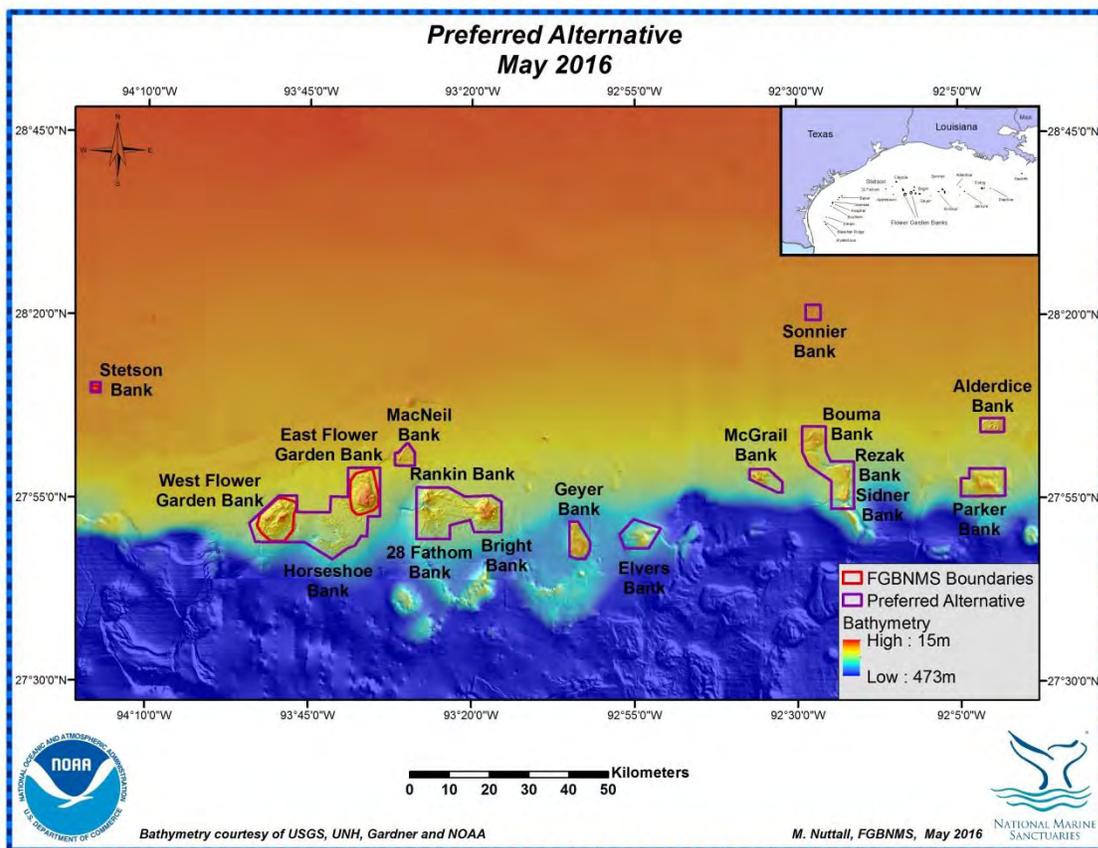


FLOWER GARDEN BANKS NATIONAL MARINE SANCTUARY

EXPANSION

PROPOSED ACTION



The purpose of this document is to give a brief overview of the reefs and banks included in the preferred alternative in the Draft Environmental Impact Statement released by the Flower Garden Banks National Marine Sanctuary (FGBNMS) in June, 2016.

The bathymetry presented in the maps was collected by Dr. Jim Gardner, then of USGS-Menlo Park, now of University of New Hampshire, NOAA, and Minerals Management Service (MMS). The maps have been adapted by the FGBNMS to illustrate boundary options, infrastructure, shipping fairways, and management zones.

The underwater images were collected by the FGBNMS during research cruises conducted with University of North Carolina-Wilmington – Undersea Vehicle Program (UNCW-UVP) using ROV, unless otherwise indicated. The images were taken at the locations represented on the specific pages.

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Stetson Bank – Amend current boundaries

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. (Image 1 and 2)

