Office of National Marine Sanctuaries
National Oceanic and Atmospheric Administration

FLOWER GARDEN BANKS NATIONAL MARINE SANCTUARY

Draft Environmental Impact Statement: Sanctuary Expansion

Volume II: Appendices

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Cover Photo:
Manta Ray (*Manta birostris*) swimming over the reef in Flower Garden Banks National Marine Sanctuary.
Photo: G.P. Schmahl/FGBNMS

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Appendix A

SITE EVALUATION PROCESSES

A.1 Boundary Expansion Working Group Ranking Criteria and Modifications Applied in the Development of this DEIS

The FGBNMS Advisory Council Boundary Expansion Working Group (BEWG) consisted of the following individuals:

Clint Moore – BEWG Chair; FGBNMS Advisory Council Oil and Gas Industry Representative
Ian MacDonald – FGBNMS Advisory Council Research Representative
John Embesi – FGBNMS Advisory Council Alternate Research Representative
Frank Burek - FGBNMS Advisory Council Recreational Diving Representative
James Sinclair – FGBNMS Advisory Council Minerals Management Service Representative
Steve Gittings – ONMS National Science Program Coordinator
Emma Hickerson – FGBNMS Research Coordinator

The BEWG developed the following Issue Description and Problem Statements in 2007 in response to substantial public comment in support of sanctuary expansion, received during public scoping for the FGBNMS management plan review.

A.1.1 Issue Description

Potentially vulnerable geological and biological features associated with protected areas are outside the current Sanctuary boundaries. Additional features were revealed through the collection of high resolution multibeam bathymetry after the present sanctuary boundaries were established. Numerous banks associated features in the northwestern Gulf of Mexico may be ecologically linked to the Flower Garden Banks National Marine Sanctuary and like the Flower Garden Banks, may be highly vulnerable to certain anthropogenic impacts that alter the physical, chemical, biological, or acoustic environment. It is proposed that selected features be evaluated for inclusion under the management and protection through the Flower Garden Banks National Marine Sanctuary.

A.1.1.1 Problem Statement I

Consider expanding Sanctuary boundaries around Stetson Bank to include vulnerable habitat known as the Stetson Bank Ring. This semi-continuous ring of features is structurally and biologically part of the Stetson Bank ecosystem.

A.1.1.2 Problem Statement II

Consider expanding Sanctuary boundaries to include vulnerable habitats between and adjacent to the Flower Garden Banks that are structurally and biologically linked to the Flower Garden Banks ecosystem.

A.1.1.3 Problem Statement III

Numerous banks and associated topographic features in the northwestern Gulf of Mexico, like the Flower Garden Banks, have unique or unusual structural features, are populated by potentially vulnerable hard bank assemblages, and may be ecologically linked to each other. These should be assessed for effectiveness of current protection, and evaluated for inclusion under the management and protection of the FGBNMS.

A.1.2 Site Ranking

An initial list of potential boundary expansion sites was compiled from the scoping comments, and SAC and Sanctuary comments, and a Bureau of Land Management (BLM) ranking document resulting from explorations in 1970s and 1980s in response to oil and gas pressures in the northwestern Gulf of Mexico. FGBNMS staff expanded this list based on additional input from other NOAA offices and federal agencies, the research community, and the public during scoping following the Notice of Intent to prepare this DEIS.

The ranking process described here was employed by the BEWG to evaluate sites for potential inclusion in their expansion proposal, and later applied, with modifications as described below, to additional sites or to re-evaluate sites considered by the BEWG in light of new information by FGBNMS staff. It was agreed by the BEWG to apply a rating from 1-3 for each of the criteria described below.

A.1.2.1 Zone Priority Index

Biological and/or Geological Significance and/or uniqueness based on BOEM (formerly BOMRE, MMS, or Bureau of Land Management, or BLM) criteria (Rezak and Bright 1981), FGBNMS data acquisition through ROV and submersible surveys and biological data collection (Schmahl and Hickerson 2006; Rezak et al. 1985). Rankings were assigned as follows:

3 = high zone priority
2 = med zone priority
1= low zone priority

The original BLM criteria Zone Priority Index is a numerical average of the rankings of criteria applied to the seven potential benthic biotic zones of the banks described in the study. Each bank in the study area was evaluated as to whether it included a particular benthic biotic zone and the zone priority index for that zone was applied. The BLM criteria Bank Priority

Rating is a sum of the applicable zone priority index numbers. Therefore, the highest Bank Priority Rating had the most benthic biotic zones with the highest Zone Priority Indices.

The "Zone Priority Index" ranking for the BEWG purposes began by subdividing the banks in the BLM study into three groups based on their BLM Bank Priority Rating. The "high" category included banks with a Bank Priority Rating of 7.8 – 31.2, as these included significant known hard coral resources and were banks with the greatest diversity of habitats and associated biota. The "medium" category included banks with a rating of 6, none of which have significant hard coral assemblages. The "low" category included banks with a rating of 3 and were those with the lowest degree of assemblage or habitat diversity.

This index published by BLM was the base value used to begin the evaluation of the banks. Additional information revealed through recent ROV and submersible surveys conducted by the FGBNMS was included in the final Zone Priority Index, including sites not considered by the BEWG.

A.1.2.2 Structural Connectivity Index

High resolution multibeam bathymetry (Gardner and Beaudoin 2005) was used to better understand the extent of individual banks and associated features (e.g. faults and dissolution basins) in the north central Gulf of Mexico (this evaluation was furthered by the GIS analysis of local relief described below). This ensured that features were considered in their entirety prior to recommending options for individual bank boundaries. Rankings were assigned as follows:

3 = Structures that are part of the same geologic formation as the banks currently protected by the Flower Garden Banks National Marine Sanctuary, but were not included in the initial designation because they were not known to exist.

2 = Structures or banks that are laterally connected with current FGBNMS features. They form a virtually continuous structure by virtue of their proximity.

1 = In the geographic region of interest to the BEWG (northwestern Gulf of Mexico between Stetson Bank and Jakkula Bank) or the study area evaluated by FGBNMS staff (north central Gulf of Mexico), and of similar geologic origin (salt diapirs and pinnacles) with surface expressions that promote thriving hard bottom and fish assemblages.

A.1.2.3 Biological Connectivity

Based on distance from closest neighbor (Steneck, 2006; Cowen et al. 2006), this criterion captures the biological connections that occur through adult movement and larval dispersal, and which is often reflected in the similarity of populations among banks. It recognizes the dependence of populations on each other (e.g., predator-prey interactions and recruitment) and on the habitats that they require. Values of the ratings reflect scientific investigations and published literature on probable larval and adult dispersal patterns and distances in the marine

environment. This literature is currently being used to inform decisions about spacing between marine protected areas. The higher ratings indicate a higher likelihood that a particular bank provides resources or services for species on another at some point in their life. This could include being a source of food for transitory species like jacks or rays, a nursery area for juvenile fish, a shelter area for migrating turtles, or a larval source for any number of species. Biological connectivity ranking by the BEWG established specific distances associated with high, medium, and low connectivity, as shown below:

3 = 1-10 km (high likelihood of movement or larval transport by many species, and a higher probability of multi-bank resource use)

2 = 11-20 km (somewhat fewer species are likely to depend on resources of multiple banks)

1 = 21-30 km (lowest likelihood of movement or transport, and therefore less likely that there are important multi-bank functional connections for most species)

Staff also considered more recent documentation of biological connectivity over much greater distances (e.g., from Schill et al. 2015) in evaluating the sites considered in the range of alternatives.

A.1.2.4 Threat Index

Level of threat, known or perceived (e.g., visitation, fishing, debris, structural fragility and renewability). This index accounts for the number of known destructive activities taking place at any given site, as well as detrimental activities not currently regulated, e.g. anchoring, treasure salvage. Rankings were assigned as follows:

3 = high (three or more types of activities)
2 = medium (two known types of activities)
1 = low (one known type of activity)

A.1.2.5 Public and Sanctuary Priority

Level of interest to incorporate sites into alternatives as expressed through public scoping and agency priorities. Rankings were assigned as follows:

3 = high
2 = medium
1 = low

A.2 Office of National Marine Sanctuaries Site Nomination Evaluation Rubric

EVALUATION FACTORS							
CATEGORY	**EXPLANATION**	**HIGH**	**MEDIUM**	**LOW**	**RATING**	**Checklists**	**Statutory Ref.**
National Significance Criteria							
Natural Resources	**Does the place have natural resources or habitat with special ecological significance?** The area's natural resources and ecological qualities are of special significance and contribute to: biological productivity or diversity; maintenance or enhancement of ecosystem structure and function; maintenance of ecologically or commercially important species or species assemblages; maintenance or enhancement of critical habitat, representative biogeographic assemblages, or both; or maintenance or enhancement of connectivity to other ecologically significant resources. May be characterized by indicators related to uniqueness; special importance to life stages of species; importance for threatened, endangered, or declining species and/or habitats; vulnerability, fragility, sensitivity, or resilience; biodiversity and productivity; and naturalness.[1]	The ecological value of this geography is exceptional and has been substantially documented. Due to its qualities and integrity, it exerts or is likely to exert national influence, either ecologically or among users and management practitioners. The area has some of the characteristics, or the equivalent, in the checklist to the right. These recognize unique or exceptional features, ecosystems, biota, and processes, as well as their value in representing resource qualities of other areas. They also account for locations critical to the life history of "keystone"[2], "foundation"[3] or other "focal"[4] species that provide important ecosystem services or require enhanced protection, or are part of a functionally connected network of such critical areas. Prior designations within the area reflect recognition of resource value by others. The area complements or adds value to the National Marine Sanctuary System for purposes of representing, protecting, understanding and tracking resource qualities.	There is a well-documented case for ecological value of this area, and it may have substantial value at the local or regional level, based on biodiversity, productivity, and other qualities listed in this category, but there is some question about its level of influence at national scales or about whether the qualities, uniqueness, or integrity of resources are exceptional, and whether the area would complement or add value to the National Marine Sanctuary System.	The case for nationally-significant ecological value is not well documented, or the ecological value is not demonstrated by exceptional qualities, uniqueness, or integrity, nor would the area complement or add value to the National Marine Sanctuary System.		__ Unique Physiography __ Unique Ecosystems __ Unique Habitats __ Unique physical regime __ Biogeographic representation __ Ecoregion representation __ Ecosystem representation __ Biodiversity hotspot(s) __ Productivity hotspot(s) __ Habitat diversity __ Biological associations __ Nursery(ies) __ Feeding grounds __ Breeding area(s) __ Migration pathways __ Connectivity __ Existing designations __ Locally significant __ Regionally significant __ Nationally significant __Biological resources of cultural value	NMSA Section 301(a)(2) NMSA Section 301(c) NMSA Section 303(a)(2) NMSA Section 303(b)(1)
Heritage Resources	**Does the place have maritime heritage resources with special historical, cultural, archaeological significance?** The area contains submerged maritime heritage resources of special historical, cultural, or archaeological significance, that: individually or collectively are consistent with the criteria of eligibility for listing on the National Register of Historic Places; have met or which would meet the criteria for designation as a National Historic Landmark; or have value or significance to the indigenous people of the region or nation, including biocultural resources. The area encompasses or is part of a nationally significant maritime cultural landscape.	Qualities, integrity, and influence have been substantially documented and fulfill criteria for listing as a National Historic Landmark as defined in the Historic Sites Act of 1935, and the property(ies), landscape, or theme is considered nationally significant. Prior designations within the area reflect recognition of resource value by others. The area complements or adds value to the National Marine Sanctuary System for purposes of representing, protecting, understanding and tracking resource qualities.	Meets criteria for historical significance and worthiness for preservation and protection as defined in the guidelines for the National Register of Historic Places, including cultural and ethnographic landscapes. There is some question about whether the maritime resources and cultural landscapes represented are exceptional and would have influence at a national scale, and whether the area would complement or add value to the National Marine Sanctuary System.	The case for nationally-significant heritage resource or maritime cultural landscape value is not well documented, or the historical, cultural, or archaeological value is not considered exceptional, nor would the area complement or add value to the National Marine Sanctuary System. Area does not meet criteria threshold for significance of the National Register of Historic Places.		__ Association with events making contribution to broad national patterns of US history __ Associated with lives of persons nationally significant to US history __ Represents some great idea or ideal of American people __ Embodies distinguishing characteristics of significant architecture, construction, etc. __ Composed of parts that collectively illustrate a way of life or culture __ Has yielded or is likely to yield information of scientific importance (i.e. archaeolgoical or historical information), etc. __ Important to a culture's identity and/or survival __ Heritage resources that may be threatened __ Able to to utilized for heritage tourism __ Cultural or spiritual value or historical significance to tribes and indigenous peoples __ Subsistence area, ceremonial site, traditional activity site, or usual and accustomed area __ Biological resources of cultural value	NMSA Section 301(a)(2) NMSA Section 301(c) NMSA Section 303(a)(2) NMSA Section 303(b)(1) Historic Sites Act of 1935 [Public Law 74-292] and administered by the National Park Service National Historic Preservation Act of 1966
Socioeconomic Importance	**Does the place have important economic uses like tourism, fishing, diving, and other recreational activities?** The area supports present and potential economic uses, such as: tourism; commercial and recreational fishing; subsistence and traditional uses; diving; and other recreational uses that depend on conservation and management of the area's resources.	There are many uses of the area that are dependent on natural and cultural resource conditions and that significantly influence economies and communities at local, regional and national scales. The area complements or adds value to the National Marine Sanctuary System for purposes of representing and supporting economic uses while ensuring protection of vital resource qualities.	Some uses that are dependent on natural and cultural resource conditions are important to local and regional economies/communities, but they may not have national influence or significance, and there is some question about whether the area would complement or add value to the National Marine Sanctuary System.	The case for nationally-significant economic importance is not well documented or the importance of the area is not considered exceptional.			NMSA Section 301(a)(2) NMSA Section 301(c) NMSA Section 303(a)(2) NMSA Section 303(b)(1)

Public Benefit	**Do all of these things depend on conservation and management of the resources?** The publicly-derived benefits of the area, such as aesthetic value, public recreation, and access to places depend on conservation and management of the area's resources. These and other ecosystem services[5] (see checklist of provisioning, regulating, cultural, and supporting services at right) can be maintained or, in some cases, enhanced using various aproaches.	Maintenance and/or enhancement of ecosystem services depends strongly on conservation of this area, and services would substantially degrade without active management. Conservation and management efforts are likely to have an influence at the national scale. The area complements or adds value to the National Marine Sanctuary System for purposes of representing, maintaining, and, if appropriate, enhancing key ecosystem services.	It is likely that ecosystem services could be influenced by active management, but it is uncertain to what extent; or, it is unclear whether services would be at substantial risk without active management. These efforts may influence resource management beyond the local scale, at least regionally, and perhaps nationally.	The maintenance or enhancement of ecosystem services for the area is not dependent on conservation efforts; or conservation efforts would not have a national-scale influence on public benefit.		PROVISIONING SERVICES __ Food __ Ornamentals __ Biotechnology __ Energy REGULATING SERVICES __ Clean water __ Biodiversity __ Coastal protection __ Climate stability CULTURAL SERVICES __ Sense of place (spiritual, aesthetic) __ Tourism and recreation __ Science and education __ Heritage SUPPORTING SERVICES __ Production __ Recycling & decomposition	NMSA Section 301(a)(4) NMSA Section 301(c) NMSA Section 303(a)(2) NMSA Section 303(b)(1)(L)
Management Considerations							
Opportunities for marine research, education, or partnerships							
Research Opportunities	The area provides or enhances opportunities for research in marine science, including marine archaeology. Rating is based on degree to which research will fill gaps and promote understanding of important phenomena or attributes in particular disciplines, such as principal controlling mechanisms of ecosystem condition (e.g., physical drivers, habitat quality, trophic structure, connectivity, climate change) or new historical insights; level of past and current scientific interest in the area, and existence of supporting data.	Will promote and attract much-needed research and advance understanding of ecosystem, historical, or societal attributes that apply in multiple contexts and over broad geographic scales. Scientists and agency priorities reflect high interest and cooperation in the area. Relevant natural, social, historical, and economic data and information for communities have been documented and can support future conservation science efforts. Knowledge gained in the area has had or is likely to have exceptional influence on fundamental understanding within its discipline.	May inform understanding of attributes that control ecosystems or affect societies at regional scales. Scientists and agency priorities reflect some interest and collaboration in the area. Some natural, social, historical, and economic data are available but contain significant gaps, or quality is uncertain.	Will support understanding of locally important natural, historical, or societal attributes, but not necessarily the character of the larger ecosystem or society beyond. Scientists and agency priorities do not reflect demonstrable interest in the area. Relevant natural, social, historical, and economic data that might support research in the area are lacking.		__ Local influence __ Regional influence __ National influence __ Existing interest __ Existing cooperation __ Will attract new research __ Data available	NMSA Section 301(a)(4) NMSA Section 301(c) NMSA Section 303(b)(1)(J)
Education Opportunities	The area provides or enhances opportunities for education, including the understanding and appreciation of the marine and Great Lakes environments.	The influence of education programming is likely to be national in scale, and enhances the educational influence of the National Marine Sanctuary System. There is a high level of interest in cooperating on educational programs.	May generate opportunities that influence education at the local and regional levels, but not necessarily the larger national scale. There is some interest in cooperating on educational programs.	May generate opportunities that influence education at the local level, but not necessarily at larger scales. It is not evident that interest in cooperation is high among potential partners.		__ Local influence __ Regional influence __ National influence __ Existing interest __ Existing cooperation	NMSA Section 301(a)(4) NMSA Section 301(c) NMSA Section 303(b)(1)(L)
Partner Commitments	There are commitments or possible commitments for partnerships opportunities such as cost sharing, office space, exhibit space, vessel time, or other collaborations to aid conservation or management programs for the area. Internal (NOAA) and external (e.g., academia, industry, NGO, stakeholder) partnerships exist, are in development, or could be formed that would contribute substantively to NOAA's Science, Service, Stewardship continuum.	Robust commitments of assets, infrastructure, and collaboration on science, education, and other management activities. All partnerships required to implement this effort are currently in place or are poised to contribute to planning and implementation, making effective management of the area realistic and likely.	Many key assets and infrastructure are available and proposals have been made to share or offer them, as well as partner with NOAA, but significant gaps exist. Partnerships currently exist that will be helpful to this effort. Additional partnerships will need to be established to fully plan and implement project.	Key assets and infrastructure that would facilitate operations and collaborations are unavailable in the region or have not been offered. A significant amount of work will be required to build partnerships in order to plan and implement project.			NMSA Section 301(b)(7) NMSA Section 301(b)(9)
Potential threats & impacts facing the place's marine resources							
Threats	Adverse impacts from current or future uses and activities threaten the area's significance, values, qualities, and resources.	There is strong and well documented evidence that current and projected threats pose a continuing and substantial risk for substantial impact to area resources, qualities, and/or services they provide to the public.	Threats to resources, qualities, and/or services are known to exist, but strong evidence for either their current and projected future levels, extents or impacts remains poorly documented.	Threats to resources, qualities, and/or services of this area have not been credibly documented.			NMSA Section 303(a)(3) NMSA Section 303(b)(1)(D)
Management and regulations that could help with conservation efforts							

New Conservation Benefits	A national marine sanctuary would provide unique conservation and management value for this area or adjacent areas. Knowledge gained from marine conservation efforts here would be useful to other constituencies and other geographies.	Area and surrounding locations will benefit substantially from a sanctuary-specific management framework that is likely to achieve its conservation objectives, and is strongly supported by public partnerships and engagement. Maintenance or restoration of ecosystem services through protection and management will offer measurable and lasting benefits for coastal communities. Early detection of changes will be facilitated, as well as intervention, when appropriate, thereby reducing the vulnerability of ecosystems, historical and cultural resources, and human communities. Lessons learned will be documented, shared, and implemented in an adaptive management regime, and transferred for use elsewhere.	Area resources are likely to benefit from sanctuary-specific regulations, adaptive management, and some public engagement, resulting in reduced vulnerability to threats and, possibly, restoration. Benefits to ecosystem services or adjacent areas are possible, but uncertain. Some knowledge gained in management could be useful to other conservation efforts.	Conservation efforts may influence local conditions, but there are little evidence that influences will extend more broadly, or that lessons learned would be useful to other situations.			NMSA Section 301(a)(3) NMSA Section 301(b) NMSA Section 301(c) NMSA Section 303(a)(4) NMSA Section 303(b)
Supplemental Protection	The existing regulatory and management authorities for the area could be supplemented or complemented to meet the conservation and management goals for the area.	Considerable conservation value will be gained by new management measures, particularly if new partners work in collaboration with existing entities and management and restoration plans as part of a network of professionals with a history of cooperation and accomplishment in conservation.	Supplemental conservation efforts, either unilateral or in collaboration with existing management entities, are likely to fill gaps in existing management frameworks, but certain shortcomings make it unlikely to be fully successful.	Additional regulatory or management actions are unlikely to be successful in substantially improving conservation of the area.			NMSA Section 301(a)(3) NMSA Section 303(a)(3) NMSA Section 301(b)(2)
Broad-based Community Support							
Community Support	There is community-based support for the nomination expressed by a broad range of interests, such as: individuals or locally-based groups (e.g., friends of group, chamber of commerce); local, tribal, state, or national elected officials; or topic-based stakeholder groups, at the local, regional or national level (e.g., a local chapter of an environmental organization, a regionally-based fishing group, a national-level recreation or tourism organization, academia or science-based group, or an industry association.	High level of community interest and engagement, and a history of grass roots efforts to work collaboratively to address marine conservation issues. Future engagement is highly likely.	Substantive demonstration of community interest and involvement, but limited evidence of a history of interest in marine conservation issues, making level of future engagement uncertain.	Limited documentation of interest by a broad base of community stakeholder groups. Little to no evidence of prior engagement or activism of community in coastal issues, and future engagement is questionable.			NMSA Section 301(b)(7)

[1] These are scientific criteria adopted during the ninth meeting of the Conference of the Parties to the **Convention on Biological Diversity** in 2008 - http://www.cbd.int/marine/doc/ebsa-brochure-2012-en.pdf

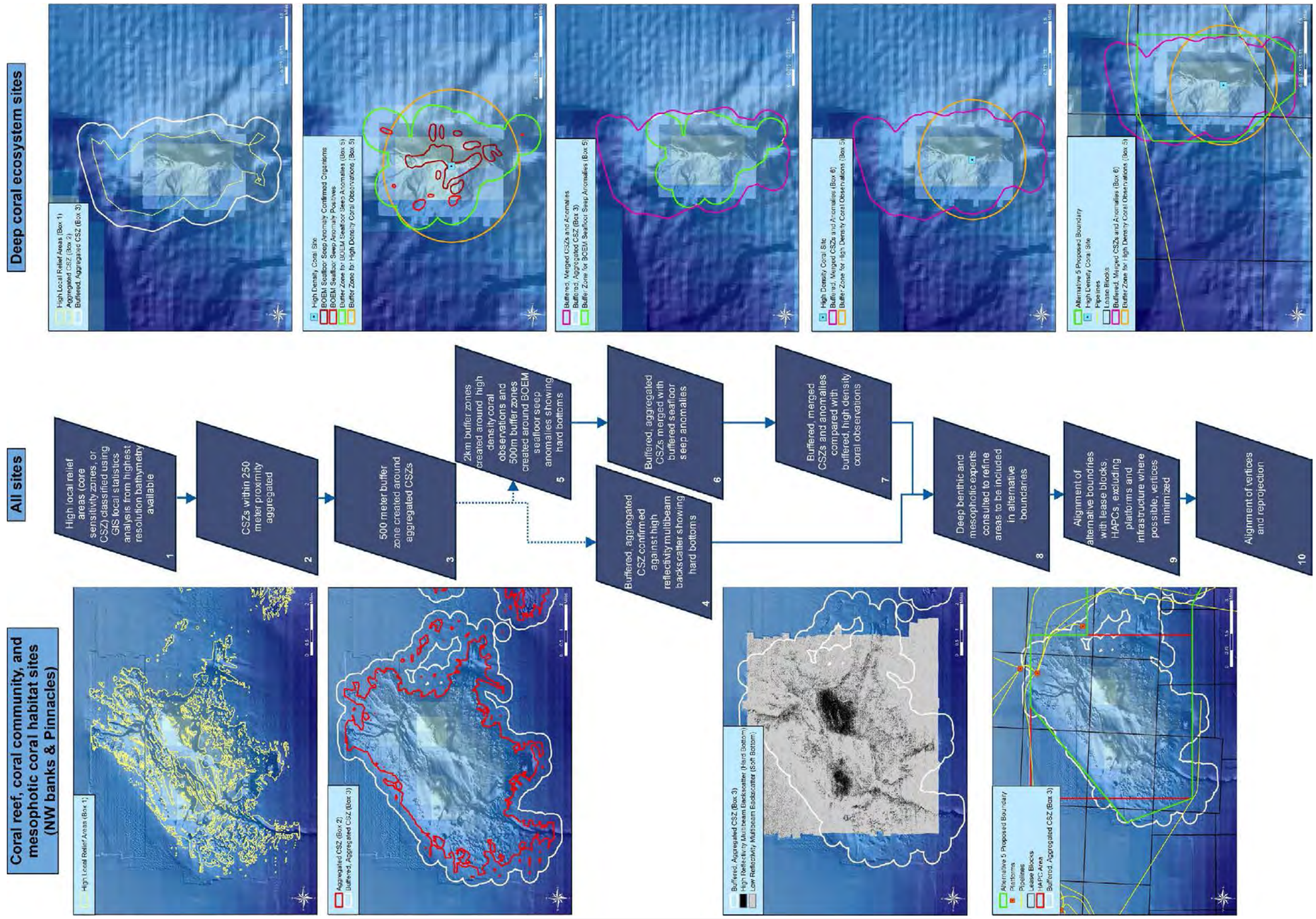
[2] **"Keystone species"** are species on which the persistence of a large number of other species in the ecosystem depends. They are the pillars of community stability (among other things, they strongly affect both resistance and resilience) and their contribution to ecosystem function is disproportionate to their numerical abundance or biomass. Their impact is therefore important at the community or ecosystem level. Keystone species are often called "ecosystem engineers" and can include habitat creators (e.g., corals, kelp), predators that control food web structure (e.g., Humboldt squid, sea otters), herbivores that regulate benthic recruitment (e.g., certain sea urchins), and those involved in critical symbiotic relationships (e.g., cleaning or co-habitating species).

[3] **"Foundation species"** are single species that define much of the structure of a community by creating locally stable conditions for other species, and by modulating and stabilizing fundamental ecosystem processes. These are typically dominant biomass producers in an ecosystem and strongly influence the abundance and biomass of many other species. Examples include krill and other zooplankton, kelp, forage fish such as rockfish anchovy, sardine, and coral. Foundation species exhibit similar control over ecosystems as keystone species, but their high abundance distinguishes them.

[4] **"Focal species "** are species of particular interest from the perspective of sanctuary management. They may not be abundant or provide high value to ecosystem function, but their presence and health is important for the provision of other services, whether conservation, economic, or strategic. Examples include species targeted for special protectio (e.g., threatened or endangered species), species for which specific regulations exist to minimize perturbations from human disturbance (e.g., touching corals, riding manta rays or whale sharks, disturbing nesting birds), or indicator species (e.g., common Murres as indicators of oil pollution). This could also include so-called "flagship" species, which include charismatic or iconic species associated with specific locations or ecosystems, are in need of specific management actions, are highly popular and attract visitors or business, have marketing appeal, or represent rallying points for conservation action (e.g., humpback and blue whales, Dungeness crab).

[5] **Ecosystem services** are the benefits people obtain from ecosystems. Four categories of ecosystem services were identified in a four year study by the United Nations in 2005, the Millennium Ecosystem Assessment (MEA) – cultural (non material benefits), provisioning (products obtained), regulating (buffers to change, such as coastal protection), and supporting (processes like nutrient recycling that control other ecosystem services). For more complete discussion, see http://www.unep.org/maweb/documents/document.300.aspx.pdf. The checklist provided is a combination of the MEA list of ecosystem services and the "Goals" used by the Ocean Health Index (http://www.oceanhealthindex.org/Goals/).

A.3 Geographic Information System Boundary Polygon Development Flow Diagram


Coral reef, coral community, and mesophotic coral habitat sites (NW banks & Pinnacles)
All sites
Deep coral ecosystem sites
High local relief areas (core sensitivity zones, or CSZ) classified using GIS local statistics analysis from highest resolution bathymetry available
1
CSZs within 250 meter proximity aggregated
2
500 meter buffer zone created around aggregated CSZs
3
2km buffer zones created around high density coral observations and 500m buffer zones created around BOEM seafloor seep anomalies showing hard bottoms
5
Buffered, aggregated CSZ confirmed against high reflectivity multibeam backscatter showing hard bottoms
4
Buffered, aggregated CSZs merged with buffered seafloor seep anomalies
6
Buffered, merged CSZs and anomalies compared with buffered, high density coral observations
7
Deep benthic and mesophotic experts consulted to refine areas to be included in alternative boundaries
8
Alignment of alternative boundries with lease blocks, HAPCs, excluding platforms and infrastructure where possible, vertices minimized
9
Alignment of vertices and reprojection
10
High Local Relief Areas (Box 1)
Aggregated CSZ (Box 2)
Buffered, Aggregated CSZ (Box 3)
High Density Coral Site
BOEM Seafloor Seep Anomaly Confirmed Organisms
BOEM Seafloor Seep Anomaly Positives
Buffer Zone for BOEM Seafloor Seep Anomalies (Box 5)
Buffer Zone for High Density Coral Observations (Box 5)
Buffered, Merged CSZs and Anomalies
Buffered, Aggregated CSZ (Box 3)
Buffer Zone for BOEM Seafloor Seep Anomalies (Box 5)
High Density Coral Site
Buffered, Merged CSZs and Anomalies (Box 6)
Buffer Zone for High Density Coral Observations (Box 5)
Alternative 5 Proposed Boundary
High Density Coral Site
Pipelines
Lease Blocks
Buffered, Merged CSZs and Anomalies (Box 6)
Buffer Zone for High Density Coral Observations (Box 5)
High Local Relief Areas (Box 1)
Aggregated CSZ (Box 2)
Buffered, Aggregated CSZ (Box 3)
Buffered, Aggregated CSZ (Box 3)
High Reflectivity Multibeam Backscatter (Hard Bottom)
Low Reflectivity Multibeam Backscatter (Soft Bottom)
Alternative 5 Proposed Boundary
Platforms
Pipelines
Lease Blocks
HAPC Area
Buffered, Aggregated CSZ (Box 3)

Appendix B

SITE PROFILES OF NATIONALLY SIGNIFICANT NATURAL FEATURES INCLUDED IN ALTERNATIVES

B.1 Purpose

The purpose of this appendix is to provide a brief descriptive overview of each of the natural features included in the range of alternatives evaluated in this DEIS. The descriptions are organized according to the subregion of the north central Gulf of Mexico in which the features are situated: 24 are located in the "northwest banks" subregion; 14 are located in the Pinnacles area (i.e., the continental shelf in the northeast portion of the study area evaluated in the DEIS); and 19 are located on the continental slope. The 24 reef and bank features, some or all of which are encompassed by the 3, 9, 11, and 13 boundaries proposed in the various alternatives evaluated in the "northwest banks" subregion on the continental shelf are described first. Descriptions of the 14 mesophotic coral sites encompassed by the 7 proposed boundaries in the Pinnacles area follow. Finally, descriptions are provided for the 19 mesophotic & deepwater coral sites, some or all of which are encompassed by the 11 and 19 boundaries from the continental slope subregion of the study area evaluated in Alternatives 4 & 5 in the DEIS. The site descriptions below are ordered generally from west to east within each subregion.

Maps are included showing the bathymetry at each site, proposed alternative boundaries, "core sensitivity zones" (high local relief identified from the highest resolution bathymetry available, supplemented by documented observations of high value habitats) using the GIS algorithm described in Chapter 3 and illustrated in Appendix A3, and existing regulatory zones and infrastructure. As described in Chapter 3, proposed boundaries are simplified to the greatest extent possible compared to the CSZs, while still encompassing features of interest as documented by observations, for ease of enforcement and consistency with existing regulatory regimes. When only a partial boundary or multiple proposed boundaries are visible in a single map image, that map image is centered on the feature or boundary of interest. The bathymetry presented in the maps included with each description was collected by Dr. Jim Gardner (then of USGS-Menlo Park, now of University of New Hampshire), NOAA, and the former Minerals Management Service (MMS) – now Bureau of Ocean Energy Management (BOEM). The maps have been adapted by the FGBNMS to illustrate proposed boundaries under the various alternatives evaluated in the DEIS, infrastructure (e.g., platforms and pipelines), shipping fairways, and other regulatory management zones (e.g., HAPCs & BOEM lease blocks).

GIS data presented for BOEM regulatory zones (NAZs, buffer zones) and regulated infrastructure (platforms, pipelines) is from a working database derived from documents submitted to the

federal government from oil companies, other government agencies, and/or the public. Some errors may exist in this data and BOEM is constantly working to find and eliminate them. For example, NAZ boundaries are based on bathymetry, which the GIS shapefiles approximate, but which requires site-specific surveying to establish with certainty. Copies of the original documents on which BOEM's GIS data are based are available for inspection and copying at BOEM's Public Information Office. Though this data aided in the preparation and evaluation of the alternatives presented in this DEIS, BOEM does not represent this data as legally binding and it is not intended for navigational use.

B.2 Northwest Banks

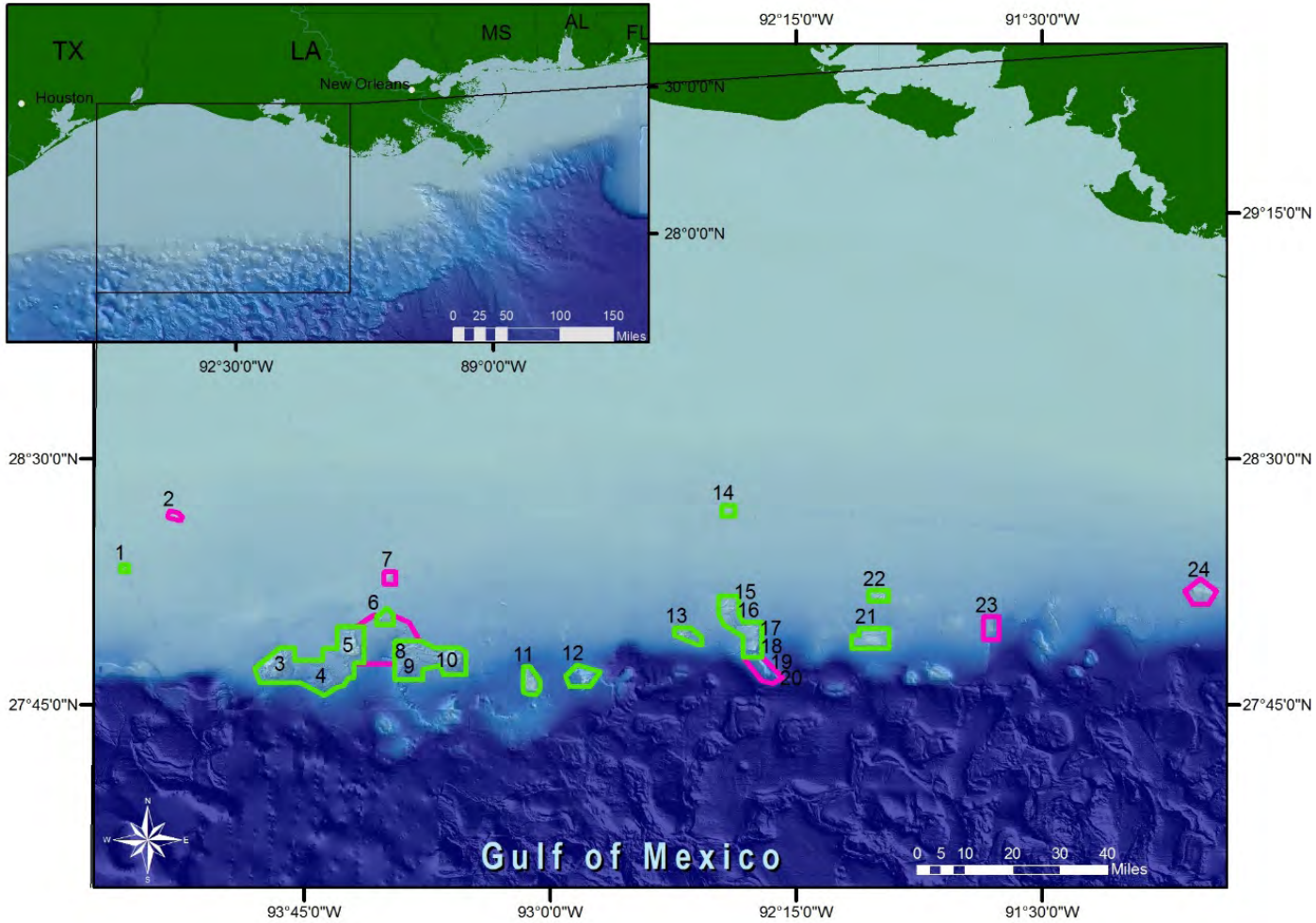


Figure B1. Overview of the 18 reef and bank features encompassed by the preferred alternative (Alternative 3, with proposed sanctuary boundaries outlined in green) and six additional features encompassed by the most comprehensive alternative (Alternative 5, with extended or additional boundaries outlined in magenta), in the context of the northwest banks subregion of the north central Gulf of Mexico. 1. Stetson Bank; 2. Claypile Bank; 3. West Flower Garden Bank; 4. Horseshoe Bank; 5. East Flower Garden Bank; 6. MacNeil Bank; 7. 29-Fathom Bank; 8. Rankin Bank; 9. 28-Fathom Bank; 10. Bright Bank; 11. Geyer Bank; 12. Elvers Bank; 13. McGrail Bank; 14. Sonnier Bank; 15. Bouma Bank; 16. Bryant Bank; 17. Rezak Bank; 18. Sidner Bank; 19. Antoine Bank; 20. Tresslar Bank; 21. Parker Bank; 22. Alderdice Bank; 23. Jakkula Bank; 24. Ewing Bank

B.2.1 Stetson Bank

Bottom Depth Range: 55-200 feet

Habitats Present: coral communities, mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: "moonscape" appearance, with distinct uplifted siltstone and claystone pinnacles that push out of the seafloor for ~1,500 feet along the northwest face of the bank; pinnacles dominated by fire coral and sponges, with cover exceeding 30% (Bernhardt 2000) and at least nine coral species present; algae, sponges and rubble dominate the flats; “halo” of claystone outcroppings dominated by sponges, gorgonians and black corals at ~165-200 feet ring the main feature of Stetson Bank (Gardner et al. 1998)

Observed Impacts: derelict fishing gear (trawl nets, shrimping doors, stabilizers, line), anchors, engine blocks

Infrastructure Present in Preferred Alternative Boundary: ~0.45 miles pipeline

Figure B2. Madracis outcropping at Stetson Bank. Image credit: FGBNMNS/Hickerson.

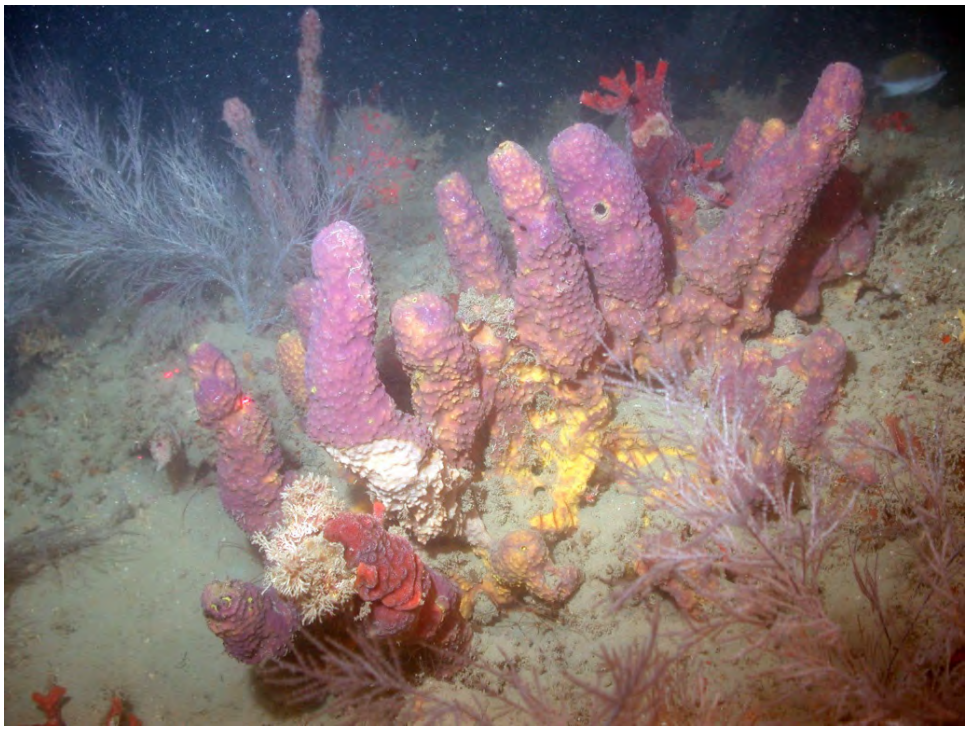


Figure B3. Mesophotic Sponge community and black coral at Stetson Ring. Image credit: FGBNMS/UNCW-UVP.

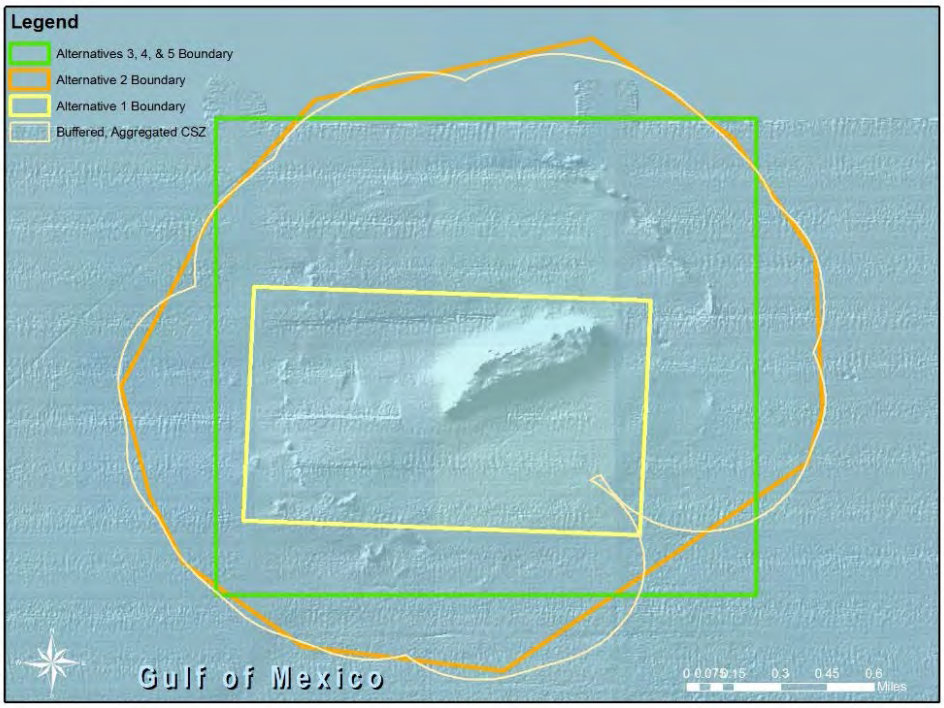


Figure B4. Stetson Bank boundary alternatives 1-5 and buffered, aggregated core sensitivity zones (CSZ)

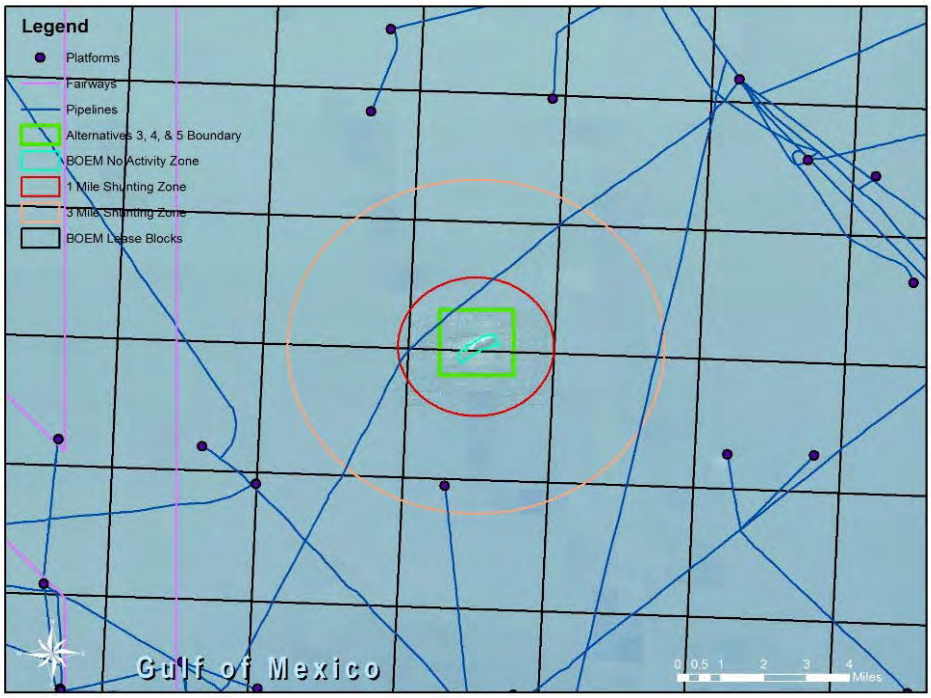


Figure B5. Stetson Bank preferred alternative boundary, existing regulatory zones, and infrastructure (existing coral HAPC boundary matches preferred alternative boundary)

B.2.2 Claypile Bank

Bottom Depth Range: 130-165 feet

Habitats Present: coral community, mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: Midshelf claystone/siltstone outcroppings, fire coral, scattered blushing star coral colonies, algae, sponges.

Observed Impacts: None

Infrastructure Present in Preferred Alternative Boundary: None

Figure B6. Sponge dominated habitat on the crest of Claypile Bank. Image credit: FGBNMS/Schmahl.

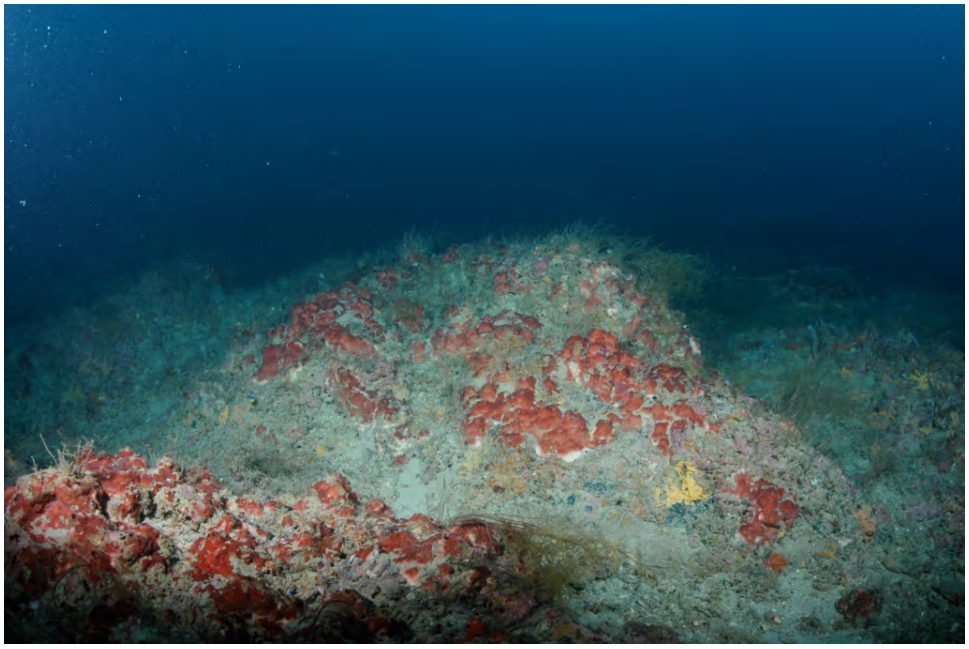


Figure B7. Sponge dominated habitat on the crest of Claypile Bank. Image credit: FGBNMS/Schmahl.

Figure B8. Claypile Bank boundary alternative and buffered, aggregated core sensitivity zones (CSZ)

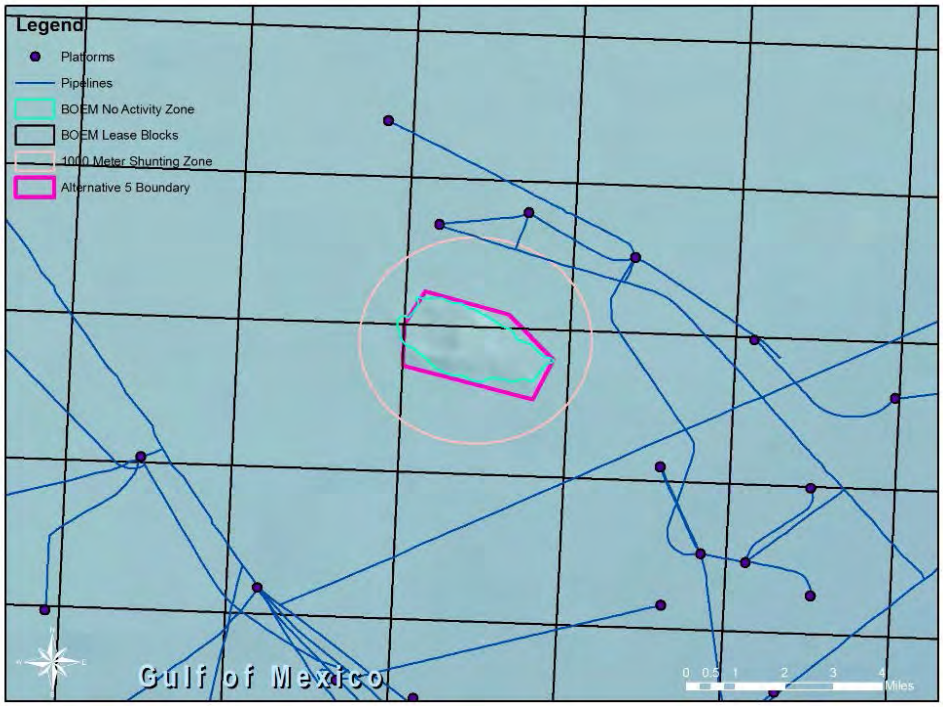


Figure B9. Claypile Bank boundary alternative, existing regulatory zones, and infrastructure

B.2.3 West Flower Garden Bank

Bottom Depth Range: ~60-540 feet

Habitats Present: coral reef, mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: well-known, highly developed coral reef in excellent health (Lang et al. 2001); bank is ~6.8 by 5 miles in size and includes ~100 acres of coral reef cap area rising to within 60 feet of the water surface; coral cap dominated by brain and star corals, with a few coral heads exceeding 20 feet (6 m) in diameter; reefs show some of highest coral percent cover for the region, with at least 24 species of coral on the coral cap, covering over 50% of the bottom to depths of 100 feet (30 m), and exceeding 70% coral cover in places to at least 130 feet (40 m) (Schmahl et al. 2008, and references therein); recently discovered (and succumbed to disease since discovery) Acropora palmata colony (along with colony observed at East Flower Garden Bank, deepest records of this coral species (Zimmer et al. 2006)), documents connectivity between areas of the Gulf; extensive mesophotic habitats, including coralline algae zones, "honeycomb" reefs (highly eroded outcroppings), mud flats, mounds, mud volcanoes and at least one brine seep system, with extensive coralline algae pavements and algal nodules, sea fans, sea whips and black corals, deep reef fish, basket stars and feather stars

Observed Impacts: derelict fishing gear (trawl nets, longlines, line), anchors, diver impacts, invasive species (lionfish)

Infrastructure Present in Preferred Alternative Boundary: ~10.35 miles pipeline; 1 platform

Figure B10. High relief and coral cover of the coral reef dominated by massive star and brain corals at West Flower Garden Bank – approximately 64 ft to 150 ft depth. Image credit: FGBNMS/Schmahl.

