuary area: 56.21 sq. miles
 Net Increase Over Current Sanctuary:
 577.55 sq. miles
 Alternative 4 Area: 633.76 sq. miles



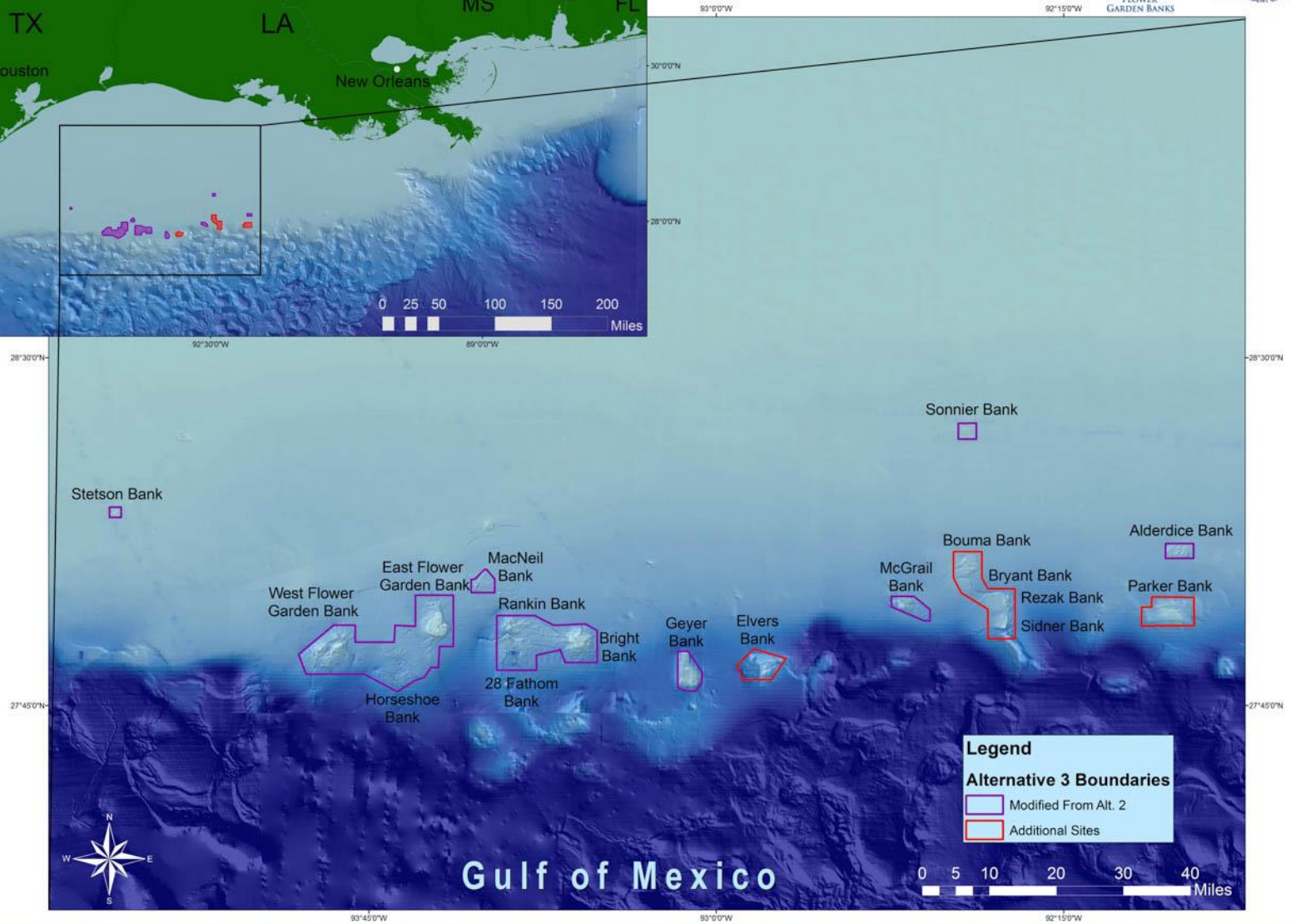
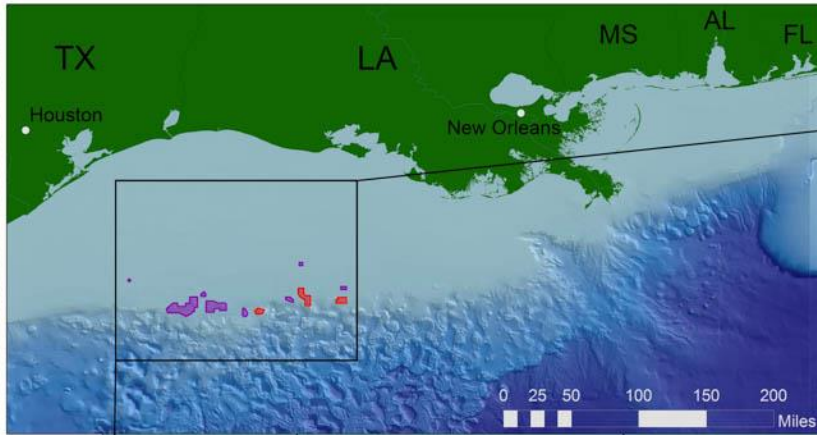
ALTERNATIVE 5

- High Value Habitats and Cultural Resources
- 54 additional banks, 9 historic shipwrecks, and the DWH site, in 42 additional polygons compared to the current sanctuary, for a total of 57 banks, 9 historic shipwrecks, and the DWH site, in 45 polygons (10 multi-bank, bank/wreck, or multi-wreck complexes)

Current sanctuary area: 56.21 sq. miles
 Net Increase Over Current Sanctuary:
 878.97 sq. miles
 Alternative 5 Area: 935.18 sq. miles



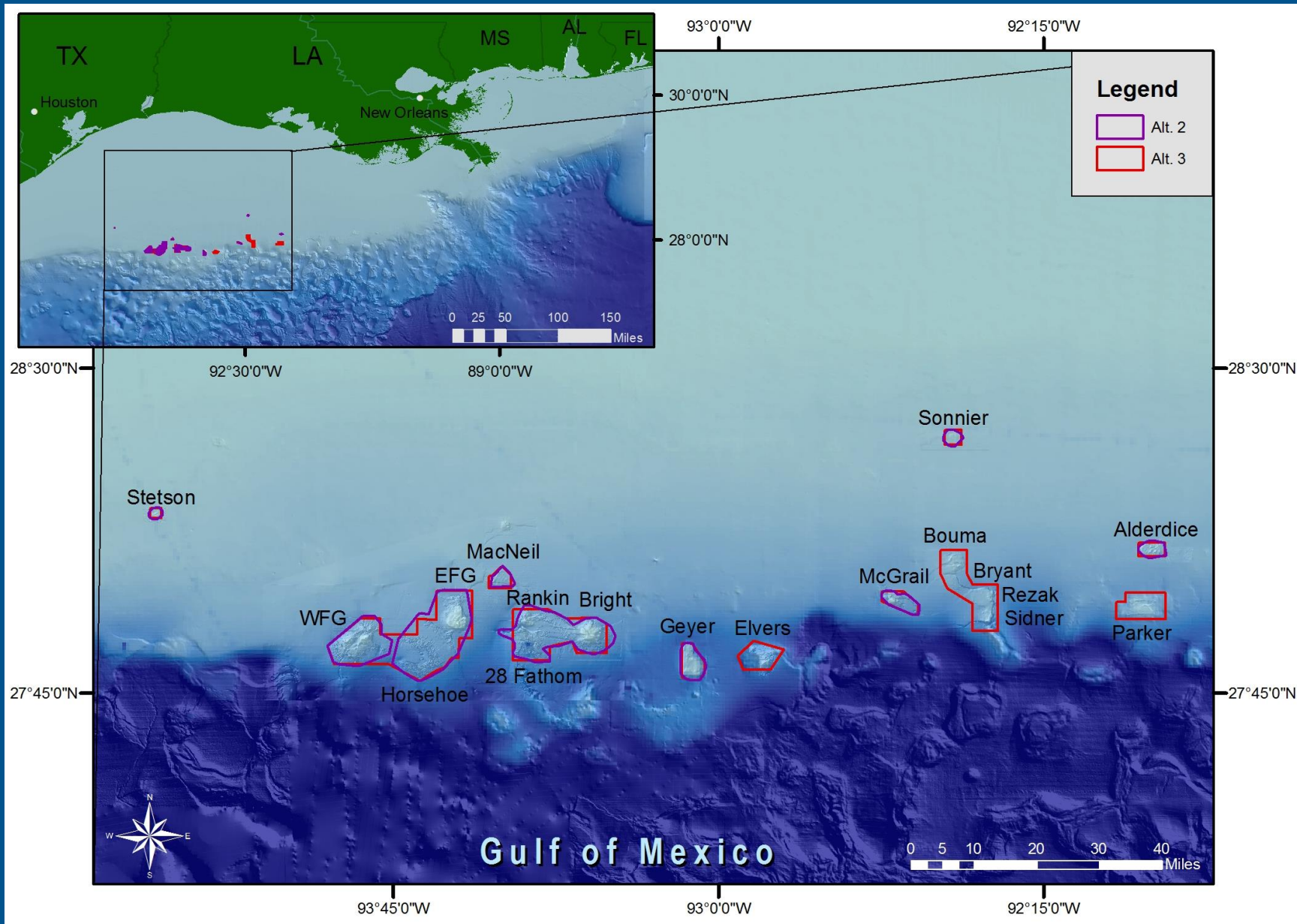
Flower Garden Banks National Marine Sanctuary Expansion: Alternative 3