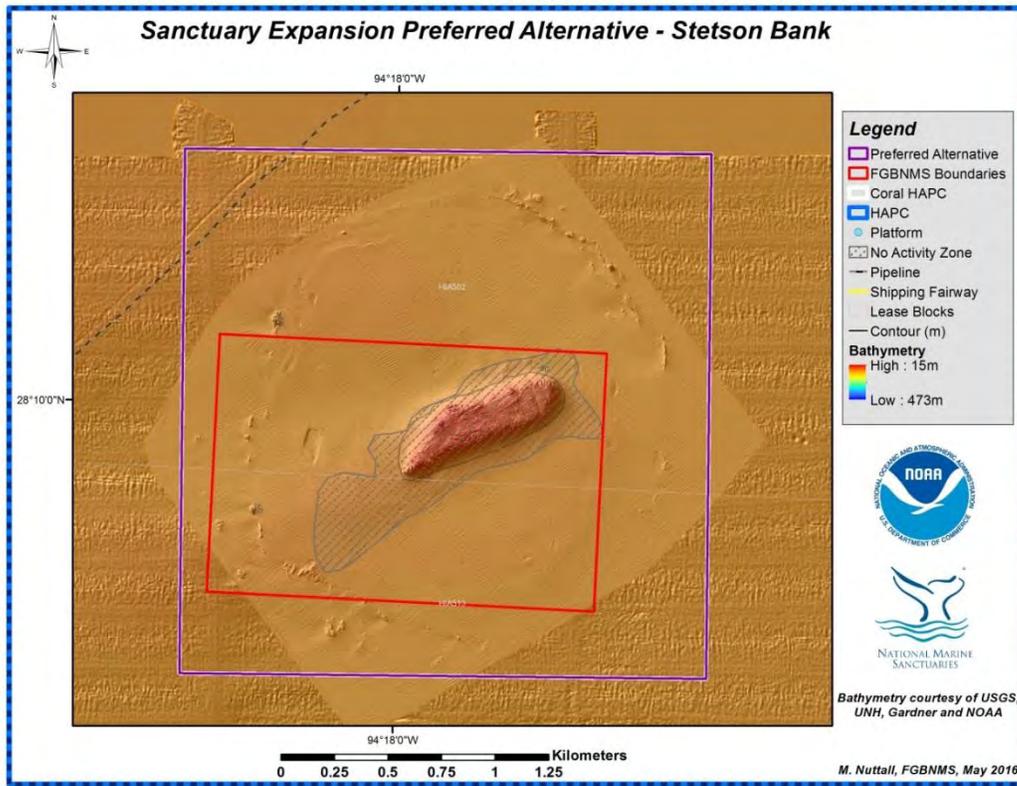


Image 1 – Sponge community around Stetson Ring



Image 2 – Sponges and black coral around Stetson Ring

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.

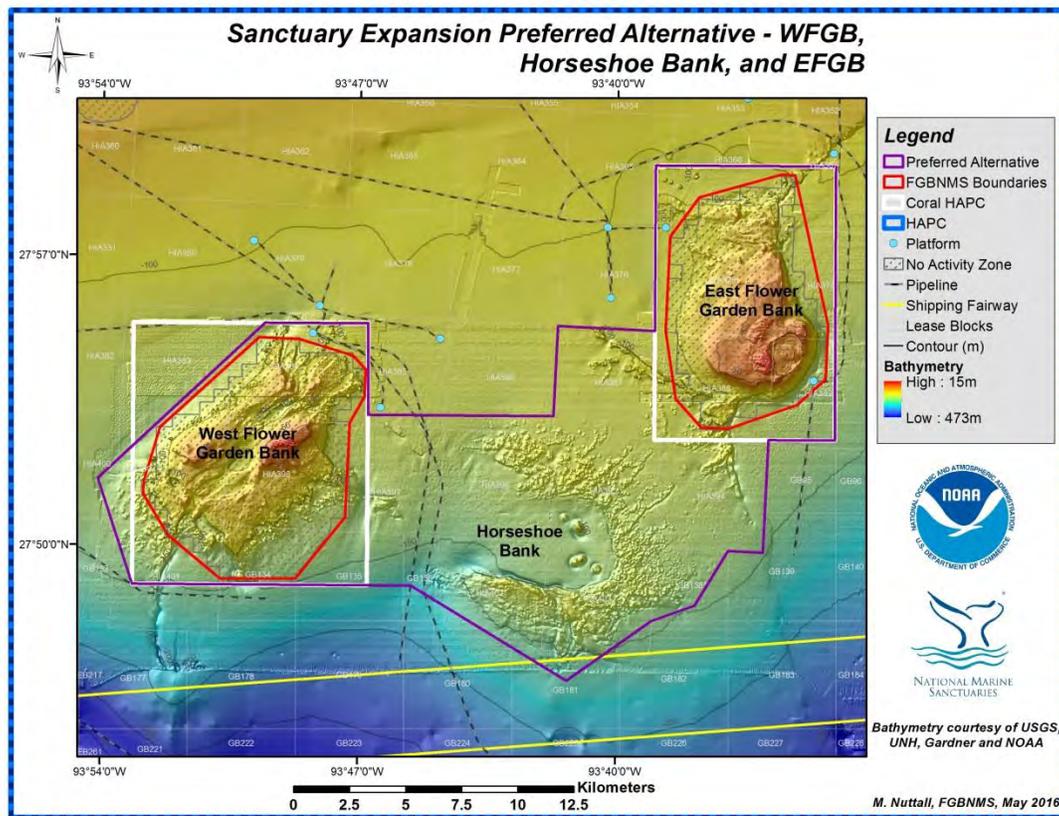


Image 3 – Soft coral, black coral, and gorgonians.