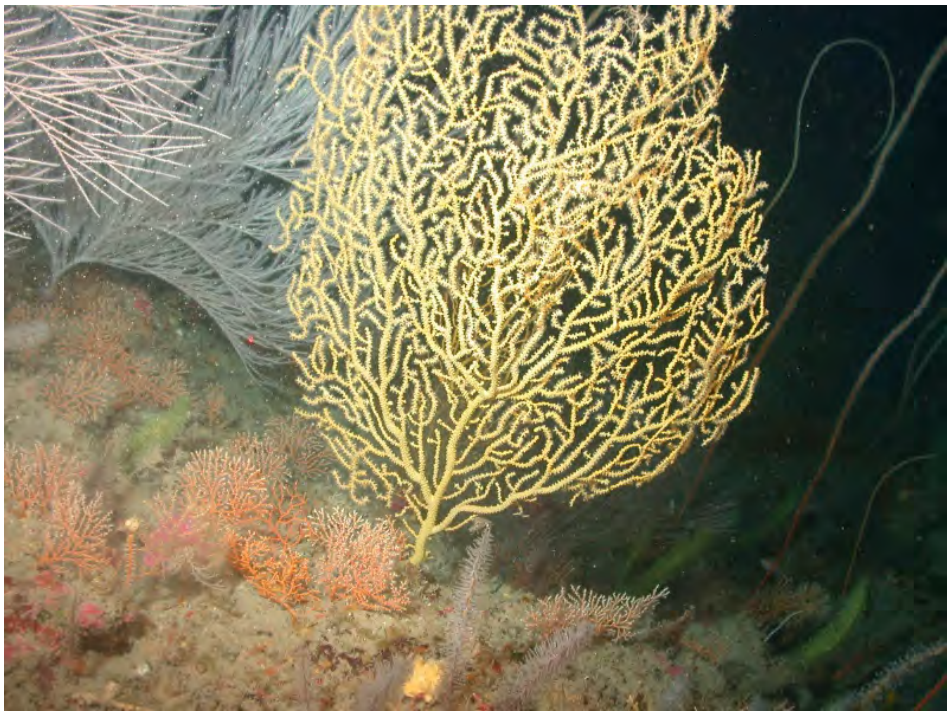


Figure B11. Large colonies of gorgonians and black corals in the mesophotic coral habitat at around 350 ft depth at West Flower Garden Bank. Image credit: FGBNMS/UNCW-UVP.

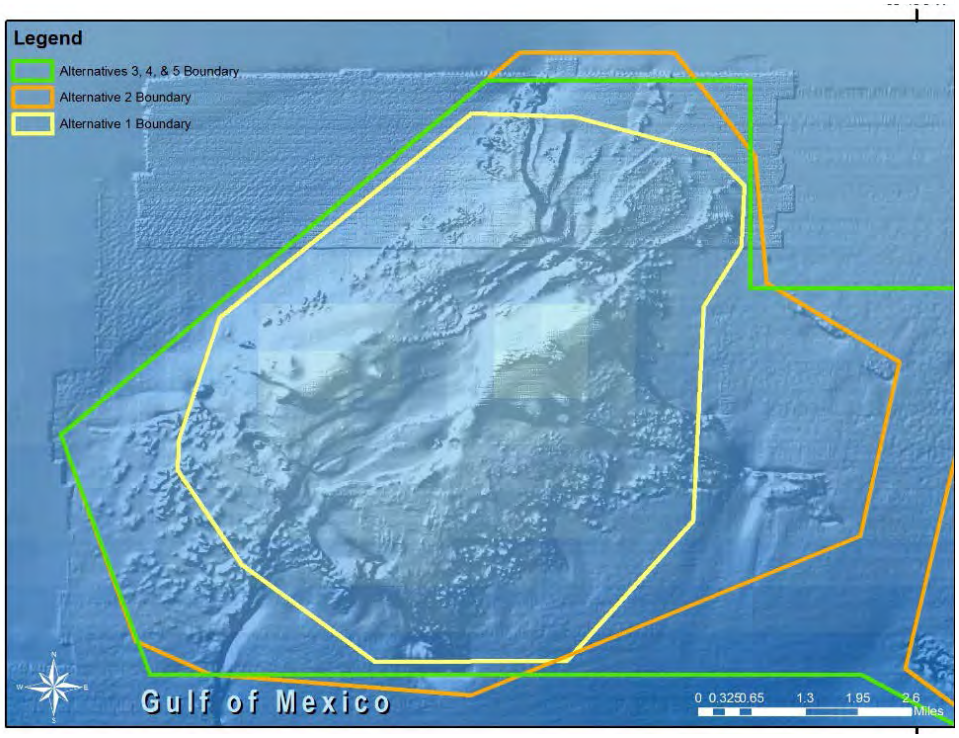


Figure B12. West Flower Garden Bank boundary alternatives 1-5

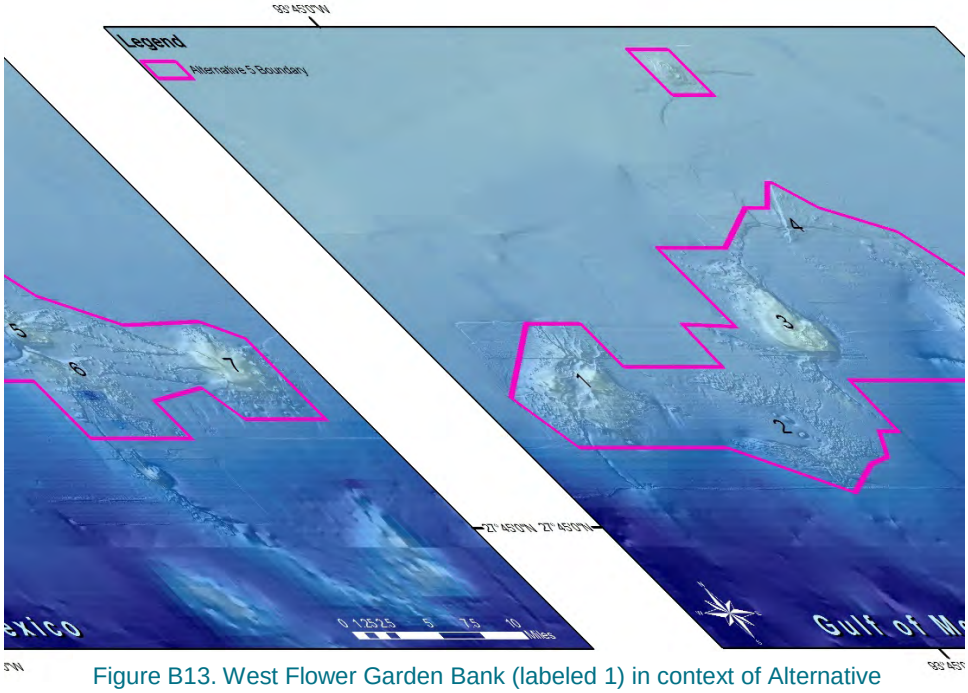


Figure B13. West Flower Garden Bank (labeled 1) in context of Alternative 5 boundary

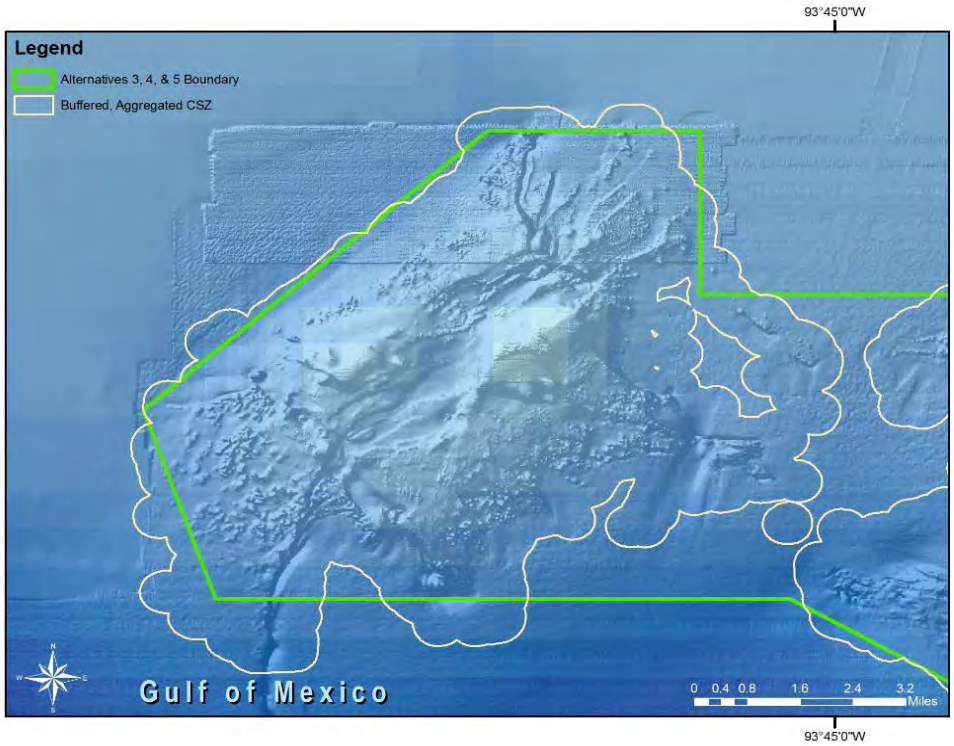


Figure B14. West Flower Garden Bank preferred alternative boundary and buffered, aggregated core sensitivity zones (CSZ)

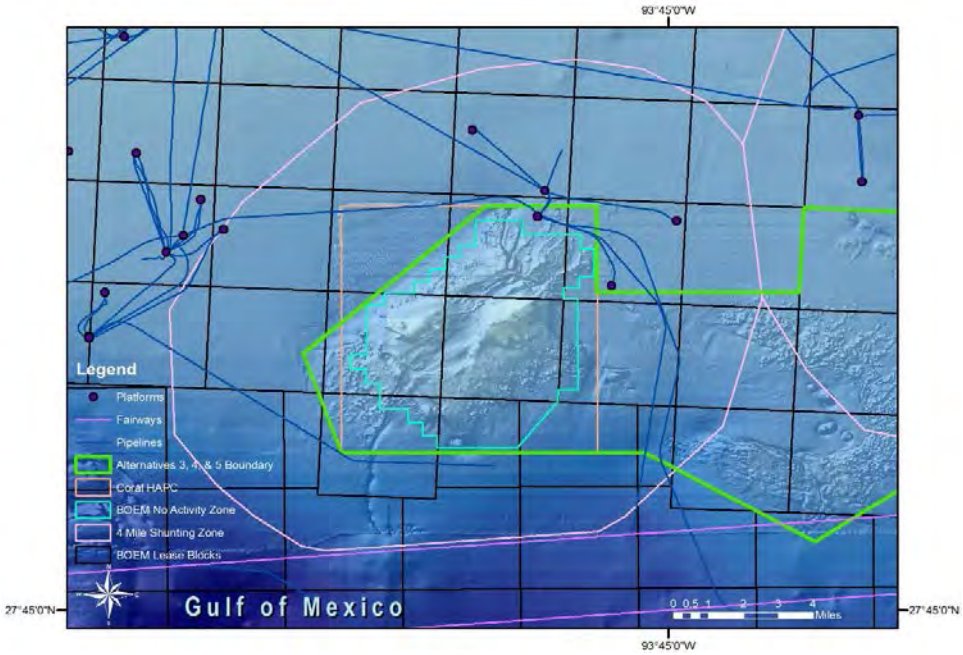


Figure B15. West Flower Garden Bank preferred alternative boundary, existing regulatory zones, and infrastructure

B.2.4 Horseshoe Bank

Bottom Depth Range: ~250-575 feet

Habitats Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: extensive deepwater habitat in the form of hundreds of patchy outcroppings covering an area approximately 3 km wide and having 5-15 m of relief above the seafloor, with extensive mesophotic coral assemblages, sponges, algae, invertebrates, and fish inhabiting these discontinuous outcroppings; several conical-shaped mud volcanoes clustered near the center of the feature, with one rising 100 m above the seafloor

Observed Impacts: derelict fishing gear (line/rope)

Infrastructure Present in Preferred Alternative Boundary: ~13.97 miles pipeline

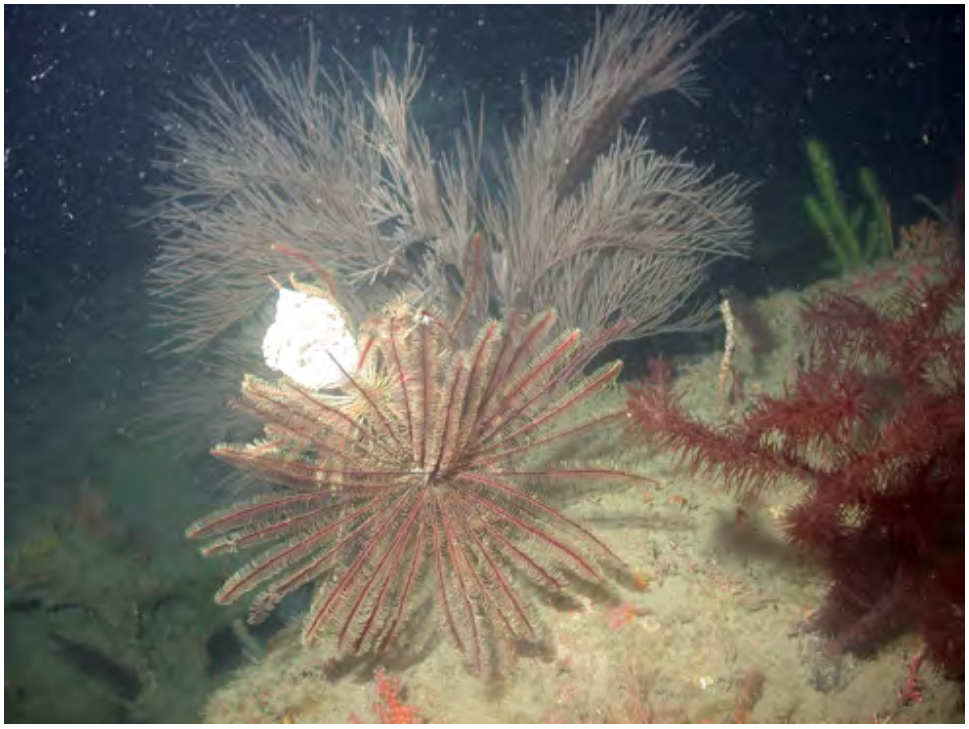


Figure B16. Crinoids, basket stars, and large black coral colonies at around330ft in the mesophotic habitat at Horseshoe Bank. Image credit: FGBNMS/UNCW-UVP.

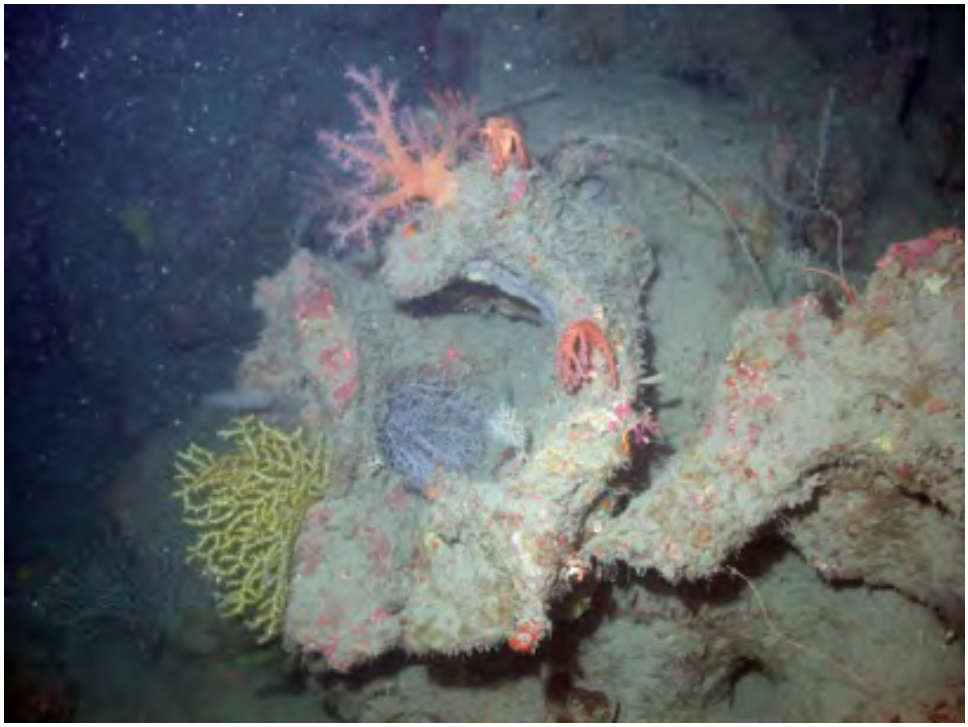


Figure B17. Soft corals, black corals, and gorgonians in the mesophotic habitat at Horseshoe Bank at around 330ft depth. Image credit: FGBNMS/UNCW-UVP.

Figure B18. Horseshoe Bank boundary alternatives 2-5

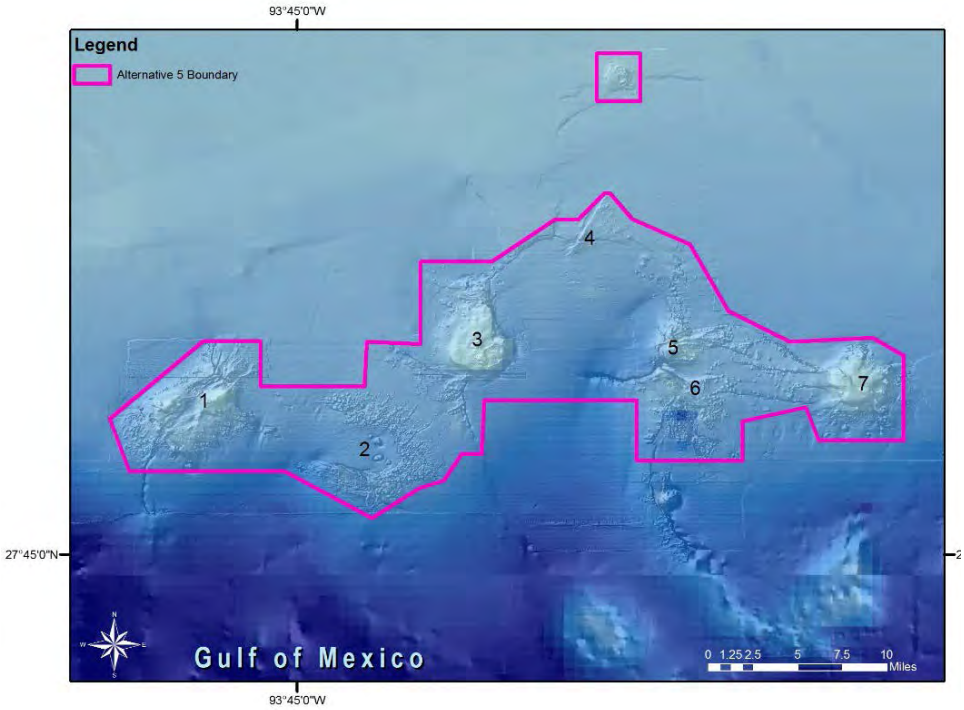


Figure B19. Horseshoe Bank (labeled 2) in context of Alternative 5 boundary

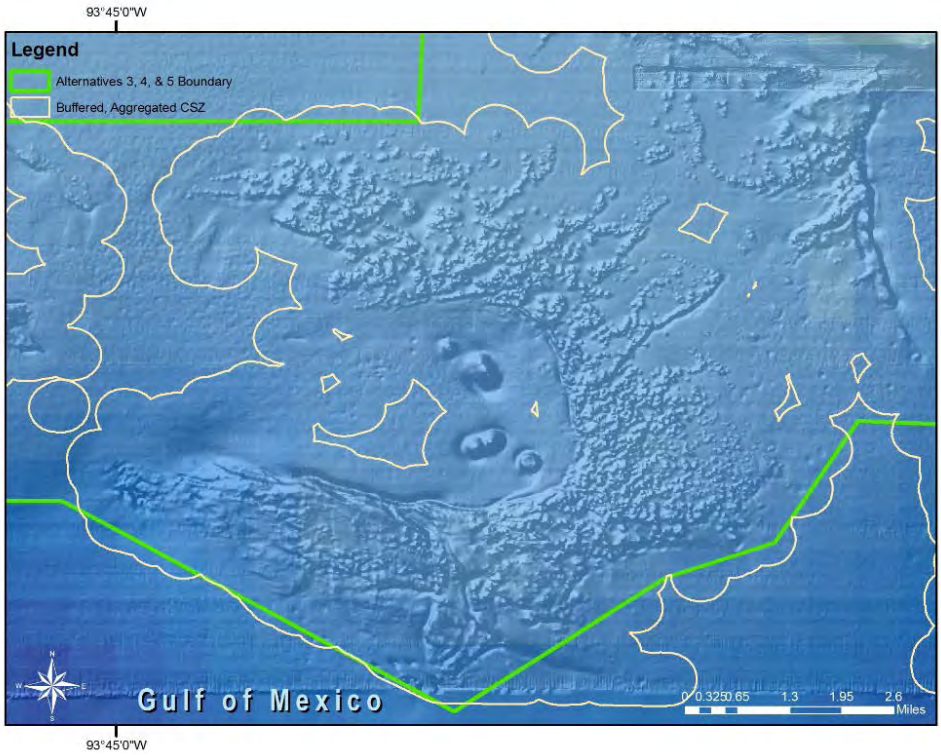


Figure B20. Horseshoe Bank preferred alternative boundary and buffered, aggregated core sensitivity zones (CSZ)

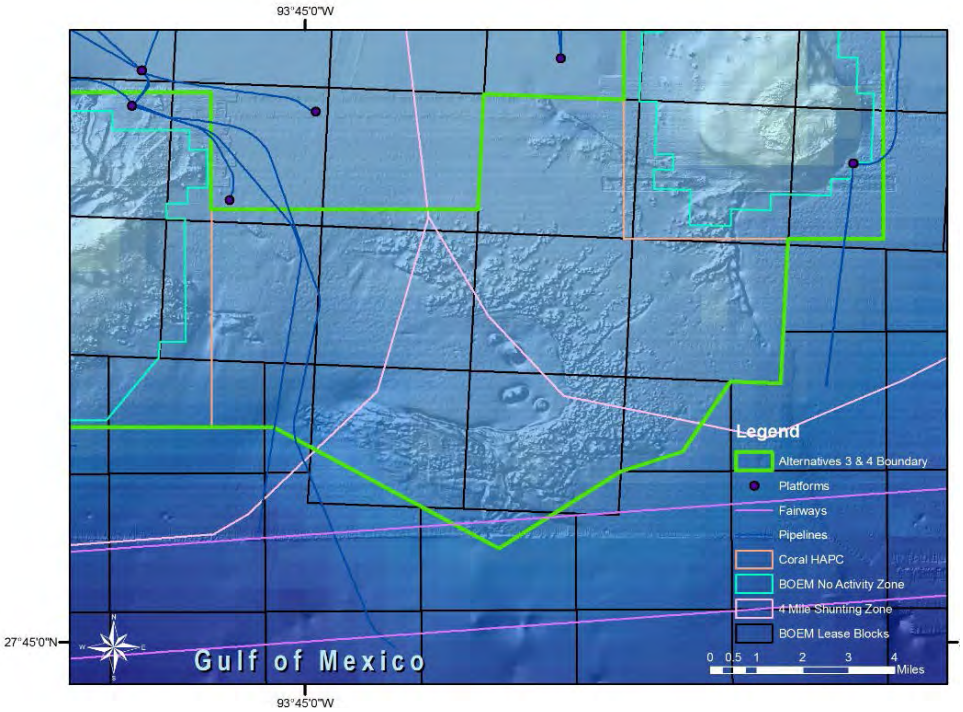


Figure B21. Horseshoe Bank preferred alternative boundary, existing regulatory zones, and infrastructure

B.2.5 East Flower Garden Bank

Bottom Depth Range: ~55-450 feet

Habitat Types Present: coral reef zone, coral community zone, mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: well-known, highly developed coral reef in excellent health (Lang et al. 2001); northernmost coral reef in the continental United States; bank is ~ 5.4 by 3.2 miles (8.7 by 5.1 km) in size, capped by 250 acres (1 square km) of coral reef that rise to within 55 feet (17 m) of the surface; coral cap dominated by brain and star corals, with a few coral heads exceeding 20 feet (6 m) in diameter; reefs show some of highest coral percent cover for the region, with at least 24 species of coral on the coral cap, covering over 50% of the bottom to depths of 100 feet (30 m), and exceeding 70% coral cover in places to at least 130 feet (40 m) (Schmahl et al. 2008, and references therein); recently discovered Acropora palmata colony documents connectivity between areas of the Gulf (along with colony observed at West Flower Garden Bank, deepest records of this coral species (Zimmer et al. 2006)); extensive mesophotic habitats, including coralline algae zones, “honeycomb” reefs (highly eroded outcroppings), mud flats, mounds, mud volcanoes and at least one brine seep system, with extensive coralline algae pavements and algal nodules, sea fans, sea whips and black corals, deep reef fish, basket stars and feather stars

Observed Impacts: derelict fishing gear (trawl nets, longlines, line), anchors, diver impacts, contaminated sediment from shunting operations, invasive species (orange cup coral and lionfish)

Infrastructure Present in Preferred Alternative Boundary: ~4.46 miles pipeline; 2 platforms

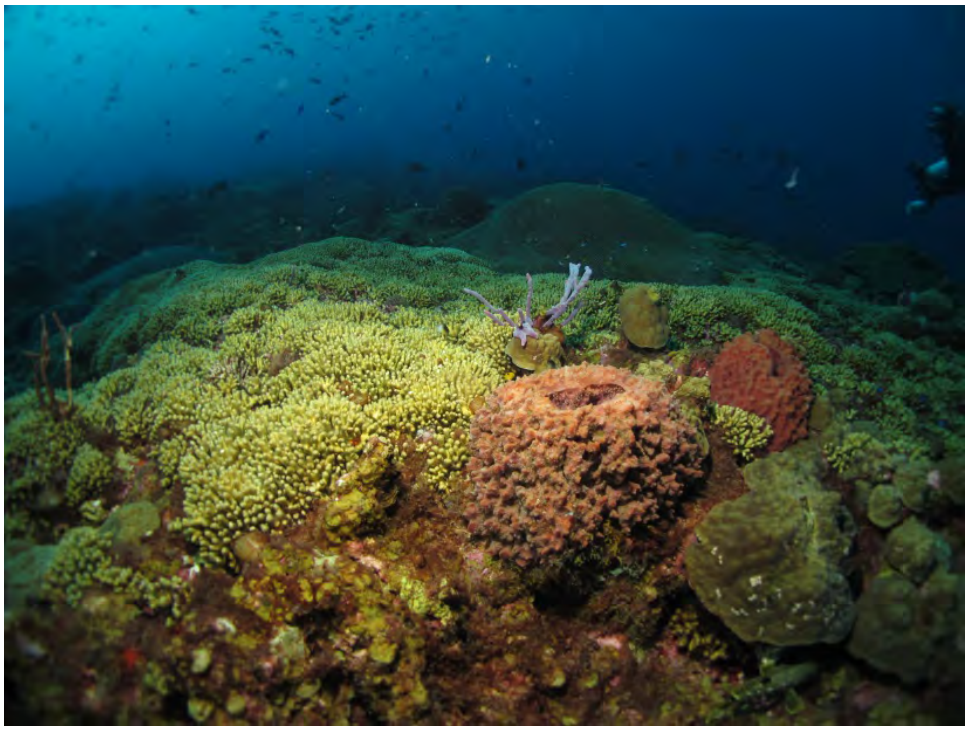


Figure B22. Low relief reef dominated by yellow pencil coral (Madracis auretenra) on the flanks of the coral reef at East Flower Garden Bank – approximately 100ft depth. Image credit: FGBNMS/Hickerson.

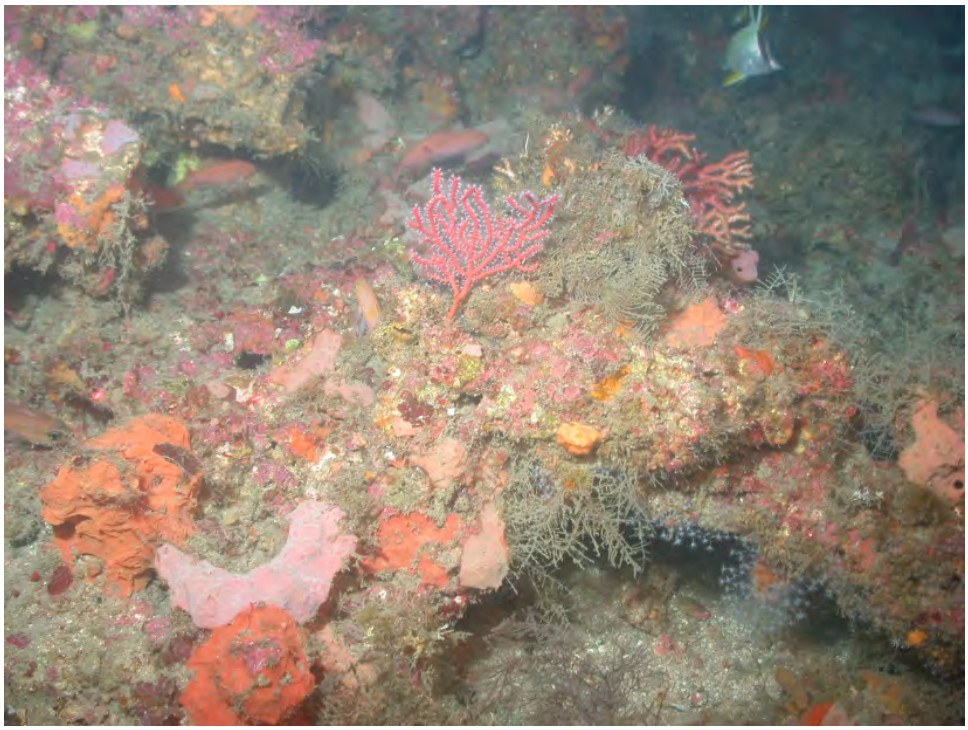


Figure B23. Mesophotic coral habitat dominated by gorgonians and sponges at East Flower Garden Bank. Image credit: FGBNMS/UNCW-UVP.

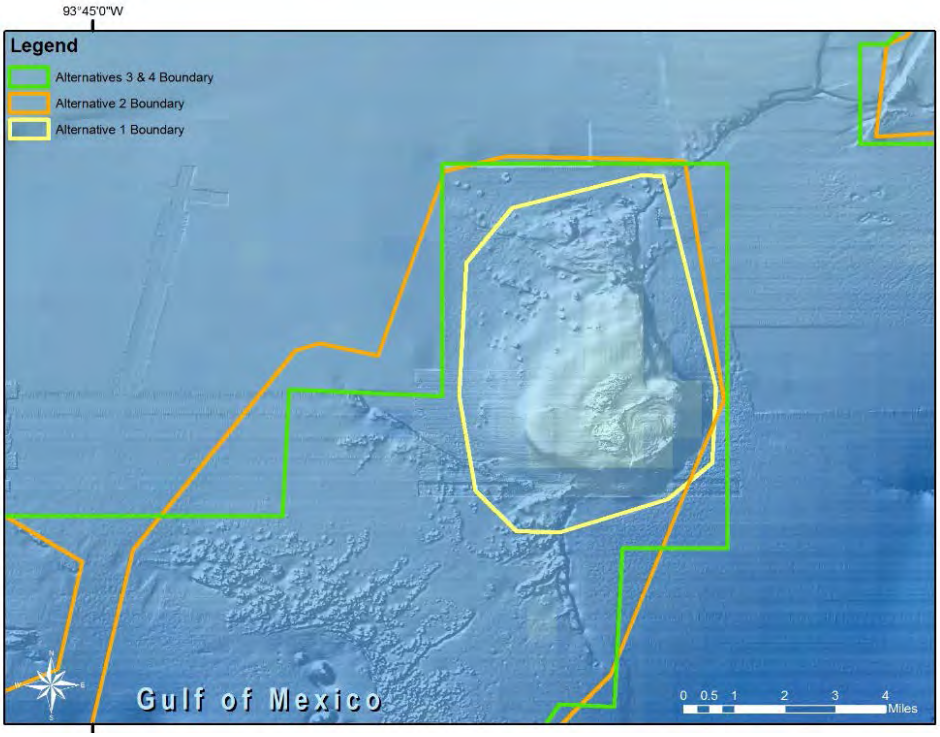


Figure B24. East Flower Garden Bank boundary alternatives 1-4

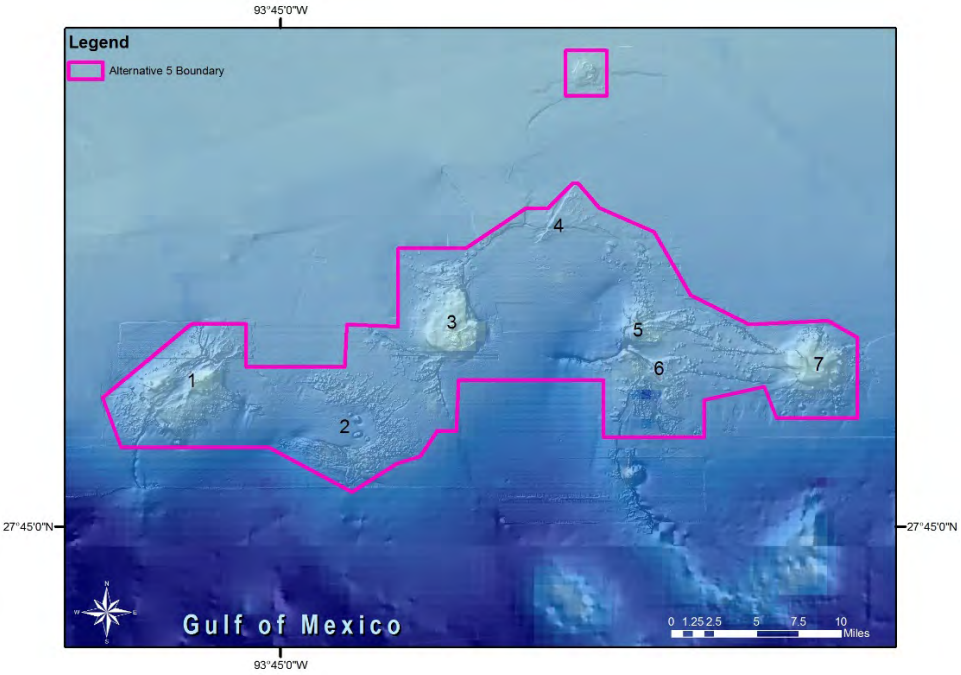


Figure B25. East Flower Garden Bank (labeled 3) in context of Alternative 5 boundary

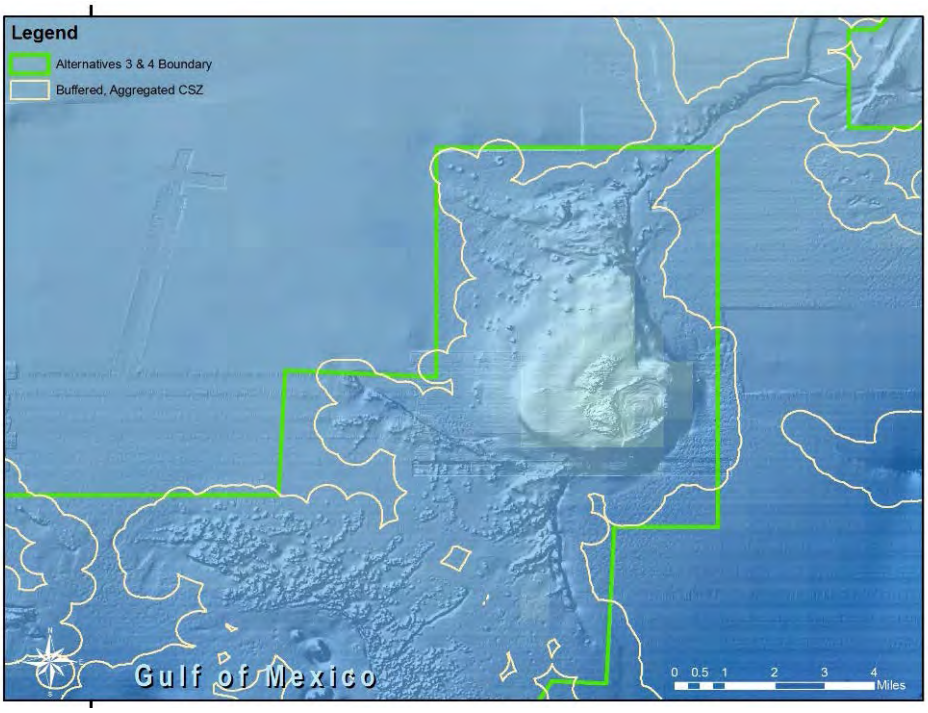


Figure B26. East Flower Garden Bank preferred alternative boundary and buffered, aggregated core sensitivity zones (CSZ)

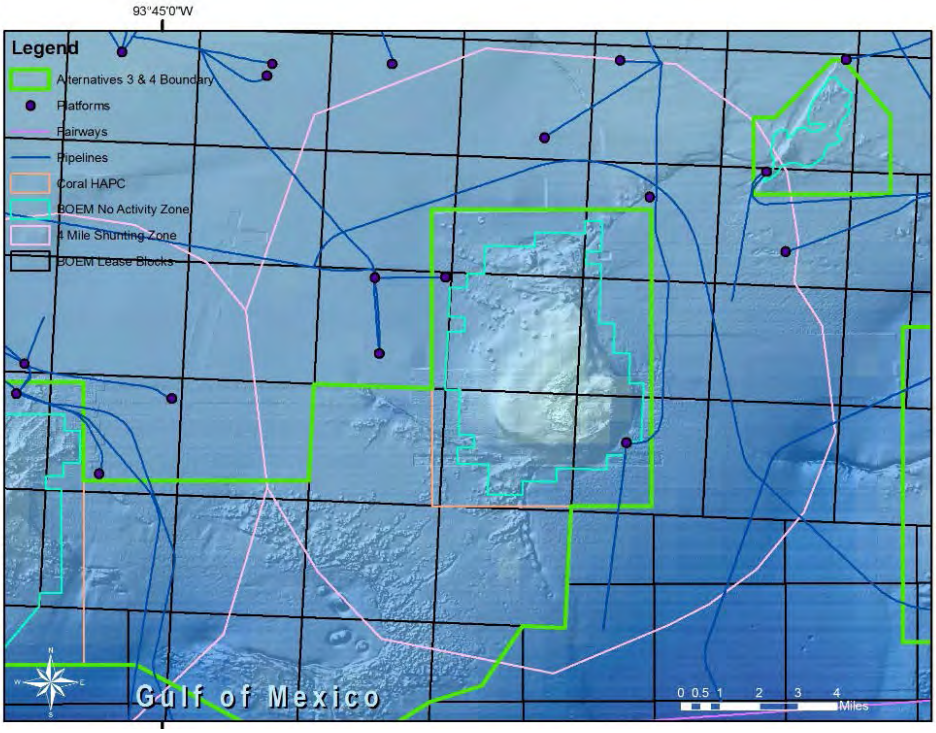


Figure B27. East Flower Garden Bank preferred alternative boundary, existing regulatory zones, and infrastructure

B.2.6 MacNeil Bank

Bottom Depth Range: ~210-315 feet

Habitat Types Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: ~3.75 miles long by 0.25 mile wide tilted fault block standing ~50 feet above the sea floor and lying on the edge of a 15-20 foot, south-facing escarpment, with the major fault trending northeast-southwest and outcrops of bedrock that have been encrusted by thick deposits of coral-algal limestone; structure occurs at the intersection of two fault systems, which creates a zone of weakness along which the salt diaper has risen; a field of isolated high relief pinnacles in the southern portion rises from a much lower-relief surface; structurally connected to East Flower Garden Bank and Rankin Bank by a ridge that runs between the three features; harbors mesophotic habitat including black corals, gorgonians, sponges, and fish

Observed Impacts: anchor scars

Infrastructure Present in Preferred Alternative Boundary: ~0.84 miles pipeline; 1 platform

Figure B28. Mesophotic coral habitat at MacNeil Bank at around 280ft depth. Image credit: FGBNMS/UNCW-UVP.

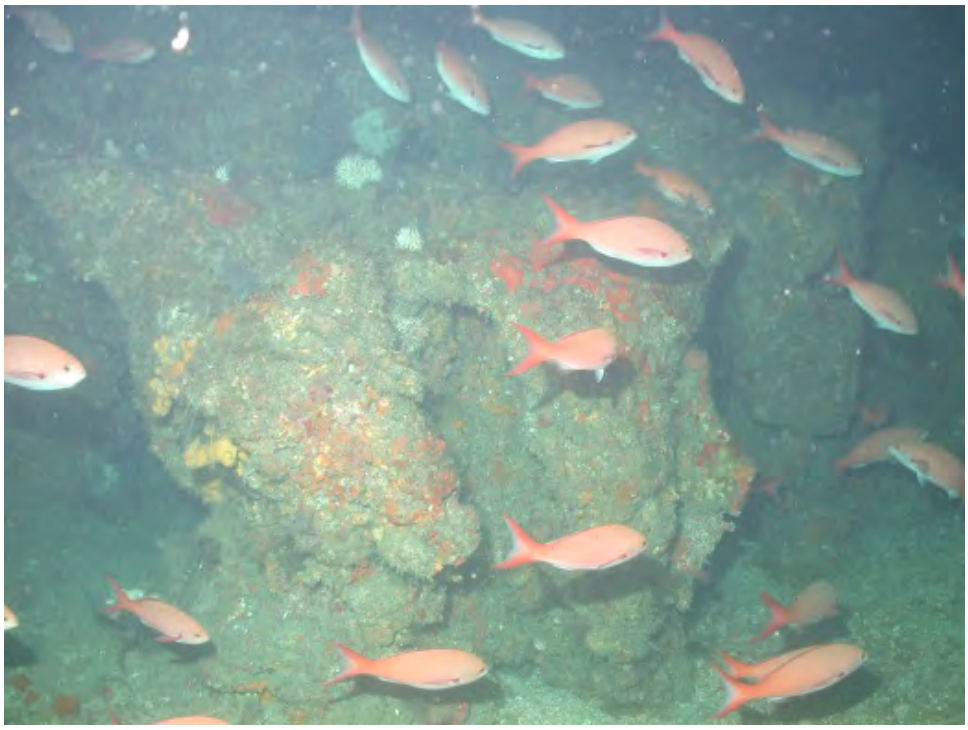


Figure B29. Mesophotic coral habitat at MacNeil Bank. Image credit: FGBNMS/UNCW-UVP.

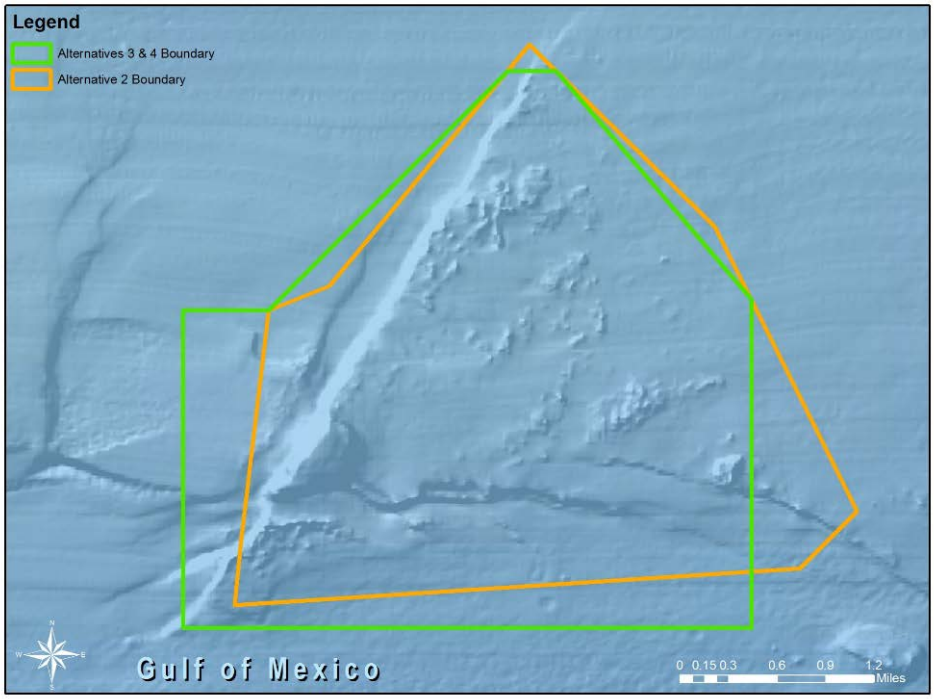


Figure B30. MacNeil Bank boundary alternatives 2-4

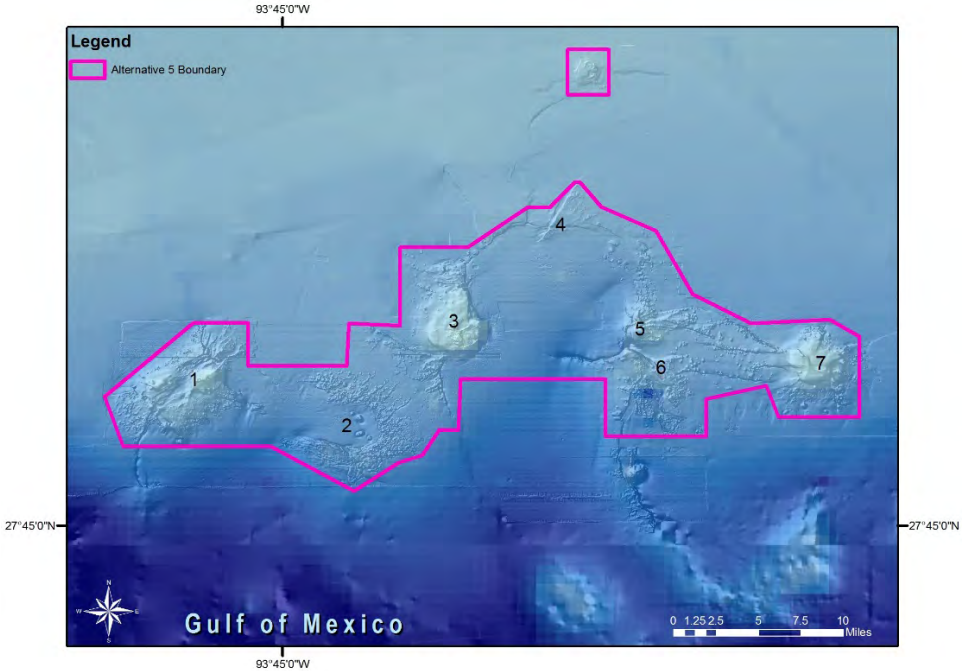


Figure B31. MacNeil Bank (labeled 4) in context of Alternative 5 boundary

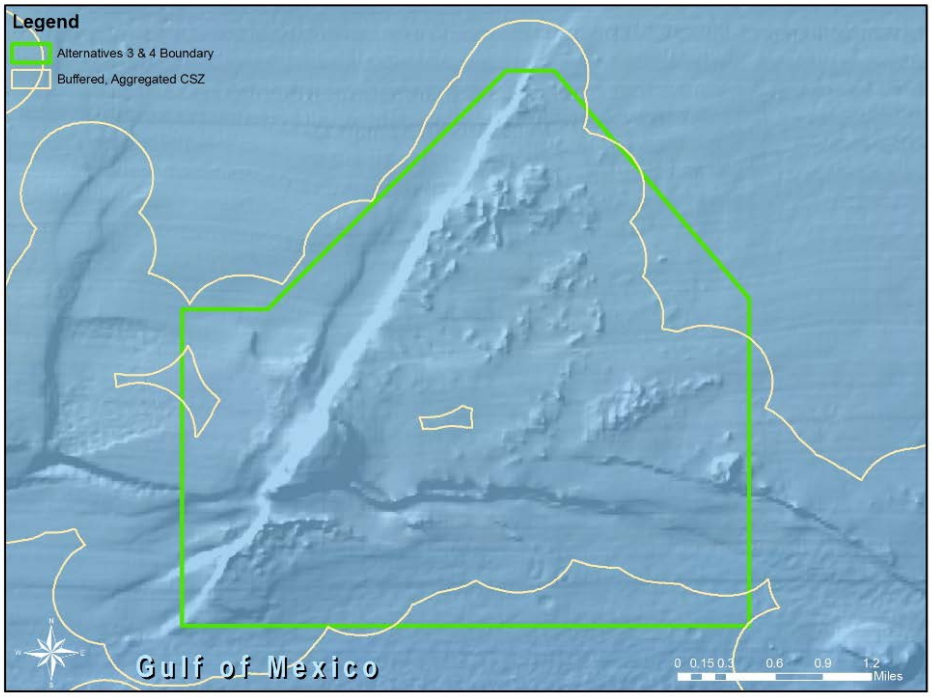


Figure B32. MacNeil Bank preferred alternative boundary and buffered, aggregated core sensitivity zones (CSZ)

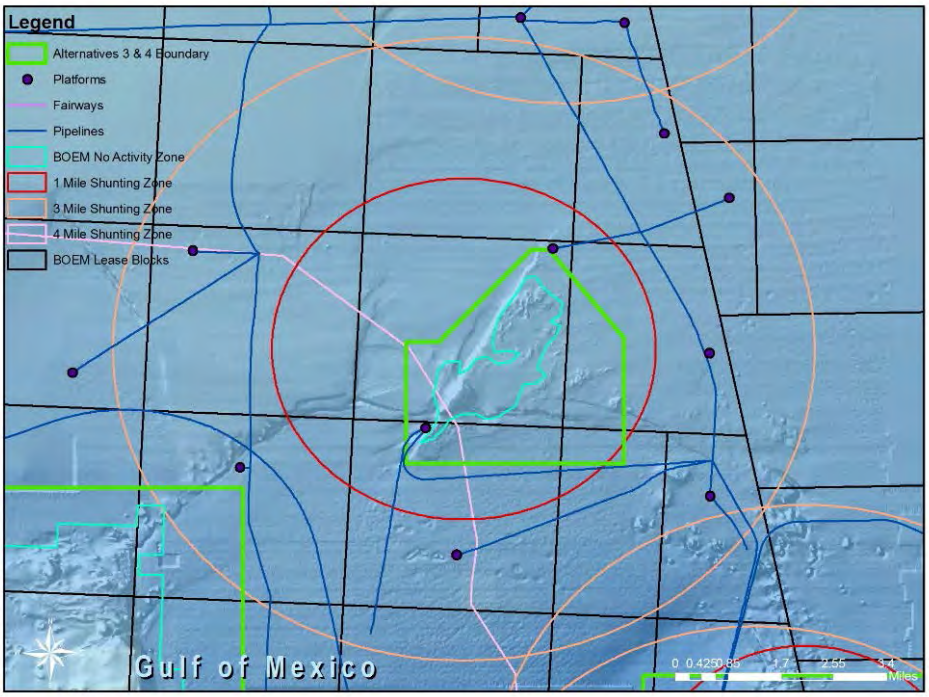


Figure B33. MacNeil Bank preferred alternative boundary, existing regulatory zones, and infrastructure

B.2.7 29-Fathom Bank

Bottom Depth Range: ~165-250 feet

Habitat Types Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: a 2-km diameter circular dome stands 10 m above the main structure of the bank; surface is a series of roughly concentric platforms with irregular surfaces that are found in water depths of ~177 feet, ~184 feet, and ~190 feet; a prominent ridge with asymmetric flanks and a smooth top, ~1700 feet long and rising ~26 feet above the bank surface, is located on the northeastern rim of the bank (Gardner & Beaudoin 2005); sparsely scattered outcroppings in primarily soft sediment. Outcroppings are inhabited by coralline algae, sponges, octocorals, and black corals.

Observed Impacts: derelict fishing gear (line/rope, trawl nets)

Infrastructure Present in Preferred Alternative Boundary: None

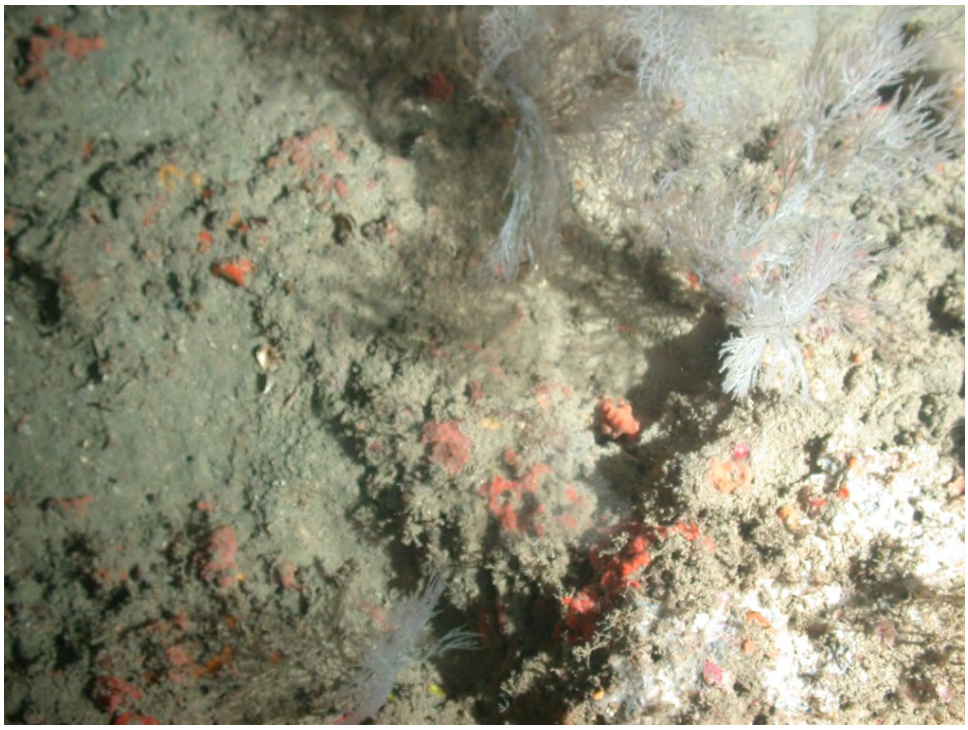


Figure B34. Black corals and sponges in the mesophotic coral habitat at 29-Fathom Bank. Image credit: FGBNMS/UNCW-UVP.