Legend

Alternative 3 Boundaries

- Modified From Alt. 2
- Additional Sites

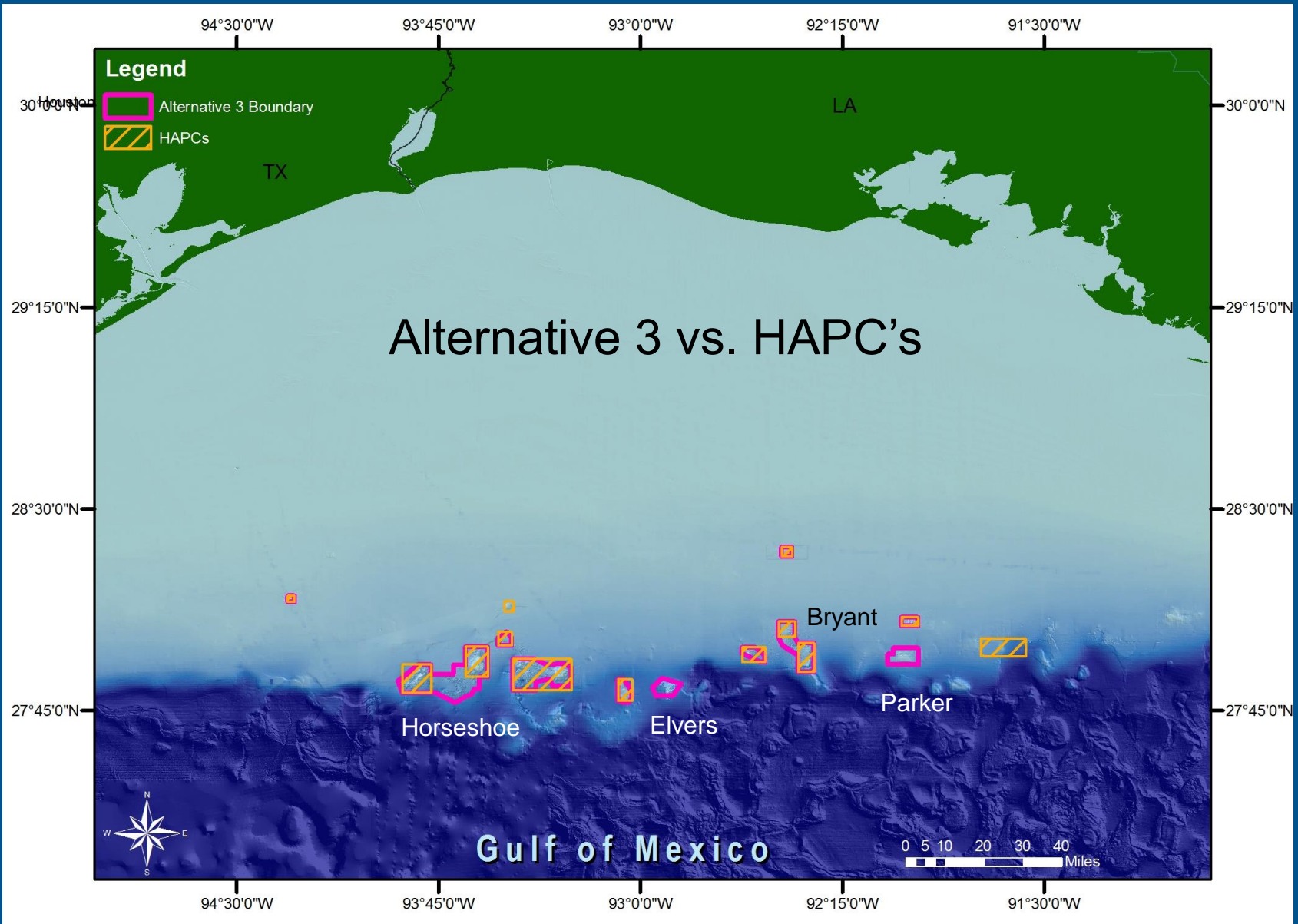


Alternative 2 (SAC Recommendation) vs. Alternative 3 (Preferred)

Investigations conducted since 2007 Sanctuary Advisory Council Recommendation

- Potentially Sensitive Biological Features Project conducted – quantitative analysis from 12 banks.
- Multibeam mapping data collected at: Coffee Lump, Parker, Elvers, and Ewing Banks
- Habitat suitability modeling developed for the region for octocorals and black corals
- 17 ROV cruises
- 268 surveys
- 356 hrs 11 mins survey time
- 27,638 images collected
- 200 samples collected
- Additional banks surveyed: 29 Fathom, Rankin, Rezak, Bouma, Sidner, Elvers, Bryant, and Parker





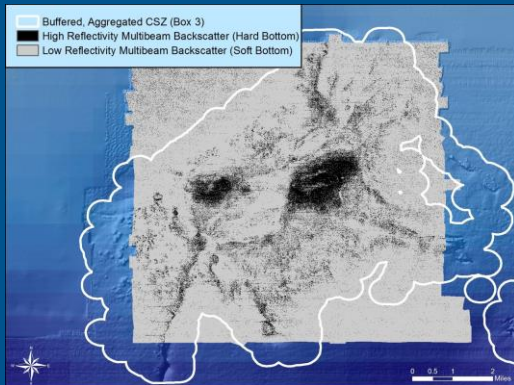
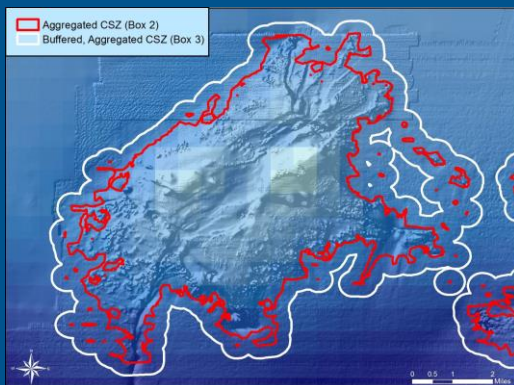
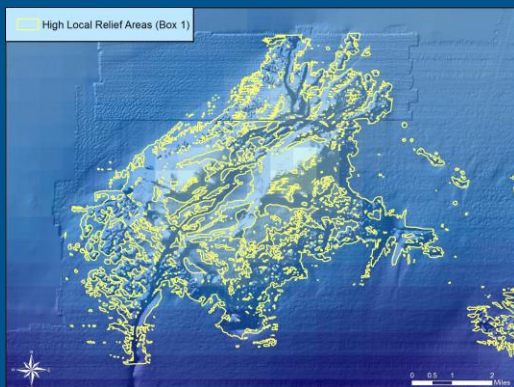
Boundary Expansion Ranking Criteria

- **Resource Significance**
 - Coral reef, deepwater coral, geological feature
- **Structural Connectivity**
 - Physical connectedness (ridges, scarps, faults)
- **Biological Connectivity**
 - Distance from nearest neighbor (larval dispersal)
- **Potential or Perceived Threat**
 - Anchoring, high use, historical resource recovery
- **Public and Scientific Priority**
 - Popular diving site, high research interest

Area or Bank	Zone Priority Index	Structural Connectivity Index	Biological Connectivity	Threat Index	Public and Sanctuary priority	Overall ranking score	Distance from FGBNMS miles	Nearest Neighbor Distance (km)	Nearest Neighbor
Stetson Ring	3	3	3	3	3	15	0	23.3	Claypile
Bright	3	2	2	3	3	13	17	14.8	Rankin
McGrail	3	1	2	3	3	12	59.4	15.8	Bouma
Geyer	3	1	2	3	3	12	31	18.25	Evers
Horseshoe reef - b/n banks	2	2	3	2	3	12	7	9.5	E&W Bank
Sonnier	3	1	1	3	3	11	74	29.8	Bouma
Alderdice	3	1	2	2	3	11	97	15.7	Diaphus
Rankin	2	2	3	2	3	12	8.1	3.4	28 Fathom
28 Fathom	2	2	3	2	3	12	8	3.4	Rankin
Rezak	2	1	3	2	3	11	73	5.9	Sidner
Sidner	2	1	3	2	3	11	74	5.9	Rezak
MacNeil	1	2	3	2	1	9	5.9	8.5	EFGB
Bouma	2	1	2	2	3	10	68	11	Rezak
Evers	2	0	3	2	3	10	40.2	9.57	Geyer
Parker	2	0	3	2	3	10	94.4	9.8	Alderdice
Jakkula	1	1	1	1	1	5	118	23.1	Sweet
Florida Middle Grounds	2	0	0	2	0	4	808	115	Madison Swanson
Pinnacles	1	0	0	1	0	2	594	219	Madison Swanson
Madison/Swanson	1	0	0	1	0	2	918	115	Florida Middle Grounds