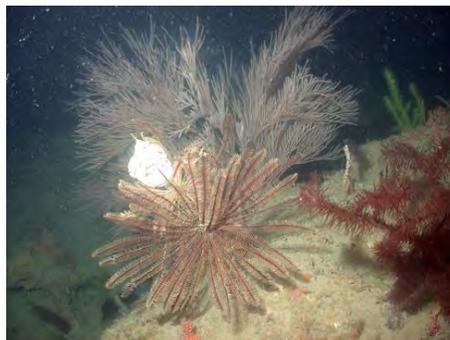


Image 4 – Crinoid and basket star and numerous types of black coral.



Image 5 – Black corals and a branching stony coral.

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 (Images 6-8).

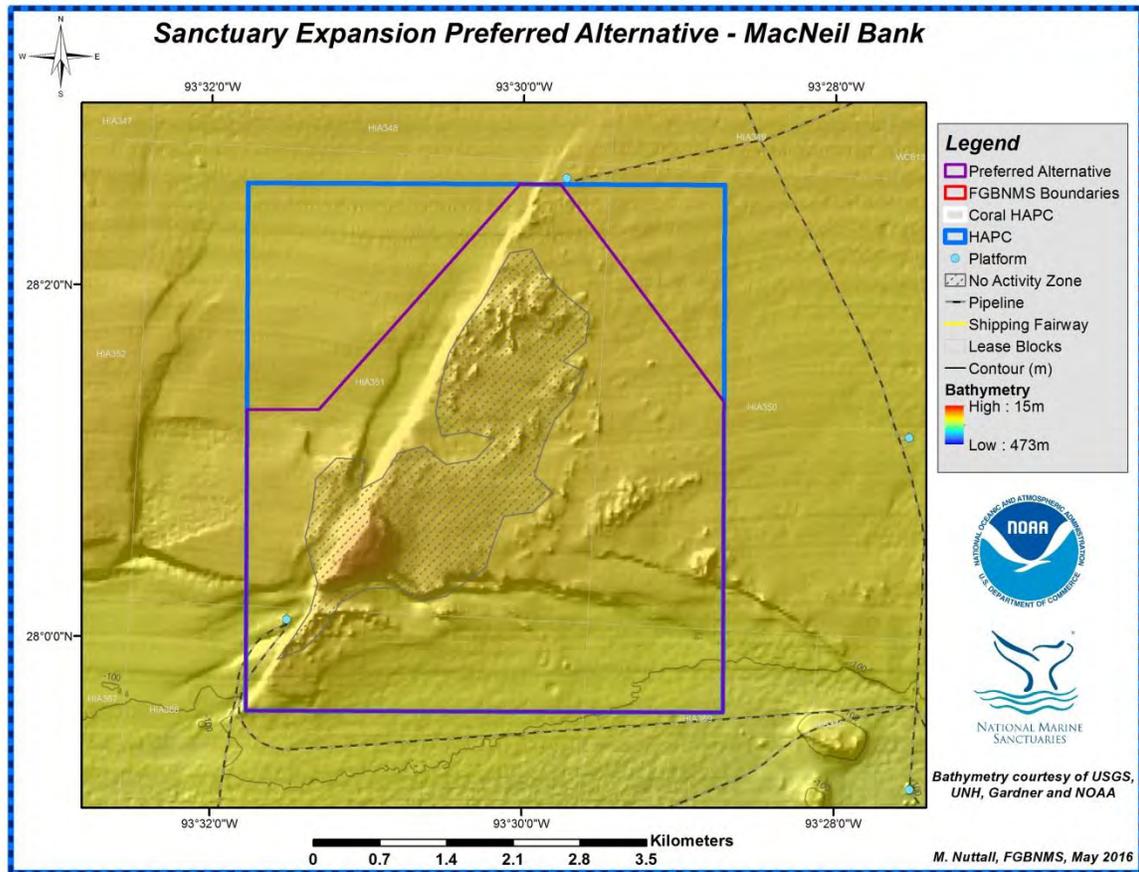


Image 6 – A Webbed Burrfish swims amongst sea whips, sponges and gorgonians



Image 7 – A school of Creolefish swim around a meter tall feature on MacNeil Bank



Image 8 – Sponges and black corals.

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.

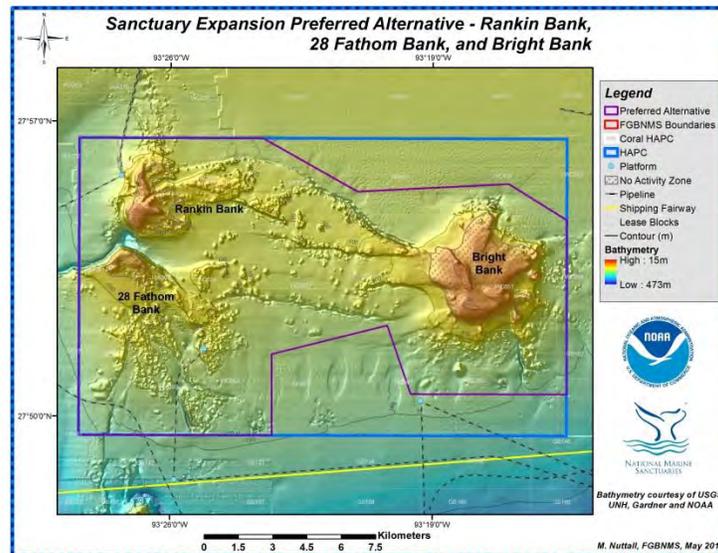


Image 9 – Remnants of coral reef habitat on the crest of Bright Bank – results from treasure hunting using explosives to excavate.