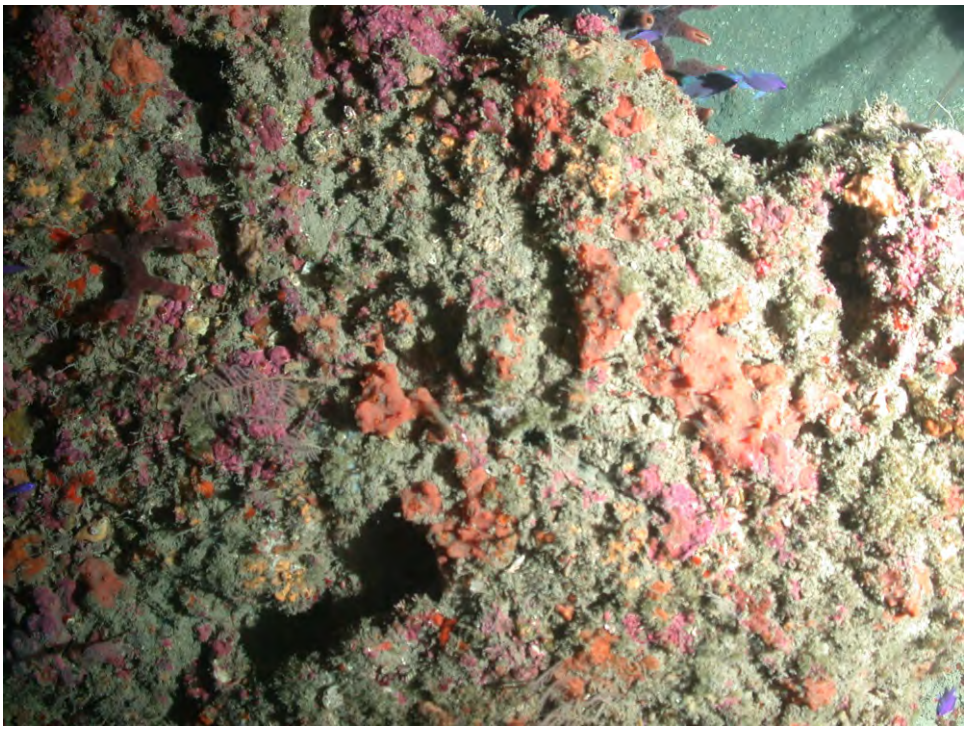


Figure B35. Mesophotic coral habitat at 29-Fathom Bank. Image credit: FGBNMS/UNCW-UVP.

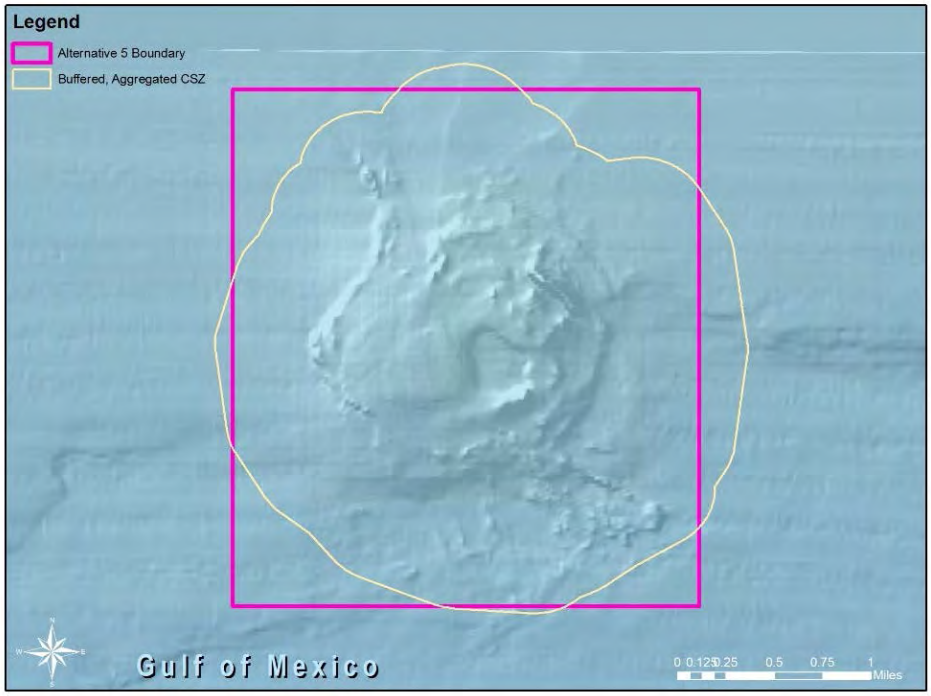


Figure B36. 29-Fathom Bank boundary alternative and buffered, aggregated core sensitivity zones (CSZ)

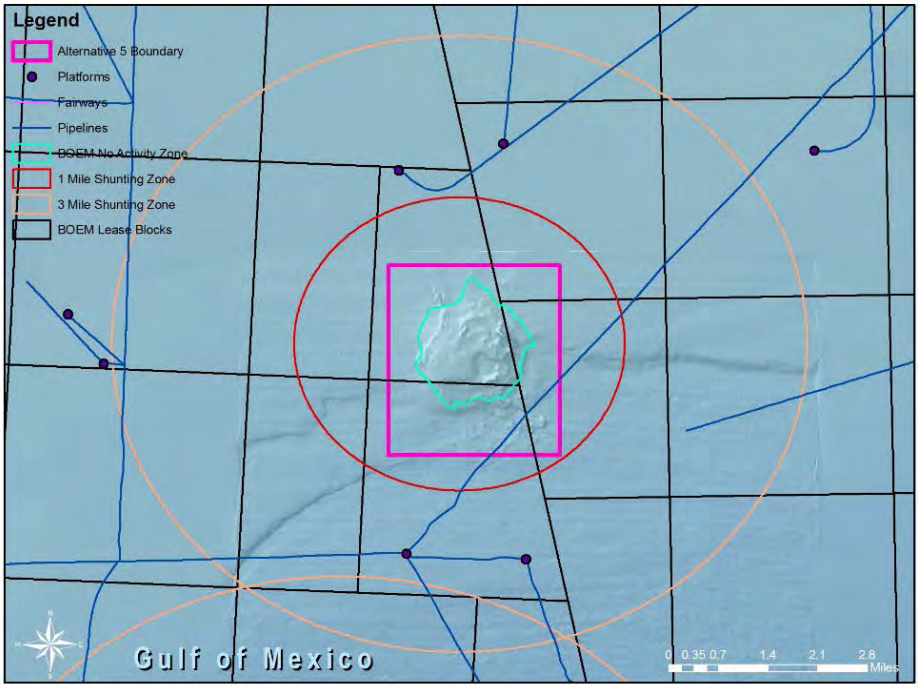


Figure B37. 29-Fathom Bank boundary alternative, existing regulatory zones, and infrastructure (boundary alternative matches existing HAPC)

B.2.8 Rankin Bank

Bottom Depth Range: ~~165-570 feet

Habitat Types Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: encompassing ~1.2 km^2 and structurally connected to MacNeil Bank to the northwest via the ridge feature that continues on to East Flower Garden Bank, Rankin Bank is just north of 28 Fathom Bank and separated from it by a ~1640 foot wide, ~6070-foot long trough which extends to a depth of ~570ft; ridges and patch reefs connect Rankin, 28-Fathom, and Bright Banks; bank harbors mesophotic habitat consisting of black corals, gorgonians, algae, sponges, stony corals, and a variety of invertebrates; extensive fields of an algae, *Codium sp*., have been documented during ROV surveys; mud volcanos exist in several locations; surface of the bank is very smooth with rounded edges, unlike the edges of 28 Fathom Bank; pinnacles occur around the western base of the bank in water depths greater than 360 feet, whereas hard bottoms occur just beyond the eastern and southeastern flank in water depths deeper than 260 feet (Gardner & Beaudoin 2005)

Observed Impacts: fishing debris (anchors)

Infrastructure Present in Preferred Alternative Boundary: ~4.60 miles pipeline; 1 platform

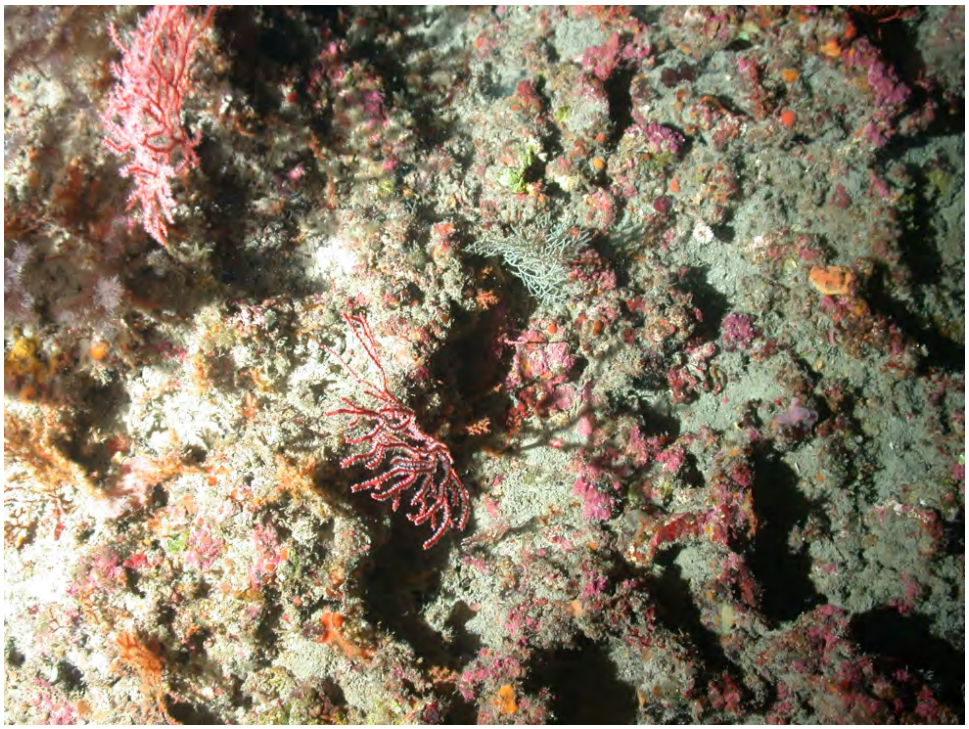


Figure B38. Gorgonians, coralline algae, and sponges in the mesophotic coral habitat at Rankin Bank. Image credit: FGBNMS/UNCW-UVP.

Figure B39. Mesophotic coral habitat with branching stony coral, crinoids, and anthiid fish at Rankin Bank. Image credit: FGBNMS/UNCW-UVP.

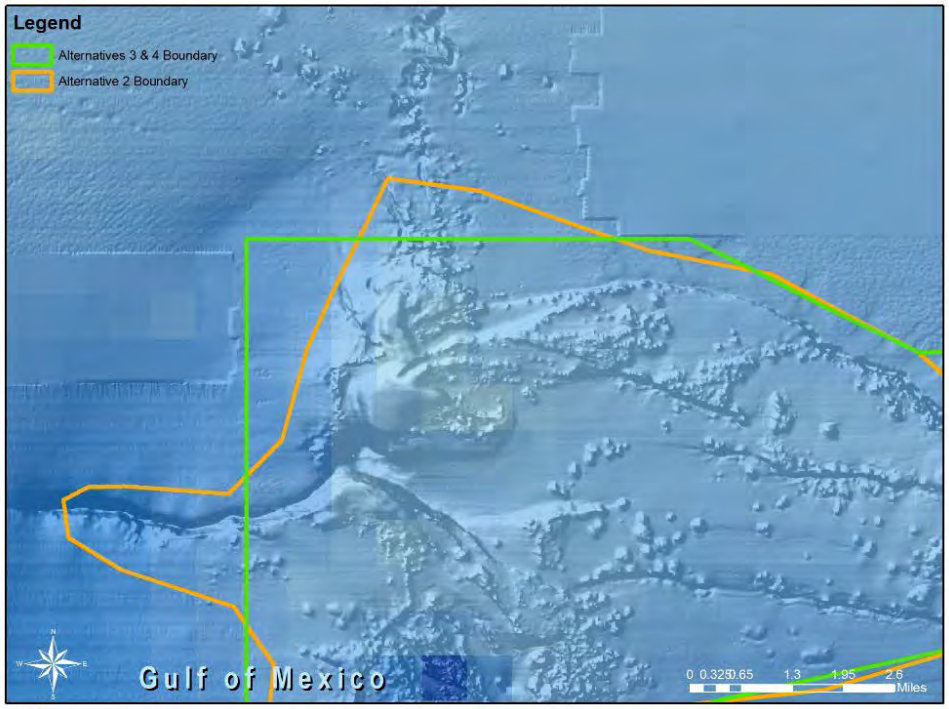


Figure B40. Rankin Bank boundary alternatives 2-4

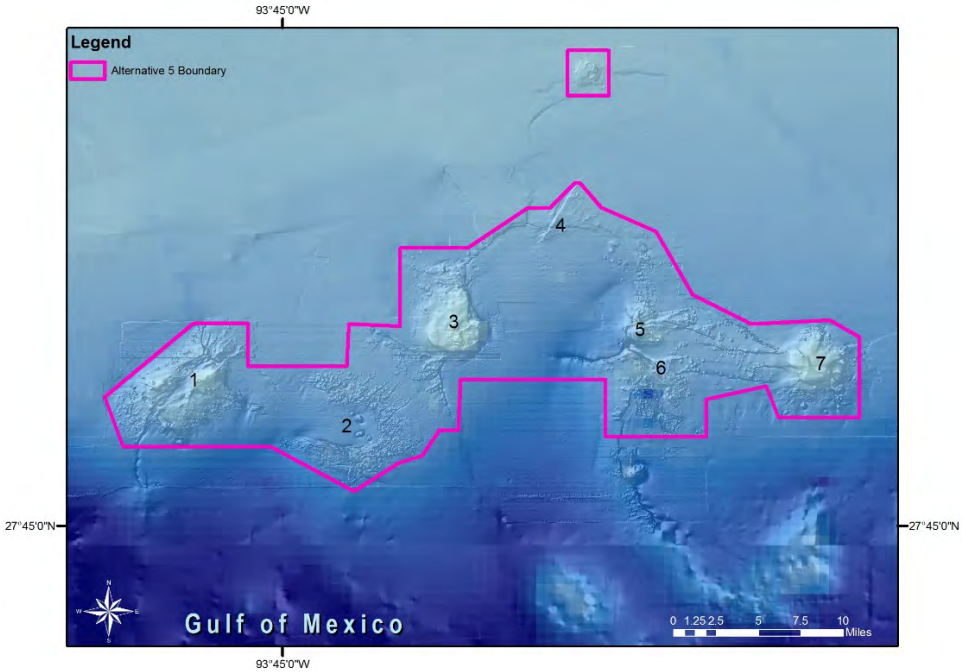


Figure B41. Rankin Bank (labeled 5) in context of Alternative 5 boundary

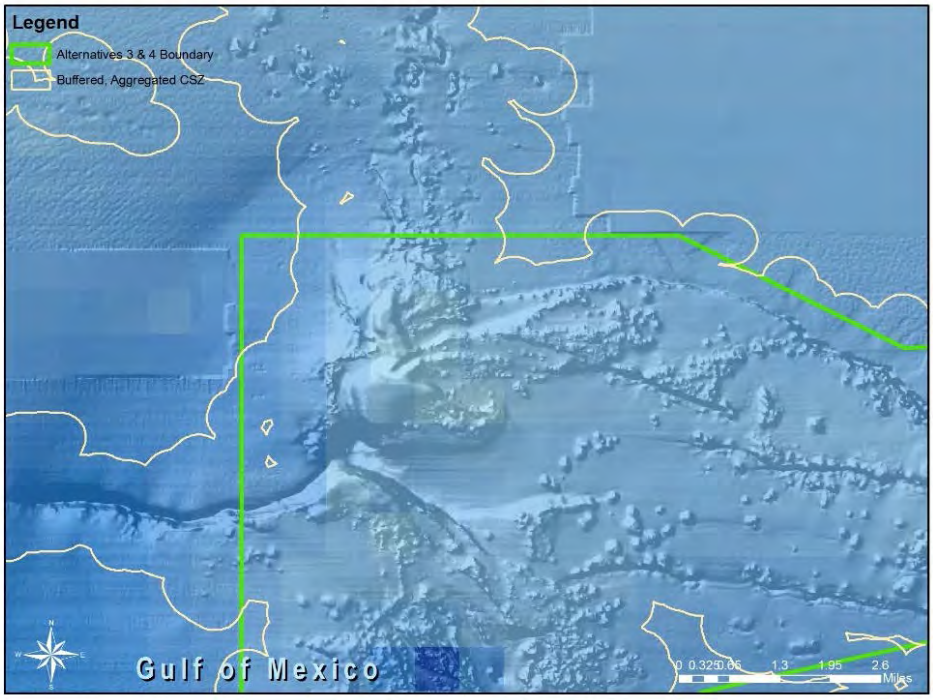


Figure B42. Rankin Bank preferred alternative boundary and buffered, aggregated core sensitivity zones (CSZ)

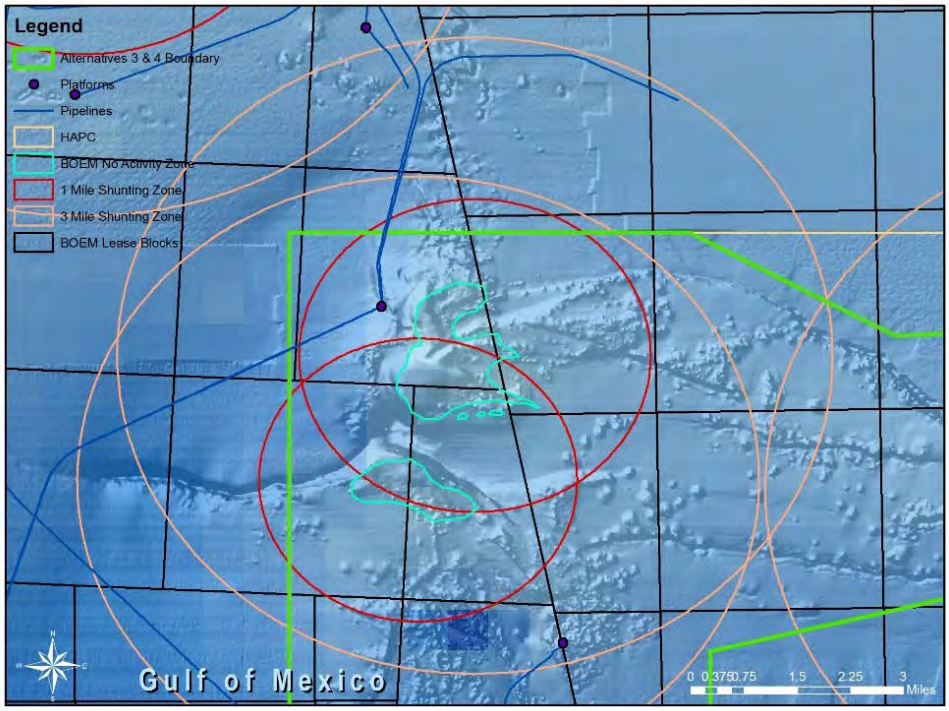


Figure B43. Rankin Bank preferred alternative boundary, existing regulatory zones, and infrastructure

B.2.9 28-Fathom Bank

Bottom Depth Range: ~210-570 feet

Habitat Types Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: encompassing ~1.8 km^2, 28-Fathom Bank is just south of Rankin Bank and separated from it by a ~1640 foot wide, ~6070-foot long trough which extends to a depth of ~570ft; ridges and patch reefs connect Rankin, 28-Fathom, and Bright Banks; bank harbors mesophotic habitat consisting of black corals, gorgonians, algae, sponges, stony corals, and a variety of invertebrates; extensive fields of an algae, *Codium sp*., have been documented during ROV surveys; mud volcanos exist in several locations; the top of the bank is very smooth but gives way to small (10 foot high) pinnacles and hard bottoms that occur in water depths deeper than 77 m immediately to the south

Observed Impacts: anchor scars

Infrastructure Present in Preferred Alternative Boundary: ~4.81 miles pipeline; 1 platform

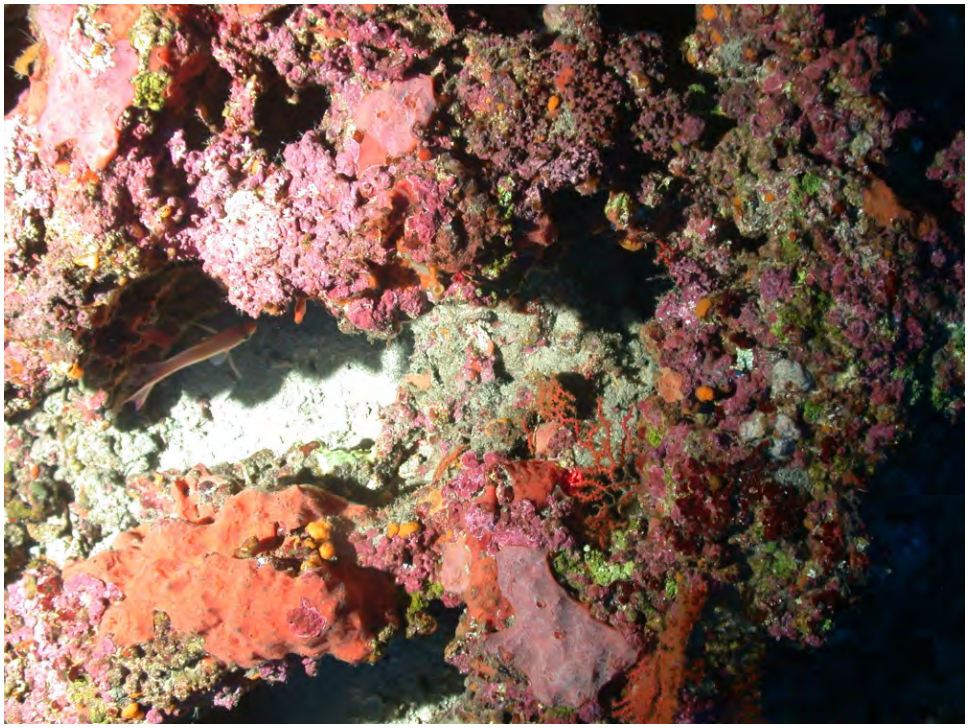


Figure B44. Coralline algae zone in the mesophotic coral habitat at 28-Fathom Bank. Image credit: FGBNMS/UNCW-UVP.

Figure B45. Mesophotic coral habitat at 28-Fathom Bank. Image credit: FGBNMS/UNCW-UVP.

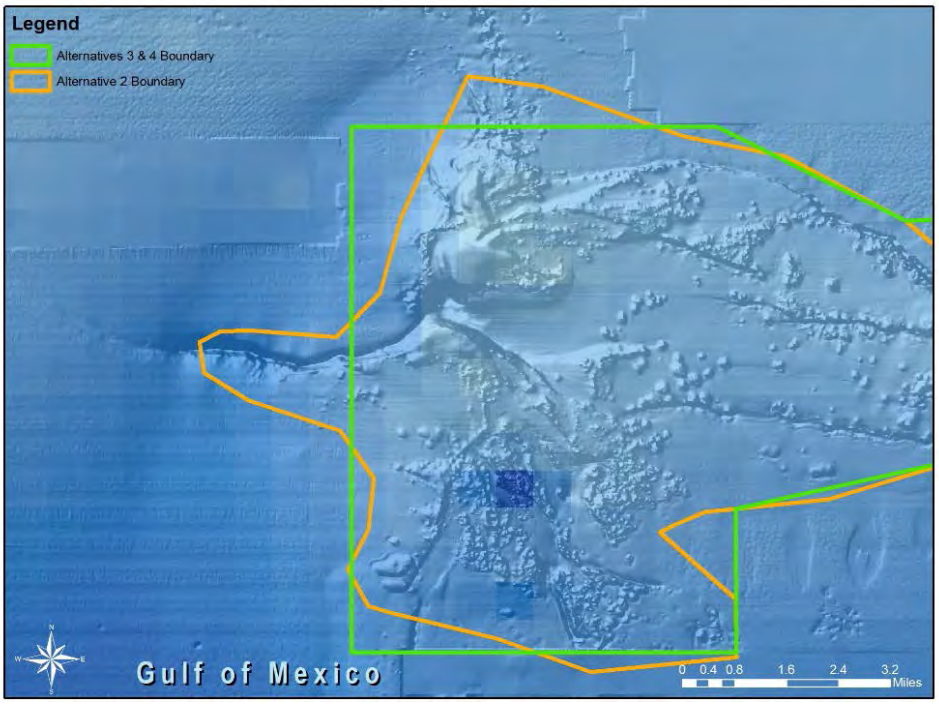


Figure B46. 28-Fathom Bank boundary alternatives 2-4

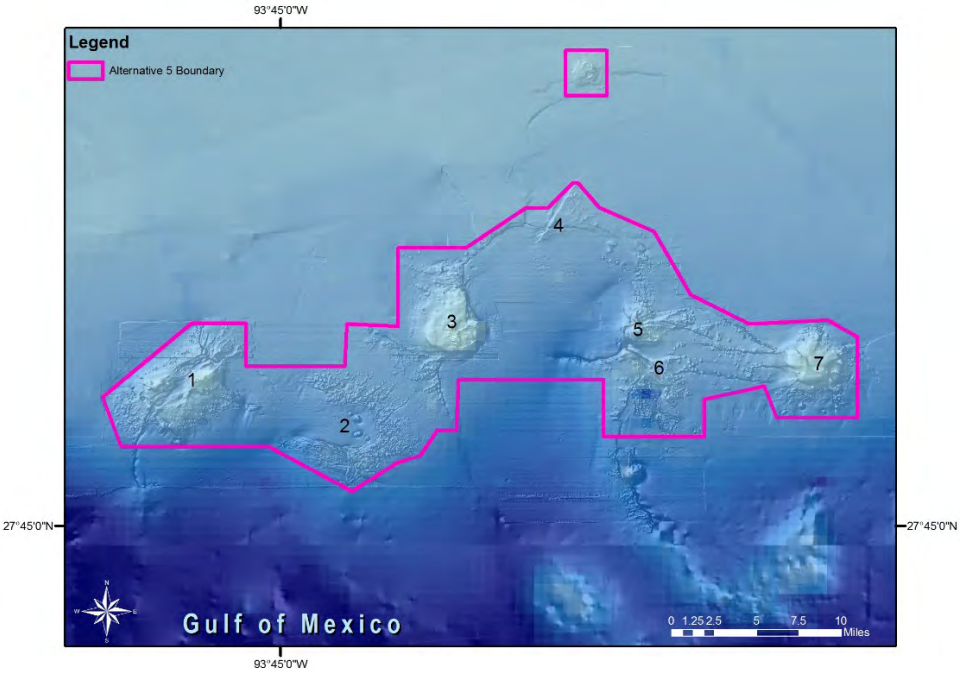


Figure B47. 28-Fathom Bank (labeled 6) in context of Alternative 5 boundary

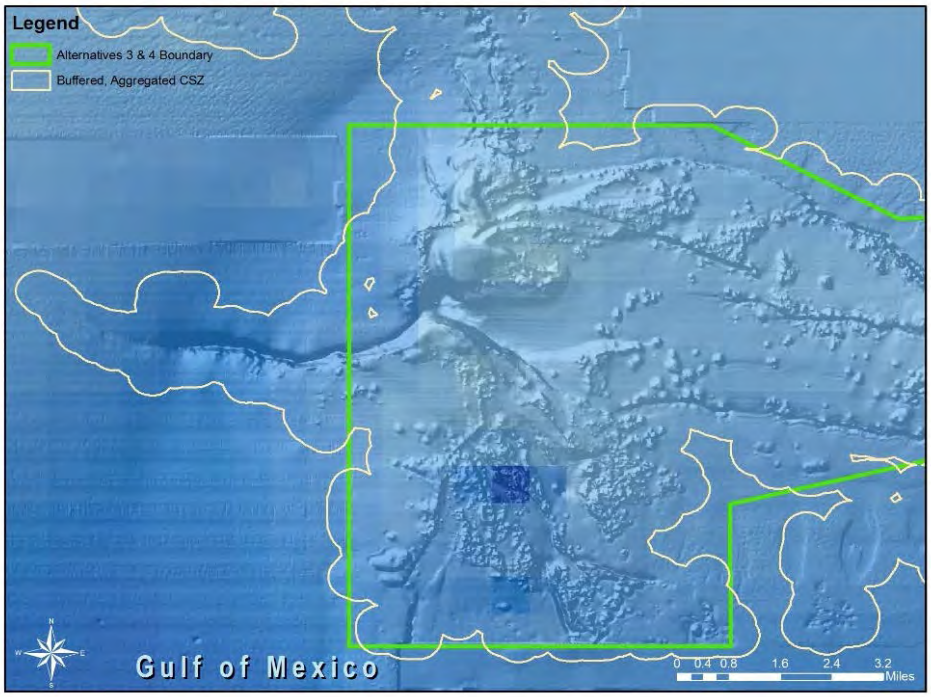


Figure B48. 28-Fathom Bank preferred alternative boundary and buffered, aggregated core sensitivity zones (CSZ)

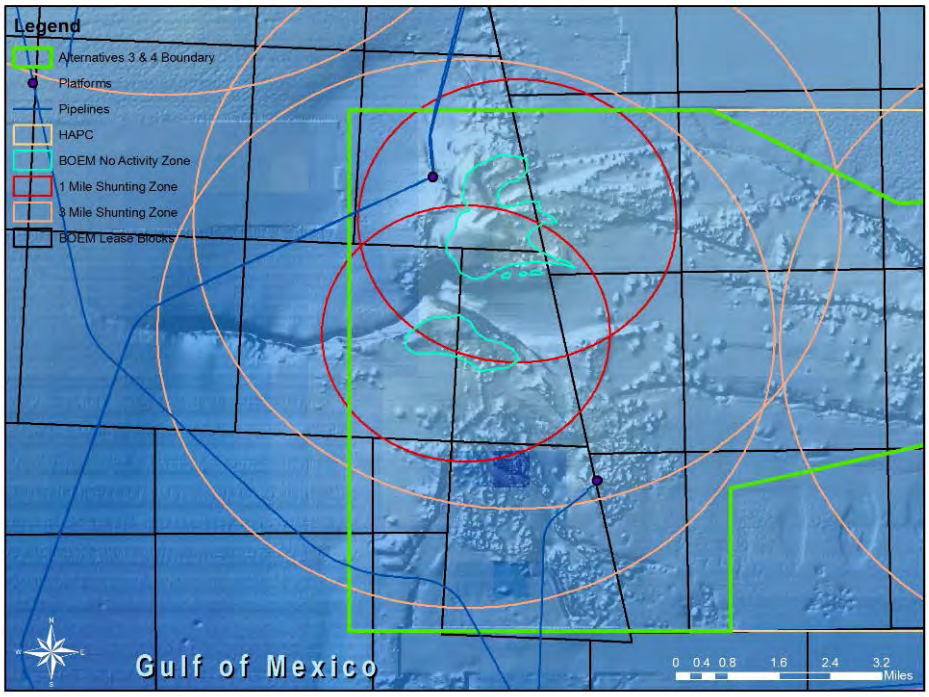


Figure B49. 28-Fathom Bank preferred alternative boundary, existing regulatory zones, and infrastructure

B.2.10 Bright Bank

Bottom Depth Range: ~95-400 feet

Habitat Types Present: coral community, mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: previously harbored coral reef; ~36 .5 km^2 in size, the total relief ranges from ~165 to ~215 feet; bank surface features linear outcrops covered by reef growth and hard bottom without reef development; steep slopes surrounding the bank are most probably the expression of a peripheral fault; outcrops of Pleistocene reef rock are interspersed with large areas of coarse sand, coral, and algal nodules; bank harbors mesophotic habitat consisting of black corals, gorgonians, algae, sponges, stony corals, and a variety of invertebrates; extensive fields of an algae, *Codium sp*., have been documented during ROV surveys; mud volcanos exist in several locations; reported boulder-like reefal structures 5 feet or less in height and 3-6 feet in diameter, occurring singly or clustered into reef patches up to 165 feet in diameter in shallow depths (Bright and Rezak, 1978); in spite of the damage to the bank from salvage and mining activities, nine species of shallow water scleractinian coral survive; two deeper water scleractinians reported; extensive coralline algae and deep coral habitats exist in deep water

Observed Impacts: salvage activities in the 1980s (treasure hunting) employing dynamite for excavation damaged many coral features; invasive species (orange cup coral), fishing debris (anchors)

Infrastructure Present in Preferred Alternative Boundary: None

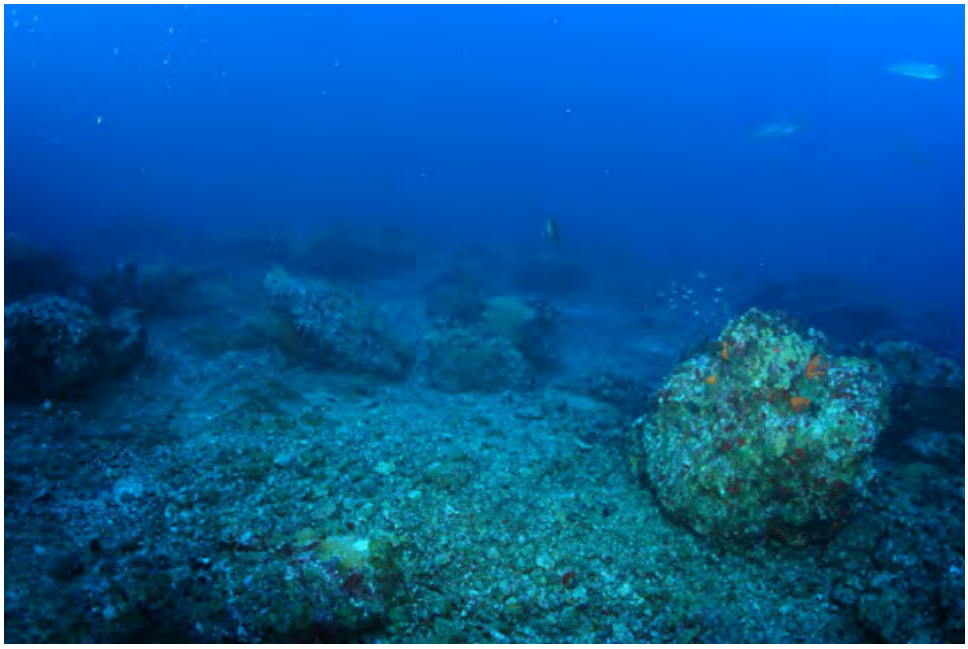


Figure B50. Remnants of coral reef habitat on Bright Bank crest – results from treasure hunting activities using explosives. Image credit: FGBNMS/Schmahl.

Figure B51. Black corals and branching corals in the mesophotic coral habitat at Bright Bank. Image credit: FGBNMS/UNCW-UVP.

Figure B52. Rankin Bank boundary alternatives 2-4

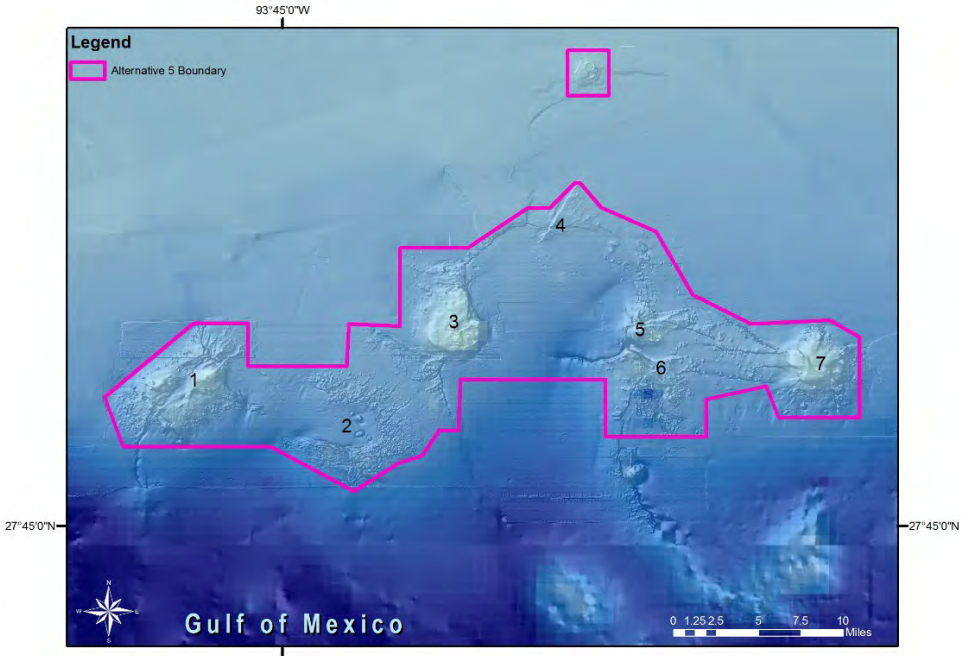


Figure B53. Bright Bank (labeled 7) in context of Alternative 5 boundary

Figure B54. Rankin Bank preferred alternative boundary and buffered, aggregated core sensitivity zones (CSZ)

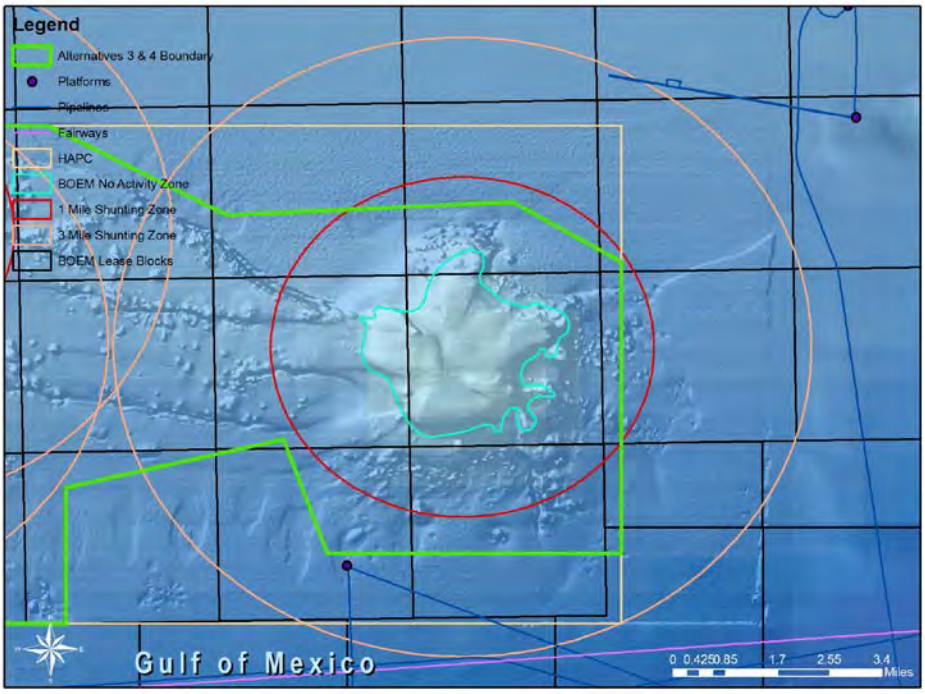


Figure B55. Bright Bank preferred alternative boundary, existing regulatory zones, and infrastructure

B.2.11 Geyer Bank

Bottom Depth Range: ~105-670 feet

Habitat Types Present: coral community, mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: situated on an active salt diapir on the upper continental slope, the entire bank is essentially fault-bounded and the top of the structure is broad and relatively flat, with prominences on the north and south ends separated by a "saddle"; supports a coral community, as well as mesophotic coral habitats including black corals, gorgonians, fish, sponges, algae, and invertebrates; over 28 fish species have been documented as well as numerous invertebrates and coralline algae; recent observations have documented a Sargassum bloom on the coral community crest, and divers have documented enormous numbers of reef butterflyfish at specific times of year

Observed Impacts: large ship anchoring just outside the safety fairway; fishing debris (line/rope)

Infrastructure Present in Preferred Alternative Boundary: None

Figure B56. A large school of reef butterflyfish around the coral community dominated by fire coral, algae and sponges, on the crest at Geyer Bank. Image credit: FGBNMS/Schmahl.

Figure B57. Brittle stars intertwined through the branches of a colorful gorgonian, Swiftia exerta, in the mesophotic coral habitat at Geyer Bank. Image credit: FGBNMS/UNCW-UVP.

Figure B58. Geyer Bank boundary alternatives 2-5 and buffered, aggregated core sensitivity zones (CSZ)

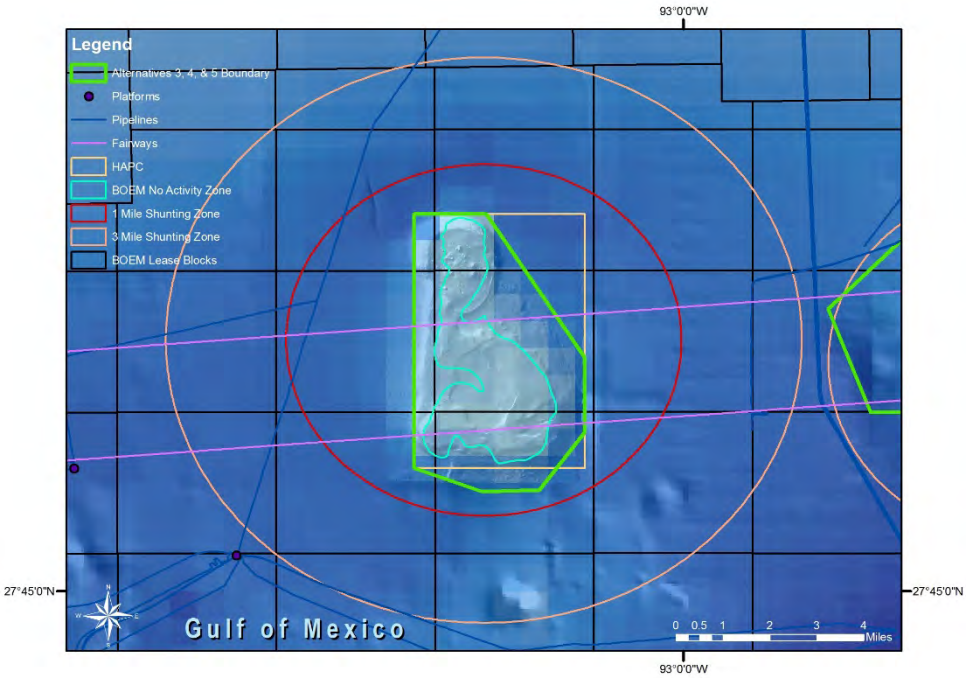


Figure B59. Geyer Bank preferred alternative boundary, existing regulatory zones, and infrastructure

B.2.12 Elvers Bank

Bottom Depth Range: ~230-675 feet

Habitat Types Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: situated at the very edge of the shelf, 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 of Mexico; fields of sea pens and yellow stalked crinoids have been documented here, as well as outcroppings covered in glass sponges, which are long-lived animals and are rare throughout the region.

Observed Impacts: fishing debris (line/rope, anchors)

Infrastructure Present in Preferred Alternative Boundary: ~8.51 miles pipeline

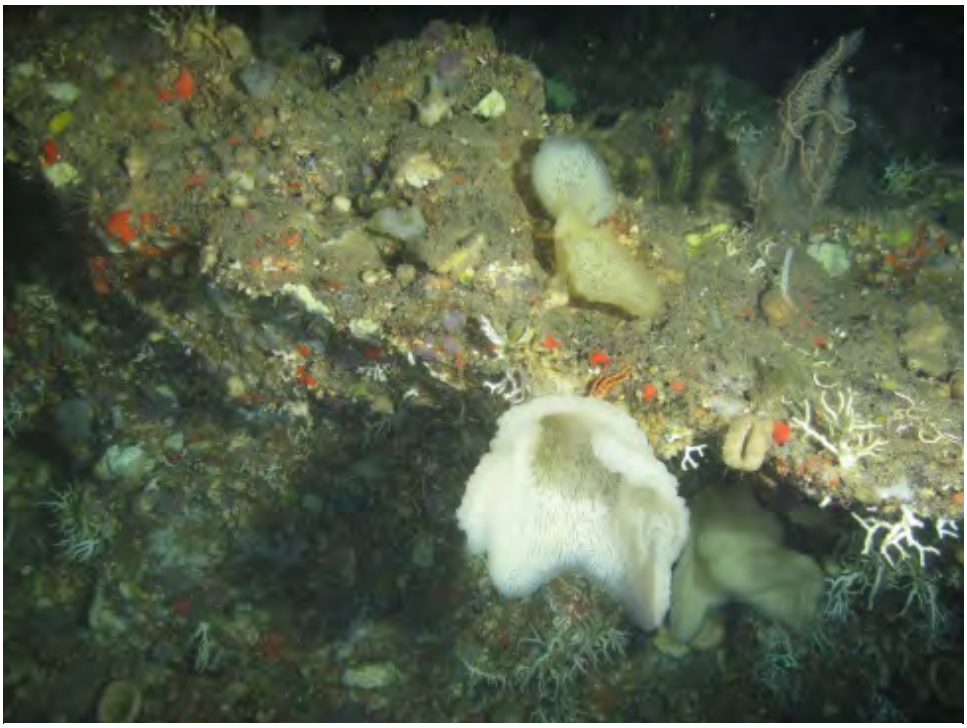


Figure B60. Glass sponge fields at 160m in the mesophotic coral habitat at Elvers Bank. Image credit: FGBNMS/UNCW-UVP.

Figure B61. Algal nodules dominated by orange sponges at 70m in the mesophotic coral habitat at Elvers Bank. Image credit: FGBNMS/UNCW-UVP.

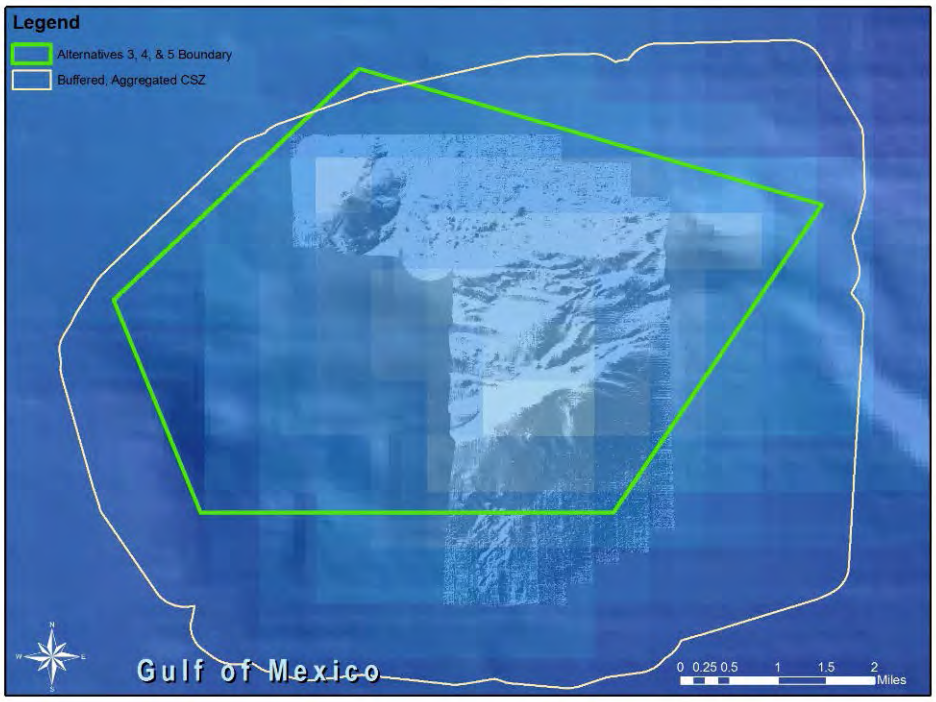


Figure B62. Elvers Bank boundary alternatives 3-5 and buffered, aggregated core sensitivity zones (CSZ)

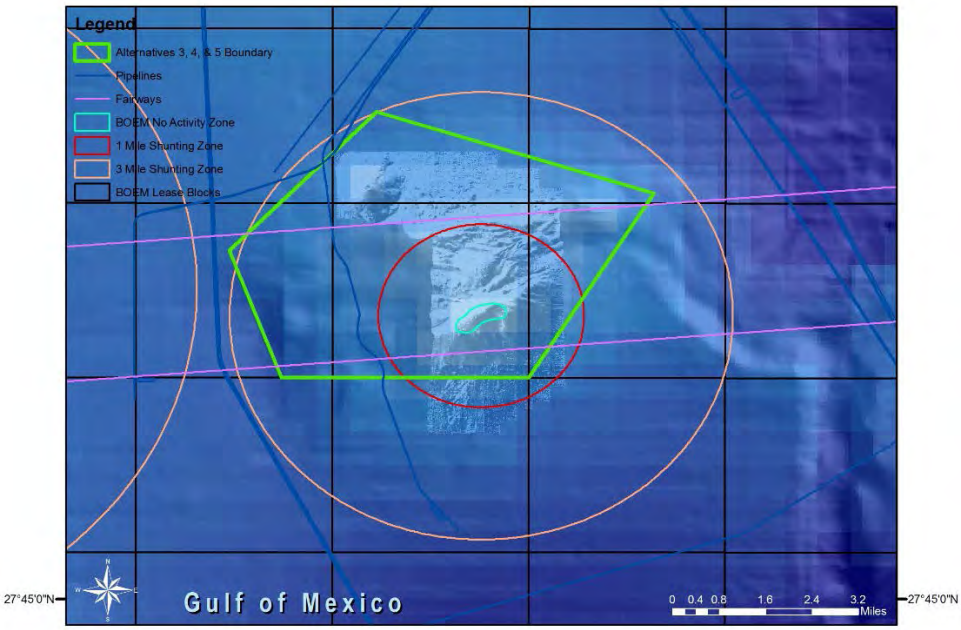


Figure B63. Elvers Bank preferred alternative boundary, existing regulatory zones, and infrastructure

B.2.13 McGrail Bank

Bottom Depth Range: ~145-490 feet

Habitat Types Present: coral reef, coral community, mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: areas of coral reefs dominated by large colonies of the blushing star coral, *Stephanocoenia intersepta* with coral cover approximately 28% in discreet areas; unique in the sense that no other coral reef is known that is dominated by this species; pinnacles varying in diameter from ~80 to 395 feet across and as high as ~25 feet are found on the southwest rim of the main feature, along east- and southeast-trending scarps that lead away from the bank and in concentrated fields to the south and southeast of the bank; a significant portion of the depth zone between 145 and 170 feet is dominated by coral colonies up to 5 feet tall, covering an area approximately 37 acres; at least 14 species of hermatypic corals, 7 species of macroalgae, 4 species of common sponges, and 78 species of reef fish have been recorded; deeper portions harbor mesophotic coral communities including black corals, gorgonians, fish, sponges, algae, and invertebrates

Observed Impacts: marine debris (e,g,, discarded 55-gallon drum, large metal springs, steel cable); fishing debris and damage (e.g., lost anchors, several mechanically overturned coral heads, linear area of disturbance approximately 3-4 meters wide and several hundred meters long likely related to trawling); *Sargassum* bloom on the coral reef crest, potentially threatening the coral colonies

Infrastructure Present in Preferred Alternative Boundary: ~9.74 miles pipeline

Figure B64. Large colonies of blushing star coral dominate the crest of McGrail Bank at around 47m. Image credit: National Geographic Society/Sustainable Seas Expedition.

Figure B65. Mesophotic coral habitat at McGrail Bank in 91m. Image credit: FGBNMS/UNCW-UVP.