Sanctuary Expansion Ranking Criteria Matrix

Coral reef, coral community, and mesophotic coral habitat sites (NW Banks & Pinnacles)



1. High local relief areas (core sensitivity zones, or CSZ) classified using GIS focal statistics analysis from highest resolution bathymetry available

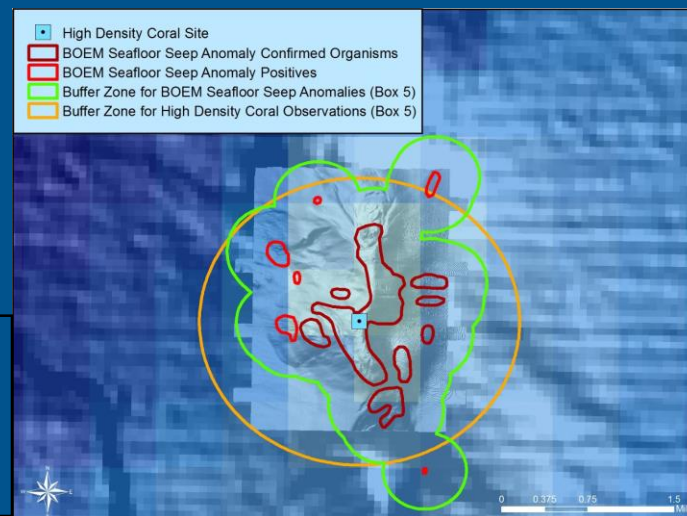
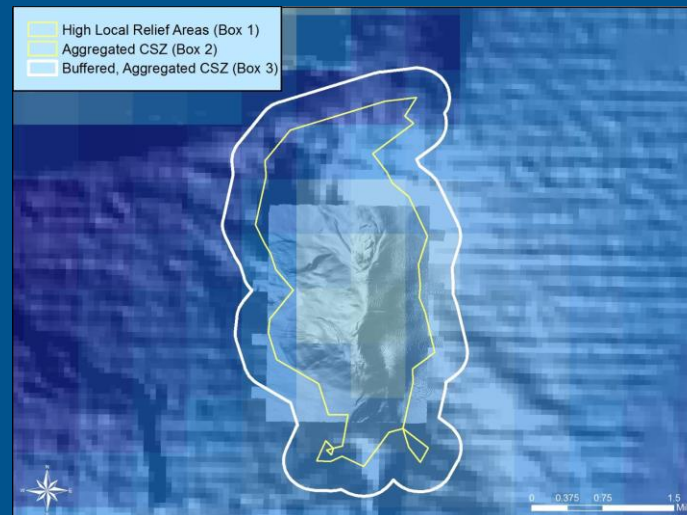
2. CSZs within 250 meter proximity aggregated

3. 500 meter buffer created around aggregated CSZs

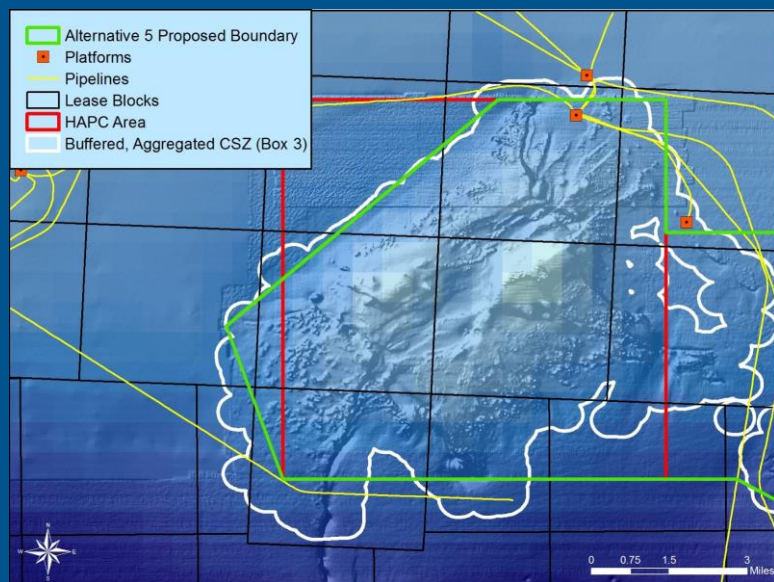
4. Buffered, aggregated CSZ confirmed against high reflectivity multibeam backscatter showing hard bottoms.

5. 2km buffer zones created around high density coral observations and 500m buffer zones created around BOEM seafloor seep anomalies showing hard bottoms

Deep coral ecosystem sites



Coral reef, coral community, and mesophotic coral habitat sites (NW Banks & Pinnacles)



6. Buffered, aggregated CSZs merged with buffered seafloor seep anomalies

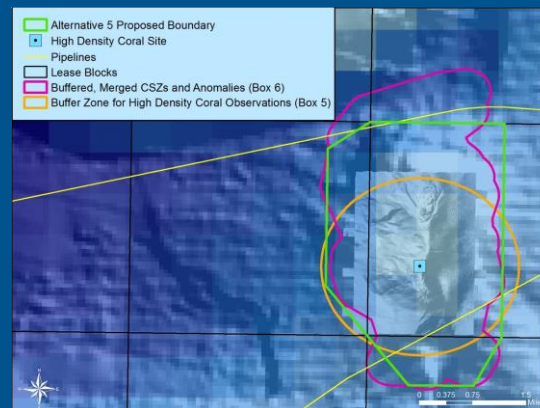
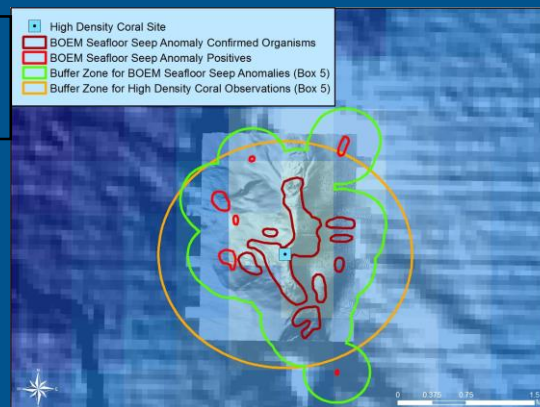
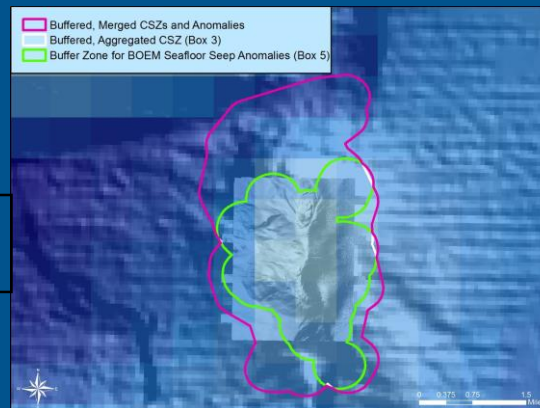
7. Buffered, merged CSZs and anomalies compared with buffered, high density coral observations

8. Deep benthic and mesophotic experts consulted to refine areas to be included in alternative boundaries

9. Alignment of alternative boundaries with lease blocks, HAPCs, excluding platforms and infrastructure where possible, vertices minimized

10. Alignment of vertices and reprojection

Deep coral ecosystem sites



PUBLIC COMMENT PERIOD OPEN UNTIL AUGUST 19, 2016

Electronic: <https://www.regulations.gov/#!docketDetail;D=NOAA-NOS-2016-0059>
(or link direct from FGBNMS home page: flowergarden.noaa.gov)

Mail: Attn: George Schmahl, Superintendent NOAA, Flower Garden Banks National Marine Sanctuary, 4700 Avenue U, Building 216, Galveston, TX 77551.