Image 10 – Stony corals, soft corals black coral at Bright Bank



Image 11 – Colorful coralline algae at 28 Fathom Bank.

Geyer Bank

Geyer Bank was named after Richard A. Geyer, a Texas A&M University geophysicist. The bank lies on an active salt diaper 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.

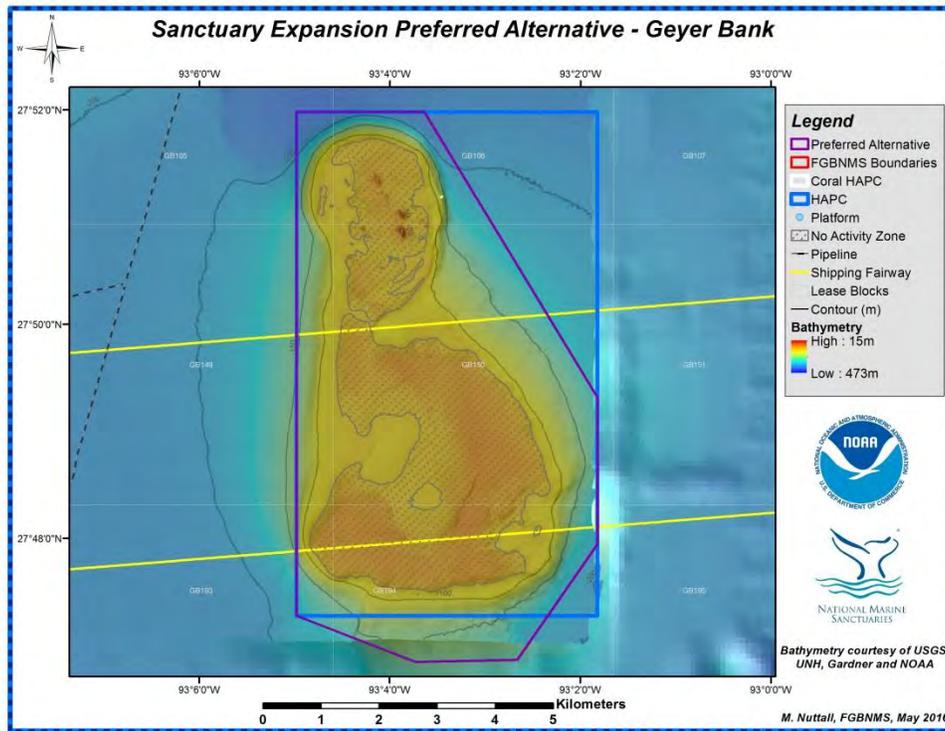


Image 12 – Sponges and algae and Reef Butterflyfish on the crest of Geyer Bank. Image by FGBNMS/G.P. Schmahl



Image 13 – Sponges, algae, and coral on the crest of Geyer Bank. Image by FGBNMS/G.P. Schmahl



Image 14 – Brittlestars are intertwined through the branches of a colorful gorgonian, *Swiftia exerta*, in the mesophotic coral habitat.

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.