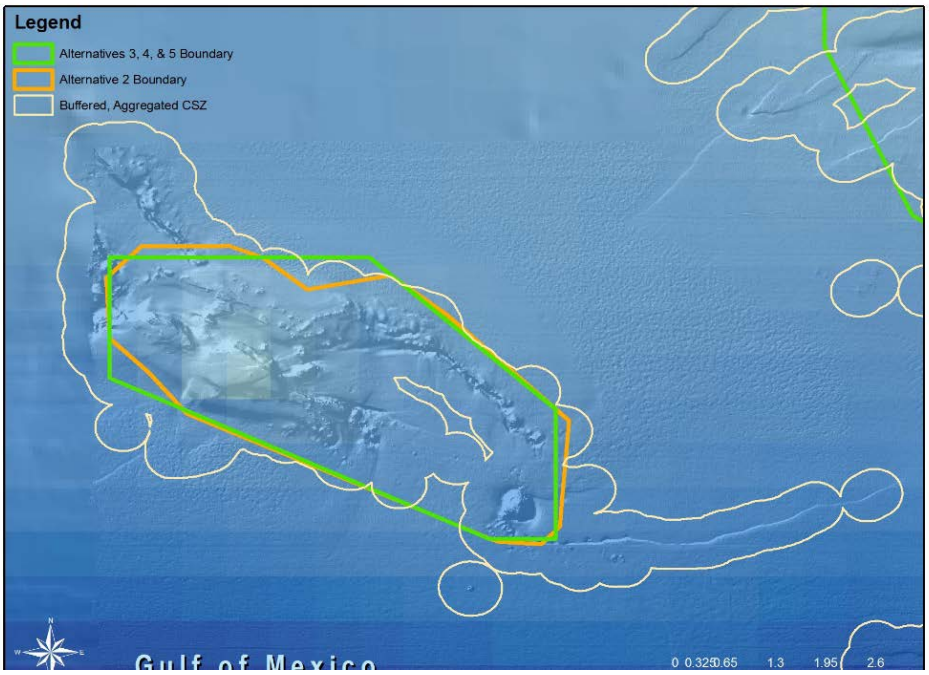


Figure B66. McGrail Bank boundary alternatives 2-5 and buffered, aggregated core sensitivity zones (CSZ)

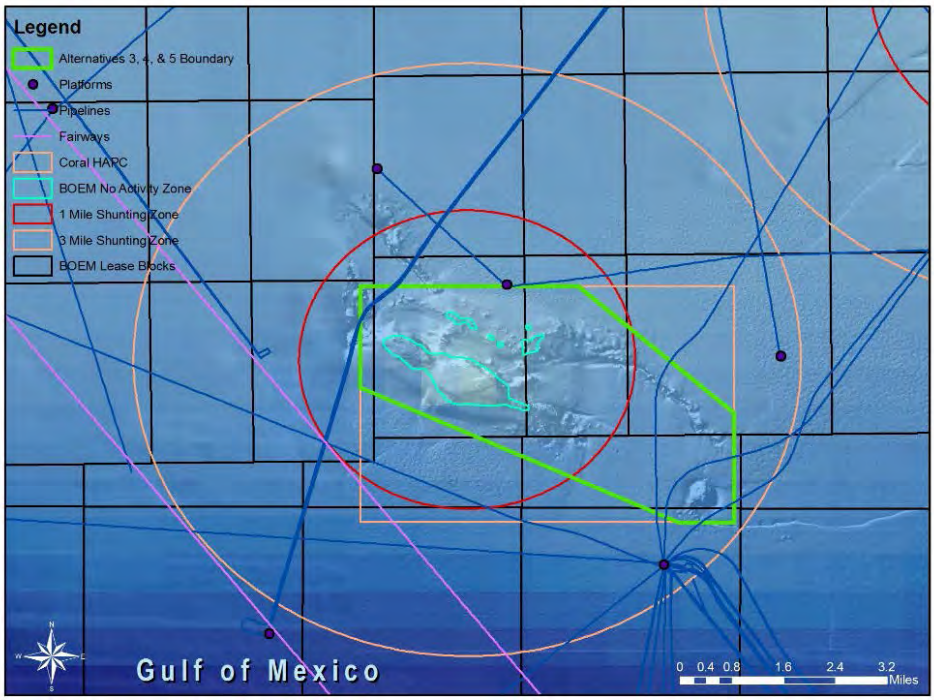


Figure B67. McGrail Bank preferred alternative boundary, existing regulatory zones, and infrastructure

B.2.14 Sonnier Bank

Bottom Depth Range: ~65-315 feet

Habitat Types Present: coral communities, mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: a series of isolated clusters of pinnacles rise mostly around the perimeter of a single roughly circular ring 3.2 km in diameter; two peaks are accessible and popular with recreational scuba divers; substrate of uplifted siltstone and claystone; a large (1.3 x 1.5 km), 3-m-deep depression occupies the southern half of the feature that is thought to be the result of the collapsed crest of an underlying salt diapir; peaks dominated by coral communities featuring fire coral, sponges, and algae; deeper portions harbor mesophotic coral habitats

Observed Impacts: fishing debris (trawl nets), anchor scars, hurricane damage to substrate

Infrastructure Present in Preferred Alternative Boundary: ~0.99 miles pipeline

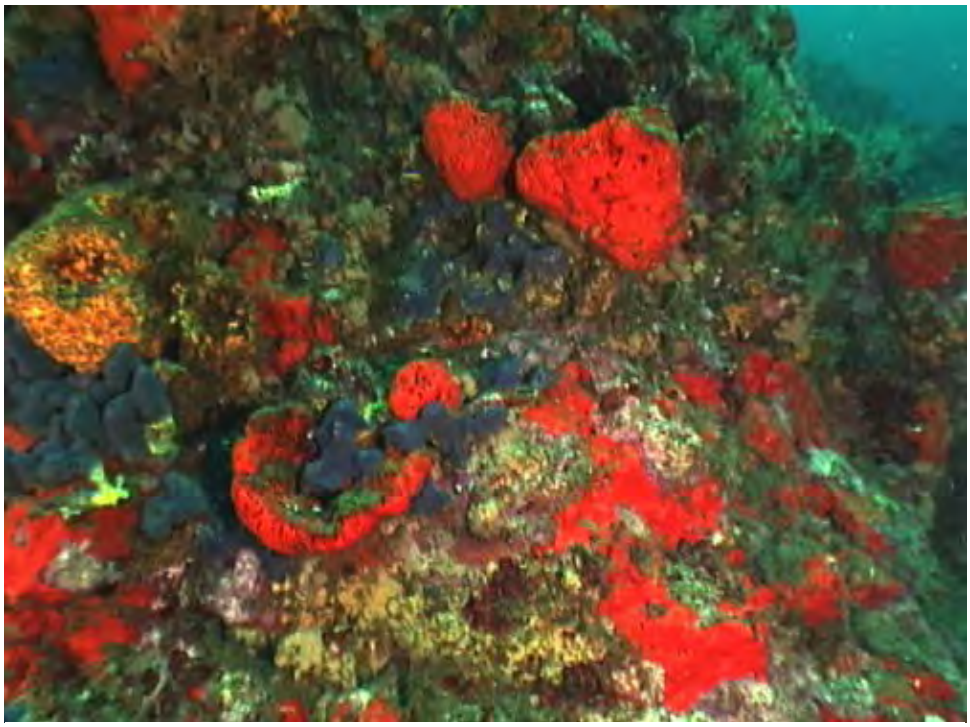


Figure B68. Sponge dominated ridge at Sonnier Bank. Image credit: FGBNMS/UNCW-UVP.

Figure B69. Sponges and fire coral dominated habitat on the crest at Sonnier Bank. Image credit: FGBNMS/UNCW-UVP.

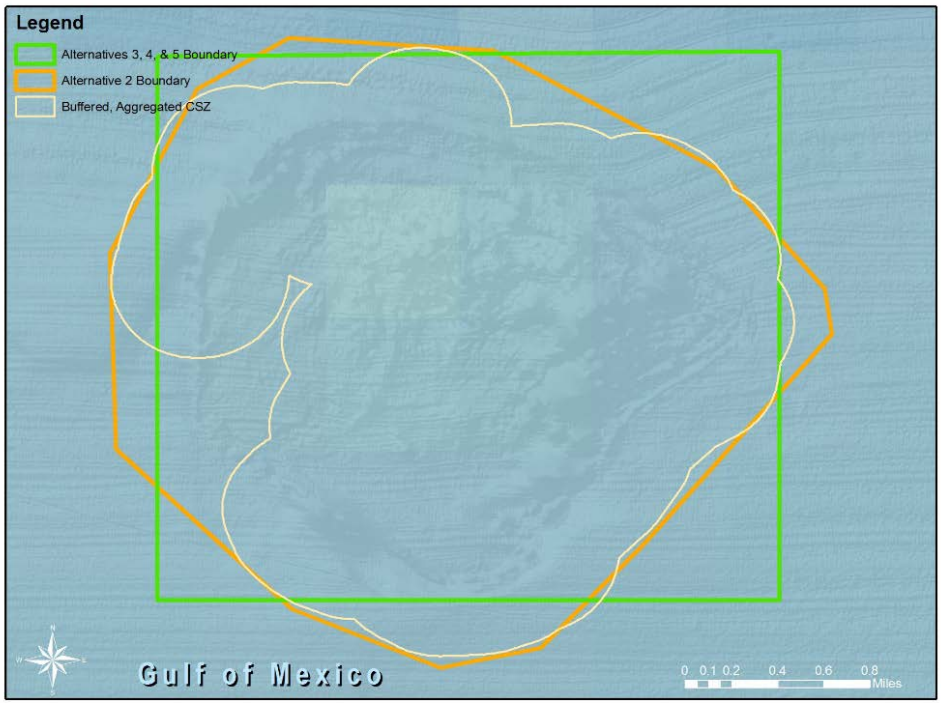


Figure B70. Sonnier Bank boundary alternatives 2-5 and buffered, aggregated core sensitivity zones (CSZ)

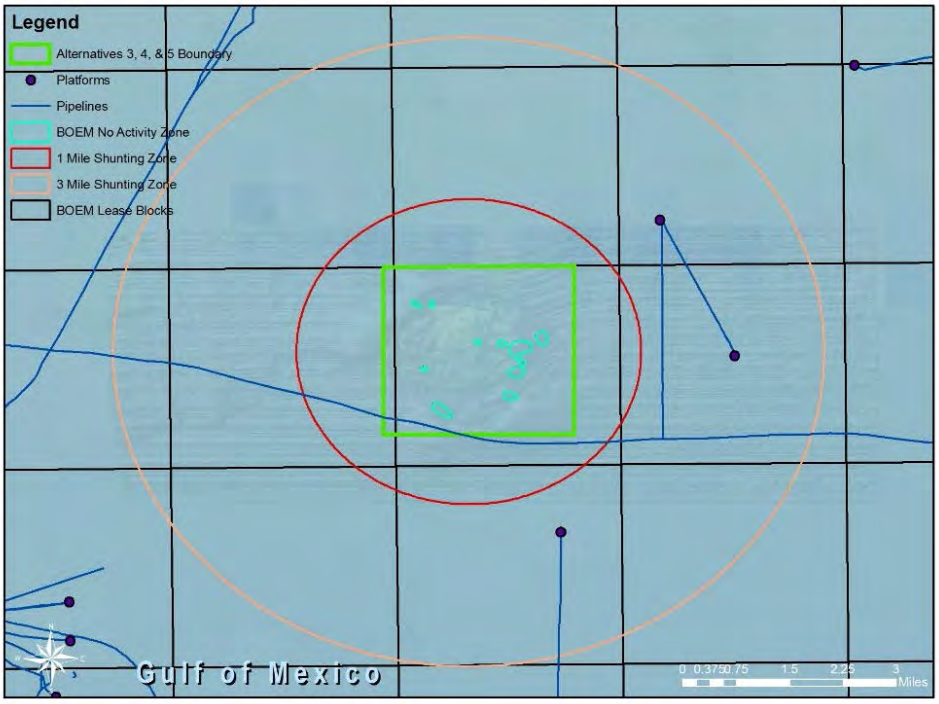


Figure B71. Sonnier Bank preferred alternative boundary, existing regulatory zones, and infrastructure (preferred alternative boundary matches existing HAPC)

B.2.15 Bouma Bank

Bottom Depth Range: ~195-380 feet

Habitat Types Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: mesophotic habitat is prevalent throughout the complex, and is dominated by black corals, gorgonians, fish, sponges, algae, and invertebrates; Bouma Bank is a mature salt dome that shows evidence of crestal collapse, and the occurrence of siltstone without encrustations of coralline algae indicates very recent exposure due to faulting; local features vary in size from less than 3 feet to greater than fifteen feet in height

Observed Impacts: fishing debris (line/rope)

Infrastructure Present in Preferred Alternative Boundary: ~0.92 miles pipeline

Figure B72. Lush sponge/algae field and a lizardfish at around 65m in mesophotic coral habitat at Bouma Bank. Image credit: FGBNMS/UNCW-UVP.

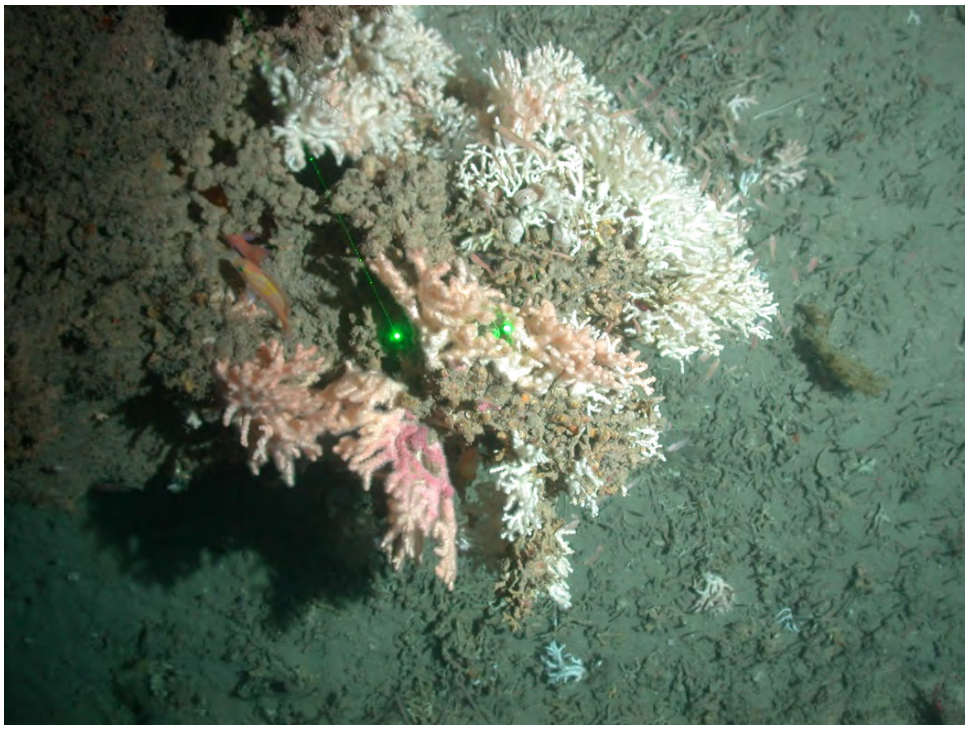


Figure B73. Branching coral at 104m in the mesophotic coral habitat at Bouma Bank. Image credit: FGBNMS/UNCW-UVP.

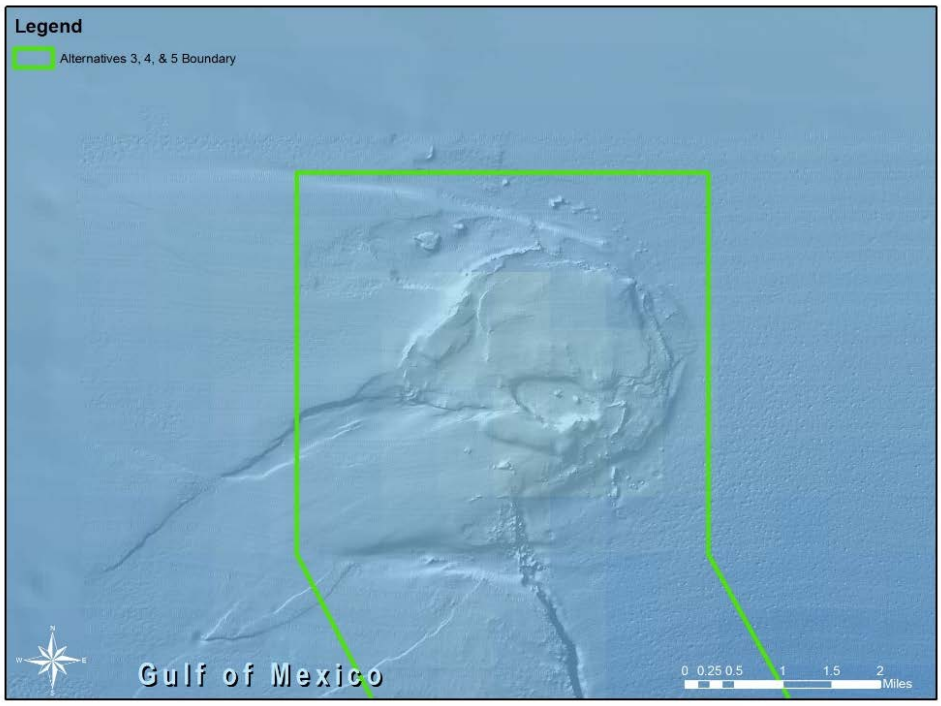


Figure B74. Bouma Bank boundary alternatives 3-5

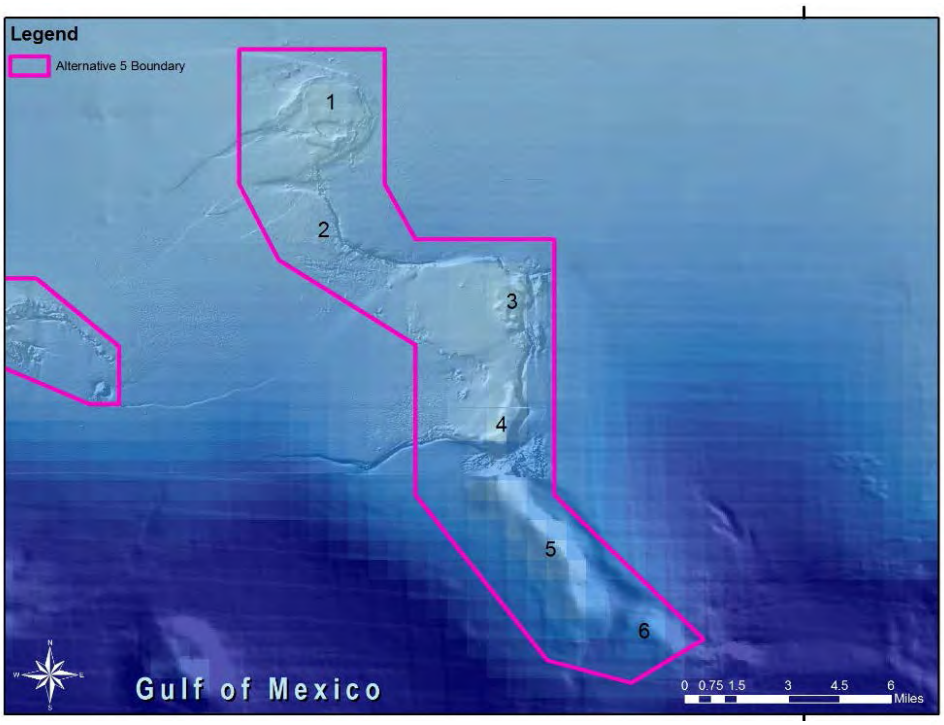


Figure B75. Bouma Bank (labeled 1) in context of Alternative 5 boundary

Figure B76. Bouma Bank preferred alternative boundary and buffered, aggregated core sensitivity zones (CSZ)

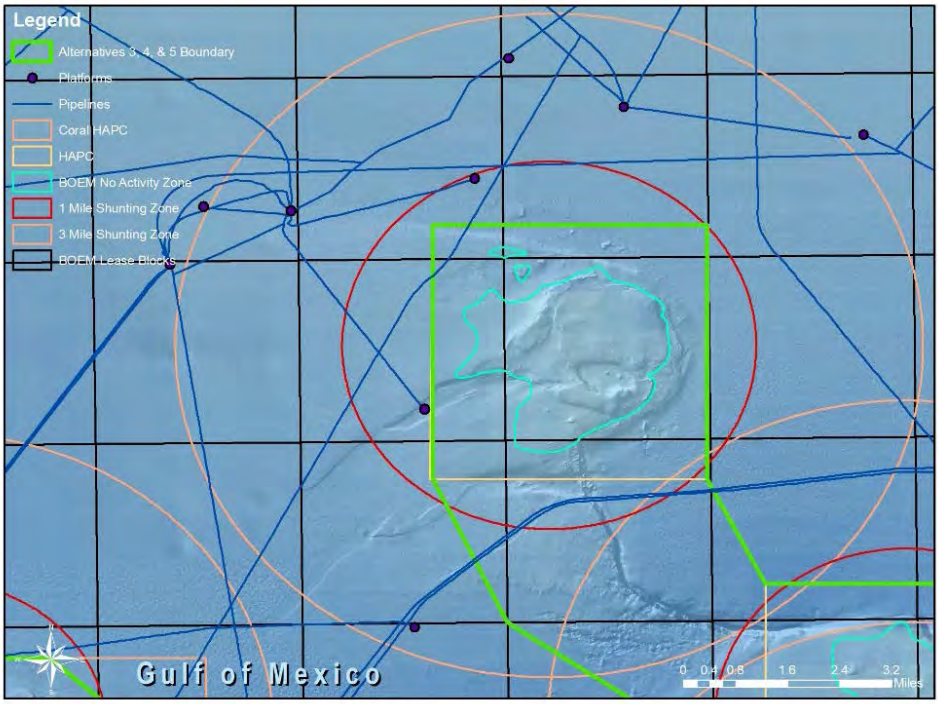


Figure B77. Bouma Bank preferred alternative boundary, existing regulatory zones, and infrastructure

B.2.16 Bryant Bank

Bottom Depth Range: ~295-560 feet

Habitat Types Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: mesophotic habitat is prevalent throughout the complex, and is dominated by black corals, gorgonians, fish, sponges, algae, and invertebrates

Observed Impacts: None

Infrastructure Present in Preferred Alternative Boundary: ~7.05 miles pipeline

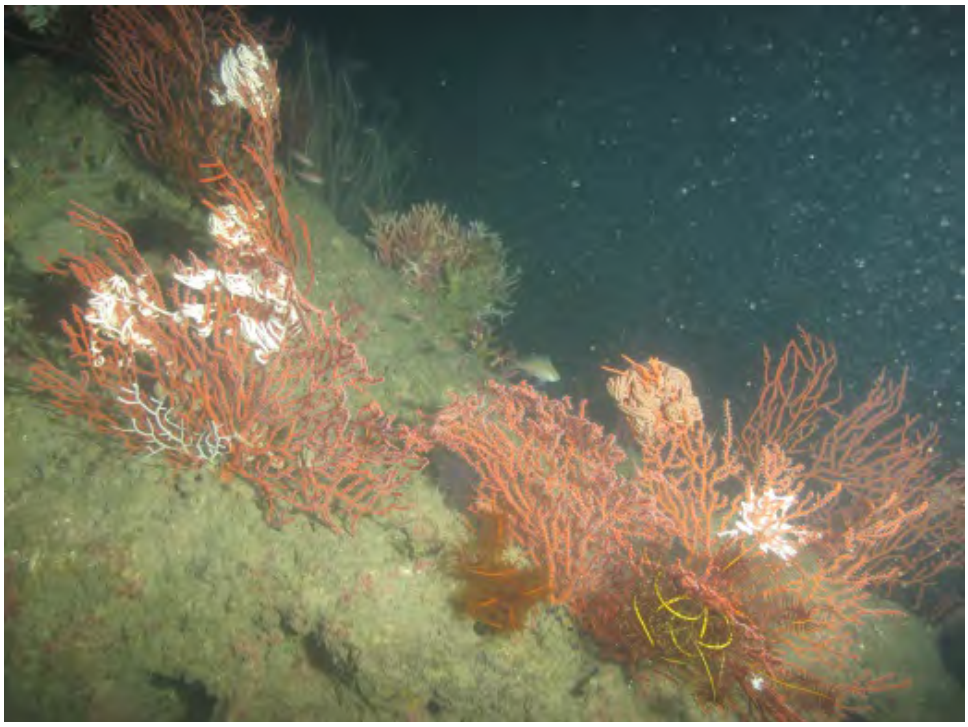


Figure B78. Thesea rubra gorgonians in the mesophotic coral habitat at Bryant Bank at 95m depth. Image credit: FGBNMS/UNCW-UVP.

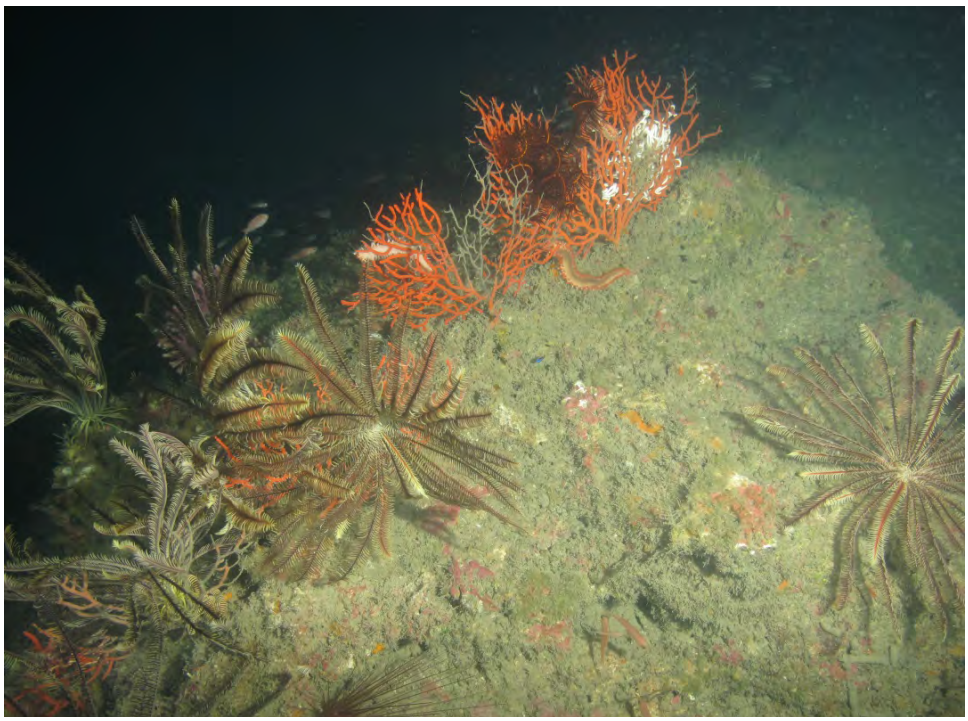


Figure B79. Gorgonians, black corals, and crinoids in the mesophotic coral habitat at Bryant Bank. Image credit: FGBNMS/UNCW-UVP.

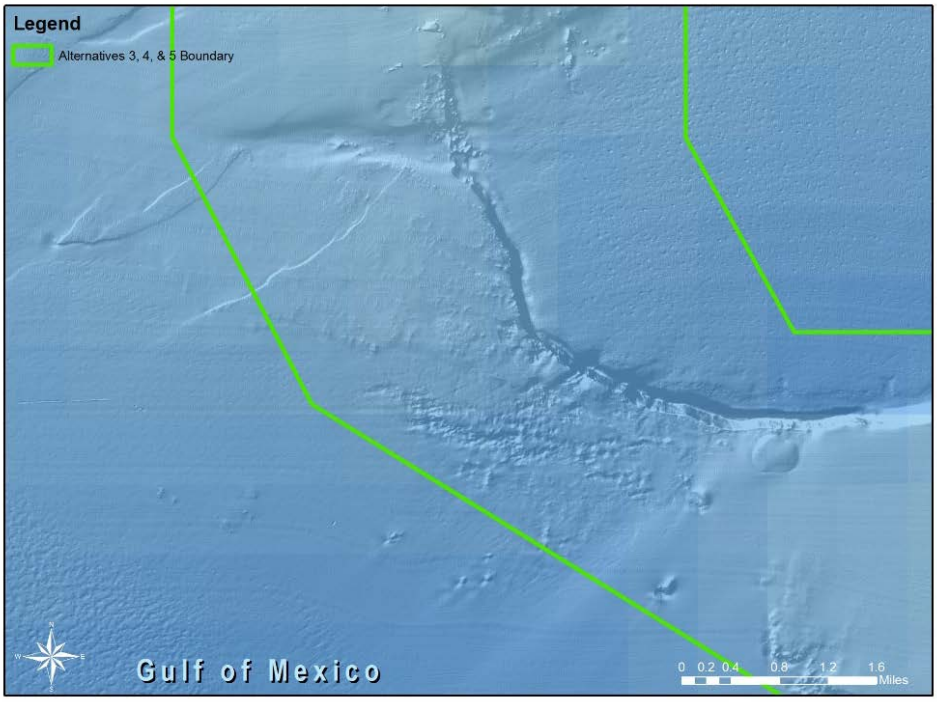


Figure B80. Bryant Bank boundary alternatives 3-5

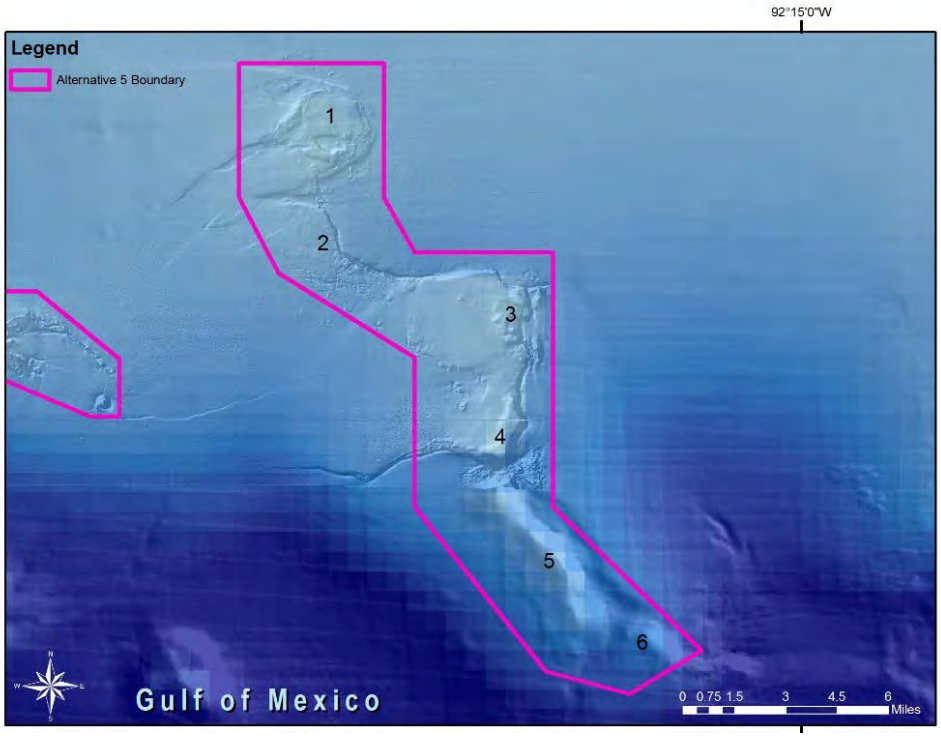


Figure B81. Bryant Bank (labeled 2) in context of Alternative 5 boundary

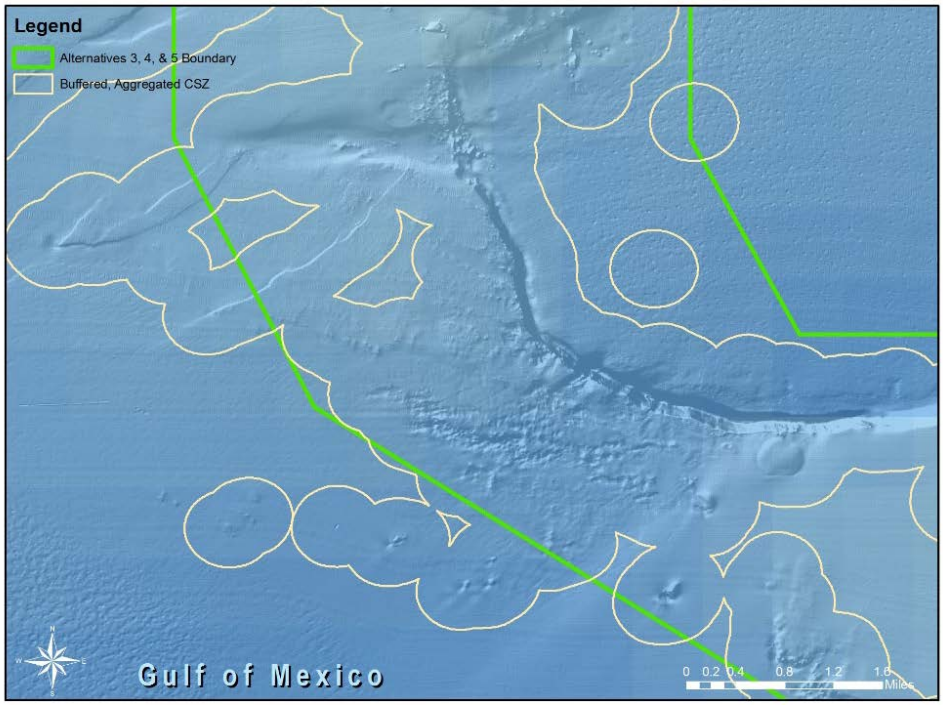


Figure B82. Bryant Bank preferred alternative boundary and buffered, aggregated core sensitivity zones (CSZ)

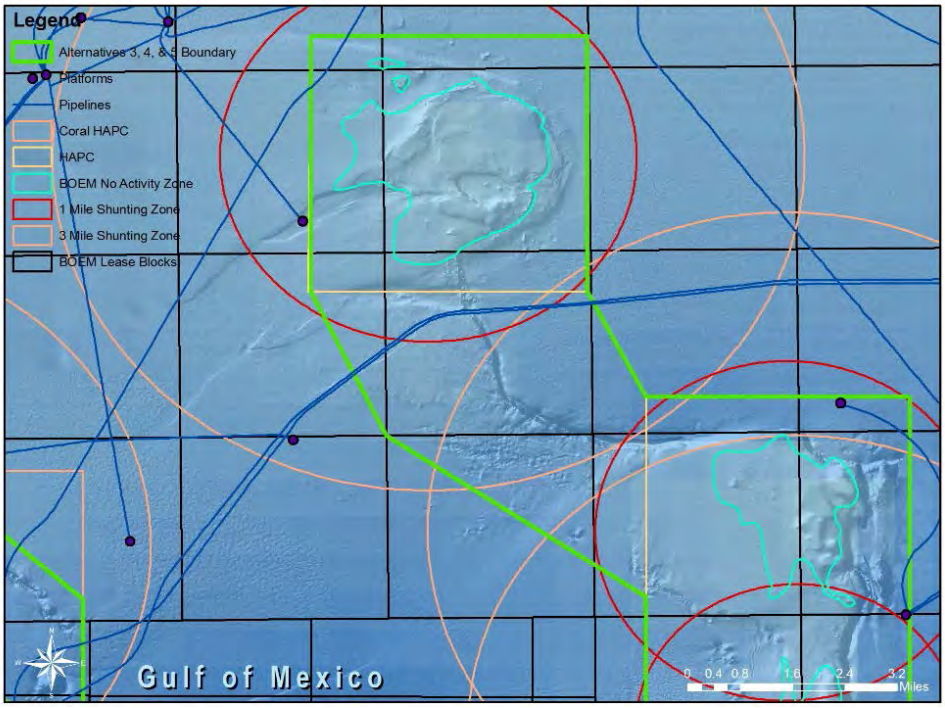


Figure B83. Bryant Bank preferred alternative boundary, existing regulatory zones, and infrastructure

B.2.17 Rezak Bank

Bottom Depth Range: ~195-475 feet

Habitat Types Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: mesophotic habitat is prevalent throughout the complex, and is dominated by black corals, gorgonians, fish, sponges, algae, and invertebrates; constructed on a gently sloping tilted fault block related to salt intrusion, Rezak Bank is a series of five elongate to circular mounds with plan dimensions of 650–3280 feet that rise 16-23 feet the surface; similar in profile to Sidner Bank, its steepest flank faces the edge of the large structure the two banks are built upon.

Observed Impacts: fishing debris (line/rope)

Infrastructure Present in Preferred Alternative Boundary: ~2.06 miles pipeline, 2 platforms

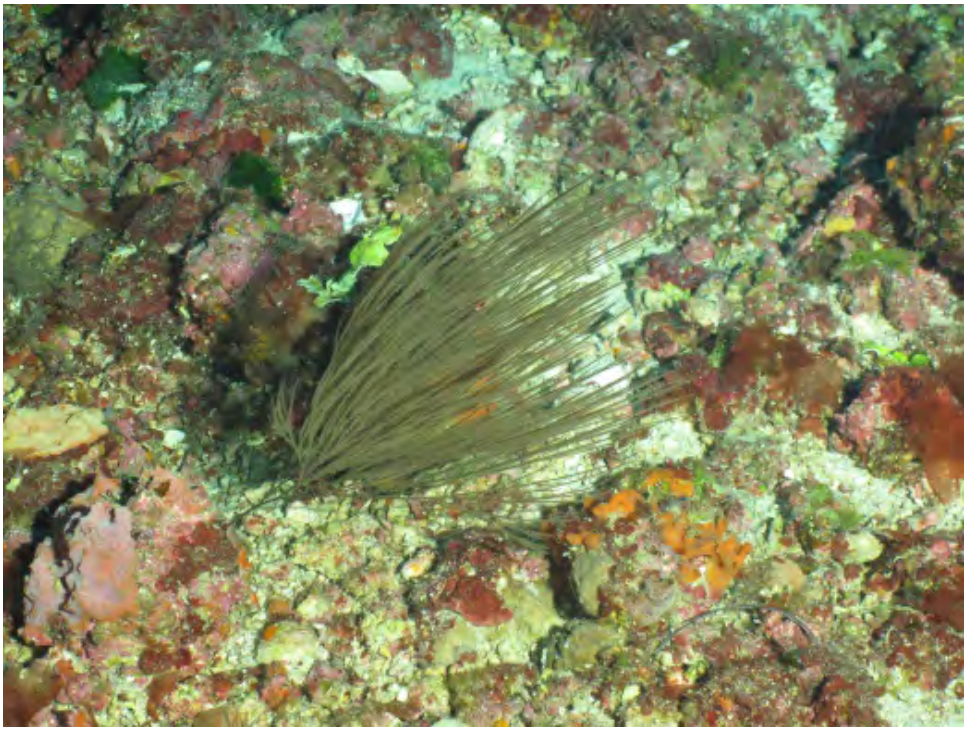


Figure B84. A black coral, Antipathes furcata in the algal nodule zone in mesophotic coral habitat at Rezak Bank at 215 ft depth. Image credit: UNCW-UVP.

Figure B85. Dense field of gorgonians in the mesophotic coral habitat at 280 ft depth at Rezak Bank. Image credit: UNCW-UVP.

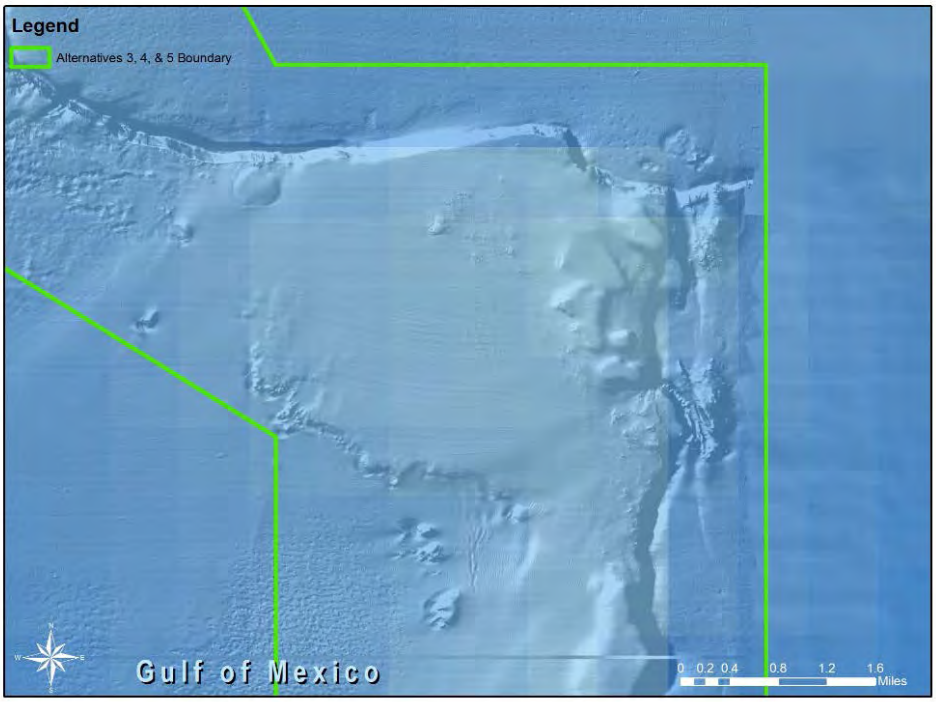


Figure B86. Rezak Bank boundary alternatives 3-5

Figure B87. Rezak Bank (labeled 3) in context of Alternative 5 boundary

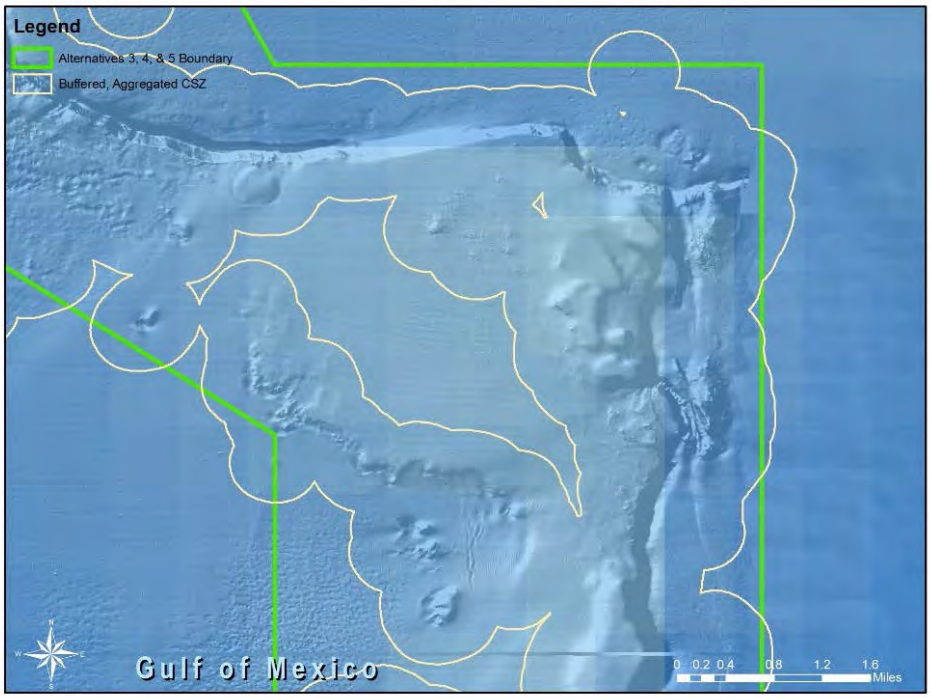


Figure B88. Rezak Bank preferred alternative boundary and buffered, aggregated core sensitivity zones (CSZ)

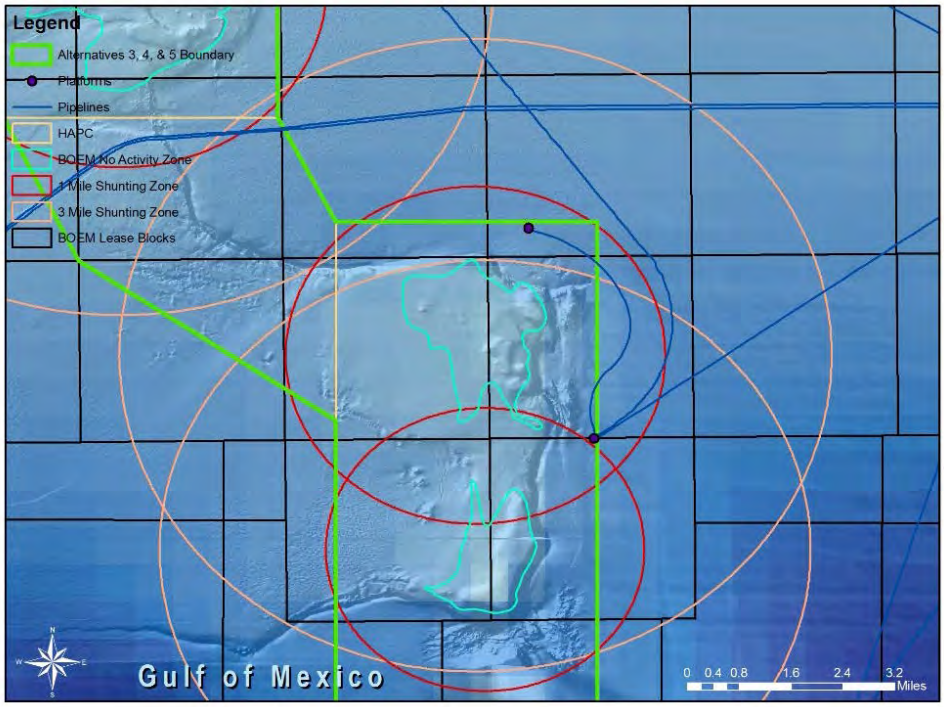


Figure B89. Rezak Bank preferred alternative boundary, existing regulatory zones, and infrastructure

B.2.18 Sidner Bank

Bottom Depth Range: ~195-610 feet

Habitat Types Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: mesophotic habitat is prevalent throughout the complex, and is dominated by black corals, gorgonians, fish, sponges, algae, and invertebrates; constructed on a gently sloping tilted fault block related to salt intrusion, Sidner Bank is a ~9500-foot-long bathymetric high that rises 50-65 feet above the surrounding seafloor and is similar to Rezak Bank in profile with its steepest flank facing the edge of the large structure it is built upon.

Observed Impacts: fishing debris (line/rope), anchor

Infrastructure Present in Preferred Alternative Boundary: None

Figure B90. Agelas clathrodes sponge, green and coralline algae in the mesophotic coral habitat at Sidner Bank. Image credit: UNCW-UVP.

Figure B91. Encrusting sponges and urchin in the mesophotic coral habitat at Sidner Bank. Image credit: UNCW-UVP.