PUBLIC MEETINGS

Galveston, Texas: Tuesday, July 12, 5:30-7:30 p.m.
Flower Garden Banks National Marine Sanctuary Office
4700 Avenue U, Building 216
Galveston, TX 77551

Houston, Texas: Wednesday, July 13, 5:30-7:30 p.m.
Trini Mendenhall Community Center
1414 Wirt Rd.
Houston, TX 77055

New Orleans, Louisiana: Tuesday, July 19, 5:30-7:30 p.m.
Hilton New Orleans Airport
Segnette Room
901 Airline Drive
Kenner, LA 70062

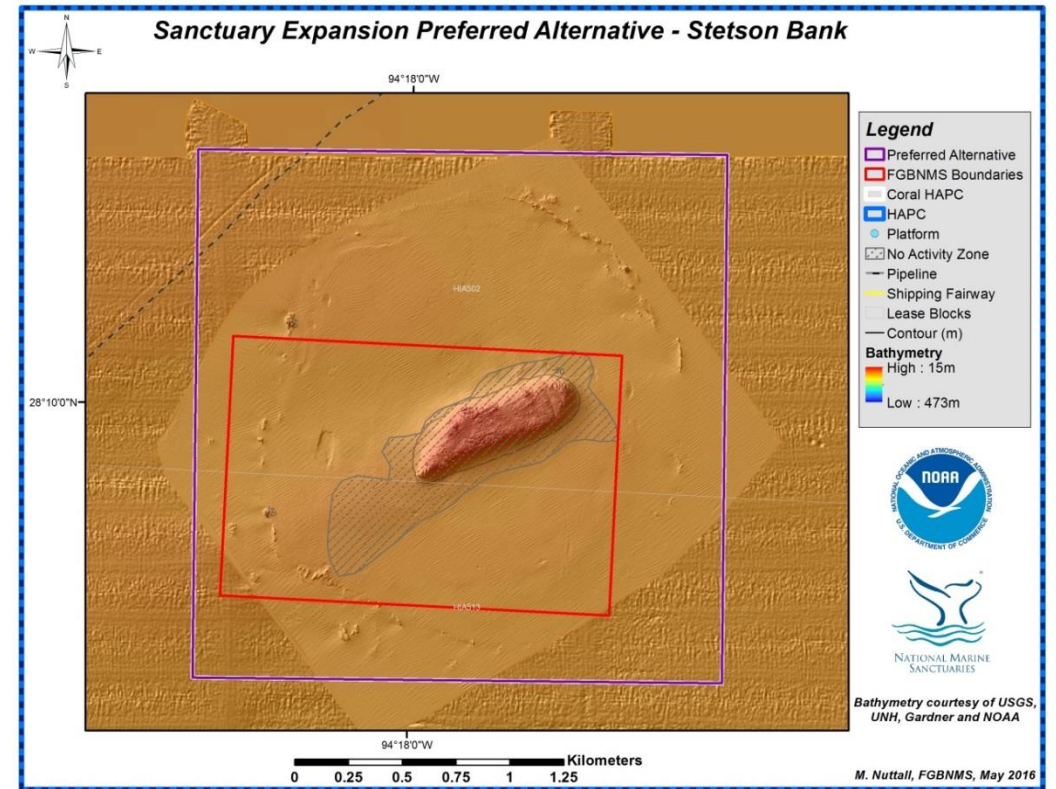
Mobile, Alabama: Wednesday, July 20, 5:30-7:30 p.m.
Five Rivers Delta Center
30945 Five Rivers Blvd.
Spanish Fort, AL 36527

Lafayette, Louisiana: Thursday, July 21, 5:30-7:30 p.m.
Estuarine Habitats and Coastal Fisheries Center
646 Cajundome Blvd.
Lafayette, LA 70506



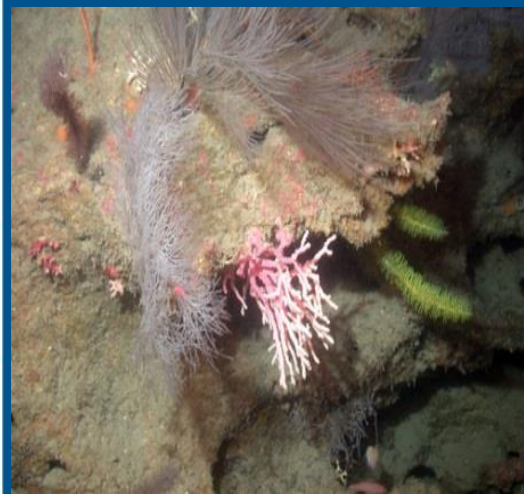
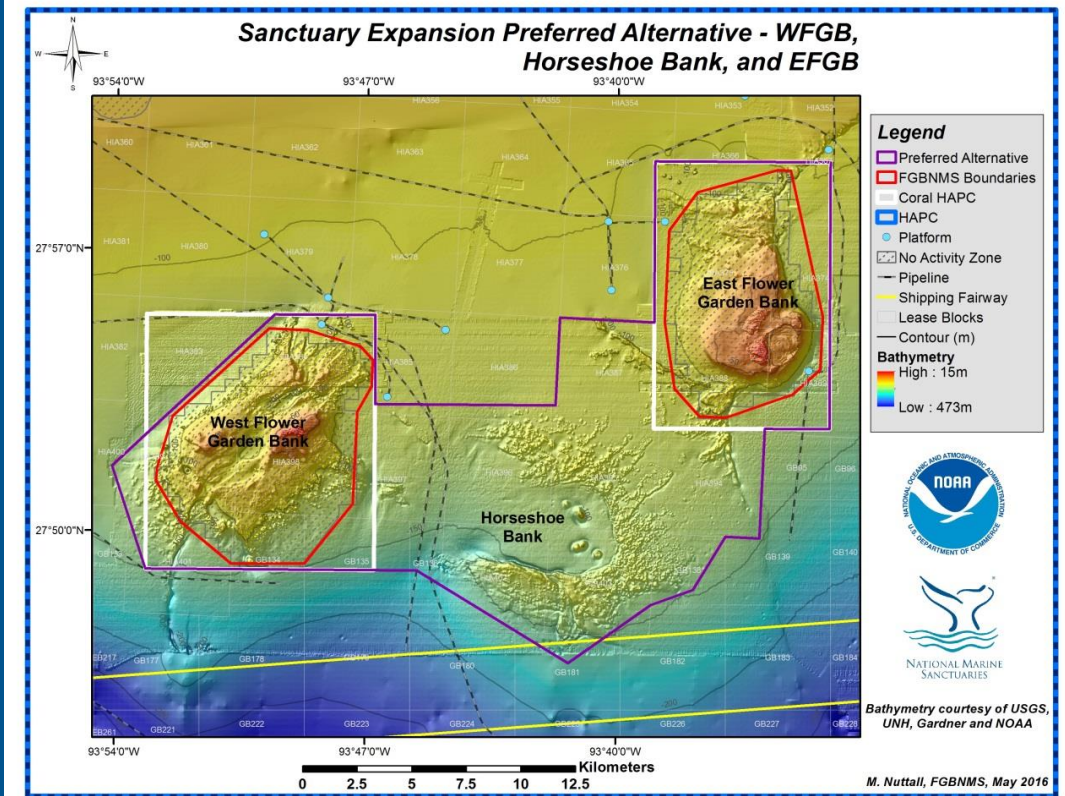
STETSON BANK

Stetson Bank was named after Henry C. Stetson, a Woods Hole Oceanographic Institute geological oceanographer. The ring around Stetson Bank was originally identified as an important associated feature when mapped in 1997, after the original sanctuary boundary designation. Data presented in FGBNMS Special Edition, Gulf of Mexico Science, 1998. Additional mapping was conducted by FGBNMS to complete the coverage of the Stetson Ring bathymetric dataset. Uplifted siltstone and claystone boulders comprise the features of the ring, which provide substrate and habitat for antipatharians, octocorals, sponges, invertebrates, and deep reef fish.