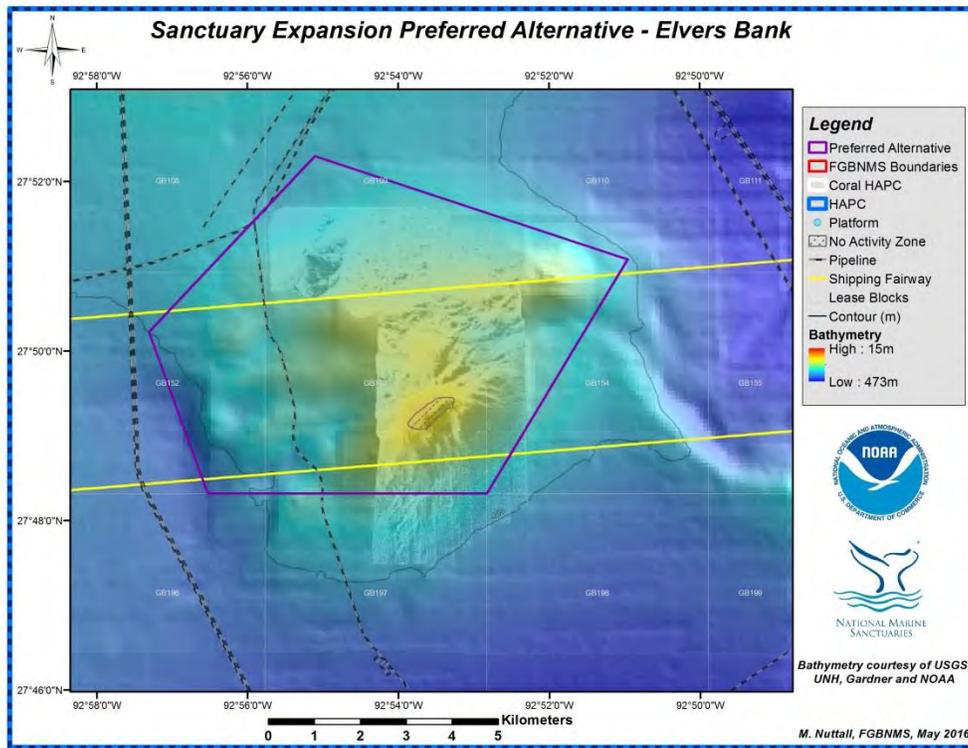


Image 15 – Large unidentified nudibranch photographed at Elvers Bank. This animal is about 15 cm long. 160m depth.



Image 16 – Glass sponge fields at 160m at Elvers Bank.



Image 17 – Algal nodules dominated by orange sponges and possibly a population of dwarf frogfish at Elvers Bank. 70m depth

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.

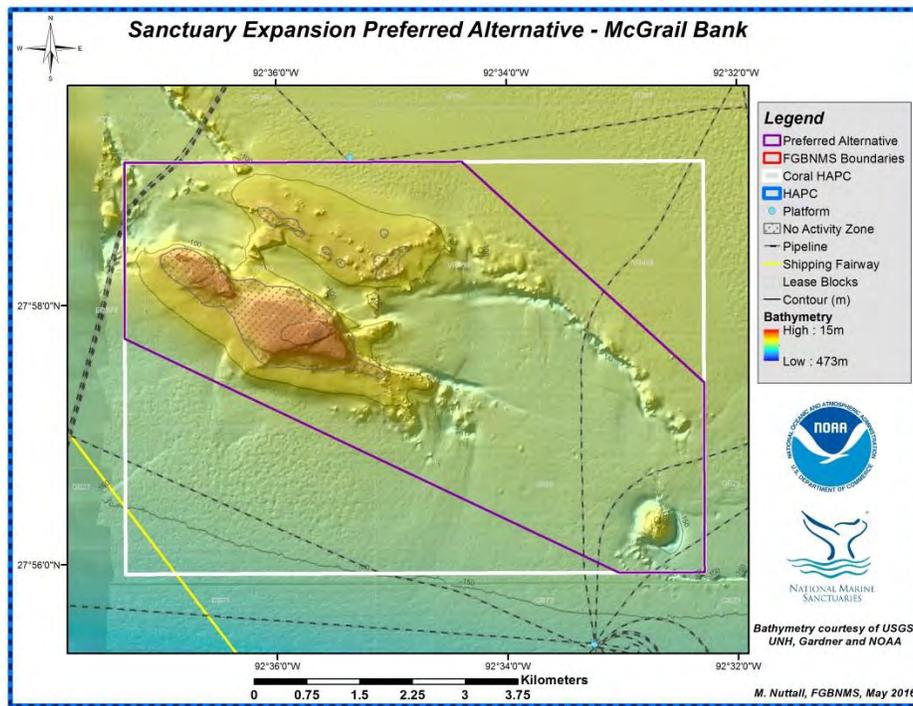


Image 18 – Large colonies of blushing star coral dominate the crest of McGrail Bank. Image credit: FGBNMS/Sustainable Seas Expedition 2002



Image 19 – Lush stands of black corals, gorgonians, and crinoids inhabit the mesophotic reefs of McGrail Bank. Conspicuous fish at this depth range include these Bank Butterflyfish and Roughtongue Bass.



Image 20 – A large gorgonian colony, stands in a forest of a dozen or more in the mesophotic habitat of McGrail Bank.

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.