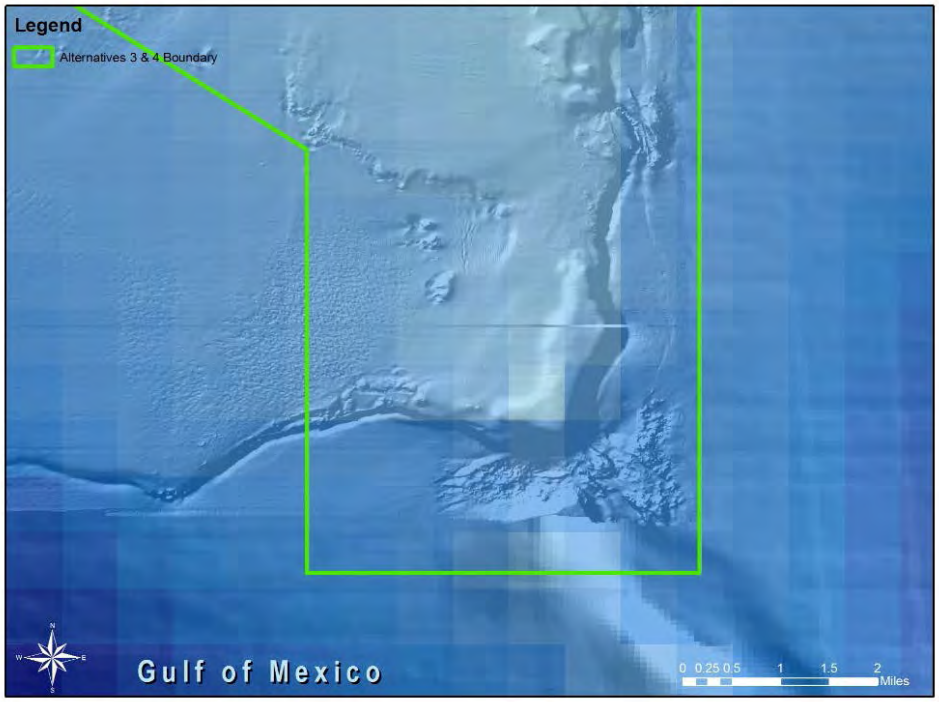


Figure B92. Sidner Bank boundary alternatives 3 & 4

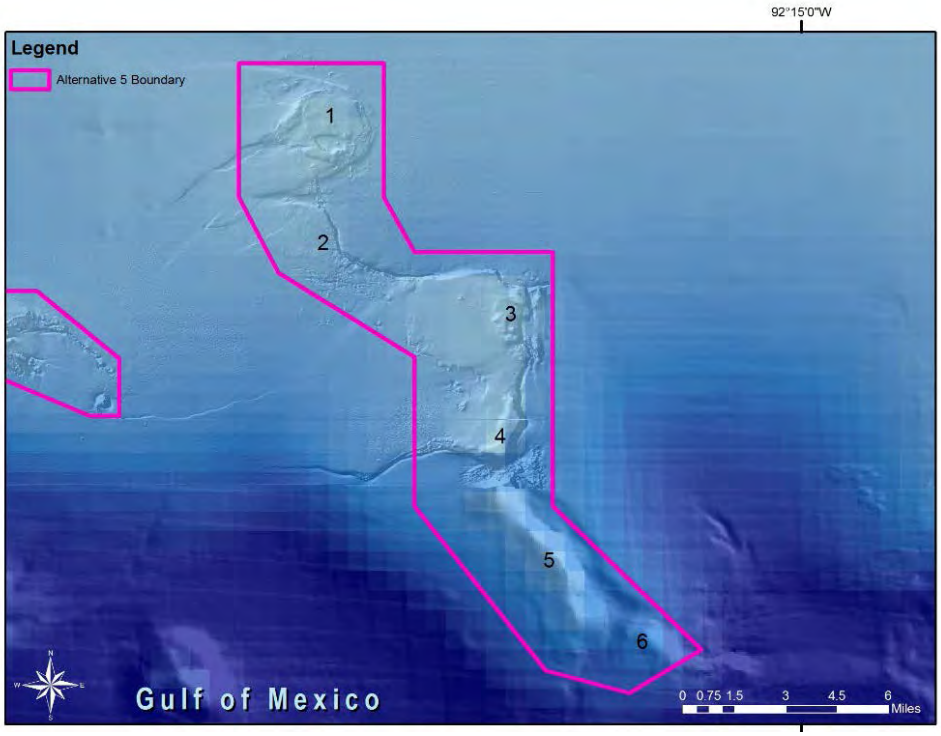


Figure B93. Sidner Bank (labeled 4) in context of Alternative 5 boundary

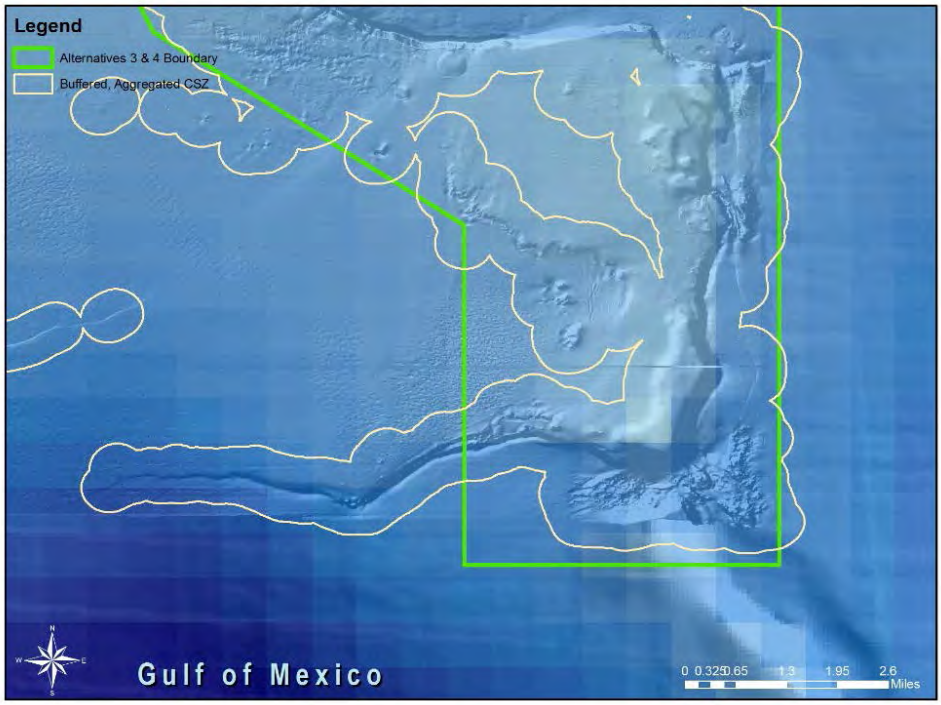


Figure B94. Sidner Bank preferred alternative boundary and buffered, aggregated core sensitivity zones (CSZ)

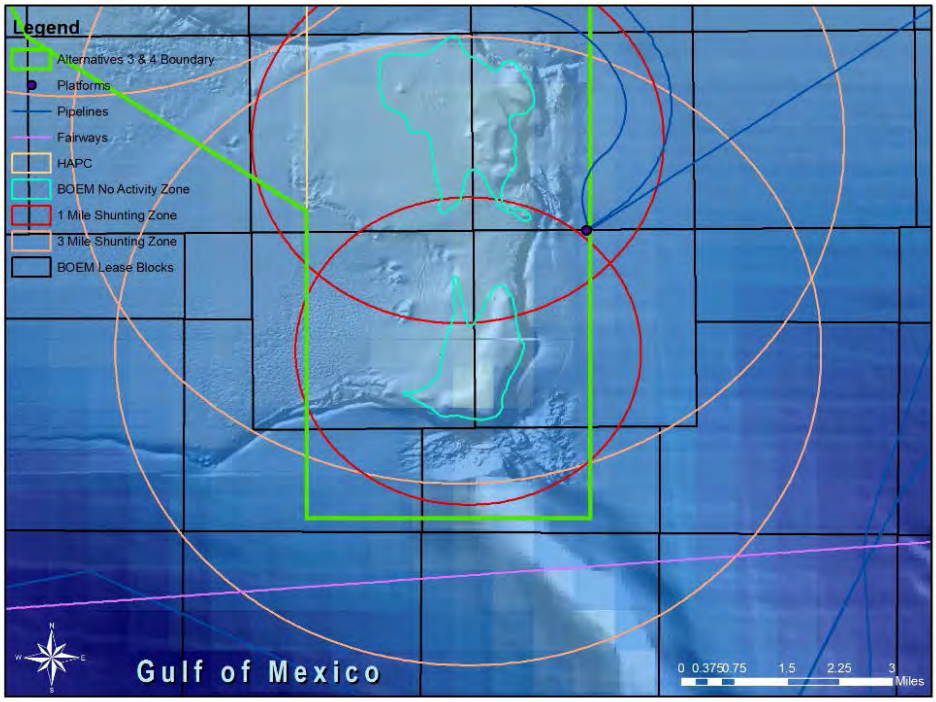


Figure B95. Sidner Bank preferred alternative boundary, existing regulatory zones, and infrastructure

B.2.19 Tresslar Bank

Bottom Depth Range: ~310-820 feet

Habitat Types Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: mesophotic habitat is prevalent throughout the complex, and is dominated by black corals, gorgonians, fish, sponges, algae, and invertebrates

Observed Impacts: None

Infrastructure Present in Preferred Alternative Boundary: None

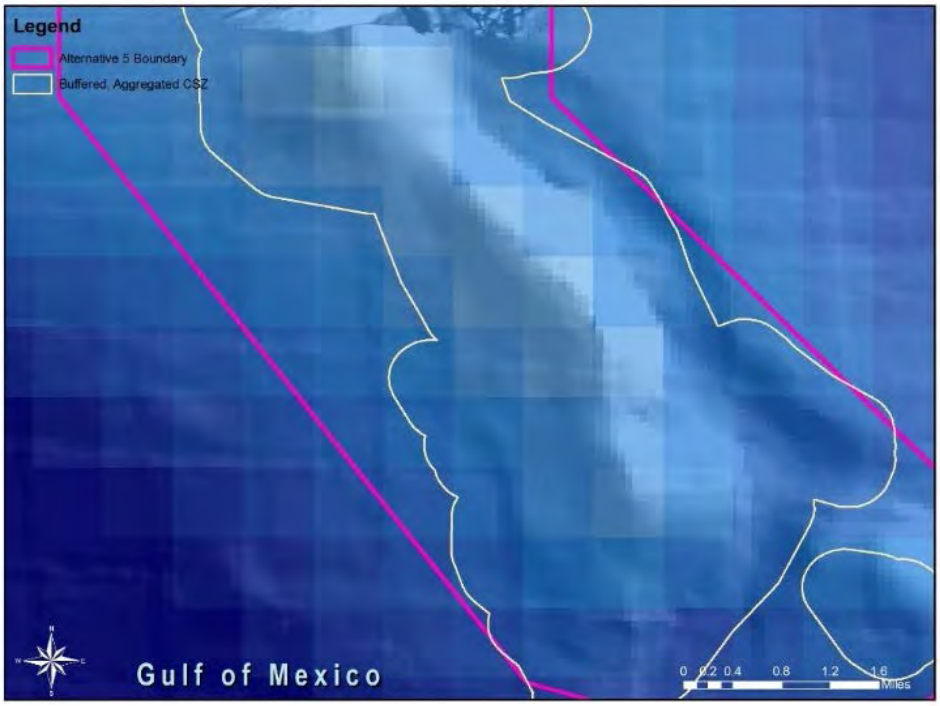


Figure B96. Tresslar Bank boundary alternative and buffered, aggregated core sensitivity zones (CSZ)

Figure B97. Tresslar Bank (labeled 5) in context of Alternative 5 boundary

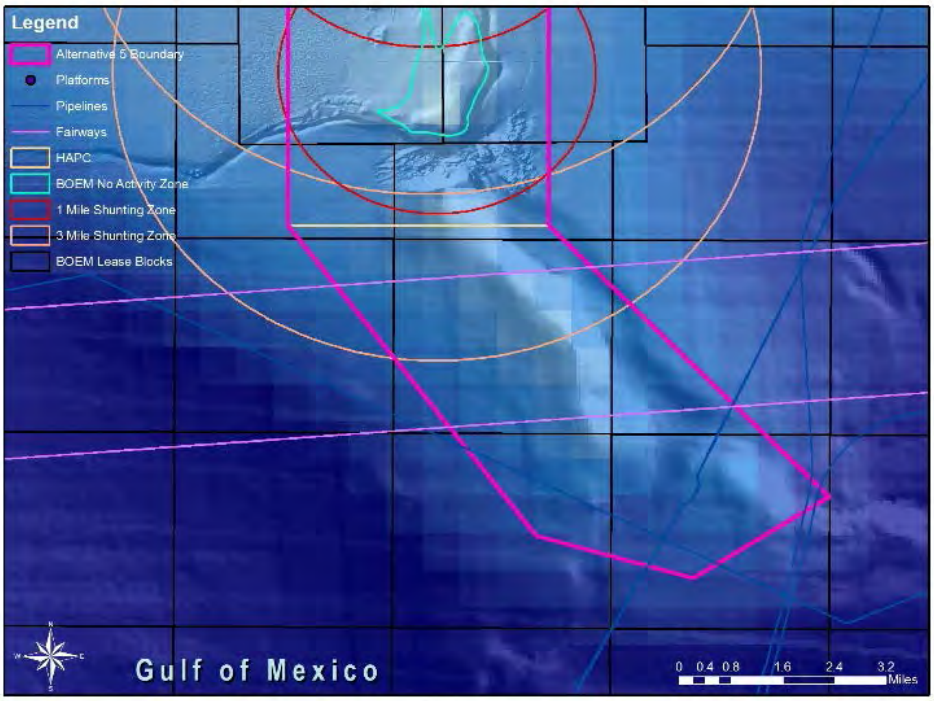


Figure B98. Tresslar Bank boundary alternative, existing regulatory zones, and infrastructure

B.2.20 Antoine Bank

Bottom Depth Range: ~575-820 feet

Habitat Types Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: mesophotic habitat is prevalent throughout the complex, and is dominated by black corals, gorgonians, fish, sponges, algae, and invertebrates

Observed Impacts: None

Infrastructure Present in Preferred Alternative Boundary: None

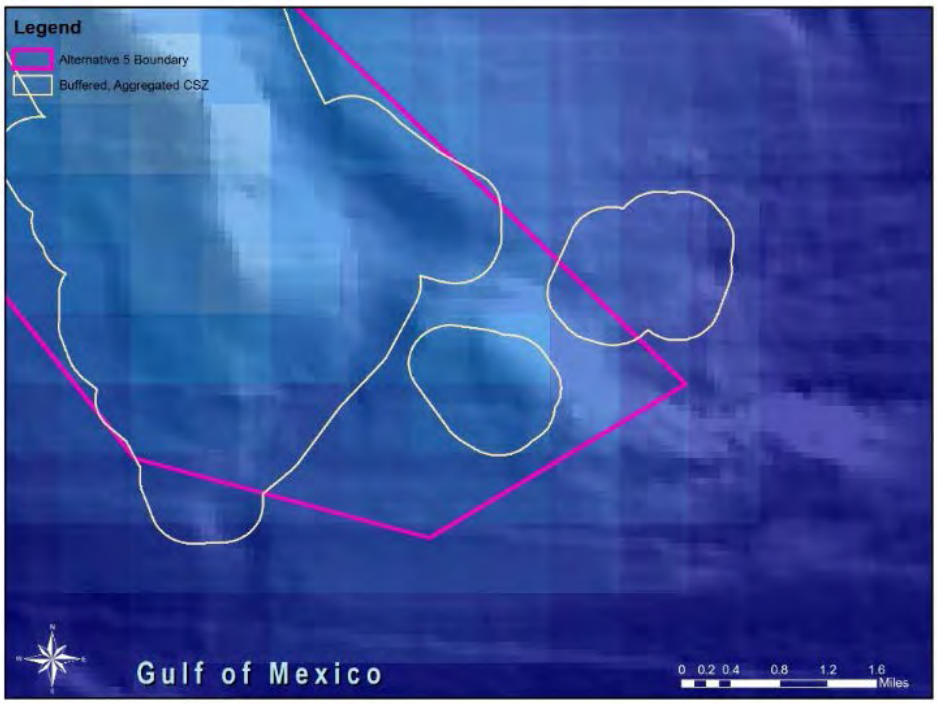


Figure B99. Antoine Bank boundary alternative and buffered, aggregated core sensitivity zones (CSZ)

Figure B100. Antoine Bank (labeled 6) in context of Alternative 5 boundary

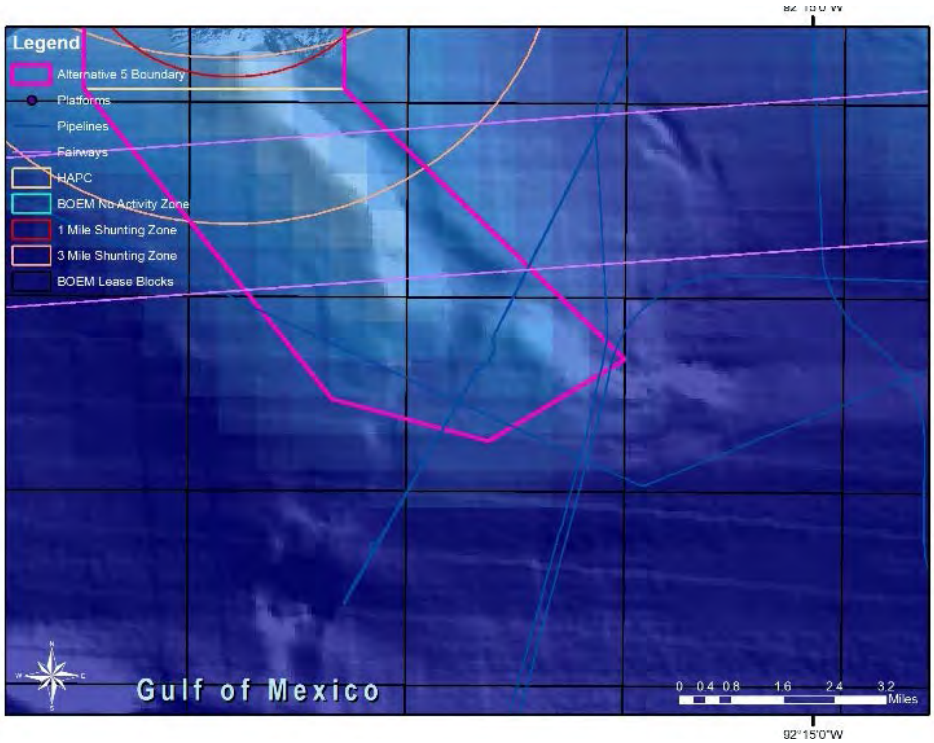


Figure B101. Antoine Bank boundary alternative, existing regulatory zones, and infrastructure

B.2.21 Parker Bank

Bottom Depth Range: ~185-475 feet

Habitat Types Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: 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 habitat for fish and invertebrates.

Observed Impacts: fishing debris (line/rope)

Infrastructure Present in Preferred Alternative Boundary: ~4.46 miles pipeline

Figure B102. Basket stars harboring in the branches of a large Hypnogorgia gorgonians in the mesophotic coral habitat at Parker Bank at around 96m depth. Image credit: UNCW-UVP.

Figure B103. A large black coral colony, Plumapathes pennacea, in the mesophotic coral habitat at Parker Bank at 57m depth. Image credit: UNCW-UVP.

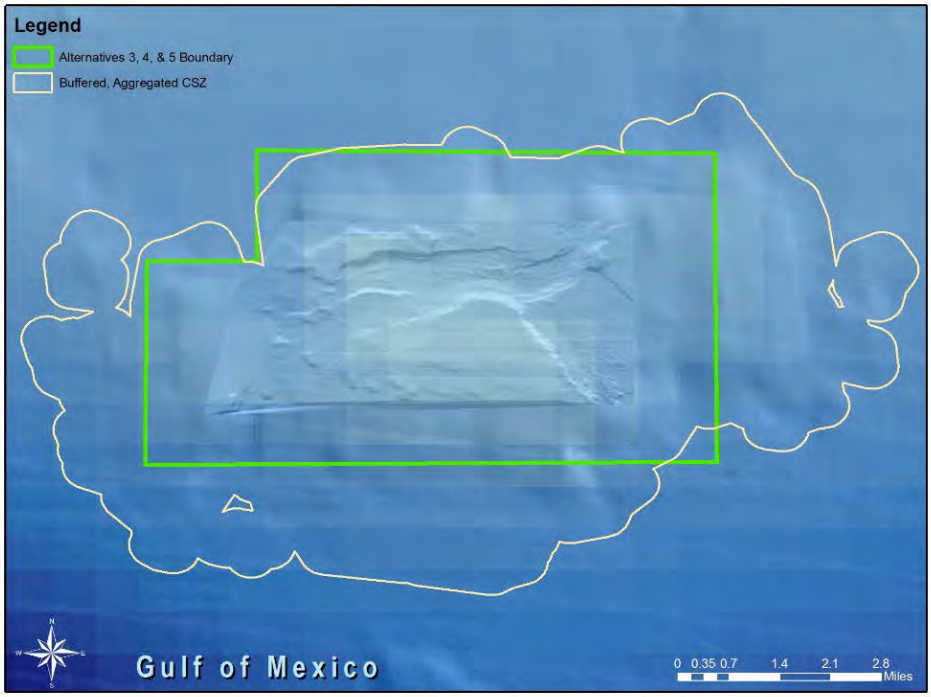


Figure B104. Parker Bank boundary alternatives 3-5 and buffered, aggregated core sensitivity zones (CSZ)

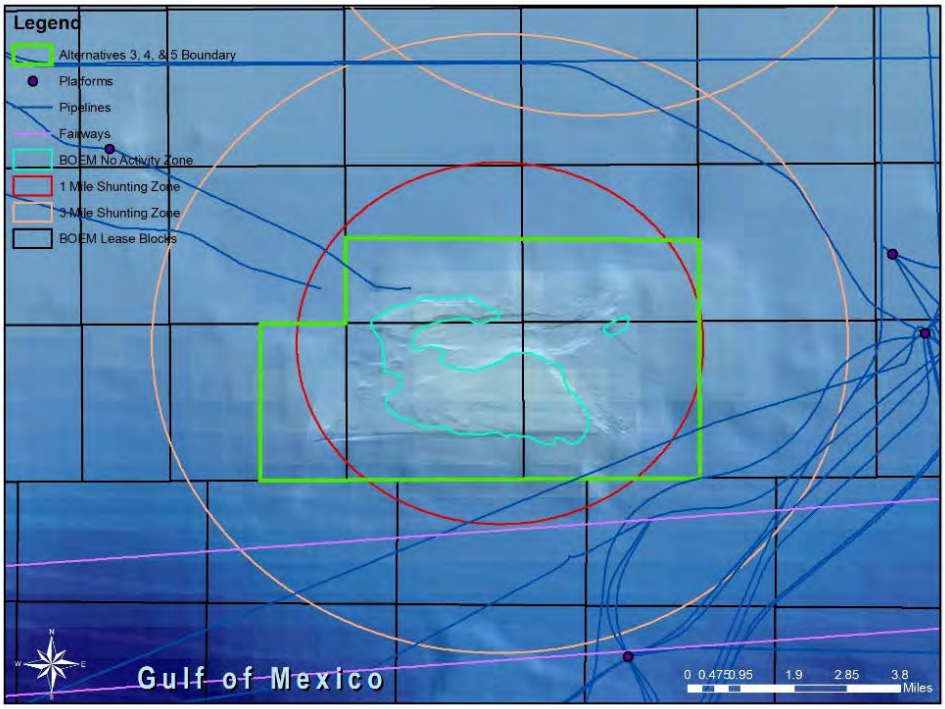


Figure B105. Parker Bank preferred alternative boundary, existing regulatory zones, and infrastructure

B.2.22 Alderdice Bank

Bottom Depth Range: ~165-240 feet

Habitat Types Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: spectacular basalt outcrops of Late Cretaceous origin (approximately 77 million years old) represent the oldest known rock exposed on the continental shelf off of Louisiana and Texas; outcrops bear a diverse assemblage of epibenthic organisms and fishes, most conspicuous of which are sea whips, sponges, and branching bryozoan colonies on the peaks, along with swarms of reef fish; habitats below the spires are dominated by black corals, gorgonians, fish, sponges, algae, and invertebrates

Observed Impacts: fishing debris (lost anchors/anchor chain), barrel

Infrastructure Present in Preferred Alternative Boundary: None

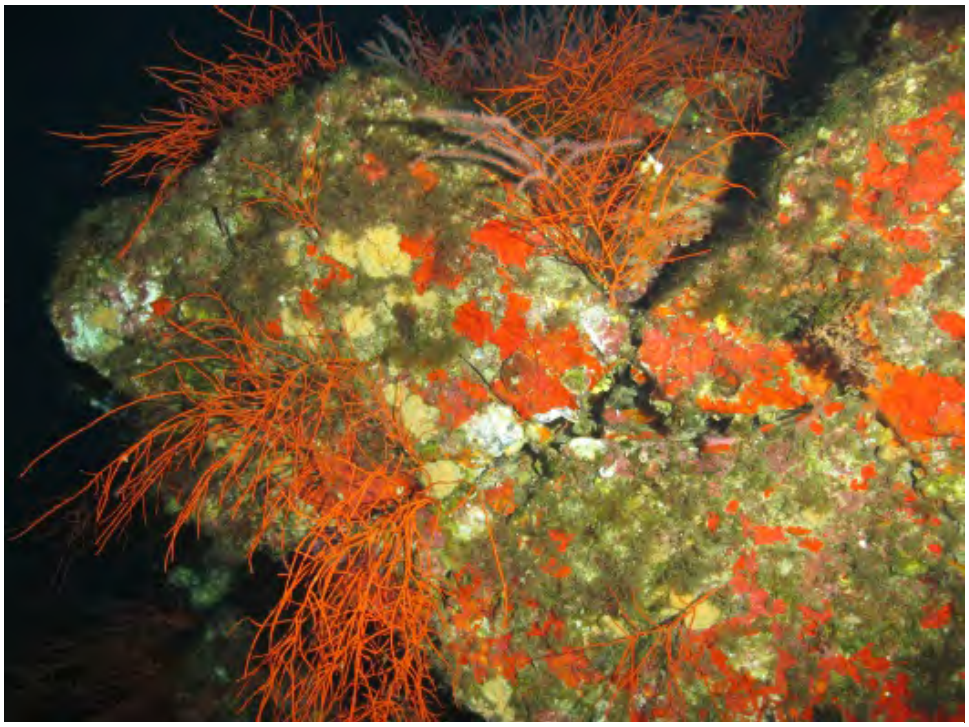


Figure B106. Basalt blocks making up a portion of one of the Alderdice Bank spires, covered in orange gorgonians, encrusting sponges and coralline algae. Image credit: UNCW-UVP.

Figure B107. Basalt spire at Alderdice Bank. Image credit: UNCW-UVP.

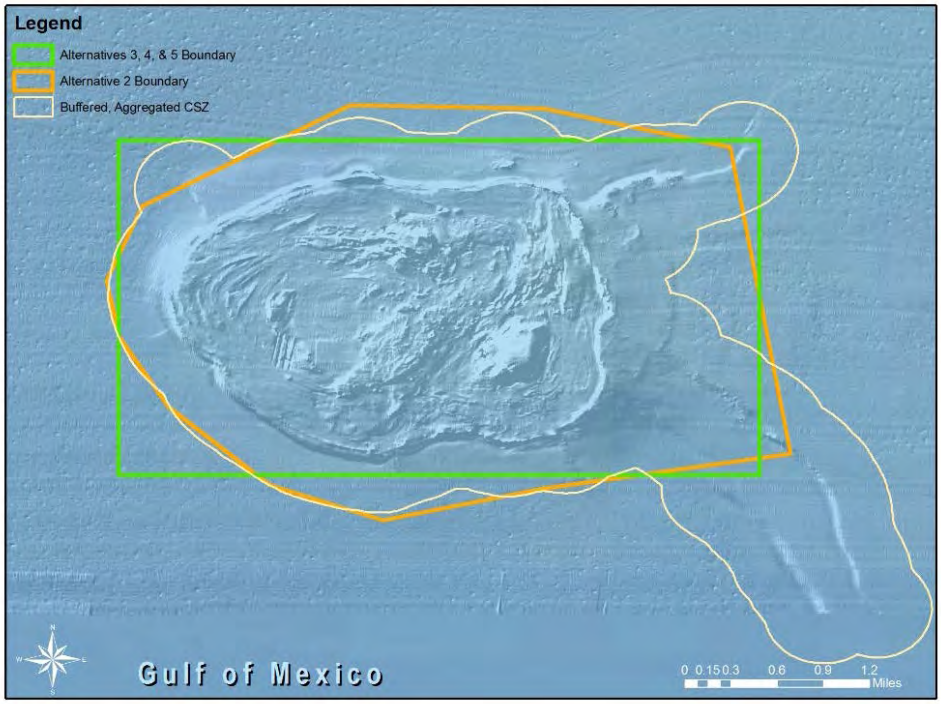


Figure B108. Alderdice Bank boundary alternatives 2-5 and buffered, aggregated core sensitivity zones (CSZ)

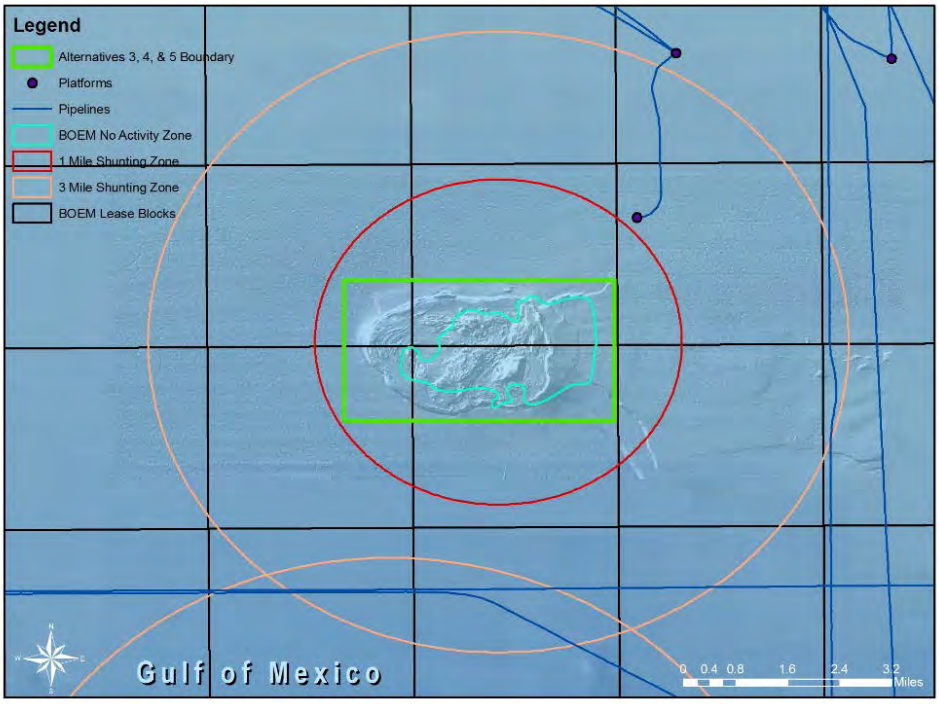


Figure B109. Alderdice Bank preferred alternative boundary, existing regulatory zones, and infrastructure

B.2.23 Jakkula Bank

Bottom Depth Range: ~245-720 feet

Habitat Types Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: located on the uppermost continental slope, the overall bank structure is composed of a basal platform with a roughly circular outline about 1 mile in diameter that rises about 66 feet above the adjacent seafloor. The basal platform is topped with a smaller summit platform with a diameter of 0.8 miles that rises 150 feet above the smooth margins of the basal platform, with a shoal area of 200 ft depth. The bank itself has no associated pinnalces, but numerous pinnacles occur just beyond the flanks of the bank flanks. A large, flat-topped mesa, extends northward from the north margin of Jakkula Bank for about 0.5 miles and then abruptly changes trend to the west for more than 4 miles. Large stands of black corals and gorgonians have been documented on the ridge to the northwest of the bank.

Observed Impacts: None

Infrastructure Present in Preferred Alternative Boundary: None

Figure B110. Large colonies of black corals and associated crinoids in the mesophotic coral habitat on the escarpment at the Jakkula Bank escarpment. Image credit: National Geographic Society/Sustainable Seas Expedition/NOAA.

Figure B111. Gorgonians and black corals in the mesophotic coral habitat at Jakkula Bank escarpment. Image credit: National Geographic Society/Sustainable Seas Expedition/NOAA.

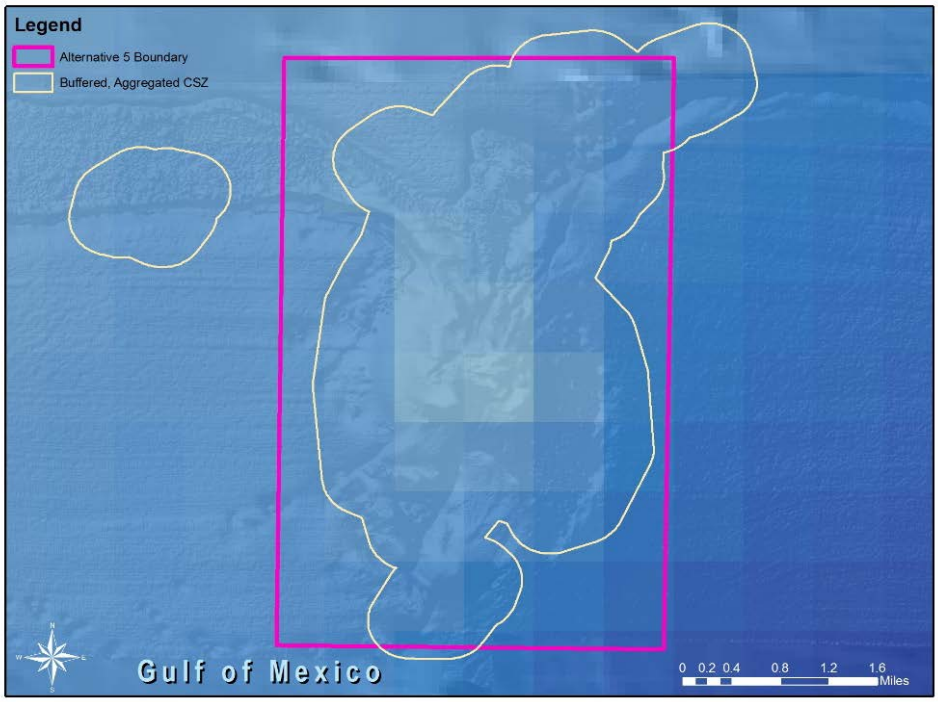


Figure B112. Jakkula Bank boundary alternative and buffered, aggregated core sensitivity zones (CSZ)

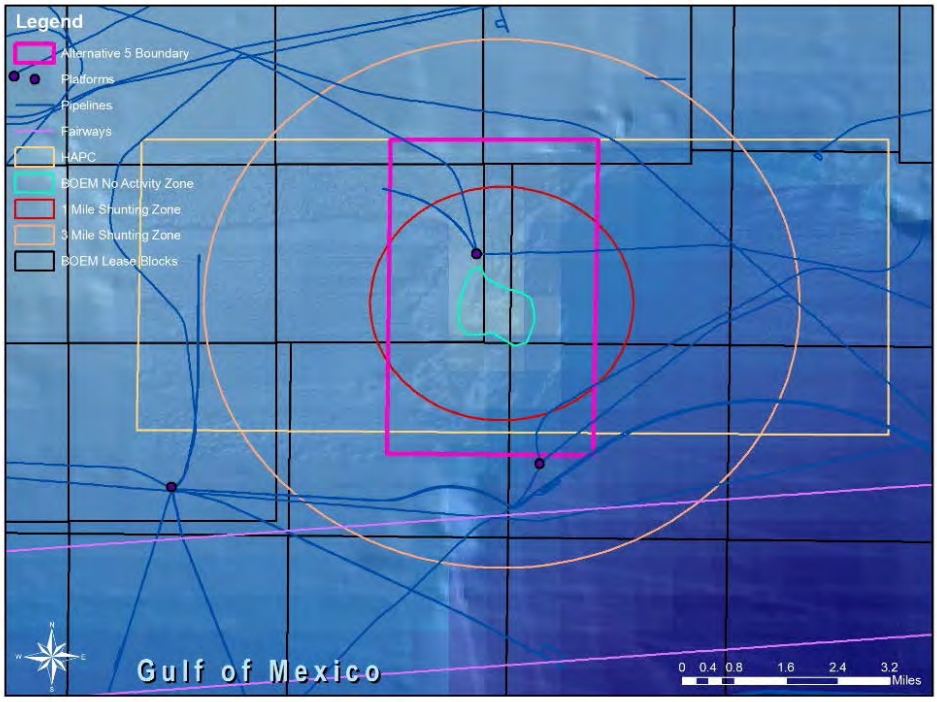


Figure B113. Jakkula Bank boundary alternative, existing regulatory zones, and infrastructure

B.2.24 Ewing Bank

Bottom Depth Range: ~180-395 feet

Habitat Types Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: known as an occasional aggregation point for whale sharks, though this aggregation targets spawning little tunny, which are associated with water column convergence zones rather than topographic features. Dominated by algal nodule habitat.

Observed Impacts: Possible impacts from DWH (Fredericq pers. obs. 2015)

Infrastructure Present in Preferred Alternative Boundary: None

Figure B114. Ewing Bank boundary alternative and buffered, aggregated core sensitivity zones (CSZ)

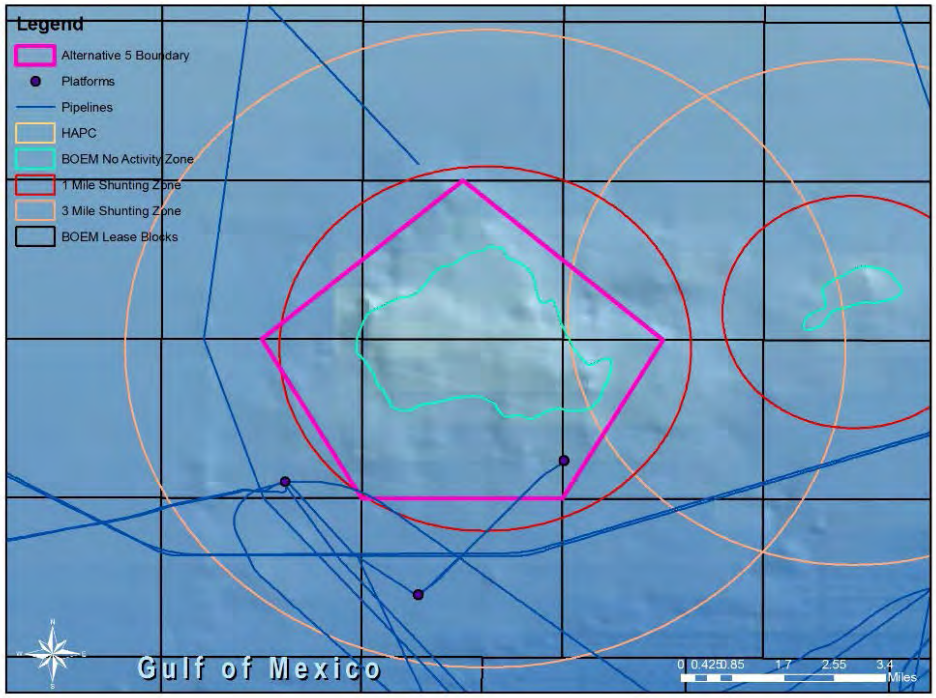


Figure B115. Ewing Bank boundary alternative, existing regulatory zones, and infrastructure

B.3 Pinnacles Area

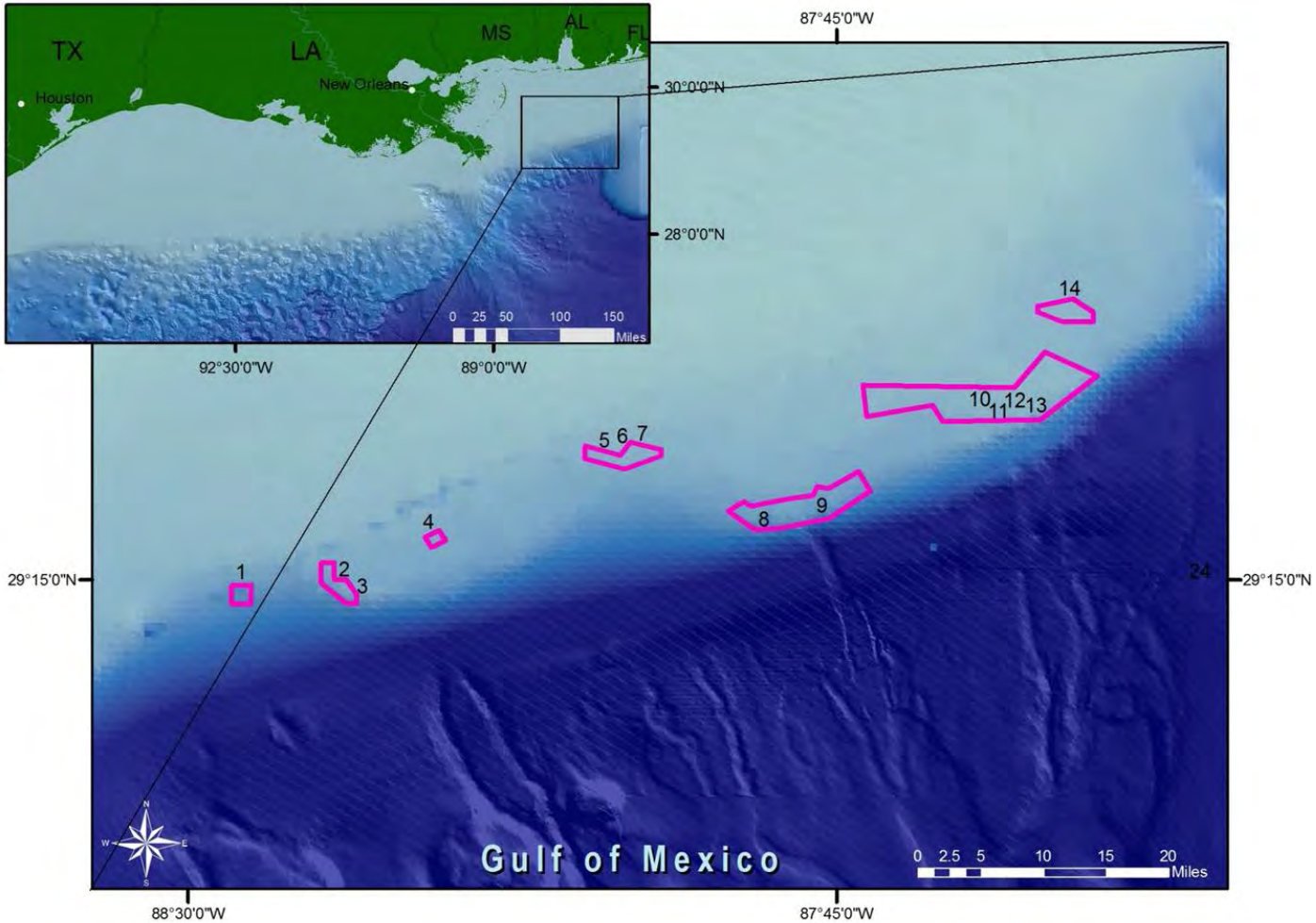


Figure B116. Overview of the 14 primary mesophotic coral habitat features encompassed by alternatives 4 & 5 in the Pinnacles subregion of the north central Gulf of Mexico. 1. Mountain Top; 2. Alabama Alps; 3. 36-Fathom Ridge; 4. West Addition Pinnacles; 5. Shark Reef; 6. Triple Top; 7. Double Top; 8. West Delta Mounds; 9.Ludwick-Walton Pinnacles; 10. Yellowtail Reef; 11. Cat's Paw Reef; 12. Roughtongue Reef; 13. Corkscrew Reef; 14. Far Tortuga

B.3.1 Mountain Top

Bottom Depth Range: ~175-475 feet

Habitats Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: among the shallowest features in the Pinnacles area, the bank is moderate in size (about 1.6 by 1.0 km); found on the western end of the Pinnacles area, unlike most features to its east it was likely formed by salt diapirism rather than induration and reef growth on deltaic bedding; on its surfaces, Mountain Top has low to intermediate relief (6-20 feet), and its small pinnacles and reefs support coralline algae and mixed octocoral, antipatharian and sponge communities; density and species composition of dominant inhabitants varies considerably across habitats on the feature; reef associated invertebrate assemblage is dominated by comatulid crinoids; numerous bacterial mats, gas seeps, and associated biological assemblages (e.g., sulfide oxidizing bacteria) are present, possibly enhancing biological production in the vicinity

Observed Impacts: derelict fishing gear (trawl nets, line), anchors

Infrastructure Present in Preferred Alternative Boundary: None

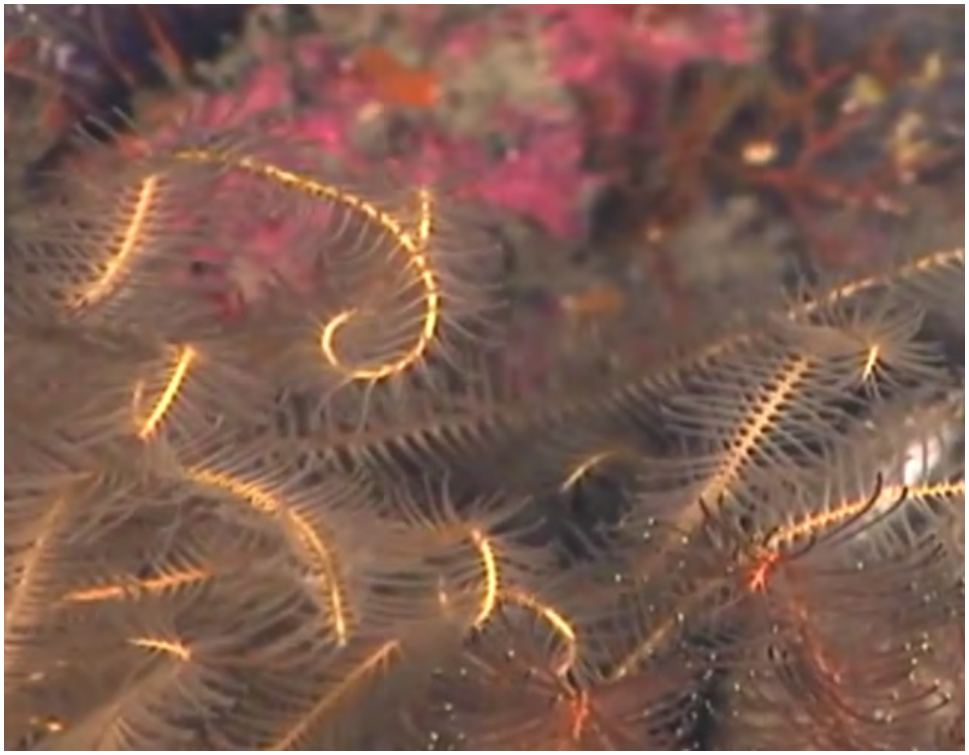


Figure B117. Mesophotic coral habitats at Mountain Top. Image credit: National Geographic Society/Sustainable Seas Expedition/NOAA.

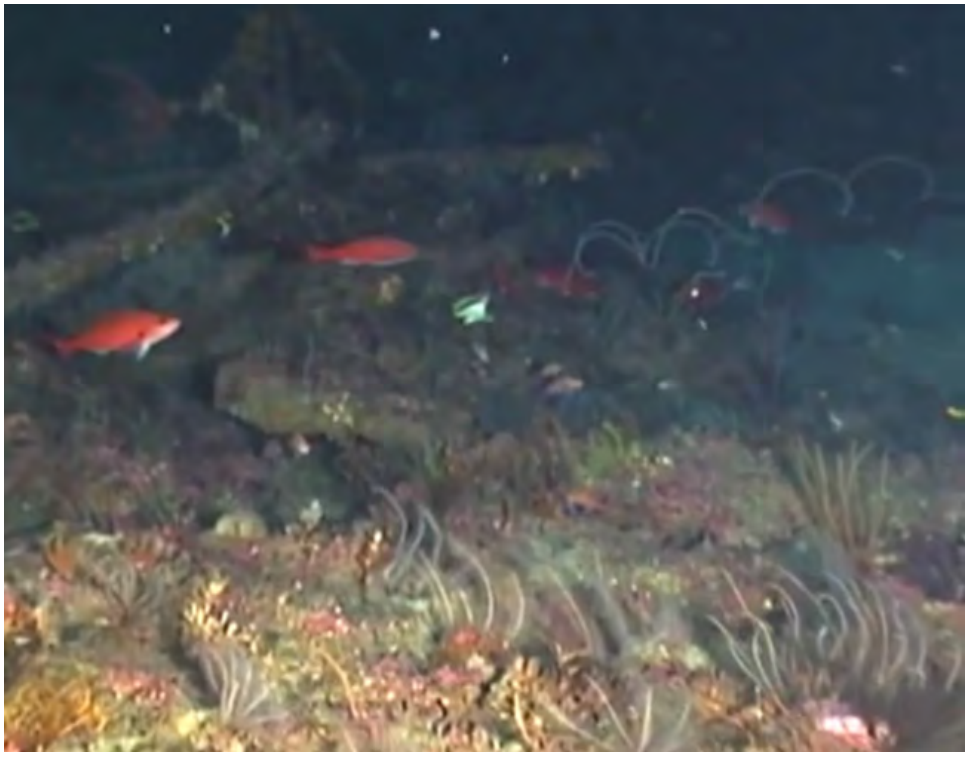


Figure B118. Mesophotic coral habitats at Mountain Top. Image credit: National Geographic Society/Sustainable Seas Expedition/NOAA.

Figure B119. Mountain Top boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

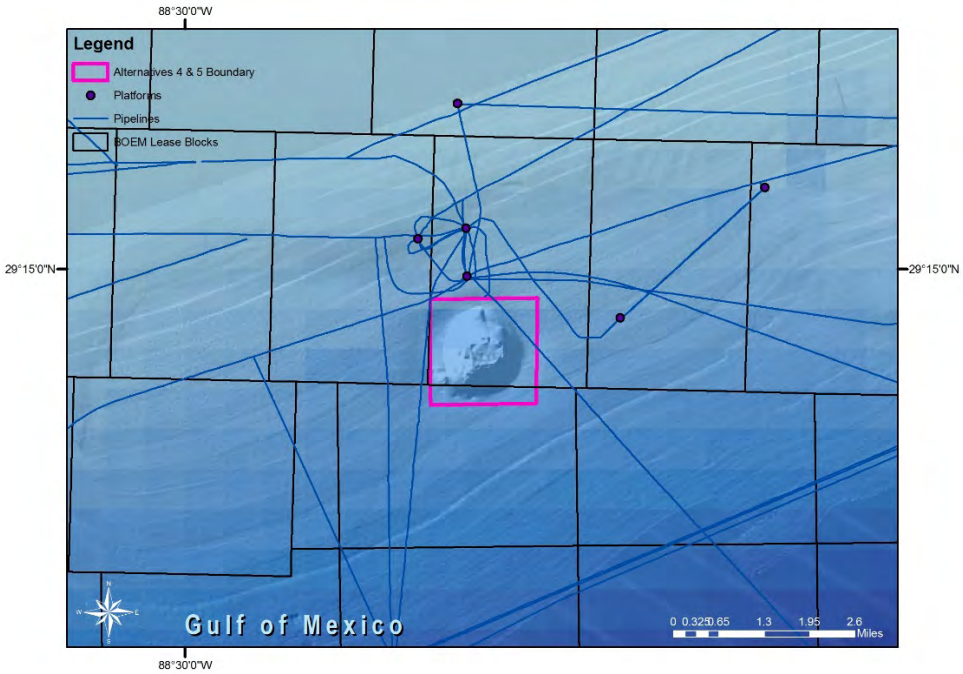


Figure B120. Mountain Top boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

B.3.2 Alabama Alps

Bottom Depth Range: ~230-295 feet

Habitats Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: among the largest and highest features in the Pinnacles area, Alabama Alps supports abundant and diverse populations of benthic invertebrates and reef fish; coral assemblage is composed of large gorgonian octocorals, small gorgonian octocorals, antipatharian black corals, and sponges; large corals are densely populated in areas on the reef top, with densities far exceeding the definition of a coral garden, following international recommendations (ICES); Alabama Alps supports a moderately diverse and highly productive fish community; planktivorous reef fish are especially abundant and contribute to sustaining populations of larger piscivores like grouper and snapper; USGS perspective view accessible at https://walrus.wr.usgs.gov/pacmaps/pn-aalps.html

Observed Impacts: derelict fishing gear (line), DWH oil and dispersant exposure and injury

Infrastructure Present in Preferred Alternative Boundary: None

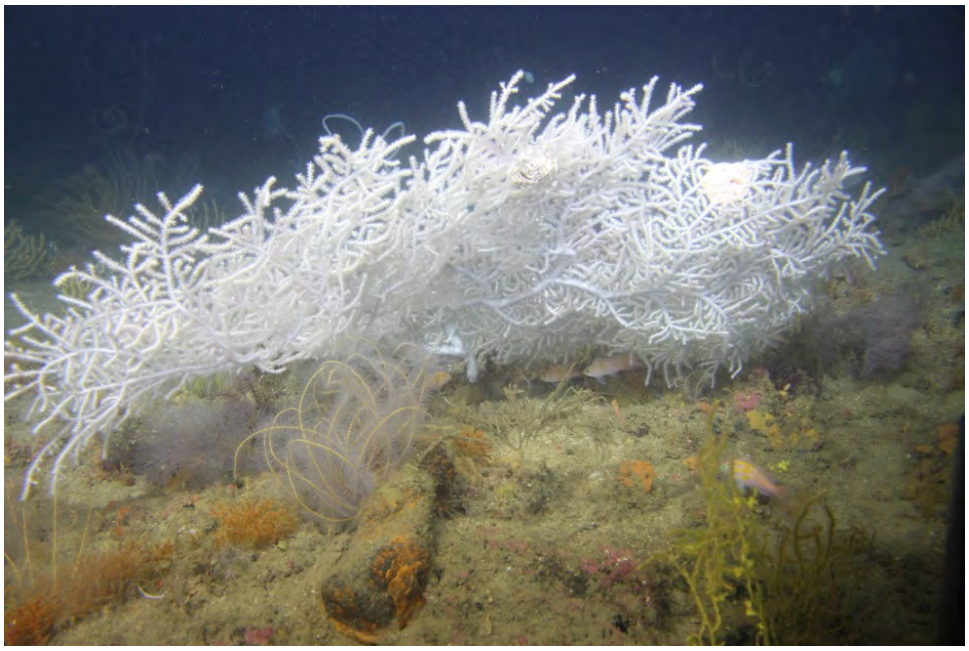


Figure B121. Mesophotic coral habitats at Alabama Alps. Image credit: NOAA/Etnoyer and USGS/Randall.