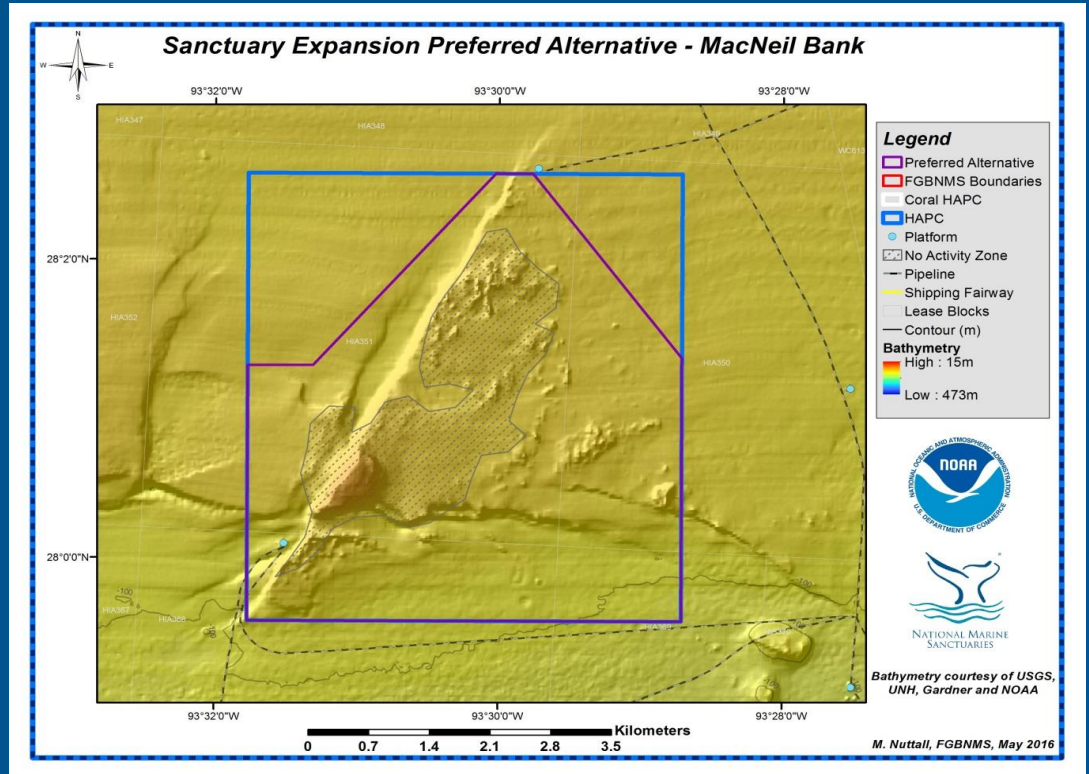
WFG/HORSESHOE/EFGB BANK COMPLEX

Horseshoe Bank was revealed through mapping by NOAA in 2004 and named by FGBNMS research staff, due to the shape of the feature. This effort revealed a feature made up of thousands of patch reefs providing habitat for mesophotic corals, sponges, algae, invertebrates, and fish (Images 3-5). It also includes interesting mud volcano features. Multibeam mapping also revealed hard bottom features not previously protected within the original FGB boundaries at West and East Flower Garden Banks.



MACNEIL BANK

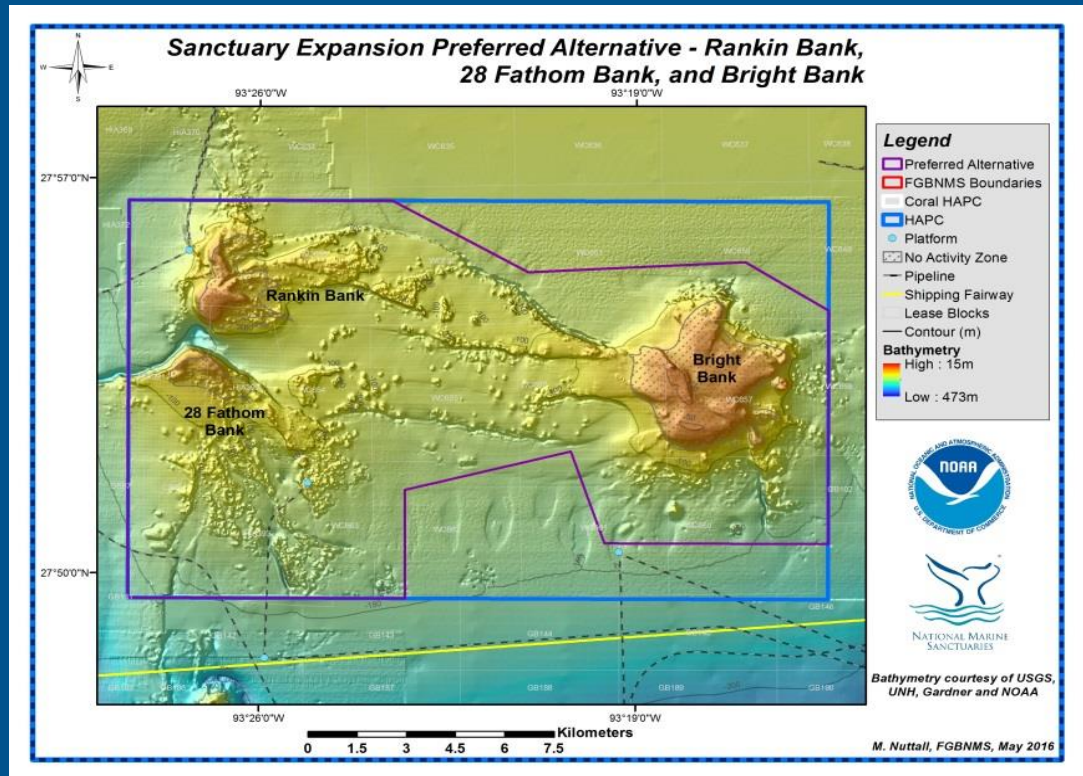
MacNeil Bank was named after F. Stearns MacNeil, a U.S. Geological Survey geologist. The bank is located north-east of the East Flower Garden Bank and is structurally connected to EFGB by a ridge that runs between the two features. MacNeil Bank harbors mesophotic habitat including black corals, gorgonians, sponges, and fish



RANKIN/28 FATHOM/BRIGHT BANK COMPLEX

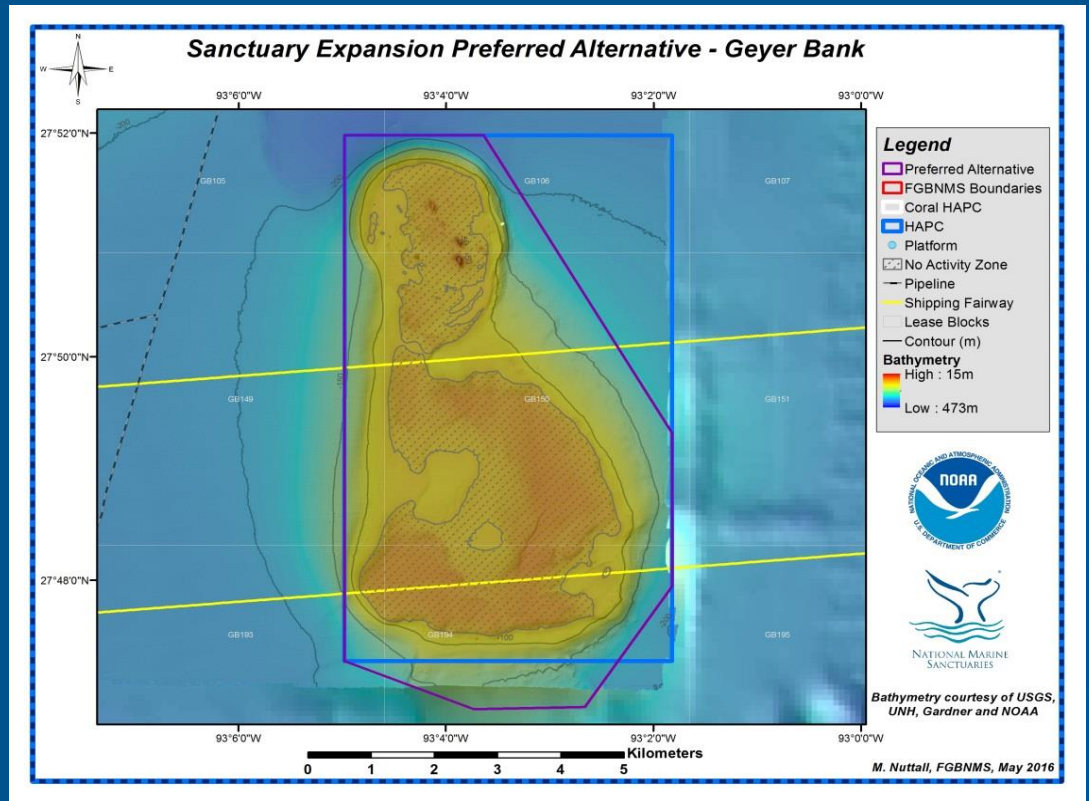
Rankin Bank was named after John L. Rankin, of the Minerals Management Service. The bank is located 15km due east of the East Flower Garden Bank (EFGB). It is physically connected to MacNeil Bank to the north via the ridge feature that continues on to the EFGB. Rankin Bank is just north of 28 Fathom Bank - the two features are split by a 1000m (3280ft) wide trough, reaching down about 154m (570ft). A series of ridges and patch reefs connect Rankin/28 Fathom and Bright Banks. The banks harbor mesophotic habitat consisting of black corals, gorgonians, algae, sponges, stony corals, and a variety of invertebrates. (Images 9-11). Extensive fields of an algae, *Codium sp.* have been documented during ROV surveys. Mud volcanos exist in several locations.