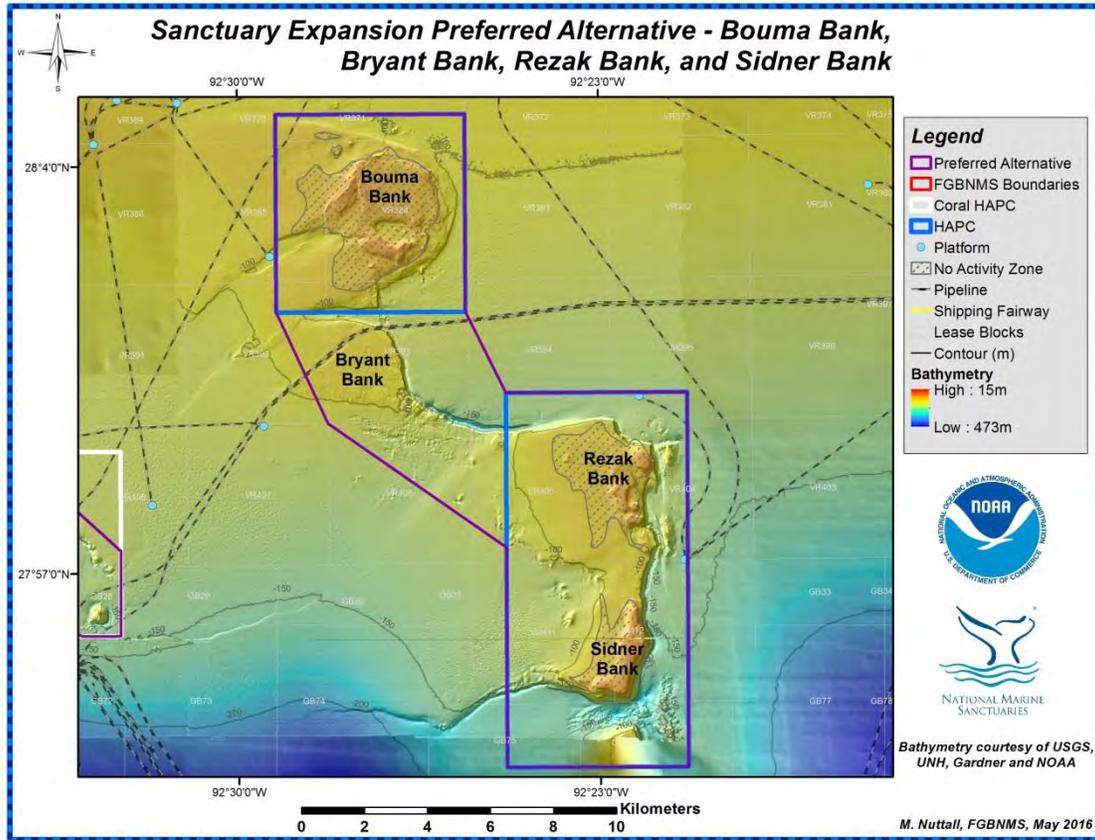


Image 21 – Lush sponge/algae field and a lizardfish at Bouma Bank – around 65m depth.



Image 22 – Colorful gorgonian, *Thesia rubra*, at Bryant Bank at around 95m depth.



Image 23 – Algal nodule habitat with black coral, *Antipathes furcata*, at Rezak Bank at around 65m depth.

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.

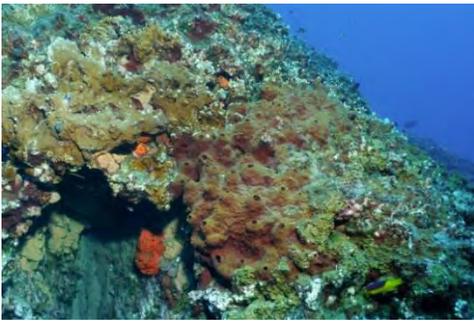
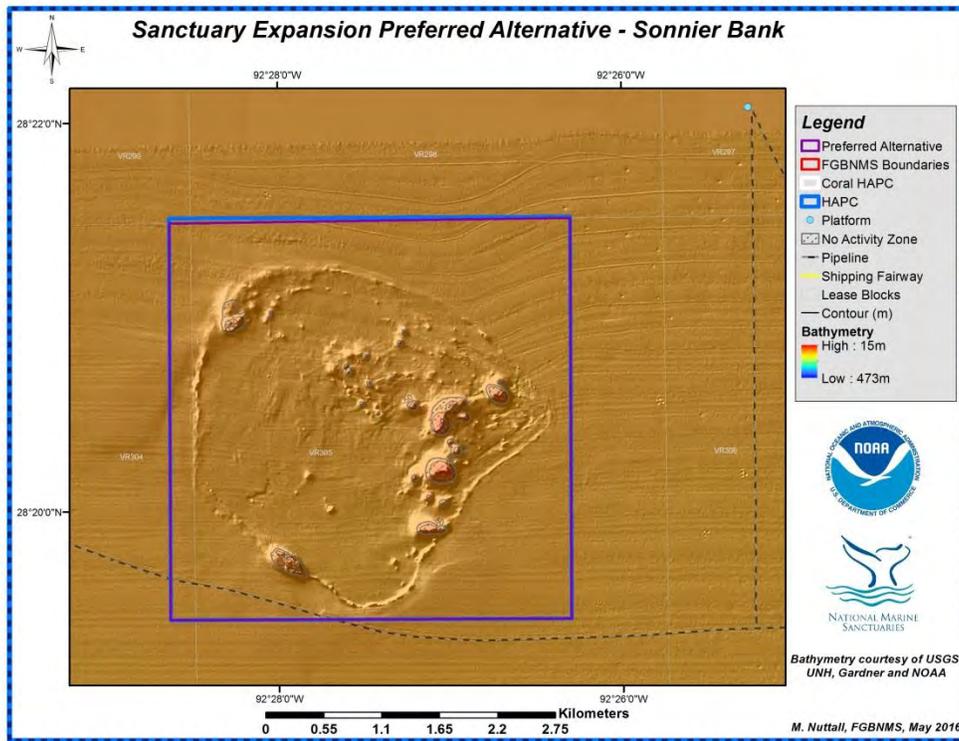


Image 24 – Sponges and fire coral dominated habitat on the crest of Sonnier Bank. Image credit: FGBNMS/G.P. Schmahl



Image 25 – Sponge dominated ridge at Sonnier Bank. Image credit: FGBNMS/Sustainable Seas Expedition 2002



Image 26 – Fire coral and sponge dominated ledge at Sonnier Bank, with Sergeant Majors and Black Bar Soldierfish. Image credit: FGBNMS/Sustainable Seas Expedition 2002

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.