Figure B122. Alabama Alps boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

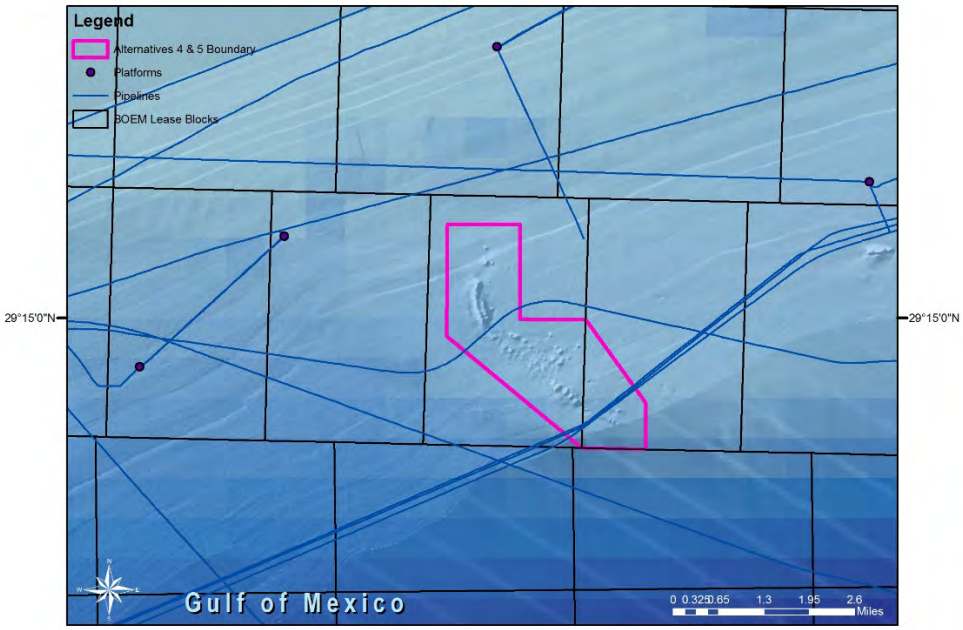


Figure B123. Alabama Alps boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

B.3.3 36-Fathom Ridge

Bottom Depth Range: ~245-395 feet

Habitats Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: extending to the southeast from Alabama Alps, 36-Fathom Ridge similarly supports abundant and diverse populations of benthic invertebrates and reef fish; coral assemblage is composed of large gorgonian octocorals, small gorgonian octocorals, antipatharian black corals, and sponges; large corals are densely populated in areas on the reef top, with densities far exceeding the definition of a coral garden, following international recommendations (ICES); supports a moderately diverse and highly productive fish community; planktivorous reef fish are especially abundant and contribute to sustaining populations of larger piscivores like grouper and snapper; USGS perspective view accessible at https://walrus.wr.usgs.gov/pacmaps/pn-aalps.html

Observed Impacts: derelict fishing gear (line), DWH oil and dispersant exposure (within 50 km of the DWH wellhead and below the slick for 35 days, subject to dispersant application; many of the large octocorals and reef fish appear to have been negatively impacted, with a dramatic reduction in reef fish numbers and an increase in sea fan injury rates noted following the spill; some evidence of reef fish numbers rebounding and overall more than 50% of colonies of large sea fans were still intact in 2014, offering potential for recovery

Infrastructure Present in Preferred Alternative Boundary: None

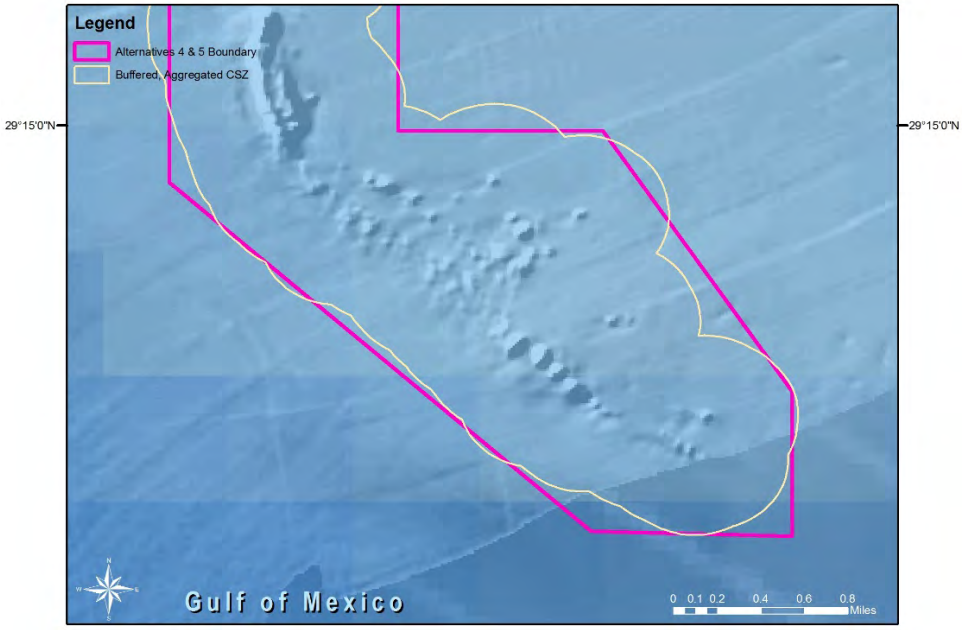


Figure B124. 36-Fathom Ridge boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

Figure B125. 36-Fathom Ridge boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

B.3.4 West Addition Pinnacles

Bottom Depth Range: ~235-295 feet

Habitats Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: small, high relief spires with an impressively high diversity and abundance of hard and soft corals, sponges, and fish; West Addition Pinnacles are very high relief (~60 feet) features supporting relatively high frequencies and richness of select taxa of octocorals, scleractinians, antipatharians and sponges in relation to other reefs; levels of species richness and animal density nearly as high as Yellowtail and Roughtongue Reefs; dense aggregations of fish dominated by planktivorous anthiids, wrasses, butterflyfish, and damselfish

Observed Impacts: None (not sampled following DWH)

Infrastructure Present in Preferred Alternative Boundary: None

Figure B126. West Addition Pinnacles boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

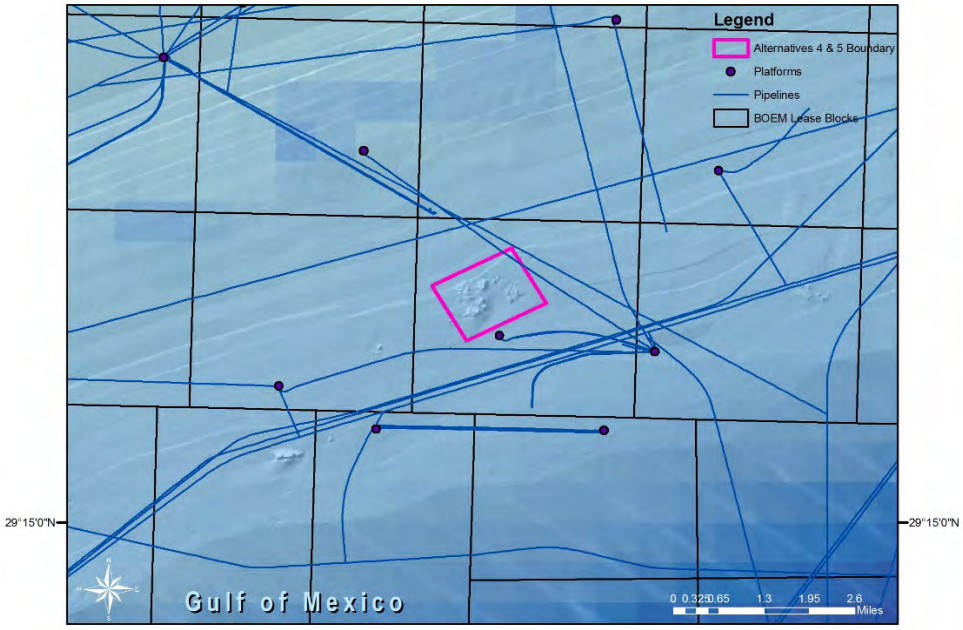


Figure B127. West Addition Pinnacles boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

B.3.5 Shark Reef

Bottom Depth Range: ~245-265 feet

Habitats Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: moderate sized reefs with dense stands of black and soft corals on reef flats, transitioning to solitary hard corals on the walls and slopes; Shark Reef, to the west of Double Top and Triple Top, has a much lower relief (~10 feet) and does not currently support a live sessile invertebrate assemblage on the heavily silted reef top; numerous invertebrates populate the vertical rock surfaces, including dense clusters of *Rhizopsammia manuelensis* stony corals; fish communities of moderate diversity but high abundance have been reported on these features, with dominant species being Roughtonge Bass and Vermilion Snapper

Observed Impacts: derelict fishing gear (line, ropes, chain), anchors; not sampled following DWH

Infrastructure Present in Preferred Alternative Boundary: None

Figure B128. Shark Reef boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

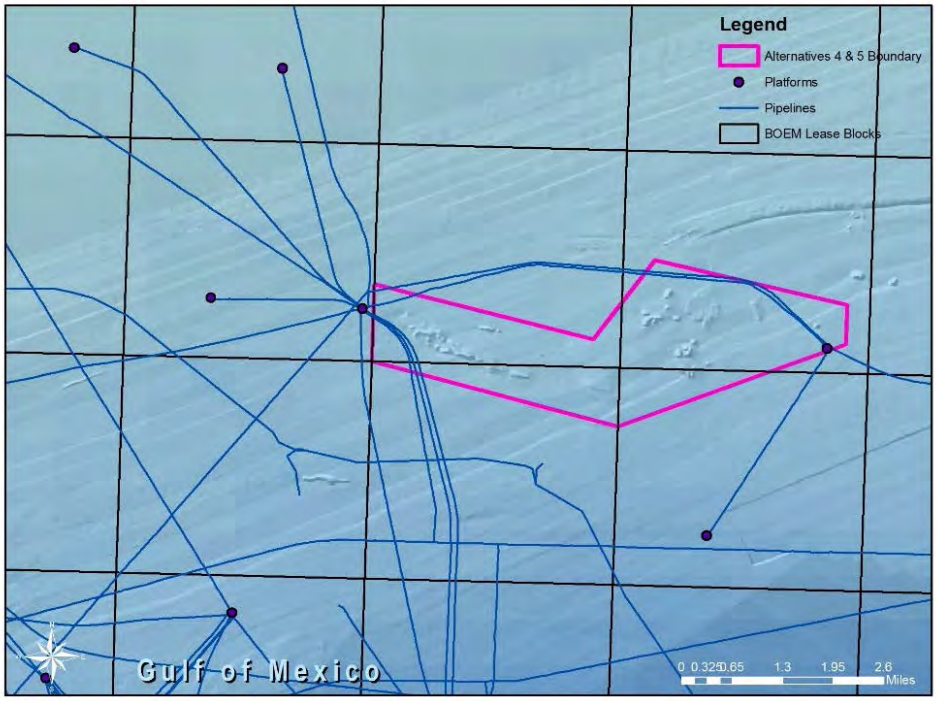


Figure B129. Shark Reef boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

B.3.6 Triple Top

Bottom Depth Range: ~230-265 feet

Habitats Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: with 25-40 feet of relief, Triple Top is a series of pinnacles with flat reef crest communities supporting dense assemblages of octocorals and antipatharians along with some solitary hard corals which are especially prevalent on vertical reef walls and slopes; fish communities of moderate diversity but high abundance have been reported on these features, with dominant species being roughtongue bass and vermilion snapper; USGS profile view is accessible at https://walrus.wr.usgs.gov/pacmaps/pn-2top.html https://walrus.wr.usgs.gov/pacmaps/pn-tpmap.html

Observed Impacts: derelict fishing gear (line, ropes, and chains); not sampled following DWH

Infrastructure Present in Preferred Alternative Boundary: None

Figure B130. Triple Top boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

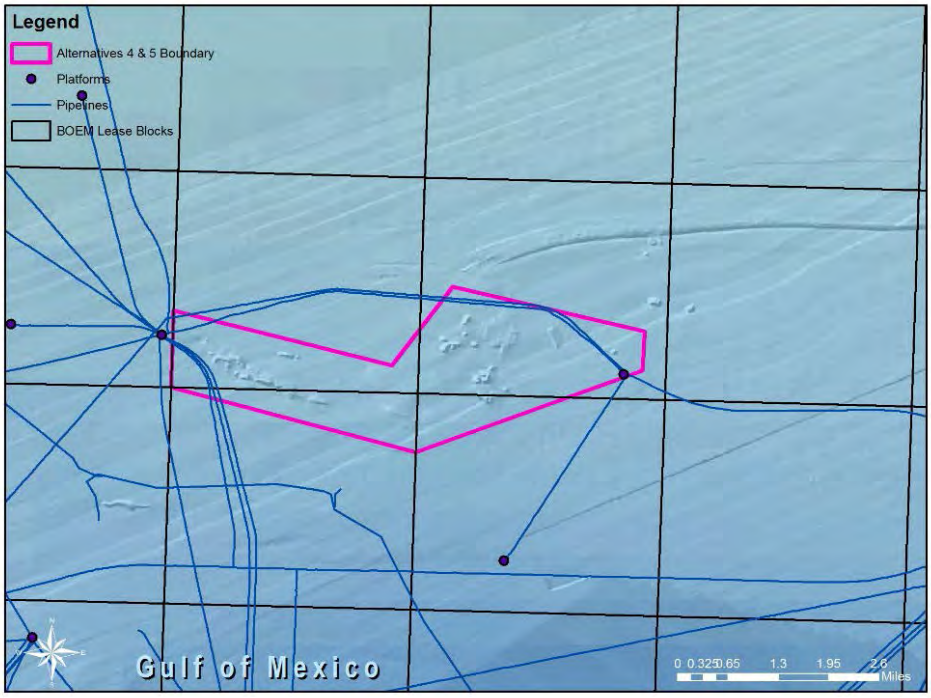


Figure B131. Triple Top boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

B.3.7 Double Top

Bottom Depth Range: ~245-265 feet

Habitats Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: with 25-40 feet of relief, Double Top is a series of pinnacles with flat reef crest communities supporting dense assemblages of octocorals and antipatharians along with some solitary hard corals which are especially prevalent on vertical reef walls and slopes; fish communities of moderate diversity but high abundance have been reported on these features, with dominant species being roughtongue bass and vermilion snapper; USGS profile view is accessible at https://walrus.wr.usgs.gov/pacmaps/pn-2top.html https://walrus.wr.usgs.gov/pacmaps/pn-tpmap.html

Observed Impacts: derelict fishing gear (trawl nets, line), anchors; not sampled following DWH

Infrastructure Present in Preferred Alternative Boundary: None

Figure B132. Double Top boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

Figure B133. Double Top boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

B.3.8 West Delta Mounds

Bottom Depth Range: ~310-410 feet

Habitats Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: tall, rugged spires inhabited by solitary and branching hard corals, octocorals, and black corals, and associated invertebrates like crinoids and basket stars; a collection of at least a hundred small to mid-sized reefs up to ~55 feet tall along the shelf-edge, ranging from ~650 to ~3280 feet in diameter; situated in the deeper range of Pinnacles reefs, they are composed of the remains of coralline algae, serpulid worms, bryozoans, ahermatypic corals, and forams, and they exhibit highly sculpted and eroded rock surfaces with many caves and depressions; they support relatively dense populations of the solitary coral *Rhizopsammia manuelensis* and *Madrepora carolina* on patch reefs and vertical walls, as well as high numbers of comatulid crinoids; due to their depth, they do not support coralline algae growth

Observed Impacts: None (not sampled following DWH)

Infrastructure Present in Preferred Alternative Boundary: None

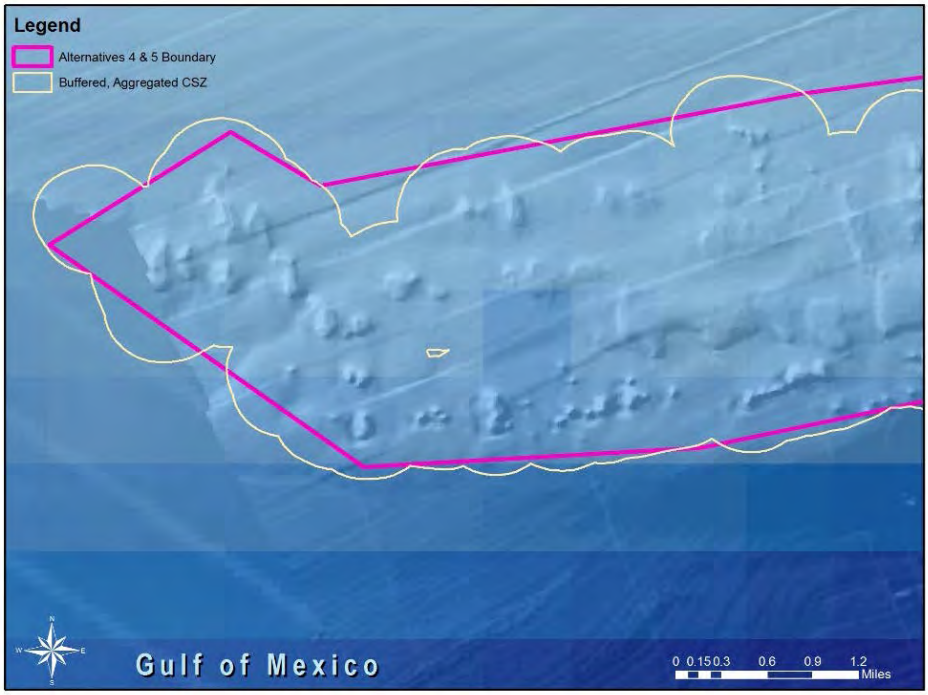


Figure B134. West Delta Mounds boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

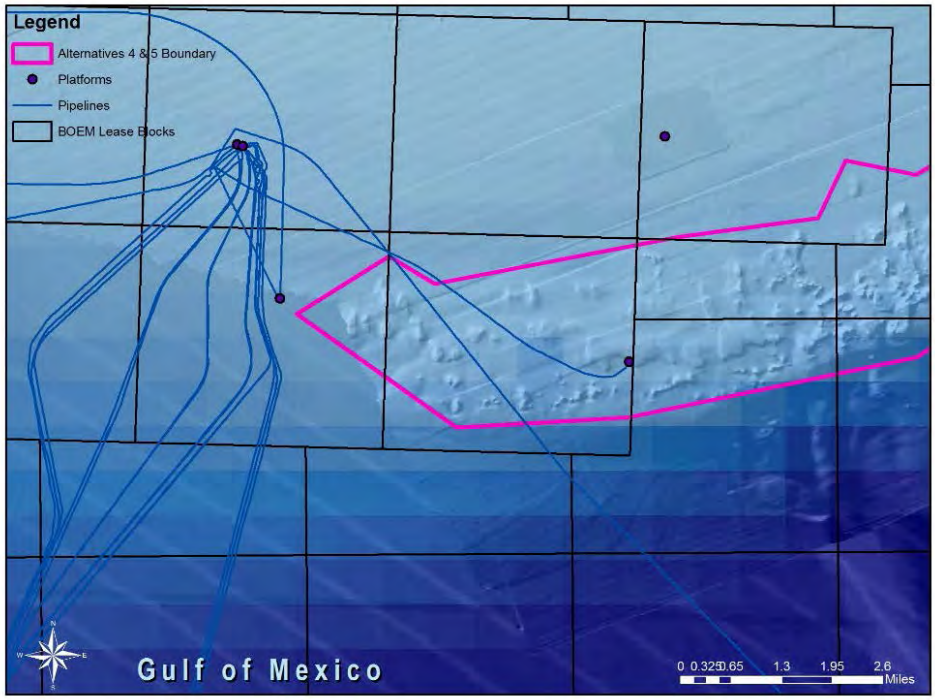


Figure B135. West Delta Mounds boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

B.3.9 Ludwick-Walton Pinnacles

Bottom Depth Range: 310-510 feet

Habitats Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: tall, rugged spires inhabited by solitary and branching hard corals, octocorals, and black corals, and associated invertebrates like crinoids and basket stars; a collection of at least a hundred small to mid-sized reefs up to ~55 feet tall along the shelf-edge, ranging from ~650 to ~3280 feet in diameter; they are composed of the remains of coralline algae, serpulid worms, bryozoans, ahermatypic corals, and forams; they exhibit sculpted, eroded rock surfaces with caves and depressions; they support relatively dense populations of the solitary coral *Rhizopsammia manuelensis* and *Madrepora carolina* on patch reefs and vertical walls, as well as high numbers of comatulid crinoids; due to depth, they do not support coralline algae growth; USGS profile views are accessible at https://walrus.wr.usgs.gov/pacmaps/pn-lnw.html

Observed Impacts: None (not sampled following DWH)

Infrastructure Present in Preferred Alternative Boundary: None

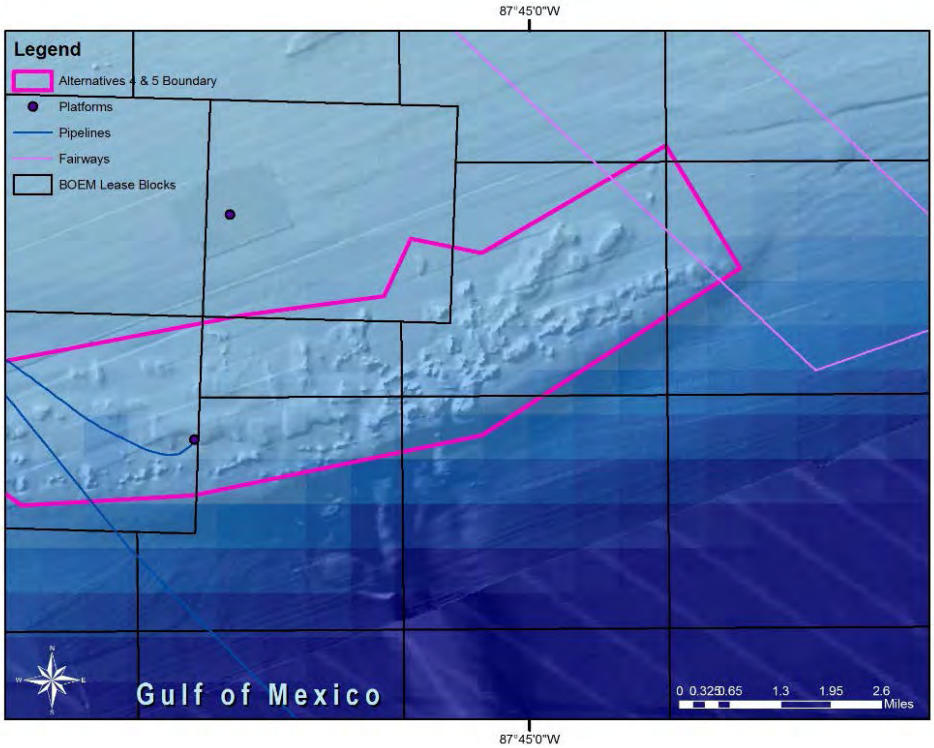


Figure B137. Ludwick-Walton Pinnacles boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

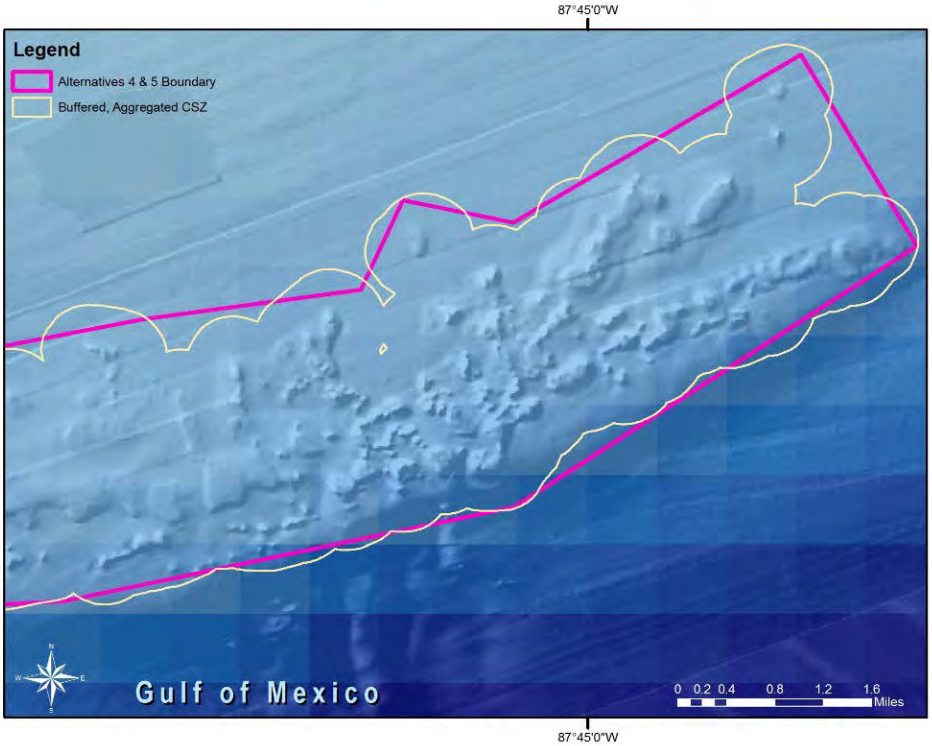


Figure B136. Ludwick-Walton Pinnacles boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

B.3.10 Yellowtail Reef

Bottom Depth Range: ~195-265 feet

Habitats Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: dense mesophotic coral gardens containing black, gorgonian, and hard corals, sponge, and fish communities on numerous flat-topped features surrounded by rugged, vertical drop-offs; second largest concentration of hard bottom in the Pinnacles area, comprised of several large to small reefs with medium to high vertical profiles (15-50 feet relief), some with extensive, relatively flat reef tops, and rugose reef faces and marginal habitats; perimeter of the reef is comprised of low-relief hard bottom interspersed with a soft sediment veneer; shallowest sites among the seven proposed boundaries in the Pinnacles area, with the most abundant faunal communities; exhibited highest diversity and abundance of reef fish (40 fish taxa) in the Pinnacles area; USGS profile view is accessible at http://walrus.wr.usgs.gov/pacmaps/pn-yt.html

Observed Impacts: derelict fishing gear (line), DWH oil and dispersant exposure and injury

Infrastructure Present in Preferred Alternative Boundary: None

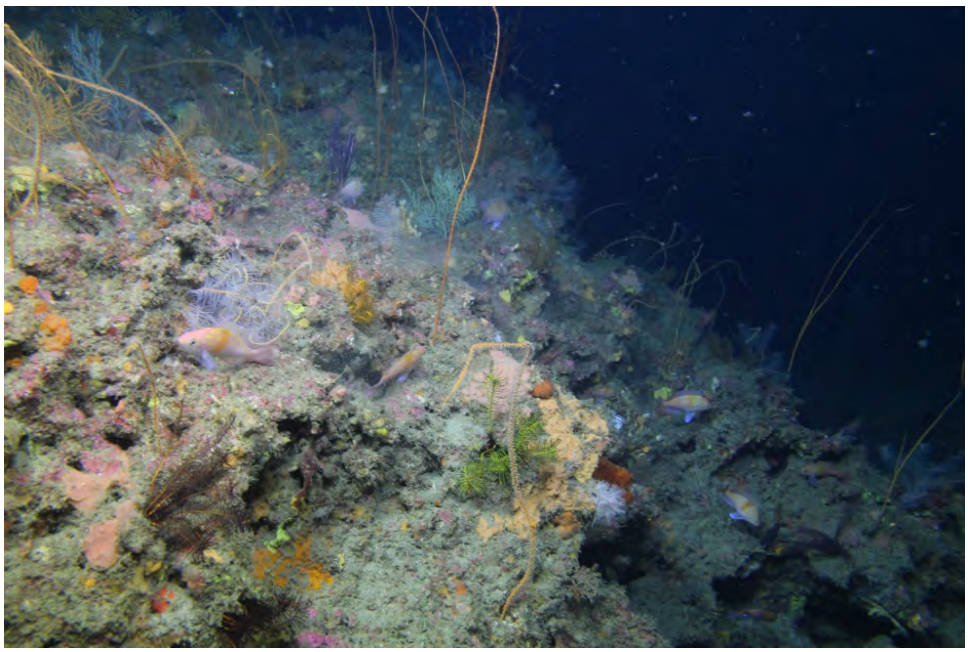


Figure B138. Mesophotic coral habitats at Yellowtail Reef. Image credit: NOAA/Etnoyer and USGS/Randall.

Figure B139. Dense field of gorgonians and black corals in the mesophotic coral habitats at Yellowtail Reef. Image credit: NOAA/Etnoyer and USGS/Randall.

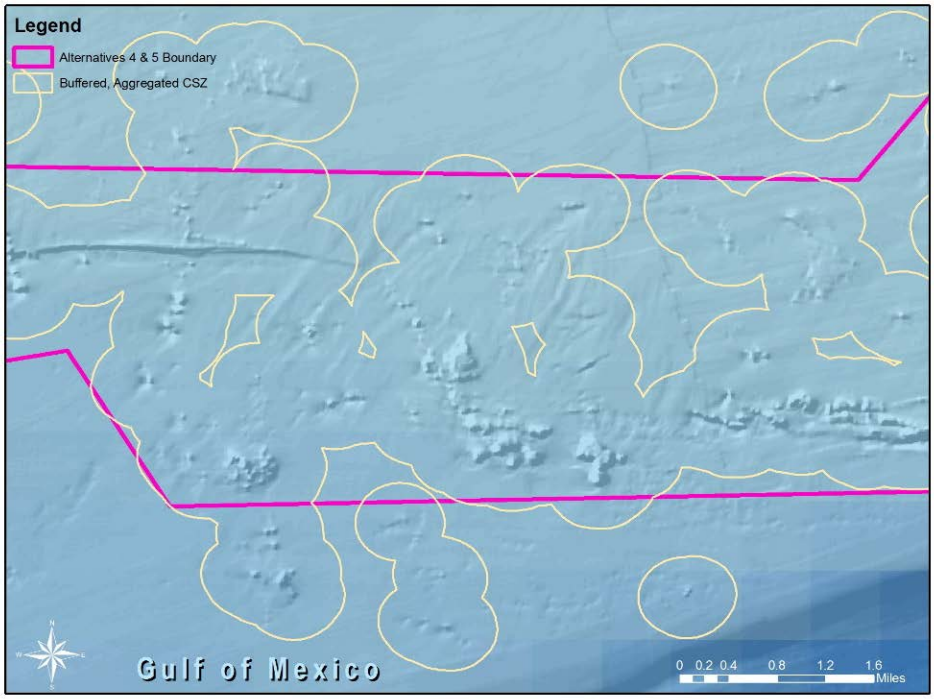


Figure B140. Yellowtail Reef boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

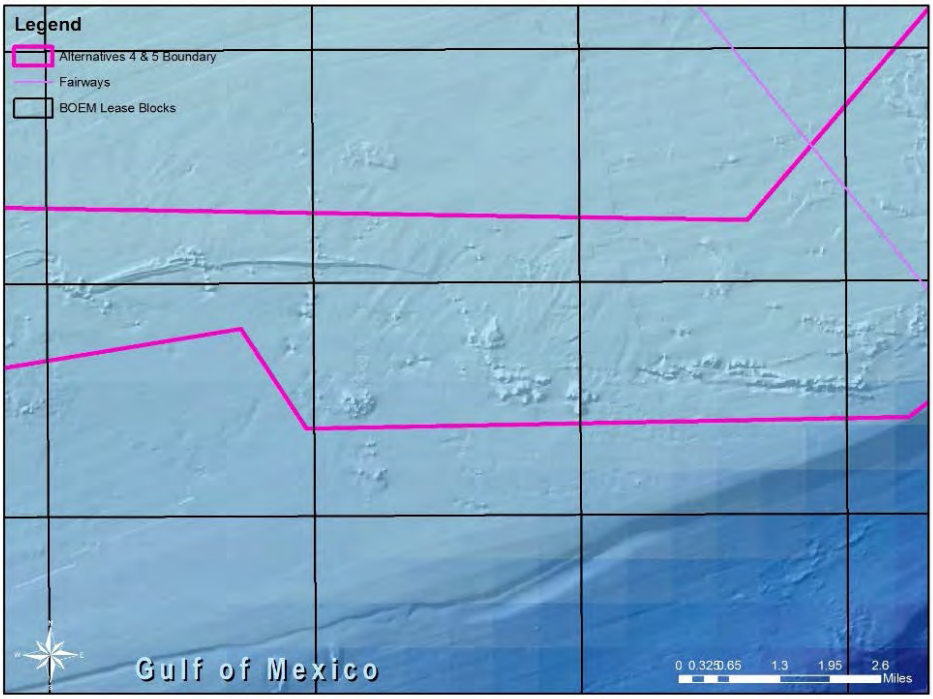


Figure B141. Yellowtail Reef boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

B.3.11 Cat's Paw

Bottom Depth Range: ~230-265 feet

Habitats Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: dense mesophotic coral gardens containing black, gorgonian, and hard corals, sponge, and fish communities on numerous flat-topped features surrounded by rugged, vertical drop-offs; second largest concentration of hard bottom in the Pinnacles area, comprised of several large to small reefs with medium to high vertical profiles (15-50 feet relief), some with extensive, relatively flat reef tops, and rugose reef faces and marginal habitats; perimeter of the reef is comprised of low-relief hard bottom interspersed with a soft sediment veneer; shallowest sites among the seven proposed boundaries in the Pinnacles area, with the most abundant faunal communities; exhibited highest diversity and abundance of reef fish (40 fish taxa) in the Pinnacles area; USGS profile view is accessible at https://walrus.wr.usgs.gov/pacmaps/pn-cats.html

Observed Impacts: derelict fishing gear (line), DWH oil and dispersant exposure and injury

Infrastructure Present in Preferred Alternative Boundary: None

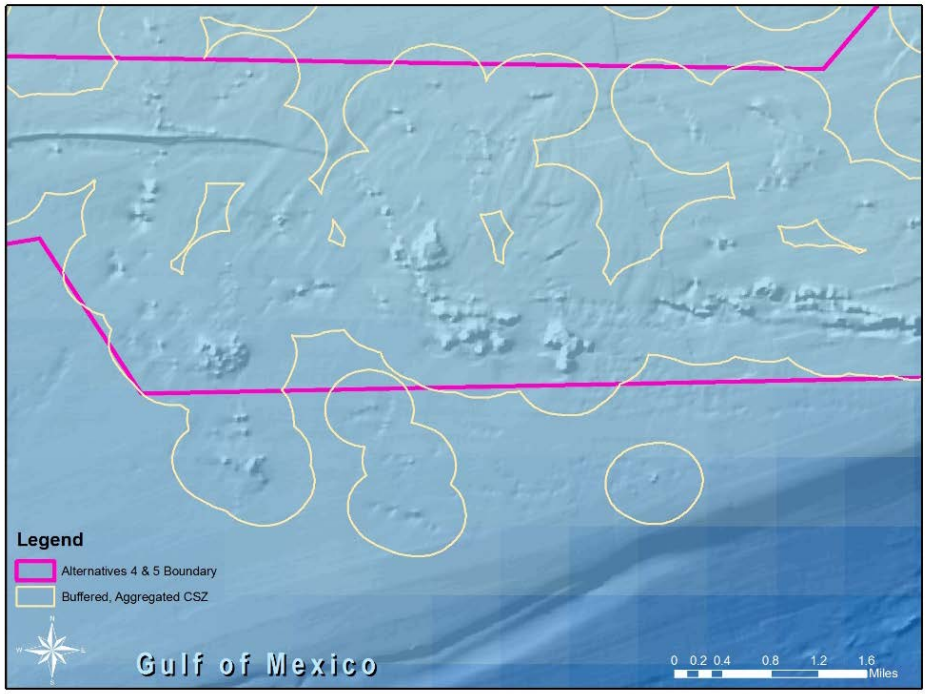


Figure B142. Cat's Paw boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

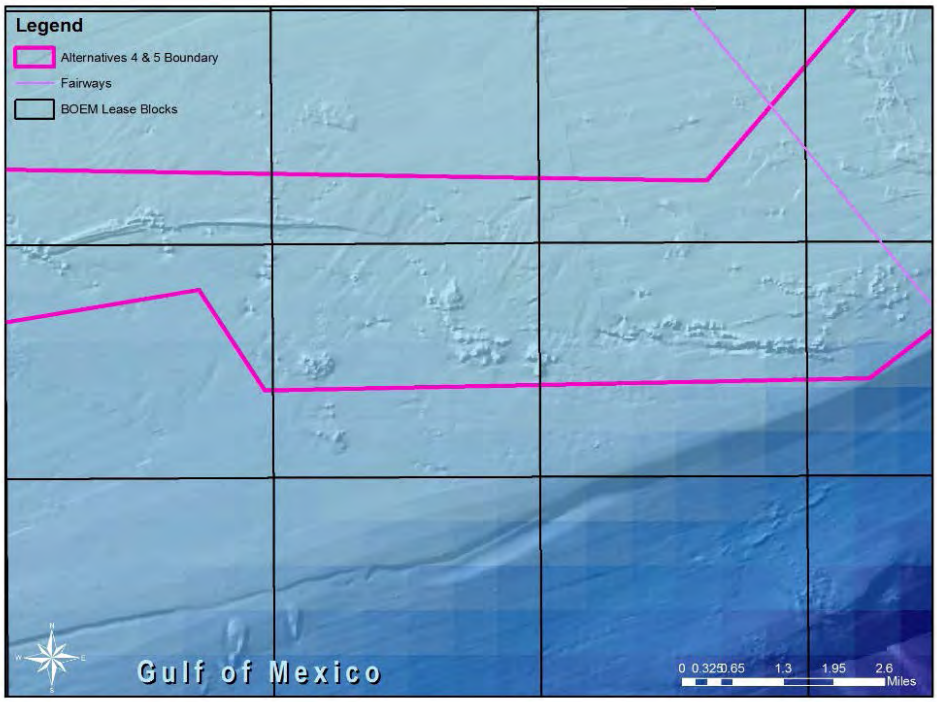


Figure B143. Cat's Paw boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

B.3.12 Roughtongue Reef

Bottom Depth Range: 215-265 feet

Habitats Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: dense mesophotic coral gardens containing black, gorgonian, and hard corals, sponge, and fish communities on numerous flat-topped features surrounded by rugged, vertical drop-offs; second largest concentration of hard bottom in the Pinnacles area, comprised of several large to small reefs with medium to high vertical profiles (15-50 feet relief), some with extensive, relatively flat reef tops, and rugose reef faces and marginal habitats; perimeter of the reef is comprised of low-relief hard bottom interspersed with a soft sediment veneer; shallowest sites among the seven proposed boundaries in the Pinnacles area, with the most abundant faunal communities; exhibited highest diversity and abundance of reef fish (40 fish taxa) in the Pinnacles area; USGS profile view is accessible at http://walrus.wr.usgs.gov/pacmaps/pn-rt.html

Observed Impacts: derelict fishing gear (line), DWH oil and dispersant exposure and injury

Infrastructure Present in Preferred Alternative Boundary: None

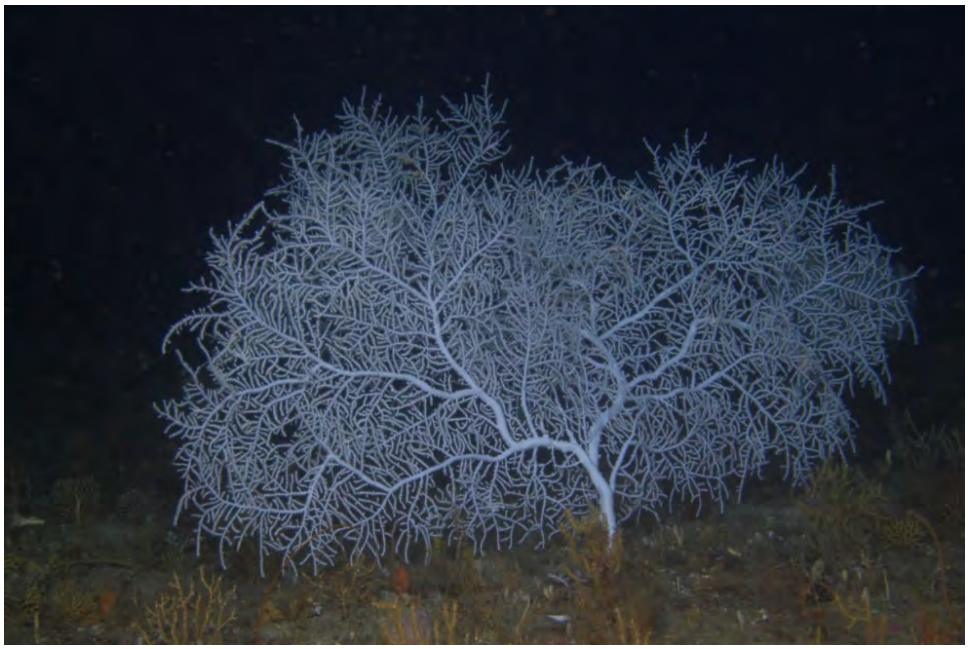


Figure B144. Large Hypnogorgia gorgonian colony in mesophotic coral habitats at Roughtongue Reef. Image credit: NOAA/Etnoyer and USGS/Randall.

Figure B145. Mesophotic coral habitats at Roughtongue Reef. Image credit: NOAA/Etnoyer and USGS/Randall.

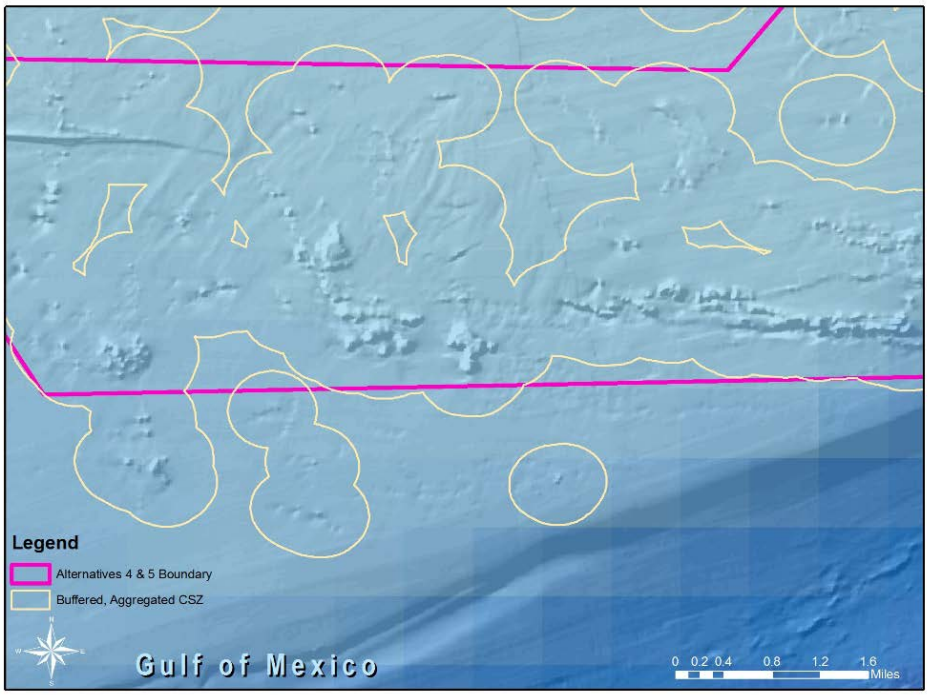


Figure B146. Roughtongue Reef boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

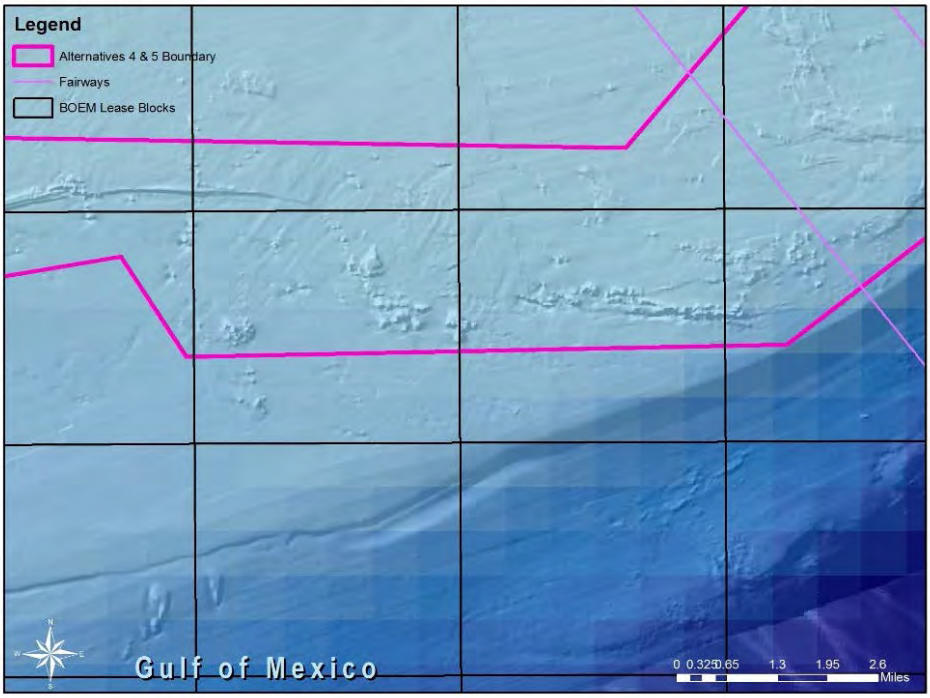


Figure B147. Roughtongue Reef boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

B.3.13 Corkscrew

Bottom Depth Range: ~230-295 feet

Habitats Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: dense mesophotic coral gardens containing black, gorgonian, and hard corals, sponge, and fish communities on numerous flat-topped features surrounded by rugged, vertical drop-offs; second largest concentration of hard bottom in the Pinnacles area, comprised of several large to small reefs with medium to high vertical profiles (15-50 feet relief), some with extensive, relatively flat reef tops, and rugose reef faces and marginal habitats; perimeter of the reef is comprised of low-relief hard bottom interspersed with a soft sediment veneer; shallowest sites among the seven proposed boundaries in the Pinnacles area, with the most abundant faunal communities; exhibited highest diversity and abundance of reef fish (40 fish taxa) in the Pinnacles area

Observed Impacts: derelict fishing gear (line), DWH oil and dispersant exposure and injury

Infrastructure Present in Preferred Alternative Boundary: None

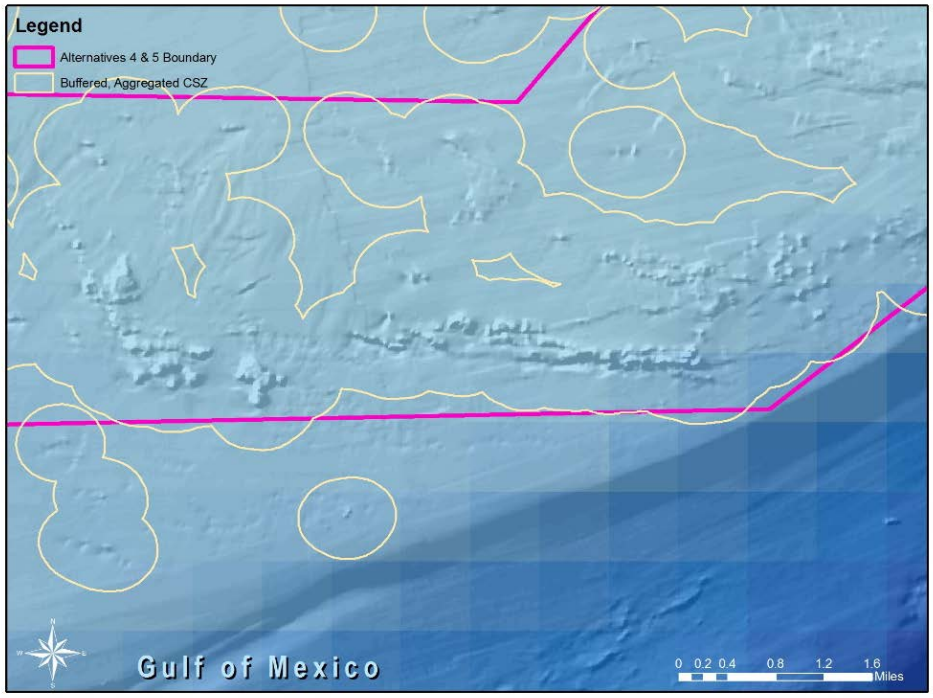


Figure B148. Corkscrew boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

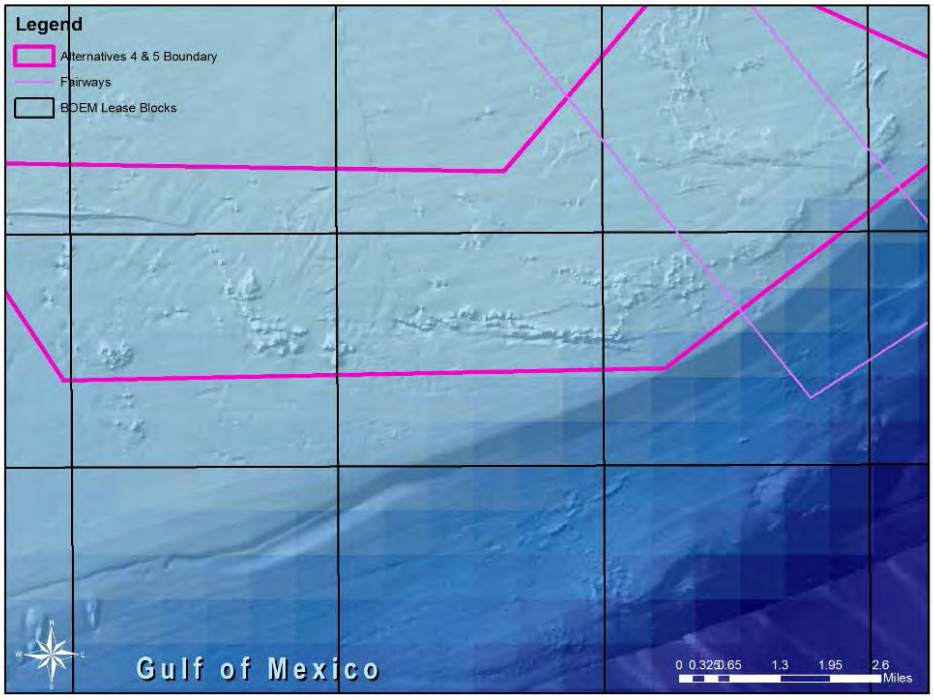


Figure B149. Corkscrew boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

B.3.14 Far Tortuga

Bottom Depth Range: ~215-245 feet

Habitats Present: mesophotic coral habitats, soft bottom communities

Biological/Geological Characteristics: a large, gently sloping intermediate relief reef found on the easternmost edge of the Pinnacles area; replacing the common flat-top reef environment found throughout the area are scattered rock outcrops supporting fairly dense communities of small octocorals (*Bebryce* sp., orange and white Plexauridae), antipatharians, solitary corals and sponges; though fish numbers and taxa richness were low relative to other Pinnacles features, a variety of small reef fish were seen in association with antipatharian black coral and small sea fans

Observed Impacts: None

Infrastructure Present in Preferred Alternative Boundary: None

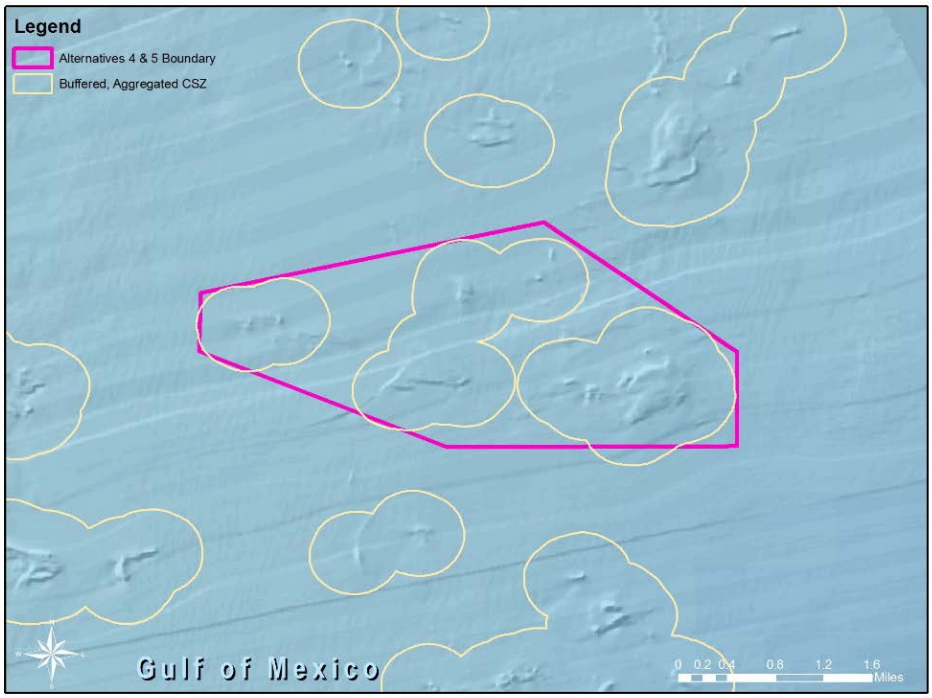


Figure B150. Far Tortuga boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

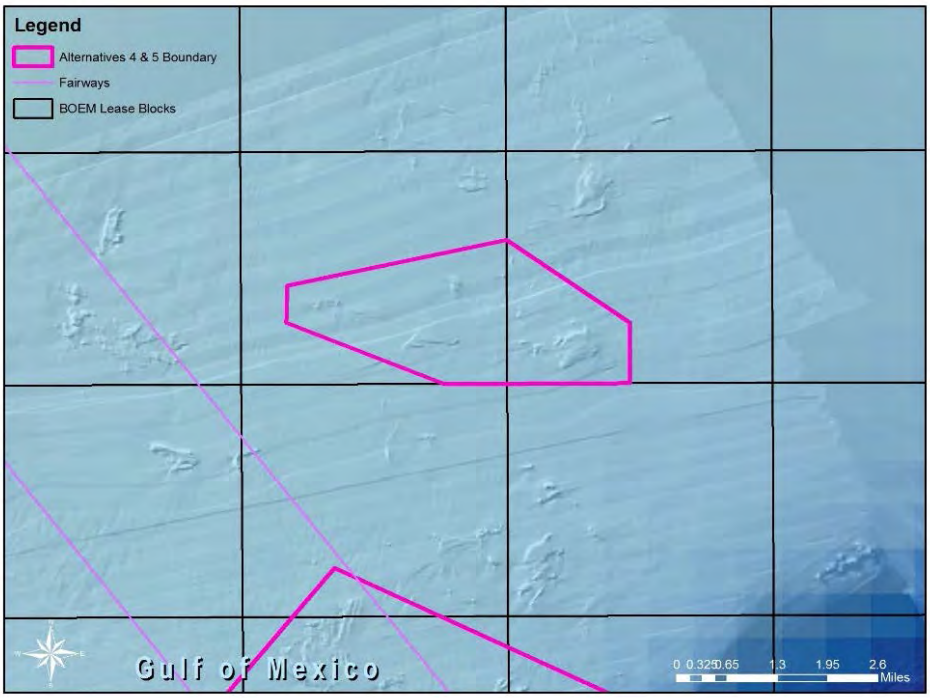


Figure B151. Far Tortuga boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

B.4 Continental Slope

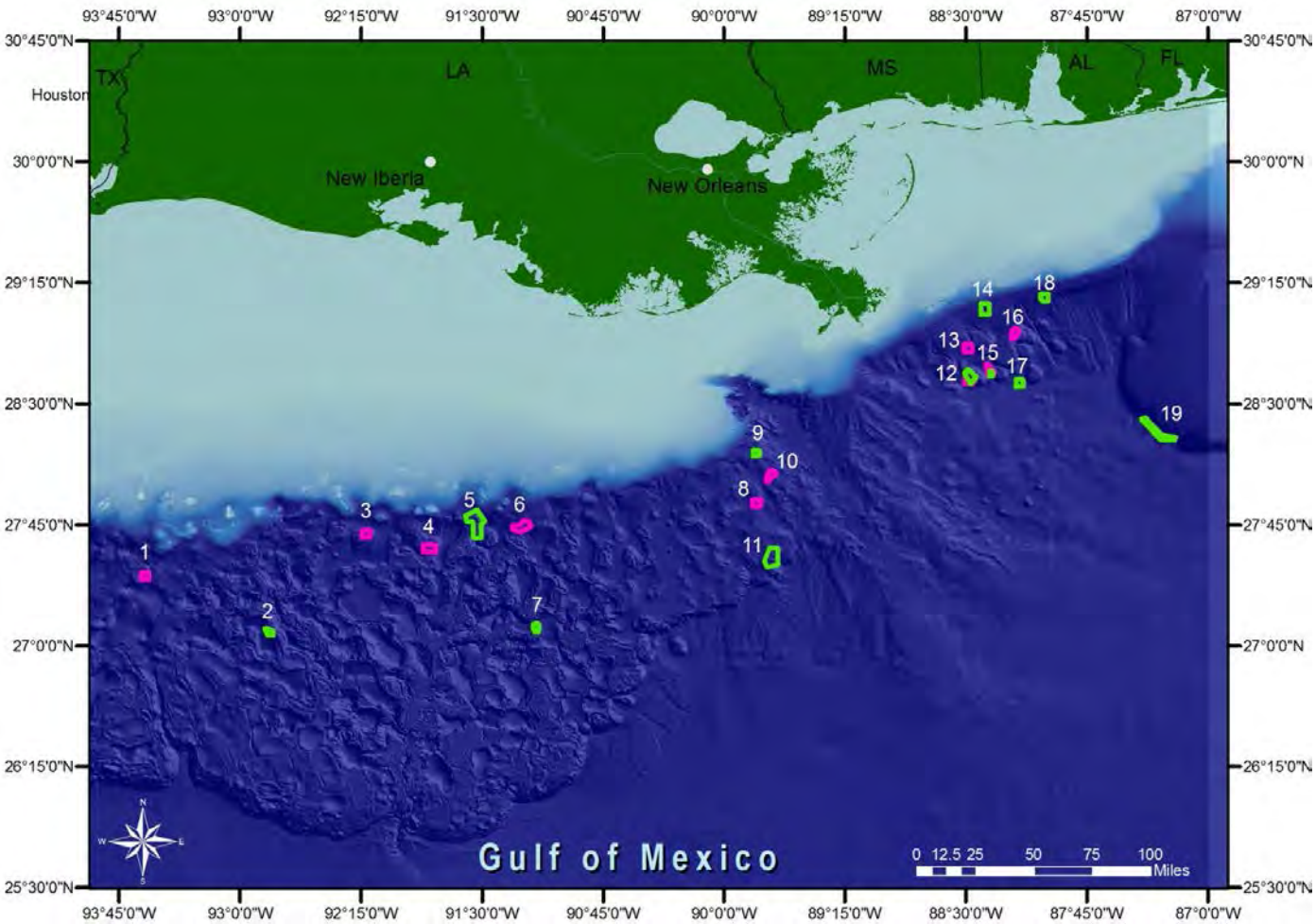


Figure B152. Overview of the 11 primary deep coral ecosystem features encompassed by Alternative 4 (with proposed boundaries outlined in green) and eight additional features encompassed by the most comprehensive alternative (Alternative 5, with extended or additional boundaries outlined in magenta) in the context of the continental slope subregion of the north central Gulf of Mexico. 1. Galvez/Frye Basins Ridge; 2. Hidalgo Basin Rim; 3. Tunica Mound; 4. Jeanerette Dome; 5. Assumption Dome; 6. Penchant Basin Rim; 7. St. Tammany Basin Rim; 8. Henderson Ridge Mid-South; 9. Henderson Ridge North; 10. Henderson Ridge Mid-North; 11. Henderson Ridge South; 12. Biloxi Dome; 13. Whiting Dome; 14. Viosca Knolls West; 15. Gloria Dome; 16. Horn Dome; 17. Dauphin Dome; 18. Viosca Knolls East; 19. DeSoto Canyon/West Florida Escarpment

B.4.1 Galvez/Frye Basins Ridge

Bottom Depth Range: ~1590-2135 feet

Habitats Present: deep coral ecosystems, soft bottom communities

Biological/Geological Characteristics: hosts high octocoral diversity and has a low aragonite saturation state (important for monitoring climate change), yet hosts numerous small live *Lophelia pertusa* mounds

Observed Impacts: None

Infrastructure Present in Preferred Alternative Boundary: None

Figure B153. Galvez/Frye Basins Ridge Alternative 5 boundary and buffered, aggregated core sensitivity zones (CSZ)

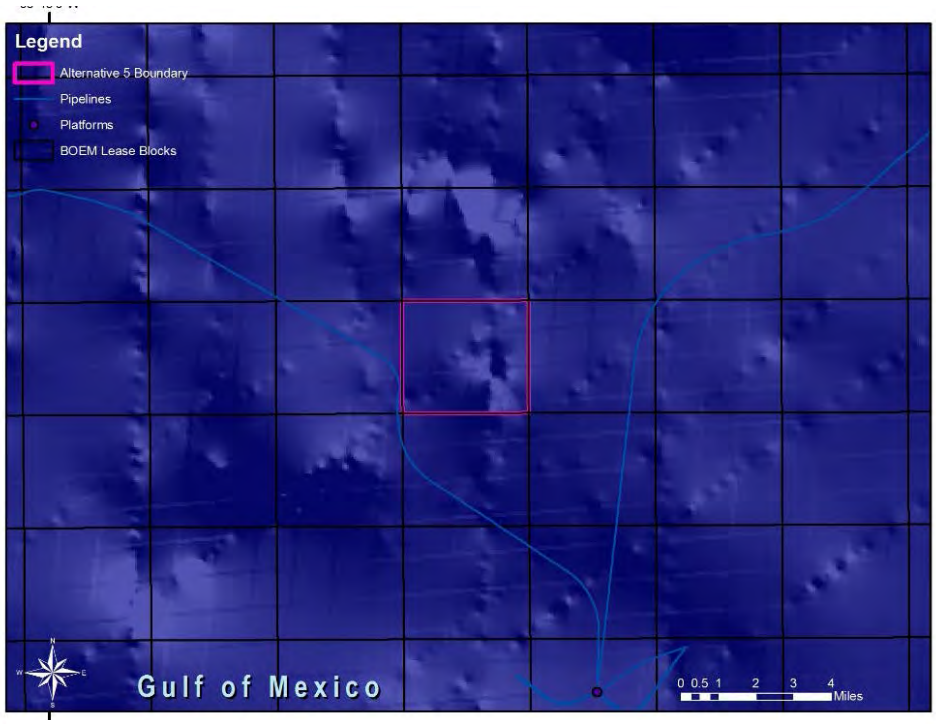


Figure B154. Galvez/Frye Basins Ridge Alternative 5 boundary, existing regulatory zones, and infrastructure

B.4.2 Hidalgo Basin Rim

Bottom Depth Range: ~3445-4230 feet

Habitats Present: deep coral ecosystems, soft bottom communities

Biological/Geological Characteristics: fractured carbonate pavement over shallow salt dome; at similar depth and geologically similar to the Henderson Ridge South site, Hidalgo Basin Rim has more active seepage including brine flows and "brine waterfalls" along with mussel beds and chemosynthetic tubeworms; the most extensive development of the bubble gum coral *Paragorgia* in the Gulf and is also the only know *Paragorgia*-dominated site in the Gulf; the genus *Paragorgia* has only been known from the Gulf since 2009, and this site was first discovered by the Okeanos Explorer in 2014

Observed Impacts: None

Infrastructure Present in Preferred Alternative Boundary: None

Figure B155. Deep coral ecosystem at Hidalgo Basin Rim. Image credit: WHOI/Cordes.