Bright Bank was named after Thomas Bright, a marine biologist from Texas A&M University. The bank peaks at approximately 29m (95ft) and has harbored, in the past, a coral reef. In the 1980's treasure hunters targeted this feature and used dynamite to excavate the top of the reef, damaging many of the coral features. This is an example of insufficient protection through the current management in place.



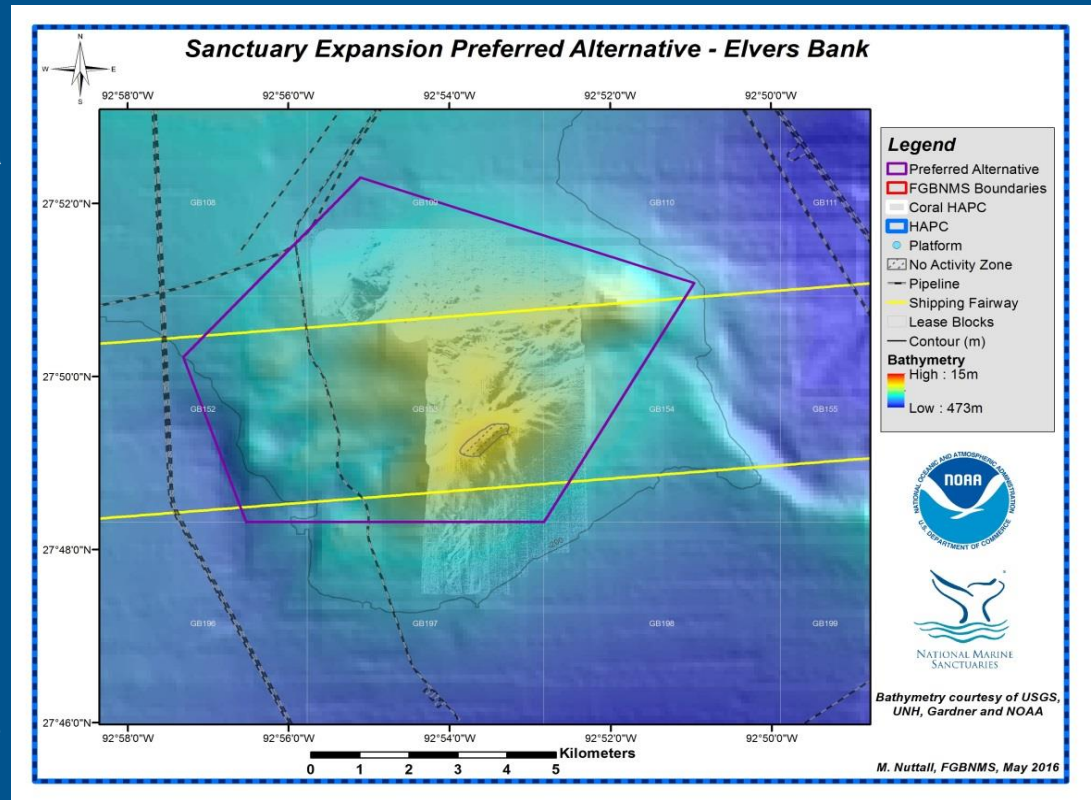
GEYER BANK

Geyer Bank was named after Richard A. Geyer, a Texas A&M University geophysicist. The bank lies on an active salt diapir on the upper continental slope. The bank reaches approximately 32m (105ft) depth. It supports a coral community, as well as mesophotic coral habitats including black corals, gorgonians, fish, sponges, algae, and invertebrates. (Images 12-14). Recent observations have documented a *Sargassum* bloom on the reef crest. Divers have documented enormous numbers of reef butterflyfish at specific times of year. A shipping lane cuts across the top of the bank. There is concern that this is a convenient place to drop anchor, impacting the resources. A large tanker was recently anchored on top of the feature, just outside of the shipping lane.



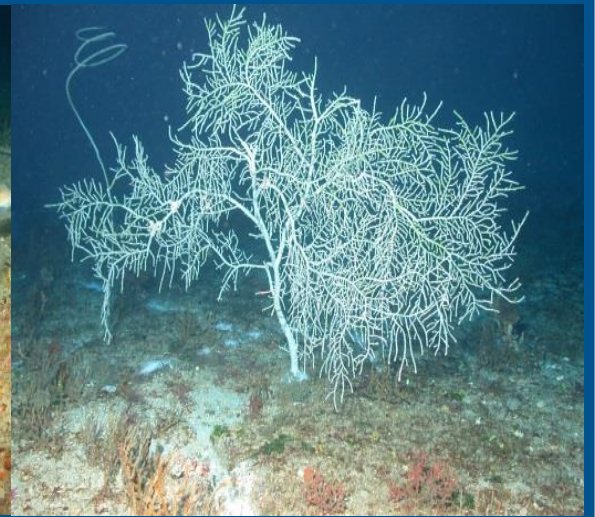
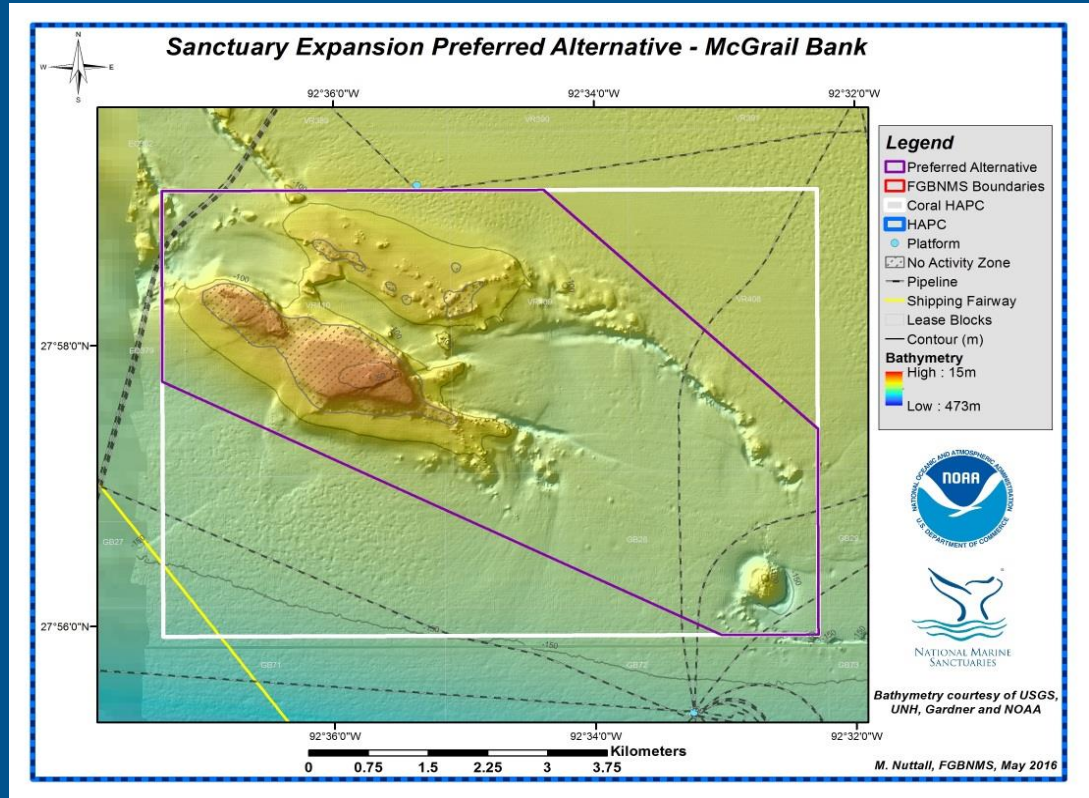
ELVERS BANK

Elvers Bank was named after Douglas J. Elvers, a Minerals Management Service geophysicist. The bank is at the very edge of the shelf, and reaches a depth of about 675 ft (206m). This site harbors a variety of habitats, including mesophotic habitats dominated by black corals, gorgonians, fish, sponges, algae, and invertebrates. An algal nodule field visited during ROV operations was dominated by a small orange/red sponge (possibly *Ptilocaulis* sp.?), that provided habitat for (at least one) dwarf frogfish – a species rarely seen in this part of the Gulf. Interesting fields of sea pens, and yellow stalked crinoids have been documented here, as well as outcroppings covered, interestingly, in glass sponges. These are long-lived animals and are rare throughout the region.