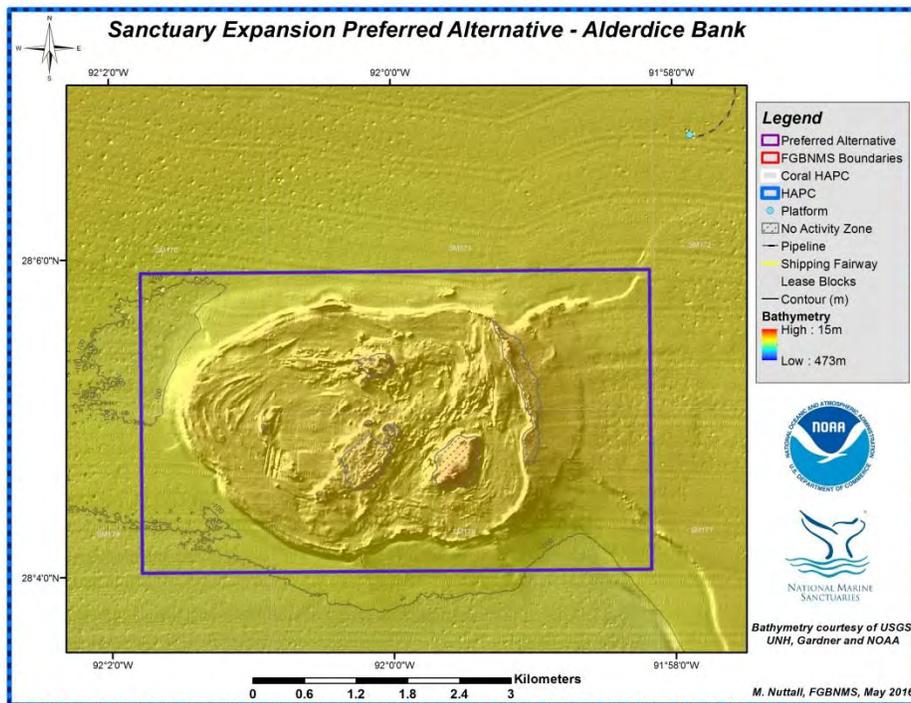


Image 27 – Basalt spire at Alderdice Bank.



Image 28 – Basalt blocks making up a portion of one of the Alderdice Bank spires, covered in gorgonians, encrusting sponges and coralline algae, with Spotfin hogfish



Image 29 – Anchor chain draped through lush algae/sponge field at Alderdice Bank.

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.