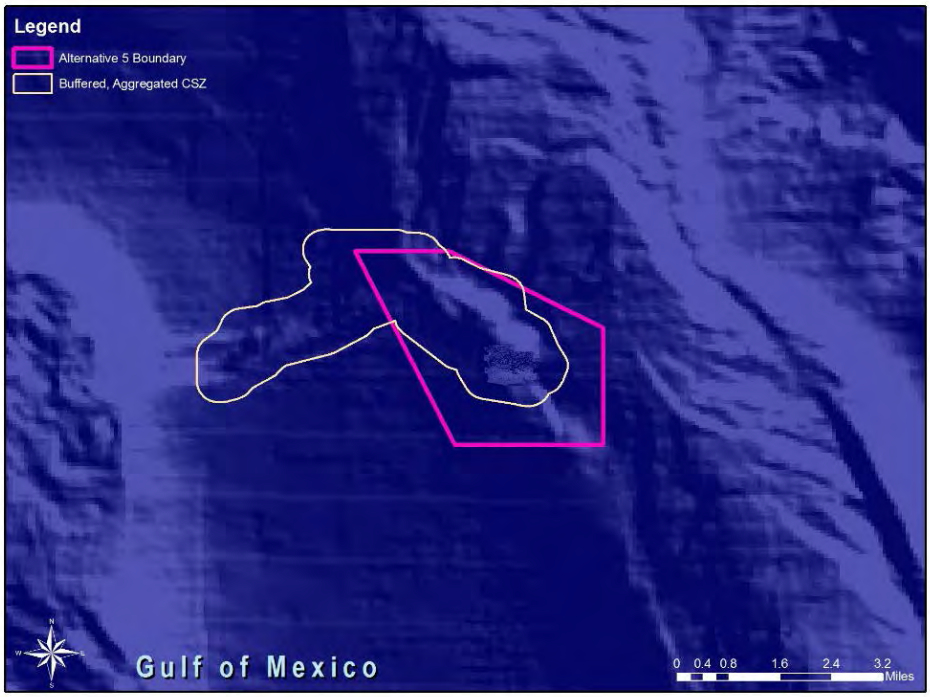


Figure B156. Hidalgo Basin Rim Alternatives 4 & 5 boundary and buffered, aggregated core sensitivity zones (CSZ)

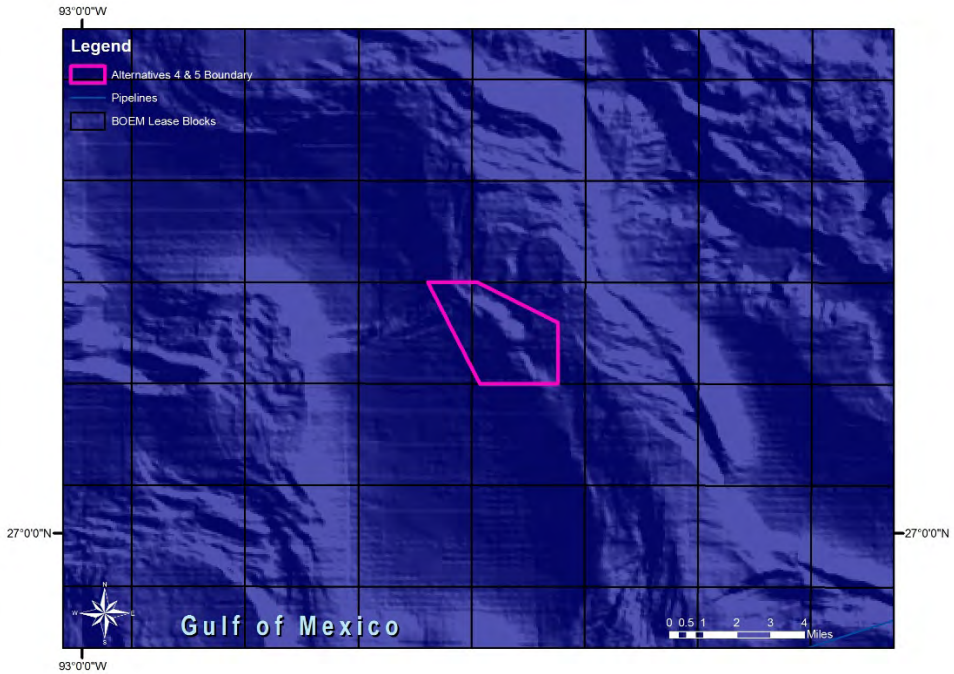


Figure B157. Hidalgo Basin Rim Alternatives 4 & 5 boundary, existing regulatory zones, and infrastructure

B.4.3 Tunica Mound

Bottom Depth Range: ~1130-1475 feet

Habitats Present: deep coral ecosystems, soft bottom communities

Biological/Geological Characteristics: a relatively shallow site among the deep coral sites evaluated, Tunica Mound hosts abundant large *Callogorgia americana* and *Leiopathes gaberrima*, the latter of which are likely quite old

Observed Impacts: None

Infrastructure Present in Preferred Alternative Boundary: None

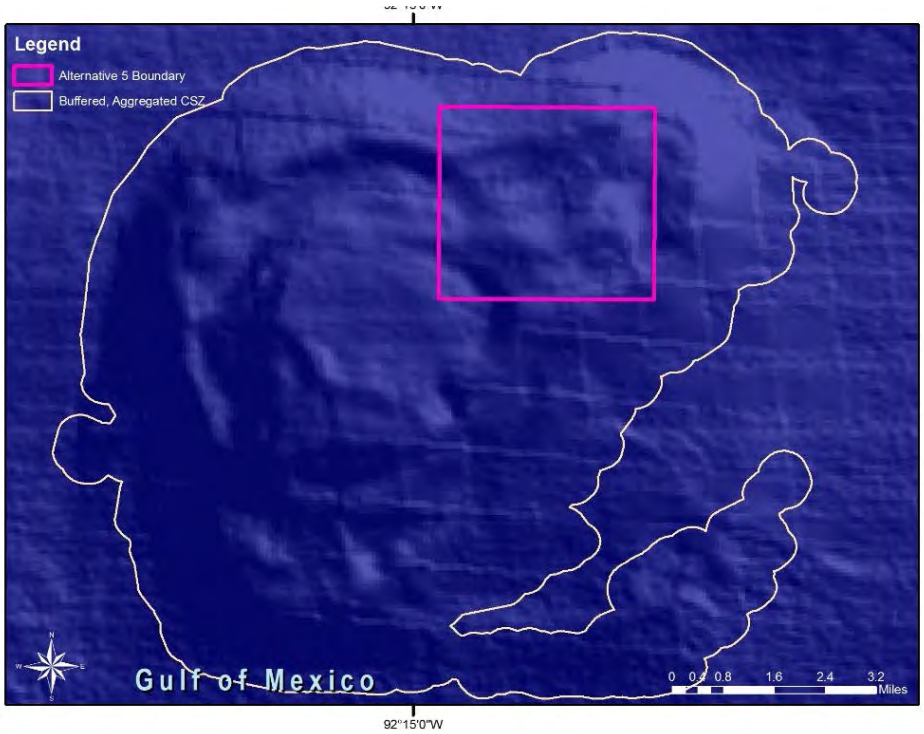


Figure B158. Tunica Mound Alternative 5 boundary and buffered, aggregated core sensitivity zones (CSZ)

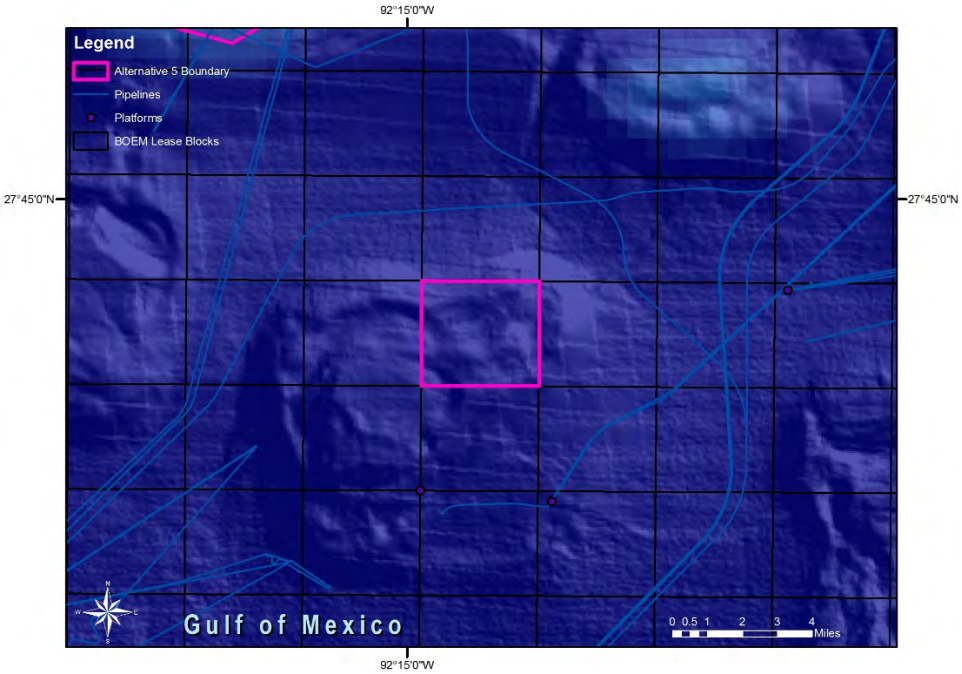


Figure B159. Tunica Mound Alternative 5 boundary, existing regulatory zones, and infrastructure

B.4.4 Jeanerette Dome

Bottom Depth Range: ~1690 2955feet

Habitats Present: deep coral ecosystems, soft bottom communities

Biological/Geological Characteristics: highest octocoral diversity known from any site in its depth range; the site also has the lowest aragonite saturation state of any site hosting *Lophelia pertusa* known in the Gulf of Mexico, making it a key site for climate change monitoring

Observed Impacts: None

Infrastructure Present in Preferred Alternative Boundary: None

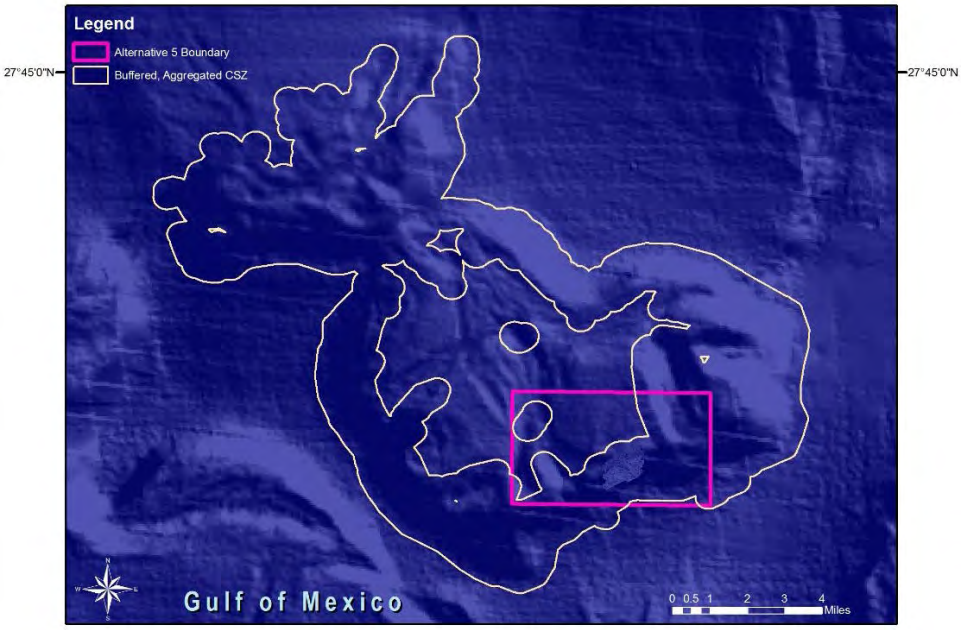


Figure B160. Jeanerette Dome Alternative 5 boundary and buffered, aggregated core sensitivity zones (CSZ)

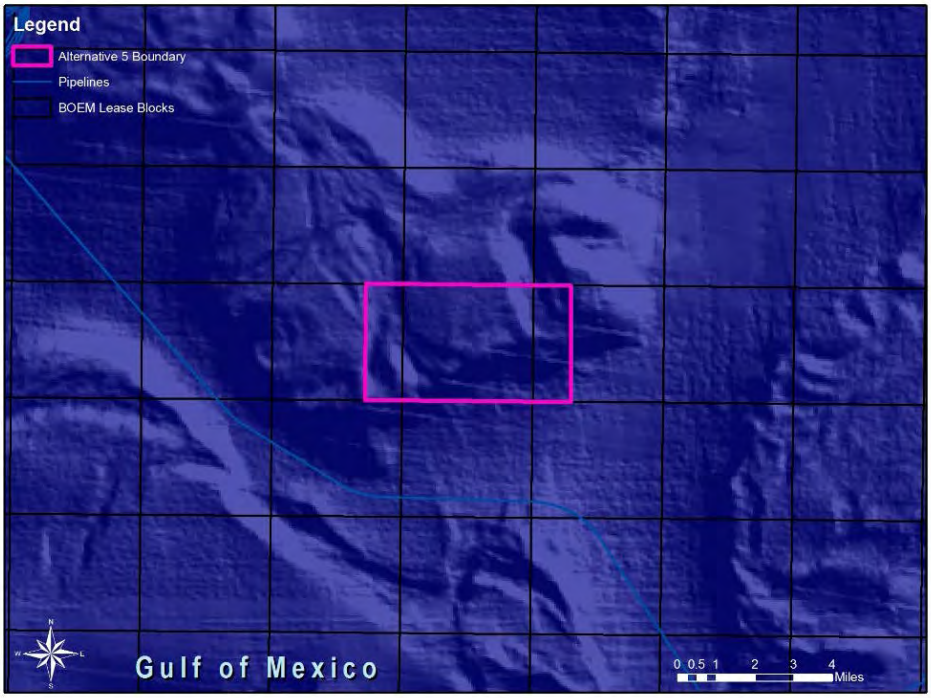


Figure B161. Jeanerette Dome Alternative 5 boundary, existing regulatory zones, and infrastructure

B.4.5 Assumption Dome

Bottom Depth Range: ~770-2890 feet

Habitats Present: deep coral ecosystems, soft bottom communities

Biological/Geological Characteristics: extensive carbonate hard bottom consisting of large boulders and massive outcrops; very large *Leiopathes* black coral colonies (3-7 feet across), some of which are likely in excess of thousands of years old, as *Leiopathes* can grow to more than 1600 years old in the Gulf of Mexico; Anthiinae fishes are closely associated with the large colonies, and can be seen nestled in large black coral branches; snowy grouper and boarfish are present; site of the shallowest known occurrence of seep tubeworms at approximately 950 feet

Observed Impacts: derelict fishing gear (line)

Infrastructure Present in Preferred Alternative Boundary: None

Figure B162. Deep coral ecosystem at Assumption Dome. Image credit: Brooks et al. (in review).

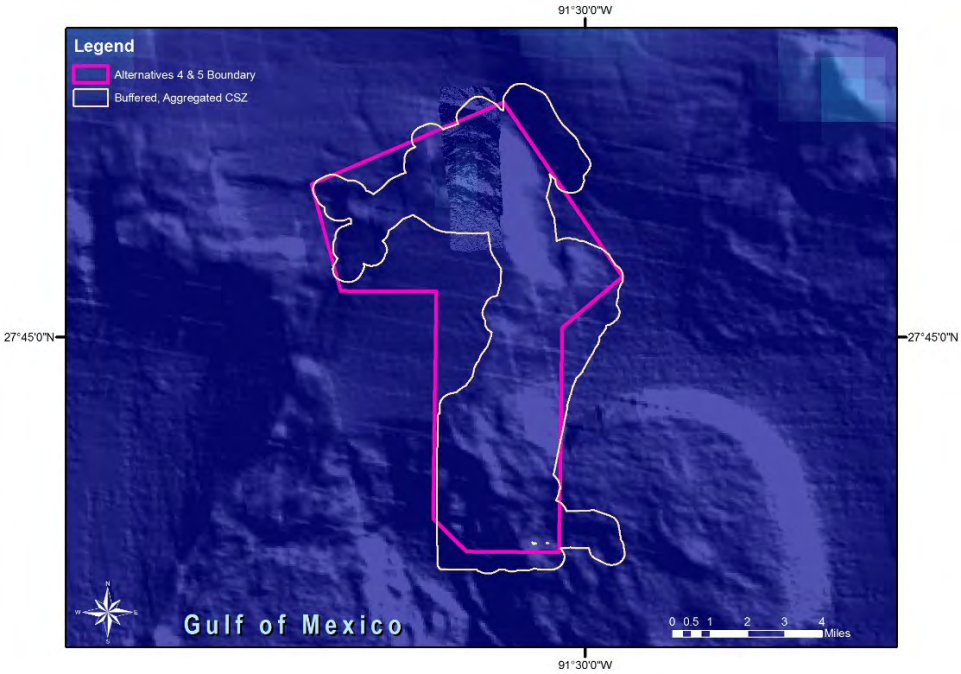


Figure B163. Assumption Dome boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

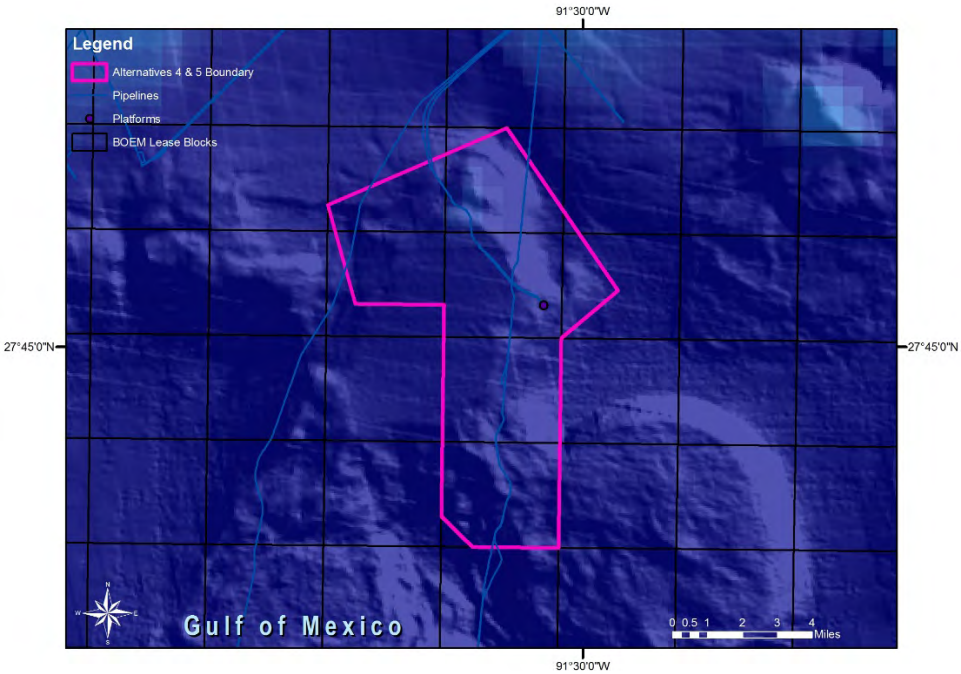


Figure B164. Assumption Dome boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

B.4.6 Penchant Basin Rim

Bottom Depth Range: ~1475-2705 feet

Habitats Present: deep coral ecosystems, soft bottom communities

Biological/Geological Characteristics: hosts one of the most spectacular seep macrofauna communities known in the Gulf of Mexico; includes the largest aggregation of tubeworms known in the Gulf of Mexico and additional areas spread over kilometers hosting numerous large spherical aggregations of very old tubeworms (over 500 individuals/ aggregation, with each individual over 6 feet in length and over 200 yrs old) as well as numerous seep mussel beds and areas with iceworms colonizing gas hydrates; areas with abundant large *Callogorgia delta* corals and an older ridge of (mostly dead) *Lophelia pertusa* to the west of the tubeworm site; very well mapped and has been extensively studied for nearly 30 years

Observed Impacts: None

Infrastructure Present in Preferred Alternative Boundary: None

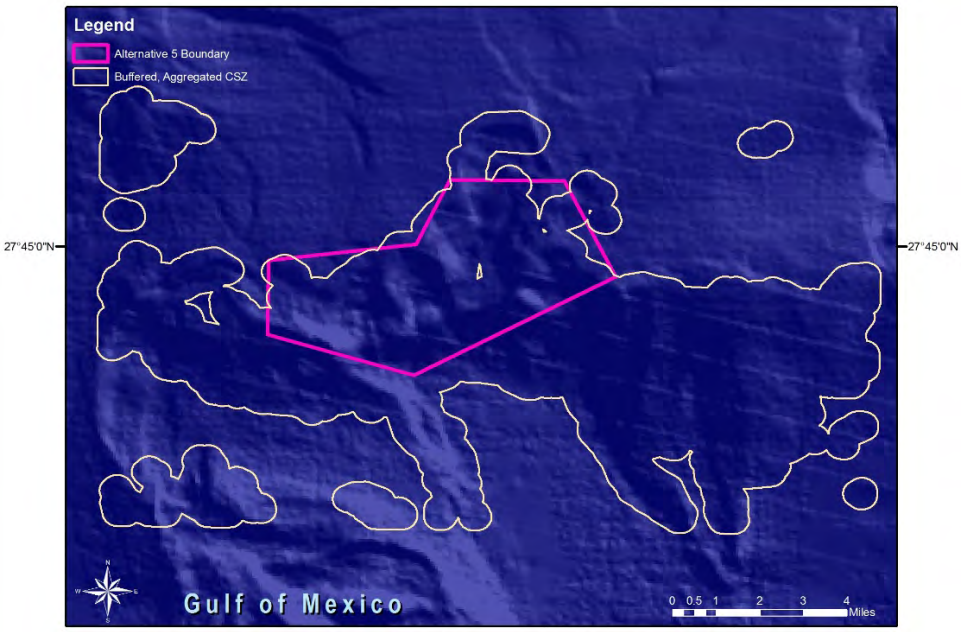


Figure B165. Penchant Basin Rim Alternative 5 boundary and buffered, aggregated core sensitivity zones (CSZ)

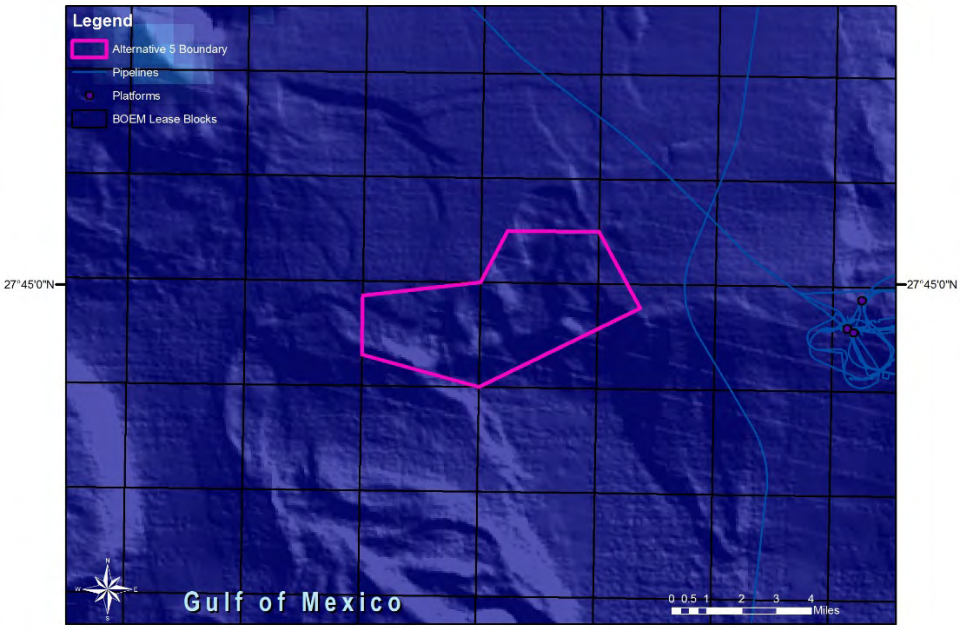


Figure B166. Penchant Basin Rim Alternative 5 boundary, existing regulatory zones, and infrastructure

B.4.7 St. Tammany Basin Rim

Bottom Depth Range: ~4595-5855 feet

Habitats Present: deep coral ecosystems, soft bottom communities

Biological/Geological Characteristics: relatively small area of high density and very diverse deepwater coral (~half an acre) in an area of exposed large carbonate boulders; the only known Gulf of Mexico site with the co-occurrence of the colonial hard corals *Enallopsammia, Madrepora*, and Solenosmilia; *Paramuricea biscaya* (the primary species of colonial coral known to have been impacted by the DWH oil spill) is also abundant at this site, which was not directly impacted by the DWH spill but is at same depth as sites impacted by the spill

Observed Impacts: None

Infrastructure Present in Preferred Alternative Boundary: None

Figure B167. Deep coral ecosystem at St. Tammany Basin Rim.
Image credit: Brooks et al. (in review).

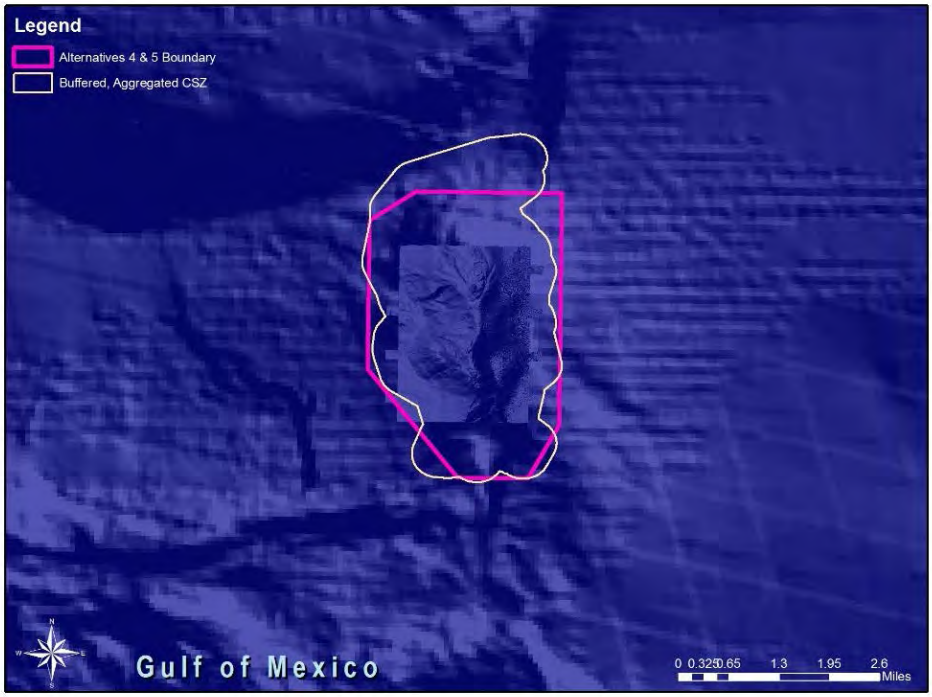


Figure B168. St. Tammany Basin Rim boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

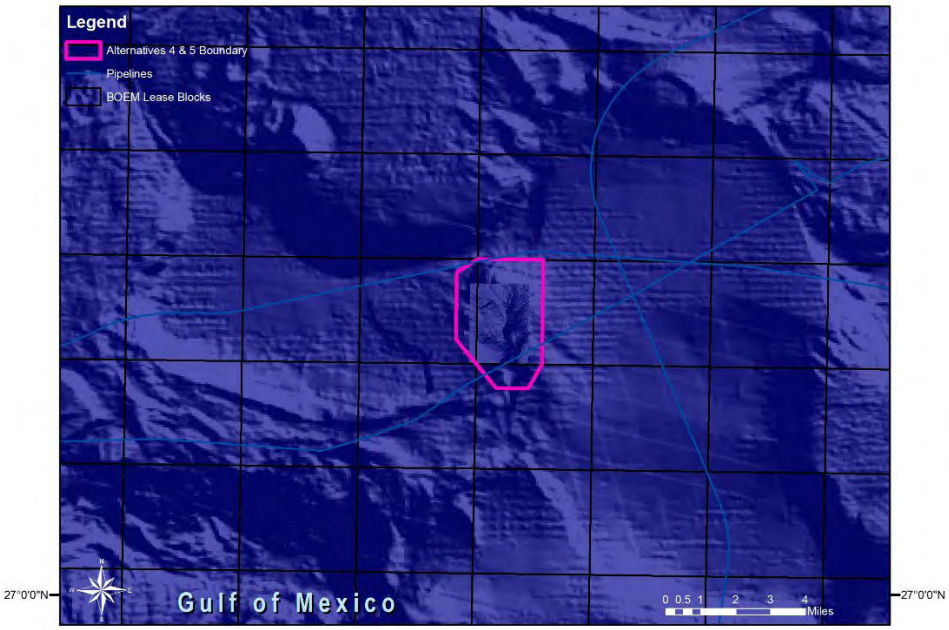


Figure B169. St. Tammany Basin Rim boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

B.4.8 Henderson Ridge Mid-South

Bottom Depth Range: ~2475-3295 feet

Habitats Present: deep coral ecosystems, soft bottom communities

Biological/Geological Characteristics: hosts several large mounds of *Madrepora* and numerous red crabs

Observed Impacts: None

Infrastructure Present in Preferred Alternative Boundary: None

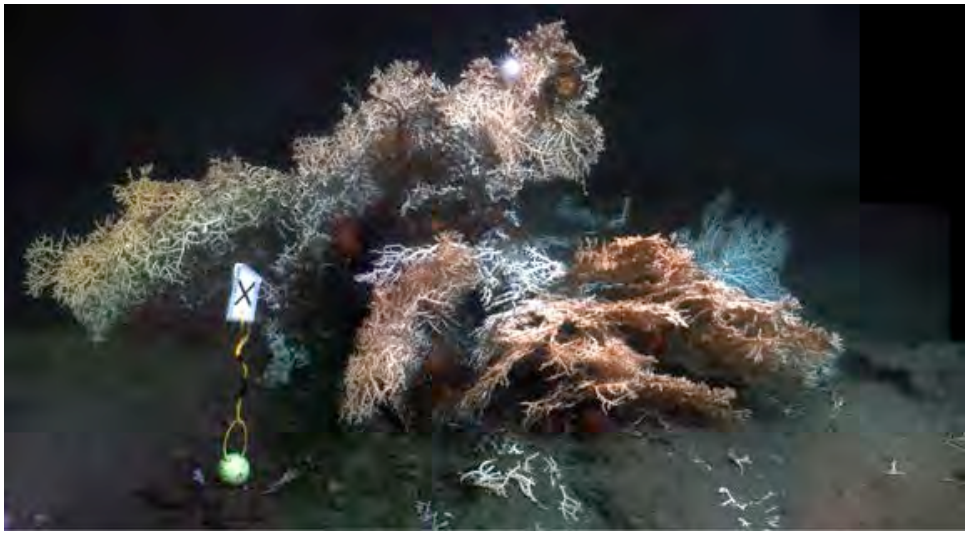


Figure B170. Deep coral ecosystem at Henderson Ridge Mid-South. Image credit: ECOGIG/Ocean Exploration Trust.

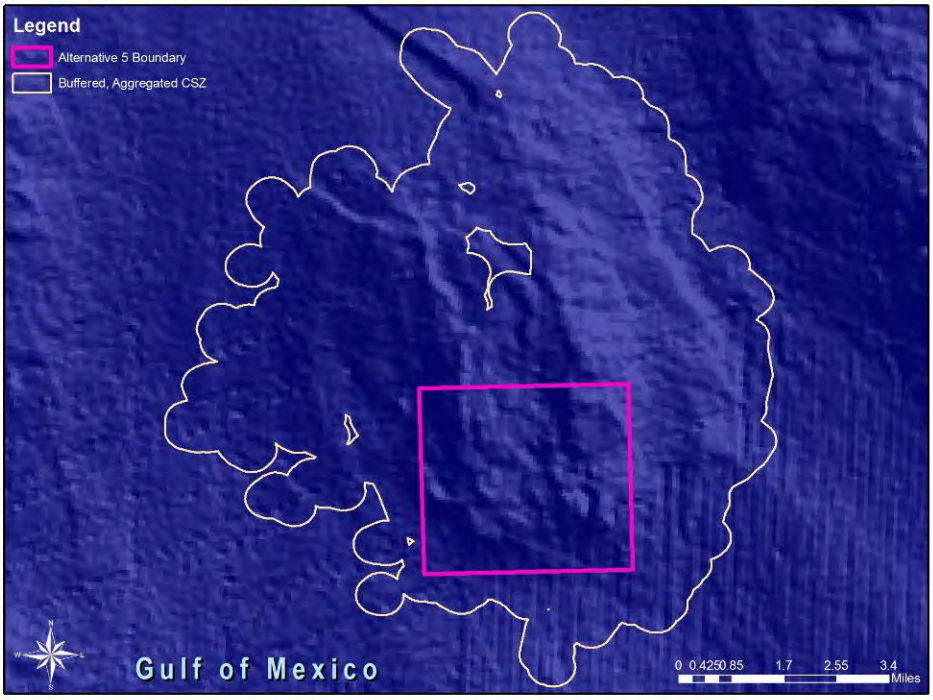


Figure B171. Henderson Ridge Mid-South Alternative 5 boundary and buffered, aggregated core sensitivity zones (CSZ)

Figure B172. Henderson Ridge Mid-South Alternative 5 boundary, existing regulatory zones, and infrastructure

B.4.9 Henderson Ridge North

Bottom Depth Range: ~1410-1655 feet

Habitats Present: deep coral ecosystems, soft bottom communities

Biological/Geological Characteristics: unique canyon feature with a high percentage of live *Lophelia pertusa* forming small mounds at the head of a canyon at approximately 1475 feet depth, extending to the rim of the canyon to the east; a high diversity of octocorals, including relatively rare bubblegum octocorals; in some areas coral density and diversity is quite high and in other areas corals spread over a relatively large extent; location is unique in that in some areas corals are co-existing in very close spatial proximity to seeps, with living *L. pertusa* attached to living tubeworms; site is well mapped and imaged, with a new area discovered in 2014; video of the site is accessible at https://www.youtube.com/watch?v=CyMSvhx_r0A

Observed Impacts: oil and gas-industry related impacts observed

Infrastructure Present in Preferred Alternative Boundary: None

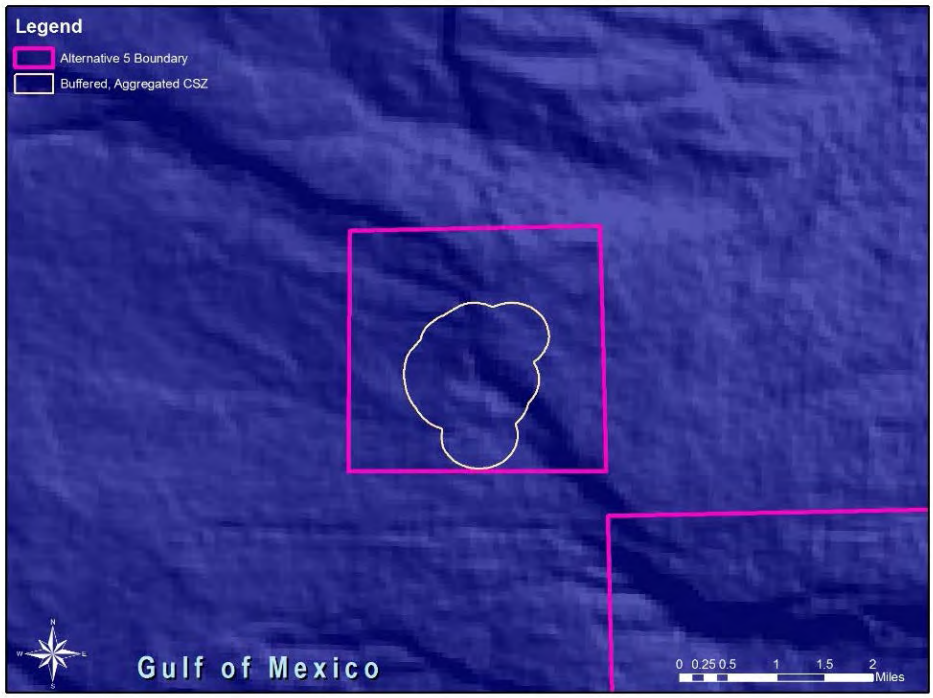


Figure B173. Henderson Ridge North boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

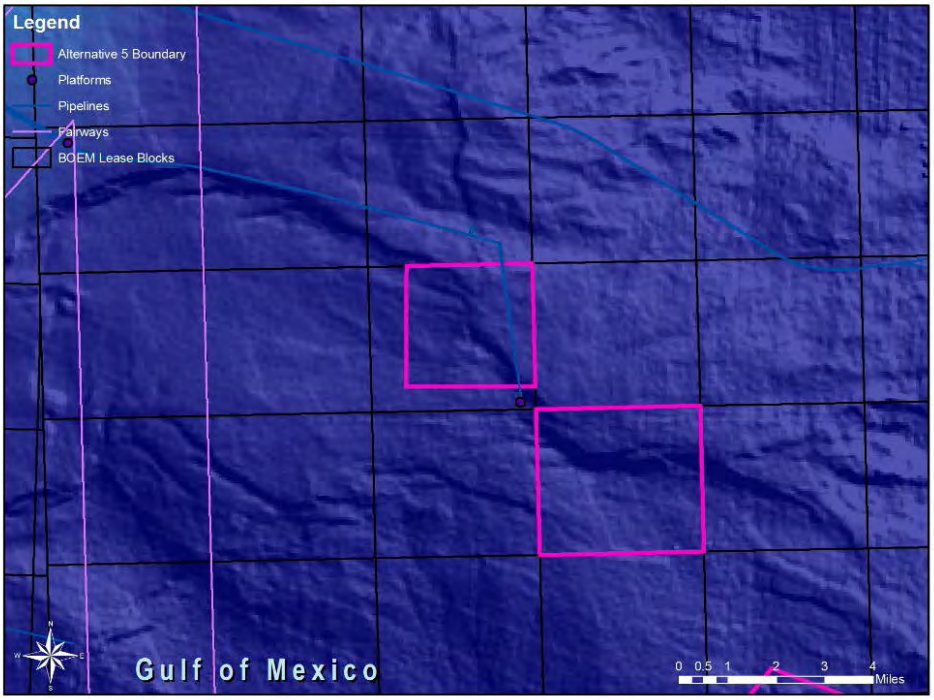


Figure B174. Henderson Ridge North boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

B.4.10 Henderson Ridge Mid-North

Bottom Depth Range: ~2050-2360 feet

Habitats Present: deep coral ecosystems, soft bottom communities

Biological/Geological Characteristics: chain catshark egg cases have been observed attached to numerous corals on every visit since their discovery in 2003 at this apparent catshark breeding site; site has the most extensive development of *Callogorgia delta* of any known site in the Gulf of Mexico, and seep communities are interspersed with aggregations of *Lophelia pertusa* and *Callogorgia delta* at this site; overlapping *Lophelia*, *Callogorgia*, and seep communities is rarely documented in the Gulf of Mexico

Observed Impacts: None

Infrastructure Present in Preferred Alternative Boundary: None

Figure B175. Henderson Ridge Mid-North Alternative 5 boundary and buffered, aggregated core sensitivity zones (CSZ)

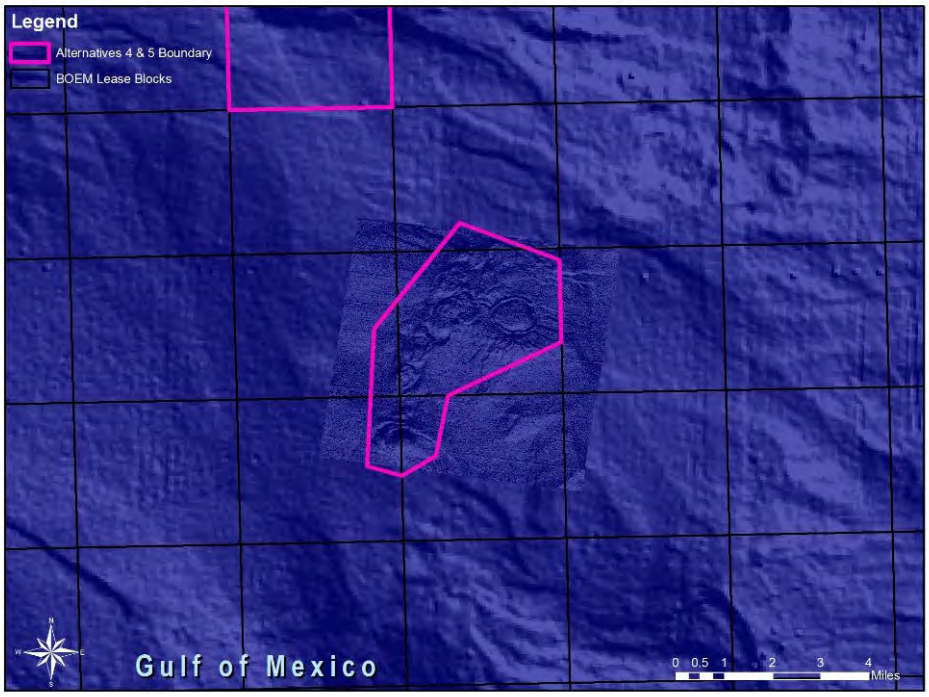


Figure B176. Henderson Ridge Mid-North Alternative 5 boundary, existing regulatory zones, and infrastructure

B.4.11 Henderson Ridge South

Bottom Depth Range: ~3410-5085 feet

Habitats Present: deep coral ecosystems, soft bottom communities

Biological/Geological Characteristics: substrate at this site is a fractured carbonate pavement over a shallow salt dome and there is active seepage in parts of this site; largest deep water (i.e., >3000 foot depth) coral site currently known in the GoM, with extensive development of both *Paramuricea* sp and *Madrepora* and the fauna associated with these corals; size of the *Paramuricea* colonies (in excess of 6-10 feet) and diversity of visible and photogenic macrofauna at this site is spectacular; similar geology to the Hidalgo Basin Rim site, but with less seepage

Observed Impacts: None

Infrastructure Present in Preferred Alternative Boundary: None

Figure B177. Deep coral ecosystem at Henderson Ridge South. Image credit: Schmidt Ocean Institute/Etnoyer.