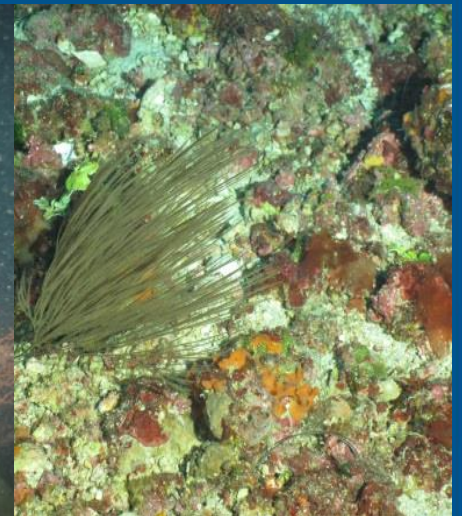
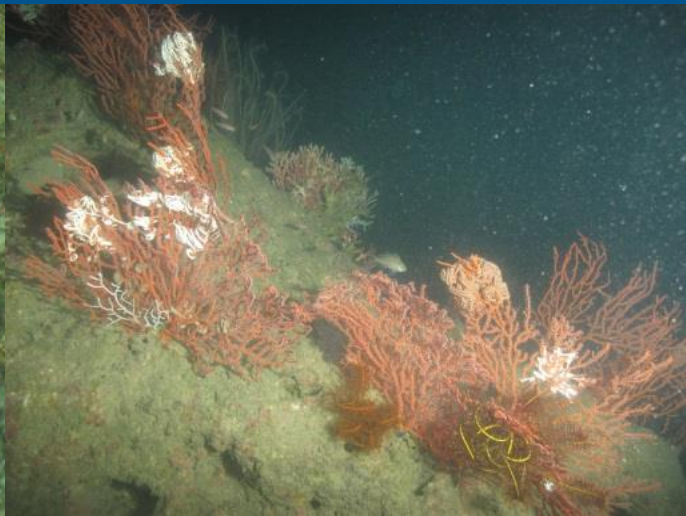
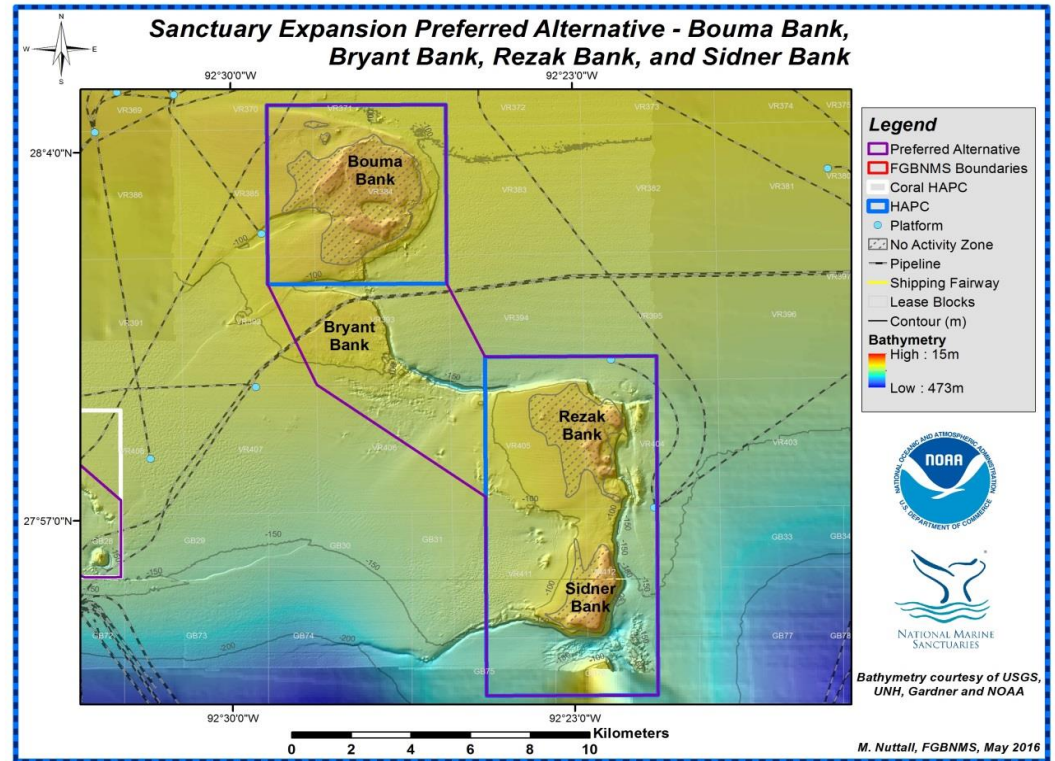
MCGRAIL BANK (formerly known as 18 Fathom Bank)

McGrail Bank was named after David W. McGrail, an oceanographer with Texas A&M University and the U.S. Coast Guard. The bank crests at about 45m (145ft), and features areas of coral reefs dominated by large colonies of the the blushing star coral, *Stephanocoenia intersepta*. The coral cover is approximately 28% in discreet areas, and is unique in the sense that no other coral reef is known that is dominated by this species (Image 15). The deeper portions of the bank harbor mesophotic coral communities including black corals, gorgonians, fish, sponges, algae, and invertebrates (Images 16 & 17.) Recent ROV surveys have documented a *Sargassum* bloom on the coral reef crest, potentially threatening the coral colonies.



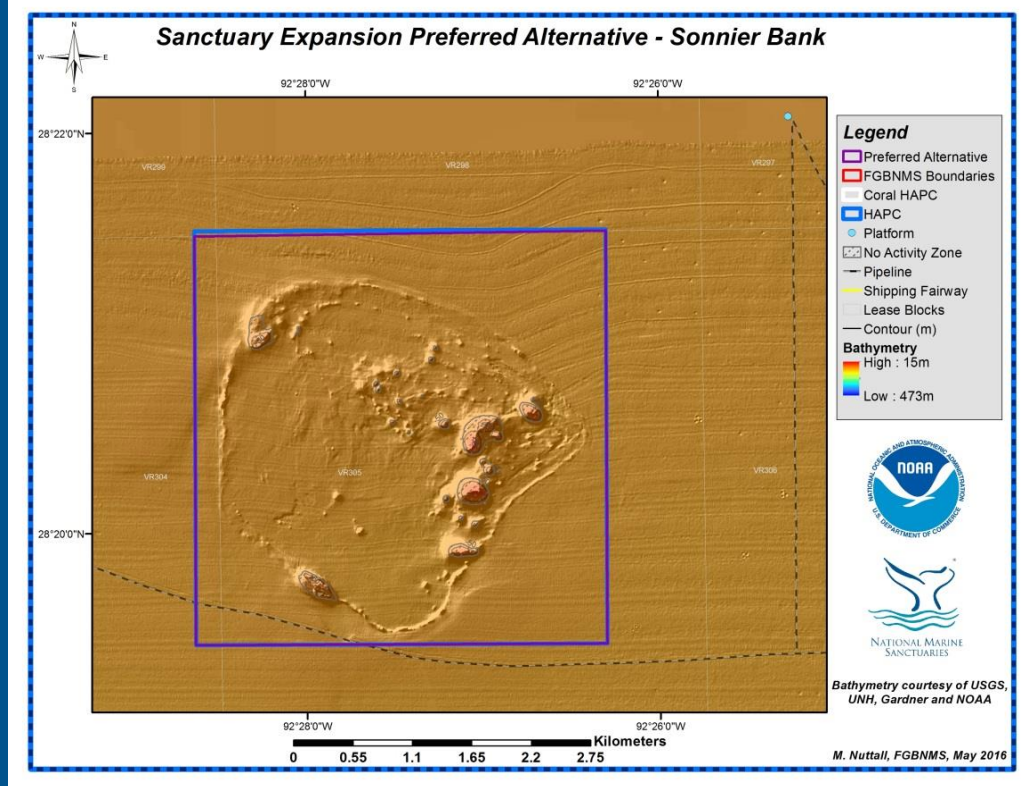
BOUMA/REZAK/BRYANT/SIDNER COMPLEX

Bouma Bank is named for Arnold H. Bouma, an LSU geologist. Rezak Bank is named after Richard Rezak, a TAMU oceanographer. He co-authored the Reefs and Banks of the NW GOM – the original authoritative work in the region. Bryant Bank is named after TAMU marine geologist, William R. Bryant. Sidner Bank is named after TAMU geologist, Bruce Sidner. The mesophotic habitat is prevalent throughout the complex, and is dominated by black corals, gorgonians, fish, sponges, algae, and invertebrates