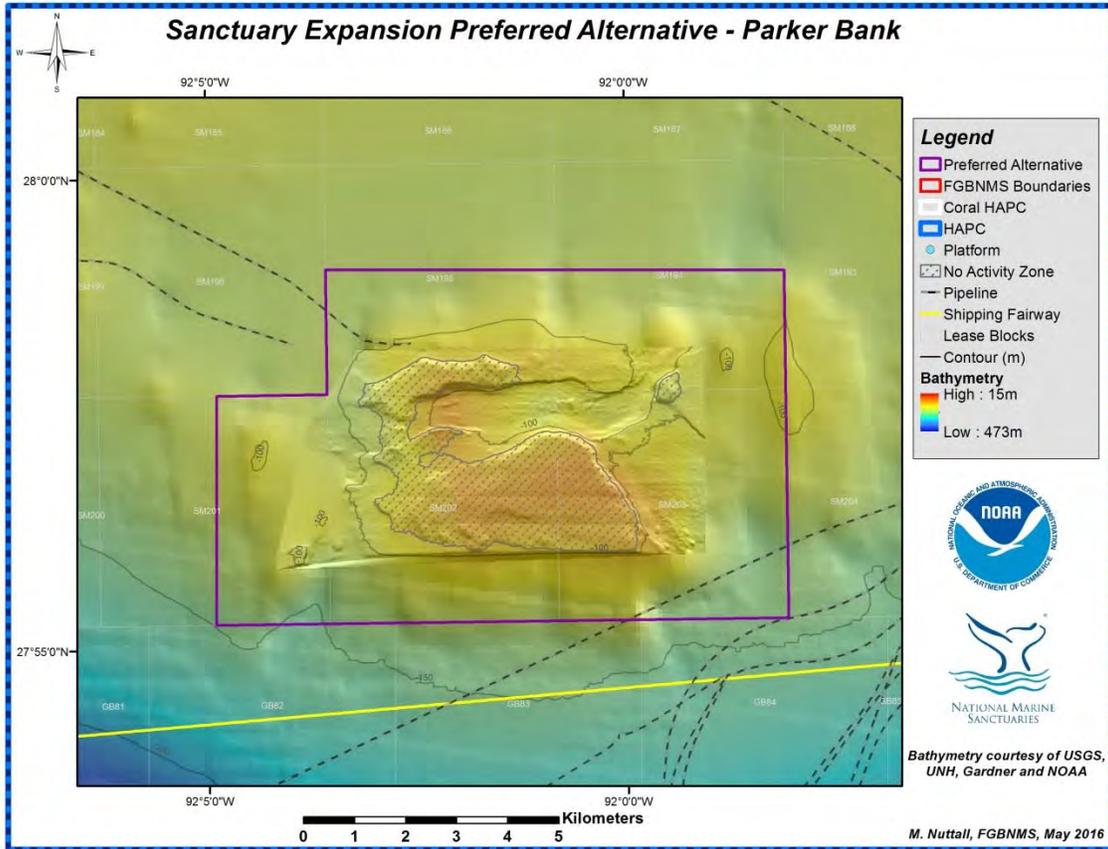


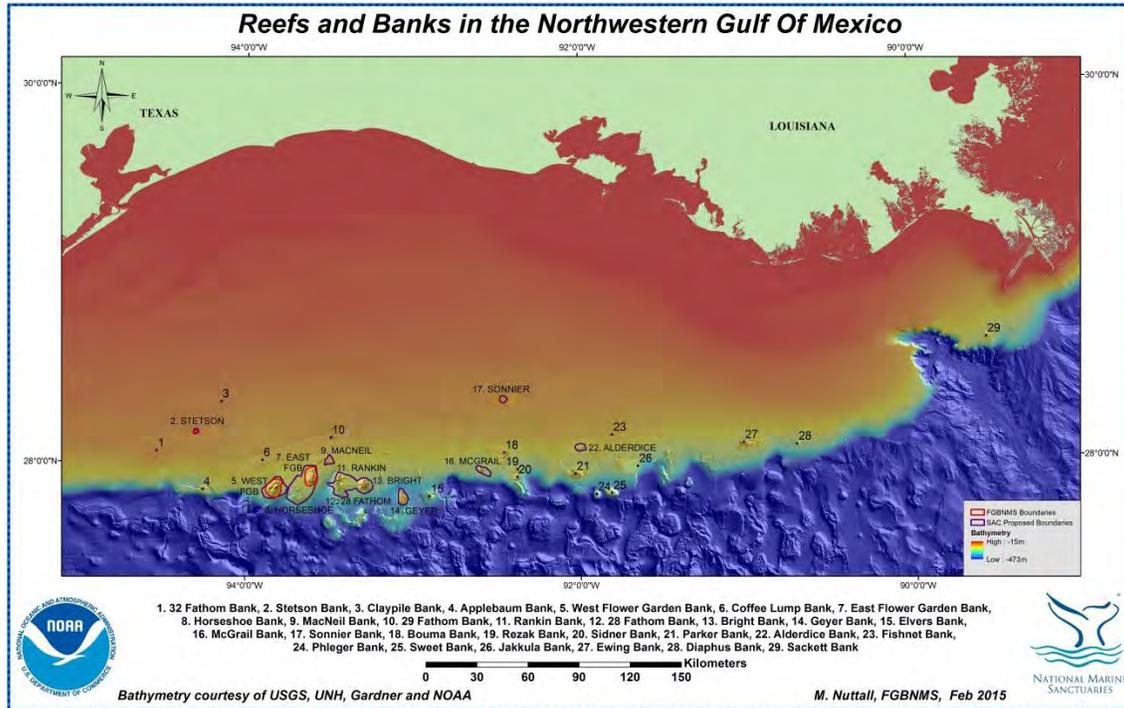
Image 30 – one of many *Hypnogorgia* gorgonians in a field at Parker Bank. This is providing habitat for large basket stars which unfurl to feed at night. Around 96m depth.



Image 31 – A pair of marbled grouper, *Dermatolepis inermis*, at Parker Bank. 67m depth.



Image 32 – A large black coral, *Plumapathes pennacea*, at Parker Bank. 57m depth.



The reefs and banks within the sanctuary boundaries and included in the preferred alternative, are just a few of several dozens of features in the Northwestern Gulf of Mexico. Since the Boundary Expansion Working Group conducted their analysis for this process in 2007/2008, the FGBNMS research team and partners have continued exploration in the region. Below is a list of additional locations visited since 2008 (from West to East):

- 29 Fathom
- Elvers
- Bouma
- Rezak
- Sidner

Multibeam mapping has taken place at:

- Claypile
- Coffee Lump
- Elvers (partial)
- Ewing