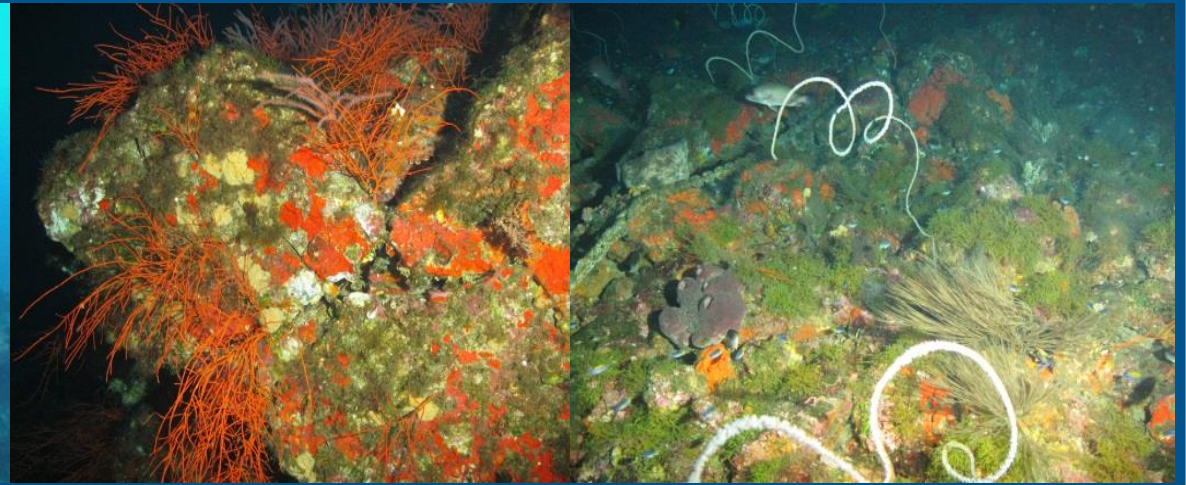
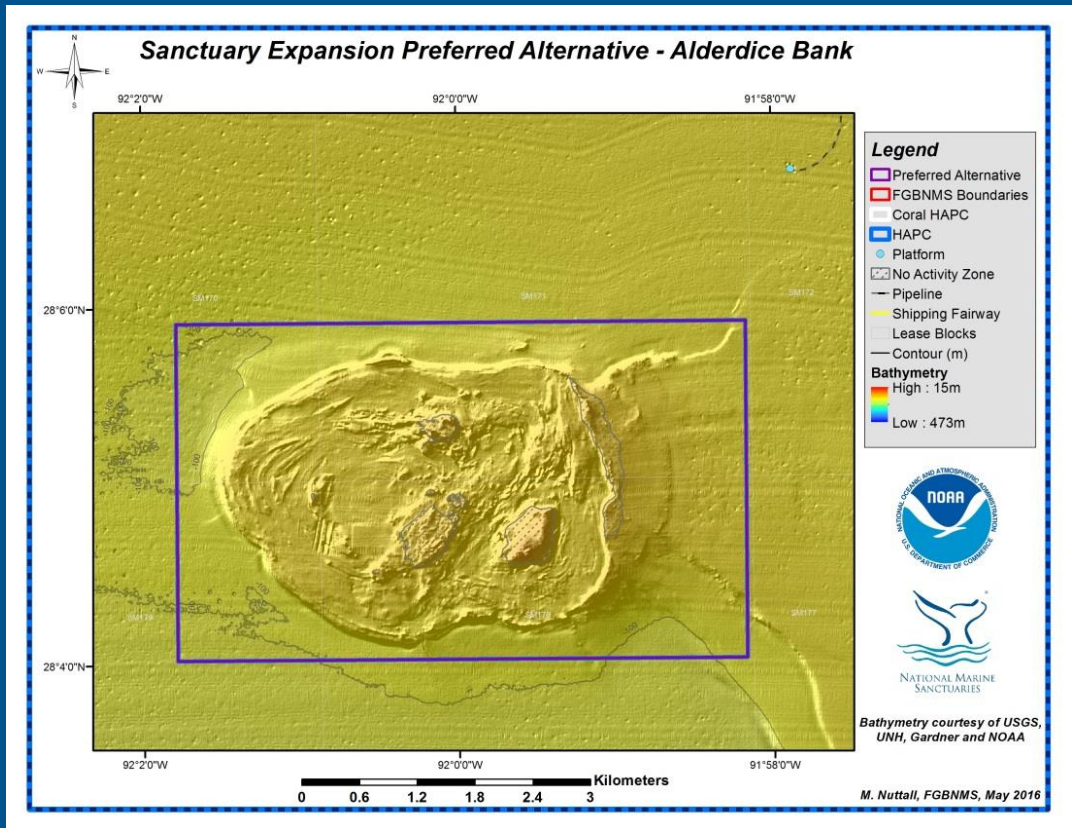
SONNIER BANKS (formerly known as Three Hickey Rock, Candy Mountain)

Sonnier Banks are named after Farley Sonnier, an offshore wildlife photographer. There are two peaks that are accessible and popular with recreational scuba divers. It is located closer to the mid-shelf area of the continental shelf. The substrate is very similar to Stetson Bank – made up of uplifted siltstone and claystone. This fragile substrate has been impacted by anchoring and hurricanes over the years. Like Stetson Bank, the crests of the peaks at Sonnier Bank are dominated by coral communities featuring fire coral, sponges, and algae (Images 18-20). The deeper portions harbor mesophotic communities.



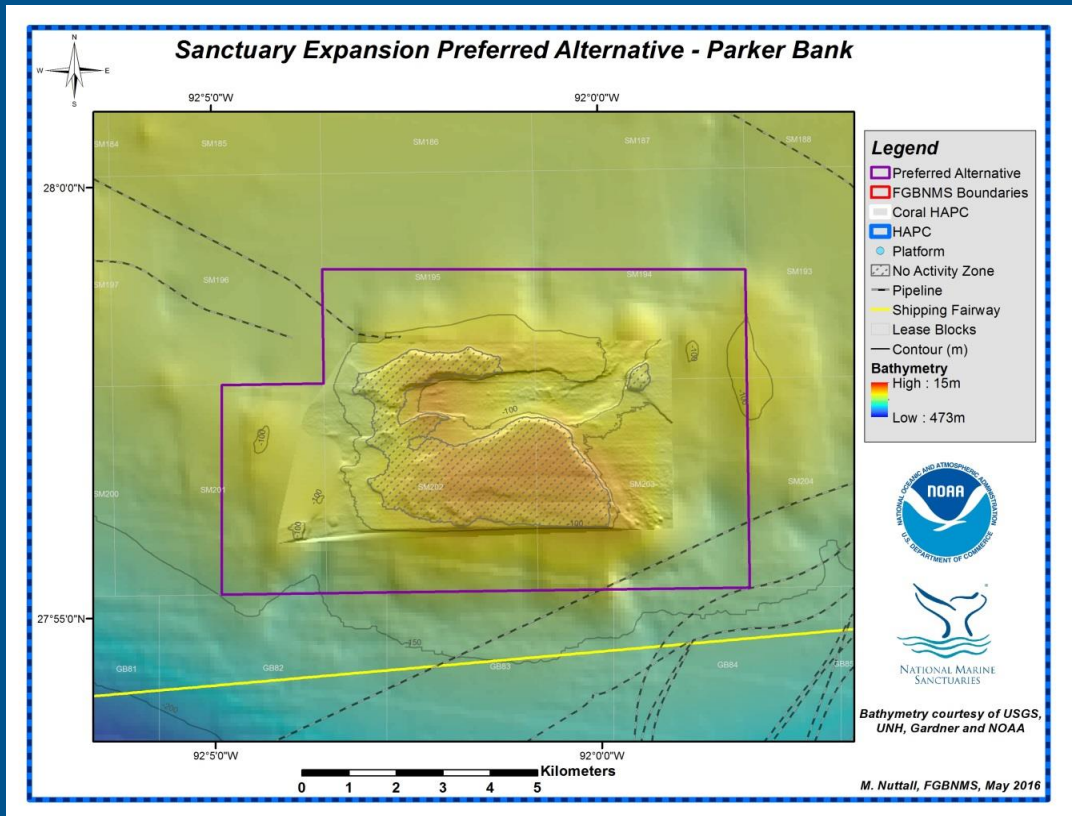
ALDERDICE BANK

Alderdice Bank was named after Robert Alderdice, founder of the Flower Garden Ocean Research Center. Spectacular basalt outcrops bearing a diverse assemblage of epibenthic organisms and fishes are a unique feature of the bank cresting at about 50m (165ft), with a base at about 73m (240ft) (Image 21). Analysis of the basalt indicated a Late Cretaceous origin – approximately 77 million years old. This is the oldest known rock exposed on the continental shelf off Louisiana and Texas. The most conspicuous biology on the peaks are sea whips, sponges, and branching bryozoan colonies, along with swarms of reef fish (Images 22 & 23). The habitat below the spires are dominated by black corals, gorgonians, fish, sponges, algae, and invertebrates.



PARKER BANK

Parker Bank is named after Frances L. Parker, an oceanographer from Scripps. The bank harbors significant mesophotic habitat that is dominated by black corals, gorgonians, fish, sponges, algae, and invertebrates. A large field of abundant *Hypnogorgia* gorgonians was encountered during ROV surveys, as well as high relief ridges providing plenty of habitat for fish and invertebrates.



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