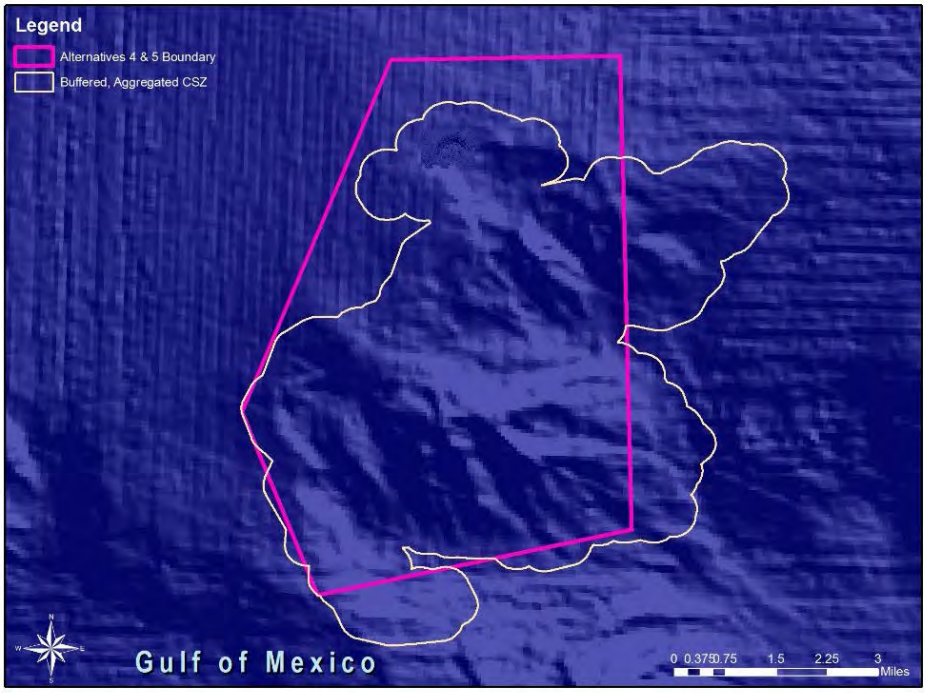


Figure B178. Henderson Ridge South boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

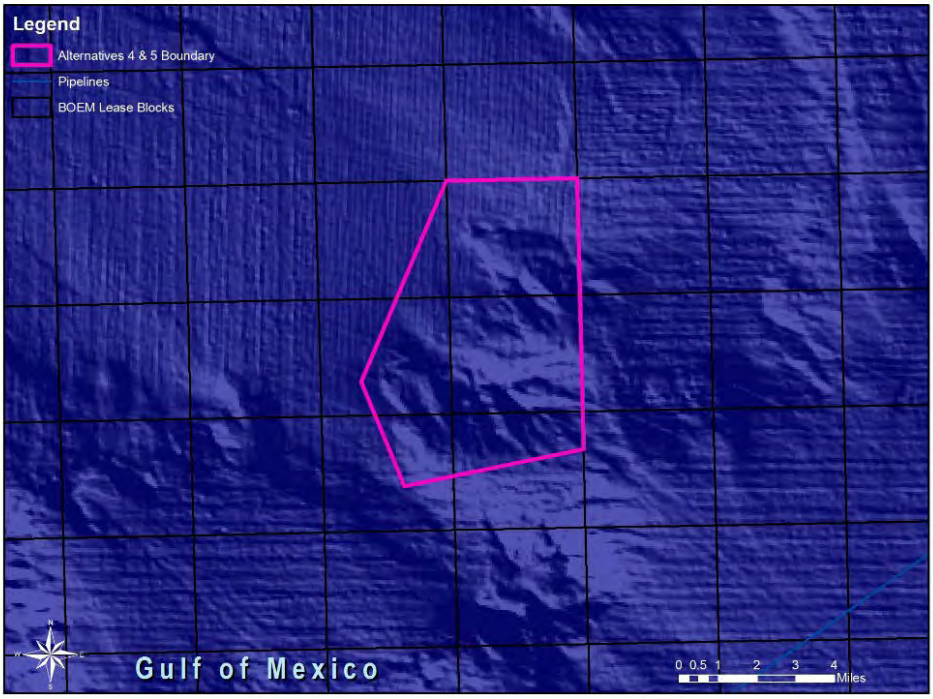


Figure B179. Henderson Ridge South boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

B.4.12 Biloxi Dome

Bottom Depth Range: ~4330-5365 feet

Habitats Present: deep coral ecosystems, soft bottom communities

Biological/Geological Characteristics: first site discovered to have been impacted by the DWH oil spill (White et al., 2012) and the site that has been monitored the most extensively since then (Hsing et al., 2013); about 50 colonial corals are known at this site and are limited to an area of about 20 x 20 m; although impacted, the corals are showing strong signs of recovery here, and continuing to follow recovery at this site is important to better understand the impacts of oil spills on deep water corals; Alternative 5 boundary proposal encompasses the wrecks of the R. E. Lee and the U-166

Observed Impacts: oil spill and response impacts

Infrastructure Present in Preferred Alternative Boundary: None

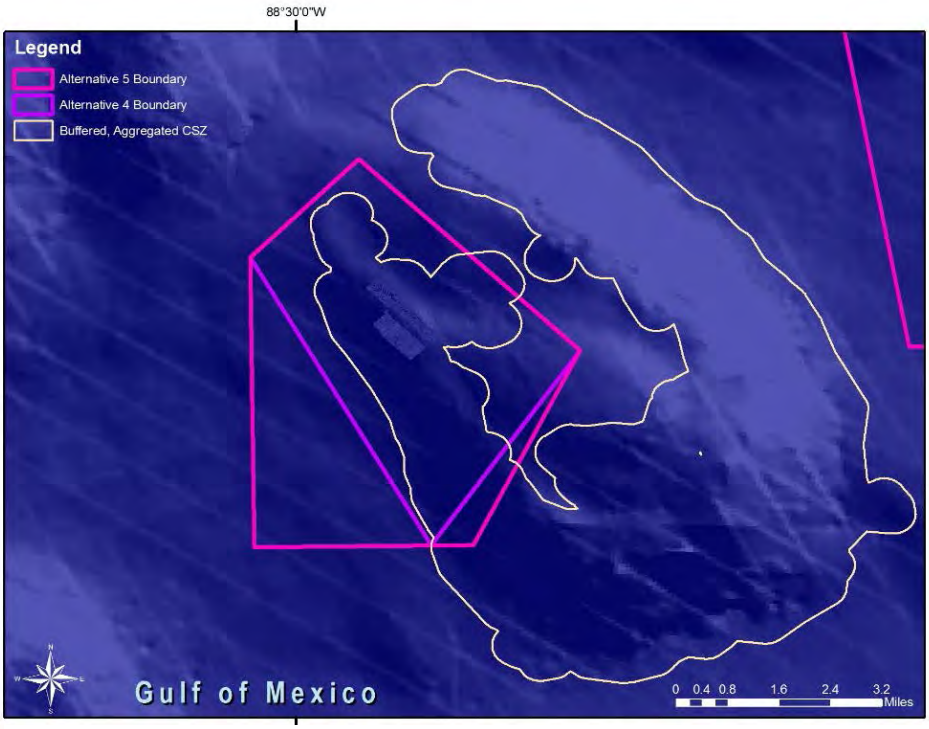


Figure B180. Biloxi Dome boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

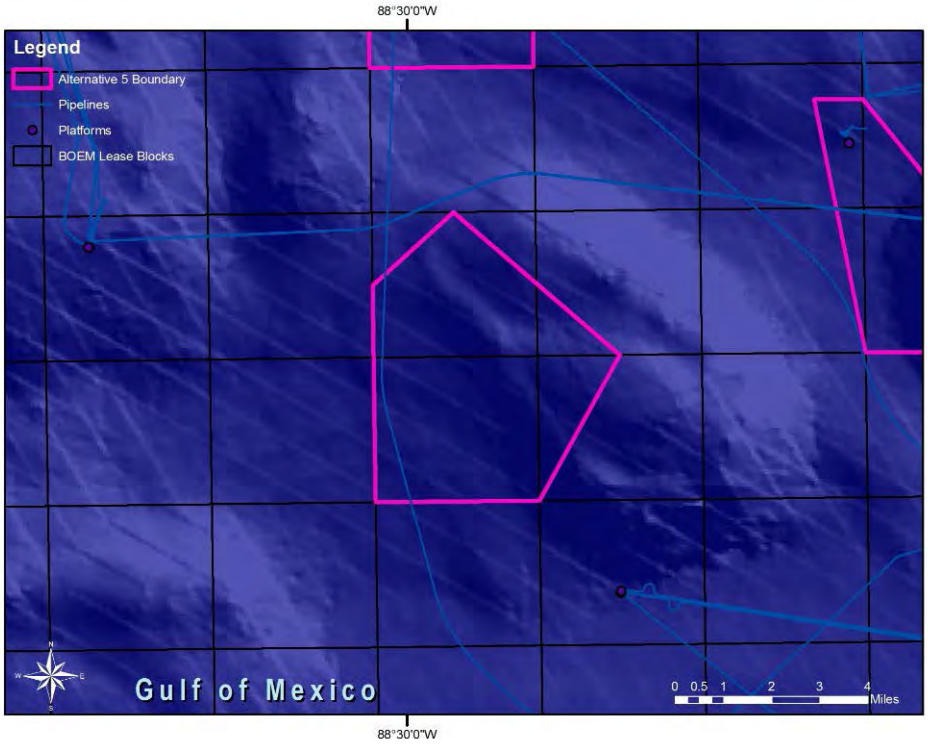


Figure B181. Biloxi Dome Alternative 5 boundary, existing regulatory zones, and infrastructure

B.4.13 Whiting Dome

Bottom Depth Range: ~2770-3740 feet

Habitats Present: deep coral ecosystems, soft bottom communities

Biological/Geological Characteristics: "hydrate observatory" site that has been monitored heavily through NOAA and other support to a consortium led by University of Mississippi and University of Southern Mississippi; in addition to very heavy seepage and exposed hydrates there is a large area with large Paramuricea spp. corals hosting the shallowest know P. biscaya; several large and old mounds of the hard coral Madrepora are present at this very well mapped and imaged site

Observed Impacts: None

Infrastructure Present in Preferred Alternative Boundary: None

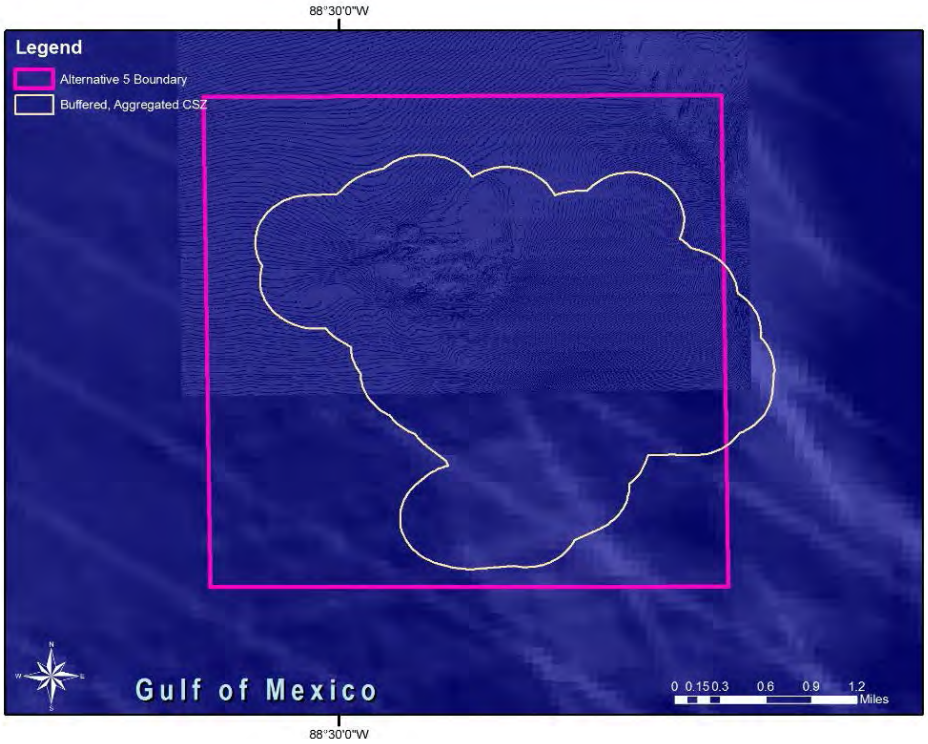


Figure B182. Whiting Dome Alternative 5 boundary and buffered, aggregated core sensitivity zones (CSZ)

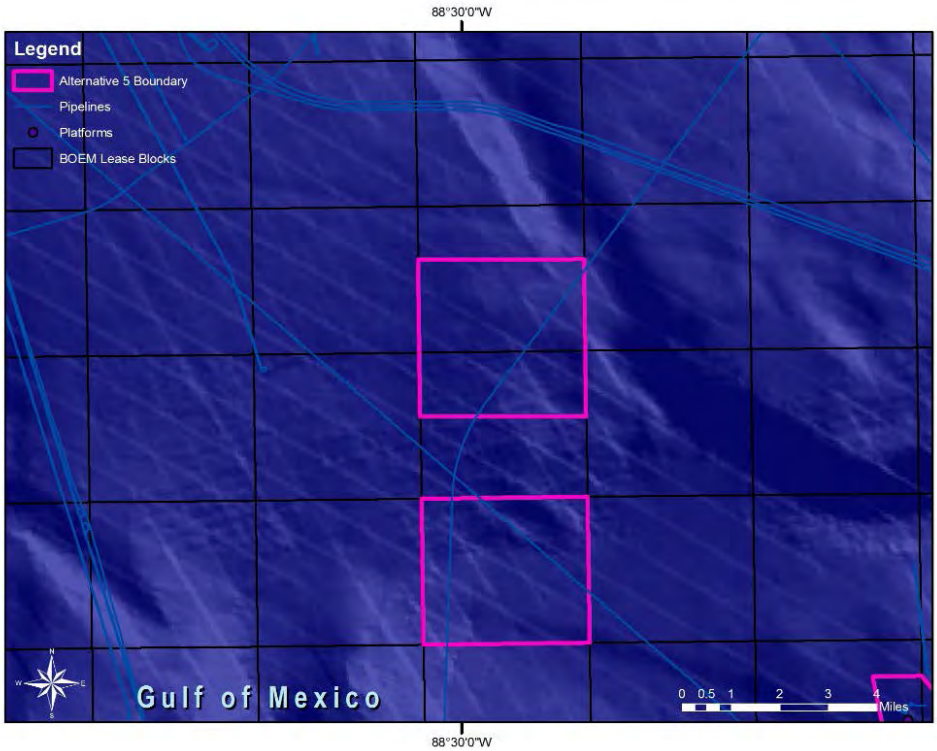


Figure B183. Whiting Dome Alternative 5 boundary, existing regulatory zones, and infrastructure

B.4.14 Viosca Knolls West

Bottom Depth Range: ~1040-1900 feet

Habitats Present: deep coral ecosystems, soft bottom communities

Biological/Geological Characteristics: only known deep coral mounds (one large mound and 2 smaller mounds) in the Gulf of Mexico, composed entirely of coral framework (living and dead) and coral rubble, rising as much as 25 meters from the sea floor and over 300,000 years old; corals (mainly *Lophelia pertusa* and *Leiopathes glaberrima*) present in very high density; distinct, re-occurring alkalinity anomaly may be related to a unique process of subsurface seepage and skeletal dissolution; parts of this site are extremely well mapped and imaged; another area, extending from the deep coral mounds, is composed of a long ridge system with many soft corals (e.g., abundant bamboo corals, large antipatharian black corals) along the edge of a narrow canyon-like feature; barrelfishes, anthias, and squat lobsters have been commonly observed in association with the black corals; site includes a carbonate mound that hosts a moderate diversity of octocorals and very large (and old) black corals on a rocky substrate dominated by large anemones; hundreds of spotted grouper present, suggesting it may be an important feeding and/or breeding ground for this fish species

Observed Impacts: derelict fishing gear (line)

Infrastructure Present in Preferred Alternative Boundary: None

Figure B184. Deep coral ecosystems at Viosca Knolls West. Image credit: Brooks et al. (in review).

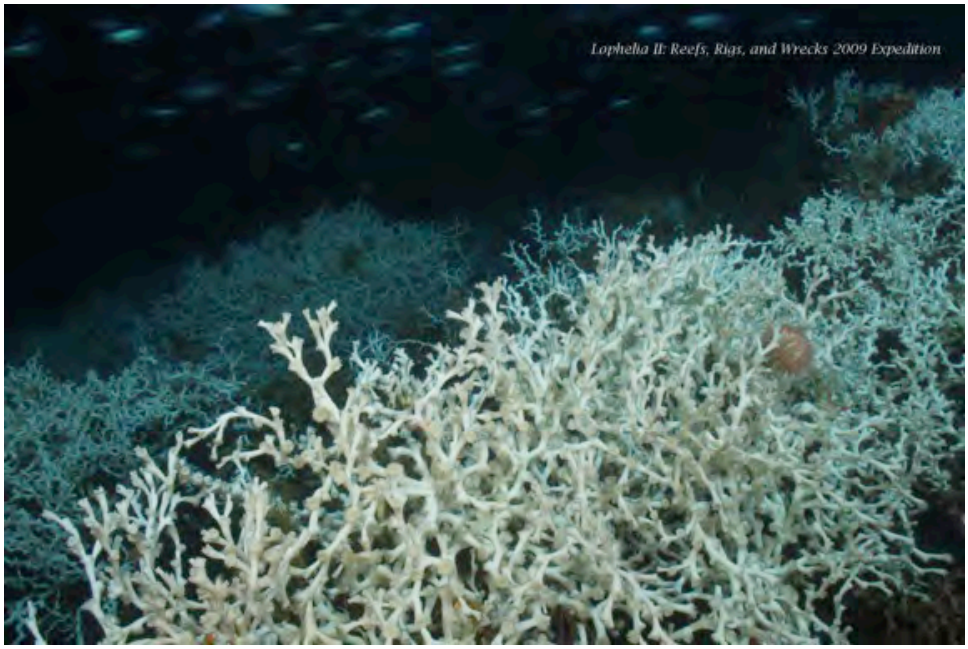


Figure B185. Deep coral ecosystems at Viosca Knolls West. Image credit: Brooks et al. (in review).

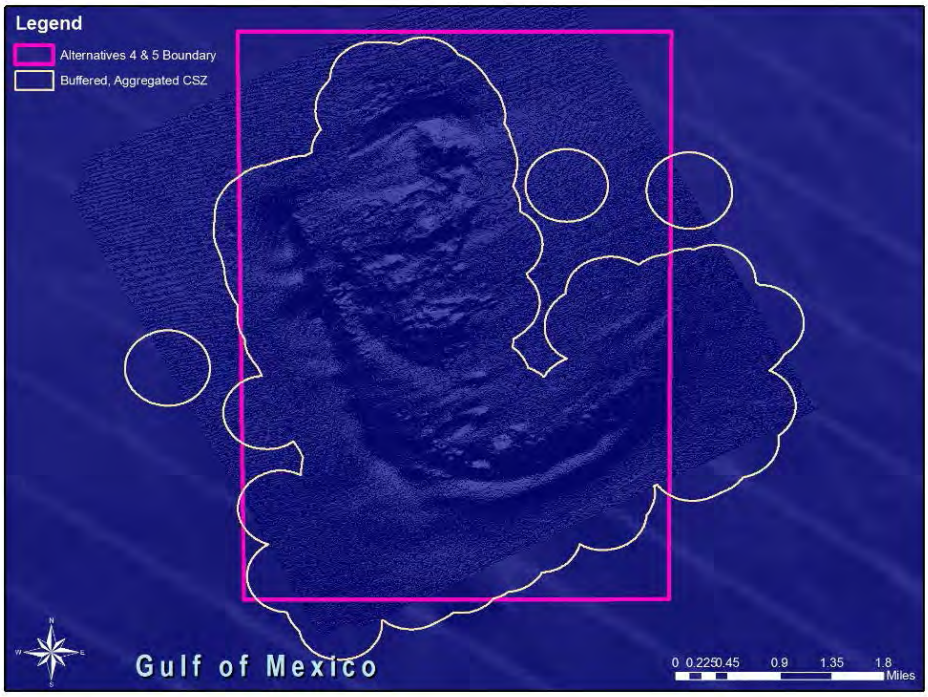


Figure B186. Viosca Knolls West boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

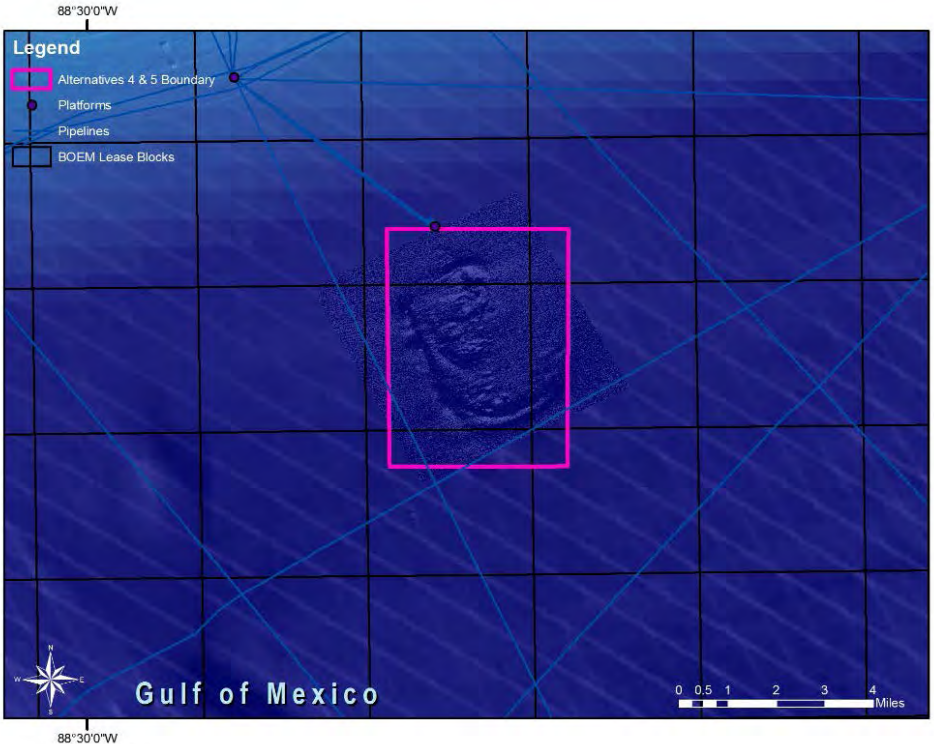


Figure B187. Viosca Knolls West boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

B.4.15 Gloria Dome

Bottom Depth Range: ~5185 feet

Habitats Present: deep coral ecosystems, soft bottom communities

Biological/Geological Characteristics: closer to the DWH well than the Biloxi Dome site, this site was also impacted heavily; it is a larger site (roughly 3 acres) with more corals and has been monitored yearly since its discovery in 2011 (Fisher et al., 2014); like at the Biloxi Dome site, some of the corals here did not evidence visible signs of impact and many others are showing signs of recovery; important for monitoring to understand the long-term impacts of an oil spill on deep water corals and for their recovery; Alternative 5 boundary proposal encompasses the wreck of the Deepwater Horizon drilling rig, providing opportunities for survey transects to be monitored between the wellhead to the deep coral site at Gloria Dome

Observed Impacts: oil spill and response impacts

Infrastructure Present in Preferred Alternative Boundary: None

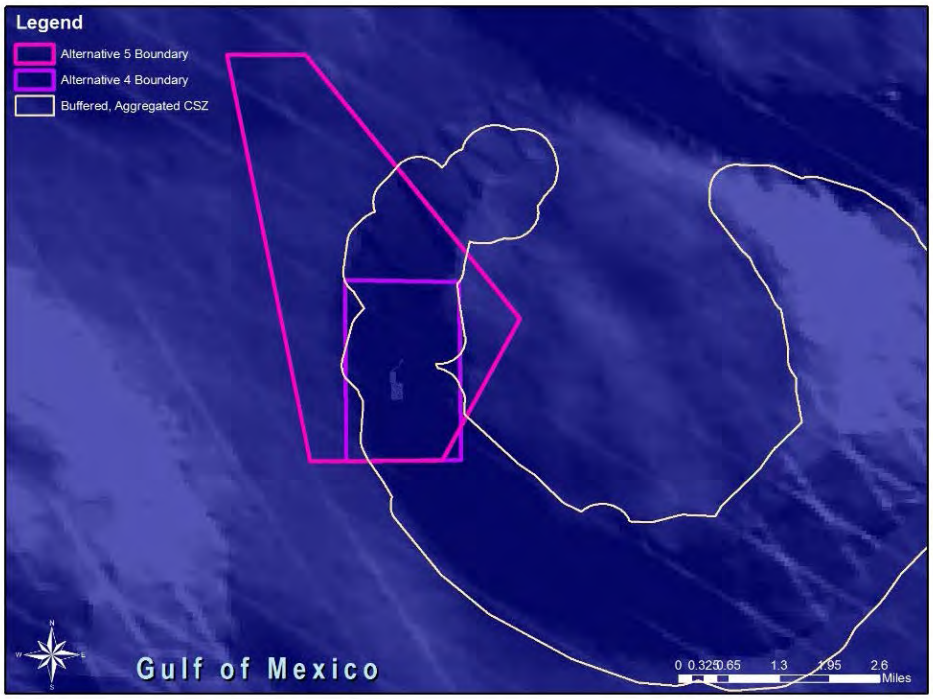


Figure B188. Gloria Dome boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

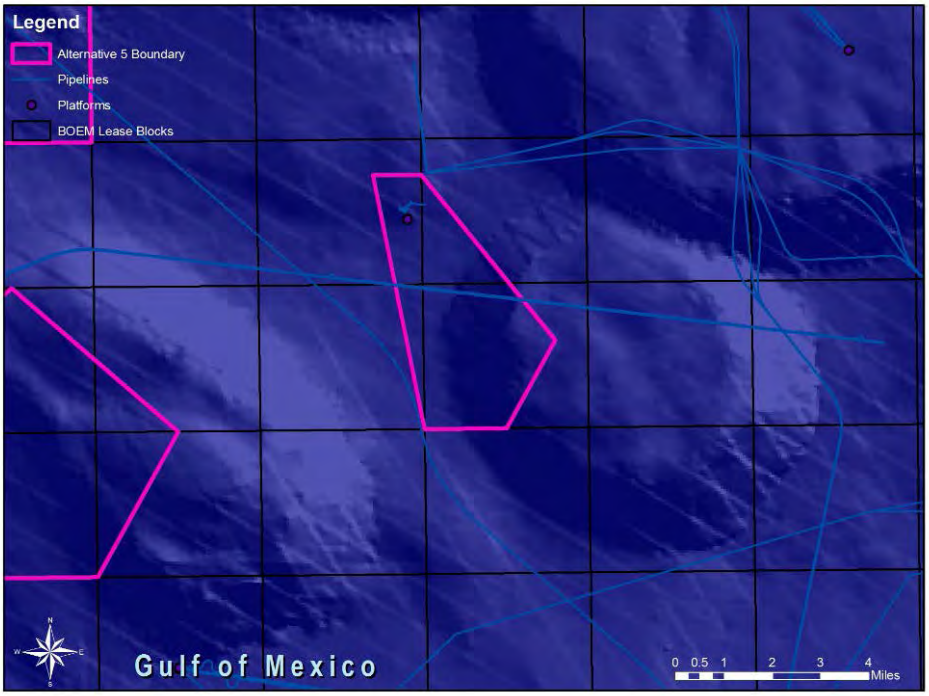


Figure B189. Gloria Dome Alternative 5 boundary, existing regulatory zones, and infrastructure

B.4.16 Horn Dome

Bottom Depth Range: ~3410-4115 feet

Habitats Present: deep coral ecosystems, soft bottom communities

Biological/Geological Characteristics: only 25 km from the DWH well at a depth where impact has been observed at other sites, yet this site hosts a pristine population of healthy (un-impacted) *Paramuricea* as well as several seep communities

Observed Impacts: None

Infrastructure Present in Preferred Alternative Boundary: None

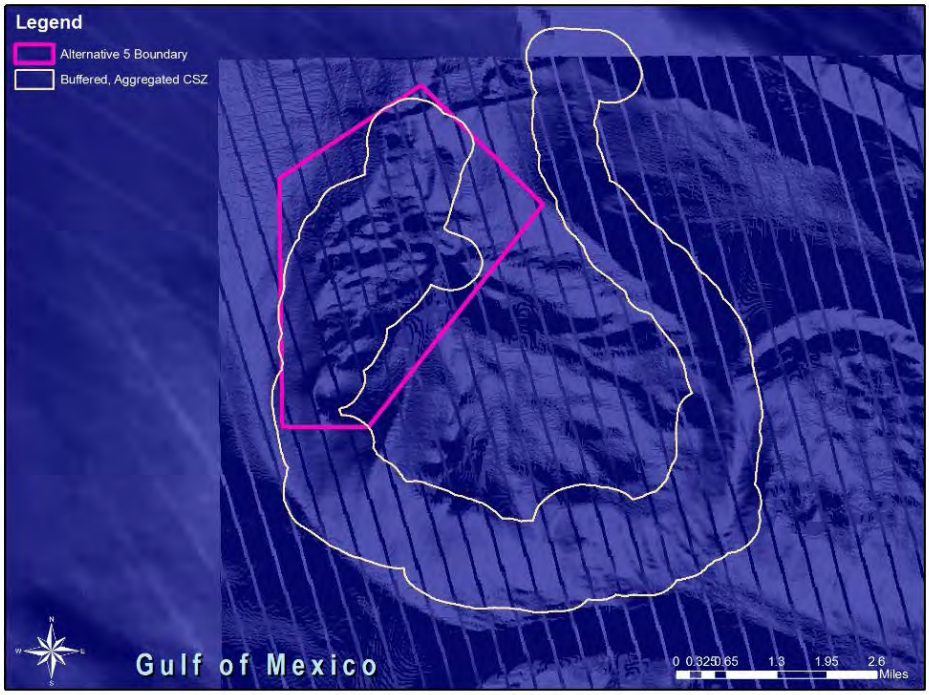


Figure B190. Horn Dome Alternative 5 boundary and buffered, aggregated core sensitivity zones (CSZ)

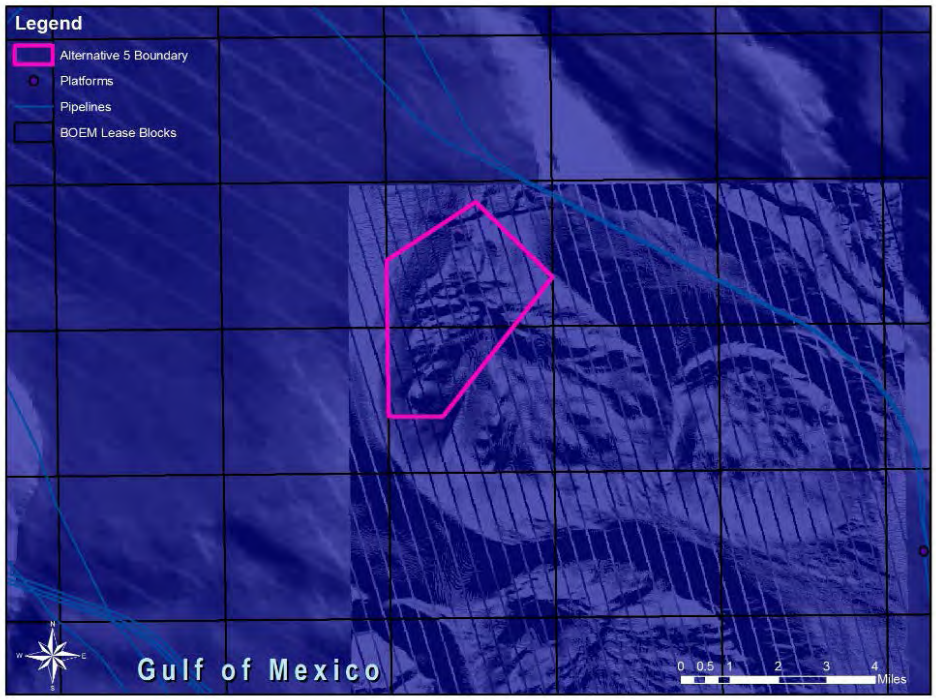


Figure B191. Horn Dome Alternative 5 boundary, existing regulatory zones, and infrastructure

B.4.17 Dauphin Dome

Bottom Depth Range: ~6035-6695 feet

Habitats Present: deep coral ecosystems, soft bottom communities

Biological/Geological Characteristics: further from the site of the DWH spill than the Biloxi Dome and Gloria Dome sites, the level of impact to coral at this site is less than at those sites; corals here are generally smaller and more spread out (lower density); this site is equally important for monitoring to understand the long-term impacts of oil spills on deep water corals

Observed Impacts: oil spill and response impacts

Infrastructure Present in Preferred Alternative Boundary: None

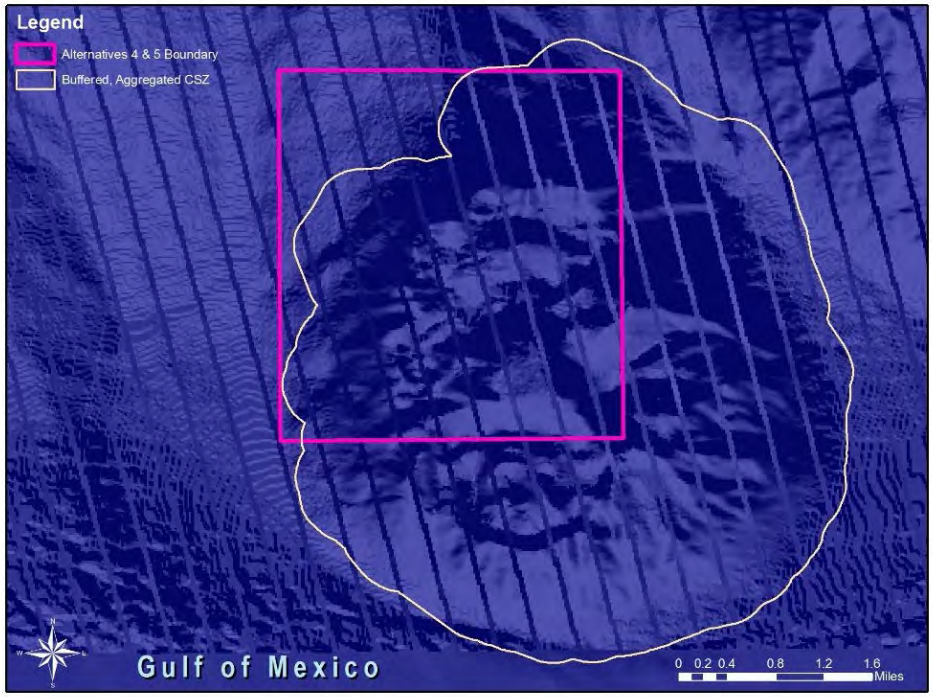


Figure B192. Dauphin Dome boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

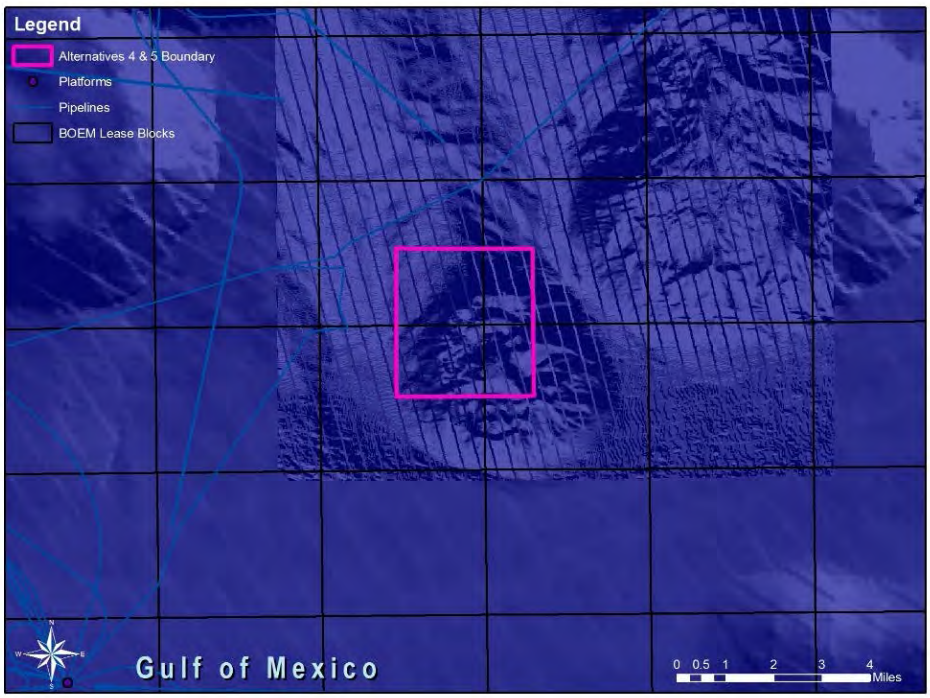


Figure B193. Dauphin Dome boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

B.4.18 Viosca Knolls East

Bottom Depth Range: ~1380-2690 feet

Habitats Present: deep coral ecosystems, soft bottom communities

Biological/Geological Characteristics: largest, most extensive *Lophelia pertusa* site known to occur in northern Gulf of Mexico, with high densities of live coral in many areas of the site; abundant *Callogorgia delta* and black corals (two color-morphs of *Leiopathes glaberrima*) present in high densities in many areas; aggregations of seep tubeworms that are at least 200 years old; the site has been visited by submersibles and ROVs more than any other coral site in the Gulf of Mexico over the past 20 years, and significant portions are extremely well mapped and imaged

Observed Impacts: oil and gas industry operations impacts

Infrastructure Present in Preferred Alternative Boundary: None

Figure B194. Deep coral ecosystem at Viosca Knolls East. Image credit: Brooks et al. (in review).

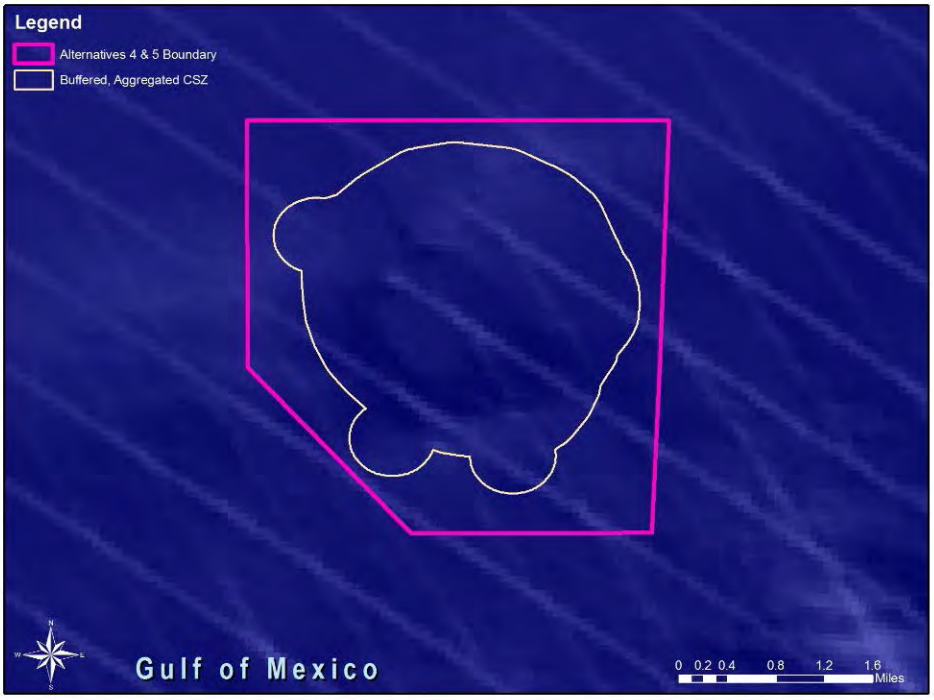


Figure B195. Viosca Knolls East boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

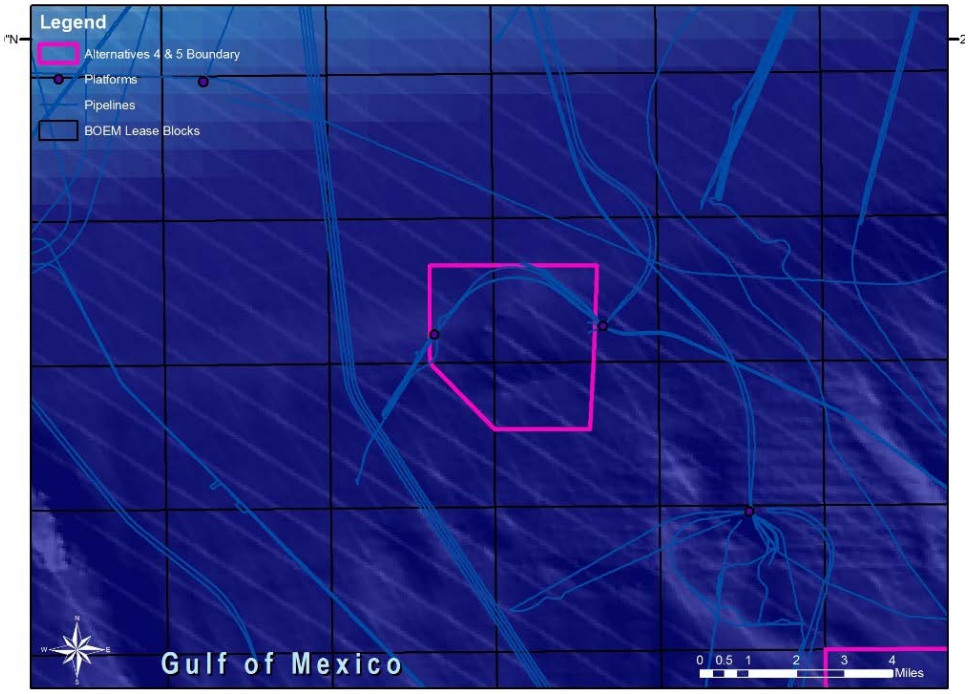


Figure B196. Viosca Knolls East boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

B.4.19 DeSoto Canyon/West Florida Escarpment

Bottom Depth Range: ~4755-8775 feet

Habitats Present: deep coral ecosystems, soft bottom communities

Biological/Geological Characteristics: on the north end of the West Florida Escarpment, most of which is likely home to extensive coral development, but most of which remains unexplored; there is a very high diversity of corals, including octocorals, documented on the escarpment in this region, including the deepest documented site with abundant corals in the Gulf of Mexico; at the base of the vertical wall are seeps that harbor a unique species of seep mussel, only known from this site (which suggests oceanographic isolation and the possibility of other unique species and/or isolated populations on this region of the Florida Escarpment)

Observed Impacts: derelict fishing gear (trawl nets, line), anchors

Infrastructure Present in Preferred Alternative Boundary: None

Figure B197. Deep coral ecosystem at DeSoto Canyon/West Florida Escarpment. Image credit: ECOGIG/Ocean Exploration Trust.

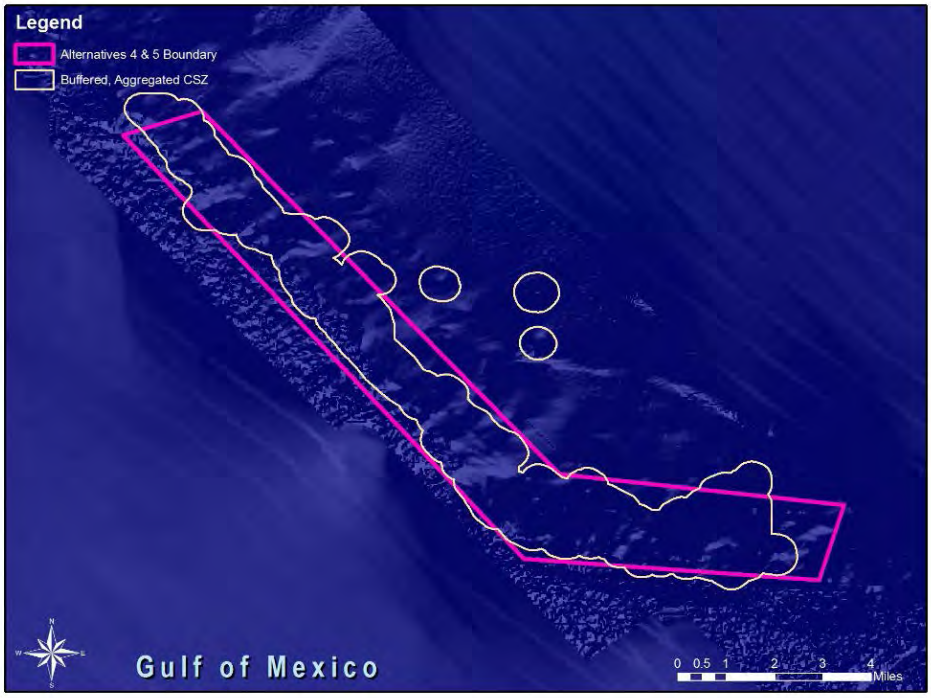


Figure B198. DeSoto Canyon/West Florida Escarpment boundary alternatives 4 & 5 and buffered, aggregated core sensitivity zones (CSZ)

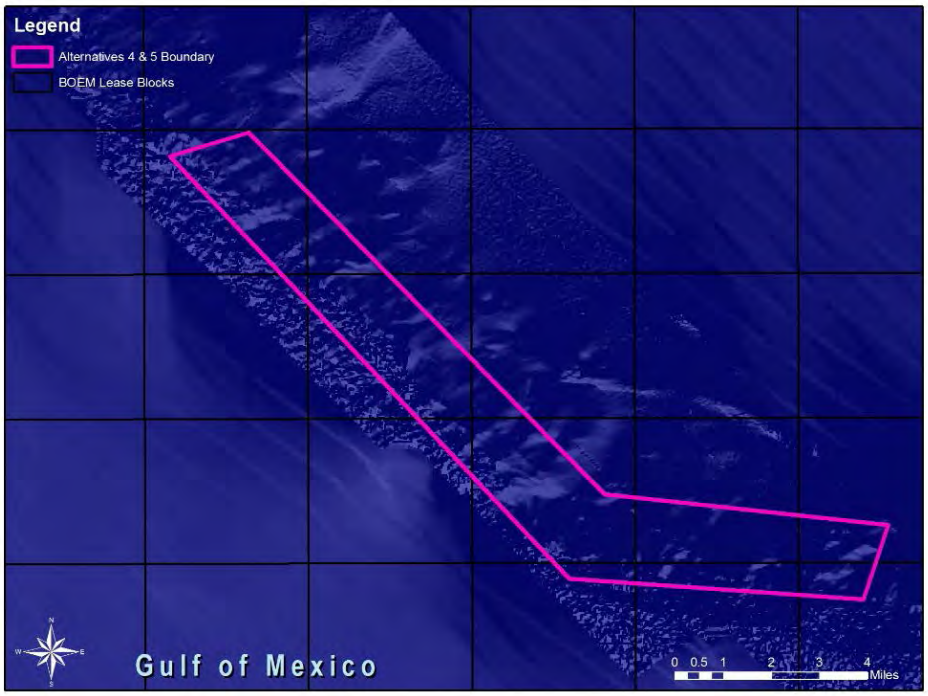


Figure B199. DeSoto Canyon/West Florida Escarpment boundary alternatives 4 & 5, existing regulatory zones, and infrastructure

Appendix C

SITE PROFILES OF NATIONALLY SIGNIFICANT CULTURAL AND HISTORIC RESOURCES INCLUDED IN ALTERNATIVE 5

C.1 Purpose

The purpose of this appendix is to provide a brief descriptive overview of each of the 10 shipwrecks included in Alternative 5 and evaluated in this DEIS. The site descriptions below are ordered generally from west to east across the study area of the north central Gulf of Mexico.

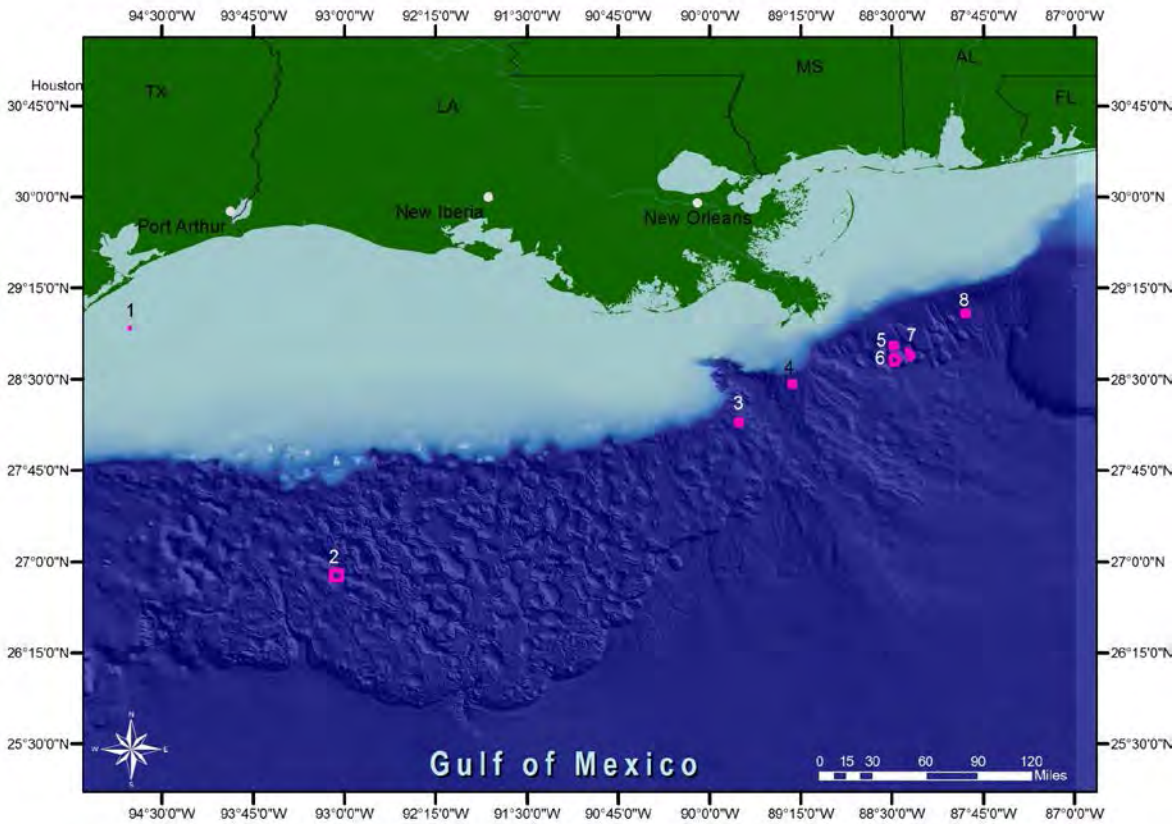


Figure C1. Overview of the 10 shipwrecks encompassed by the eight proposed boundaries presented in Alternative 5, in the context of the north central Gulf of Mexico. 1. USS *Hatteras*; 2. Monterrey wrecks; 3. *GulfOil*; 4. *GulfPenn*; 5. Mardi Gras wreck; 6. *R. E. Lee* & *U-166*; 7. *Deepwater Horizon*; 8. *Anona*

C.2 USS *Hatteras*

Bottom Depth: ~57 feet

Approximately 20 miles south of Galveston, TX, the wreck of USS *Hatteras* is largely undisturbed. Listed in the National Register of Historic Places (NHRP) and a Texas State Landmark, *Hatteras* is a nationally significant war grave and archaeological site with strong local ties to Galveston and Texas. It is one of many historic shipwrecks that lie in the extended maritime cultural landscape off Texas' historically significant port of Galveston, part of the greater Houston region, itself an ongoing and nationally significant hub of maritime economic activity.

In early January of 1863 the USS *Hatteras,* as part of Rear Admiral David Farragut's West Gulf Blockading Squadron, was stationed off Galveston during the Union bombardment of the city. Galveston recently had been recaptured by Confederate forces at the Battle of Galveston on January 1, 1863. When the 210-ft steam warship USS *Hatteras* ventured out in the Gulf in pursuit of an unknown vessel on January 11, 1863 its captain and crew neither anticipated the mark it would make on history that night or foresaw its influence on protective legislation for historic shipwrecks more than 100 years later. *Hatteras* approached the unidentified steamship only to discover it was the famous Confederate commerce raider CSS *Alabama.* Following a brief exchange of cannon fire, *Hatteras* was damaged and sank in less than 15 minutes with the loss of two lives. This was the only naval battle during the Civil War to occur offshore in the Gulf of Mexico and the only engagement resulting in the loss of a Union warship at sea throughout the war. The discovery and early salvage attempt by Dr. Paul Cloutier, a Rice University physics professor, in 1976 was the first major challenge to U.S. ownership of its sunken military properties. The landmark court case inexorably established the government's claim on its historic shipwrecks.

The wreck of *Hatteras* is in federal waters and its ownership continues to rest with the U.S. Navy. It lies on the navigation track to the Flower Garden Banks National Marine Sanctuary from the FGBNMS offices in Galveston, TX. When rediscovered decades ago, the wreck lay largely buried by bottom sediments, which sealed it like a time capsule. Unauthorized digging into the wreck in the 1970s recovered a handful of well-preserved artifacts, including the ship's builder's plate, and led to a lawsuit in which the federal government litigated and the court stopped what would have been private salvage that the U.S. Navy did not desire.

Since then, the Minerals Management Service (MMS), now the Bureau of Ocean Energy Management (BOEM), working first with the Texas Antiquities Committee (later the Texas Historical Commission [THC]), the University of Western Florida, and most recently with a private cultural resources firm, Tesla Offshore LLC of Prairieville, Louisiana, has visited the site and documented what protrudes above the bottom while deploying sub-bottom profiling equipment to delineate what lies buried. Water conditions are such that visibility is limited; and photographs of the wreck are rare, close-up views.

A 1995 account of the THC and MMS work on the site noted that "little of the wreck is exposed above the sand. Paddlewheel hubs on both sides of the ship and some parts of the steam engine rise partially above the sand bottom. The only other remains showing above the bottom in 1992 and 1993 were a very small section of encrusted iron near the bow which was tentatively identified on the assumption that it was located forward of the paddlewheels and on its orientation and distance from other exposed remains. In 1994, the bow wreckage was buried."

Within the last few years, however, the wreck, as documented by Tesla Offshore LLC, BOEM and the University of Western Florida, is more substantially exposed than it was in 1995. Recent hurricanes (such as Hurricane Ike in 2008) and storm activity on the Texas coast has removed some of the sediment and sand that once buried the USS *Hatteras*, revealing more of the ship. A more extensive site map was drawn in 2010, showing a dramatic change in the visible nature of the vessel's remains from the 1995 map.

In 2012 a coalition of sponsors and partners including FGBNMS, ONMS, Bureau of Safety and Environmental Enforcement (BSEE), the Bureau of Ocean Energy Management (BOEM), the Texas Historical Commission (THC), Tesla Offshore LLD, and the U.S. Navy's History and Heritage Command, as well as OceanGate Foundation and Teledyne BlueView, collected high resolution 3-D acoustic multibeam scanning sonar imagery of the wrecksite.

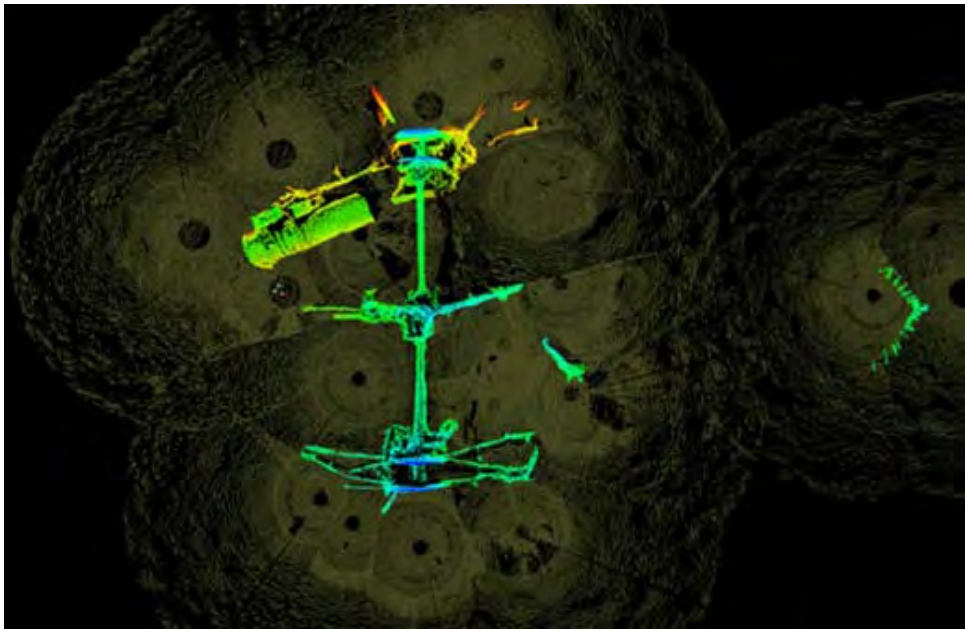


Figure C2. Bird's-eye view of the USS *Hatteras* wreck site produced by 3-D sonar scanning. Image credit: Glaeser/Northwest Hydro, Inc.

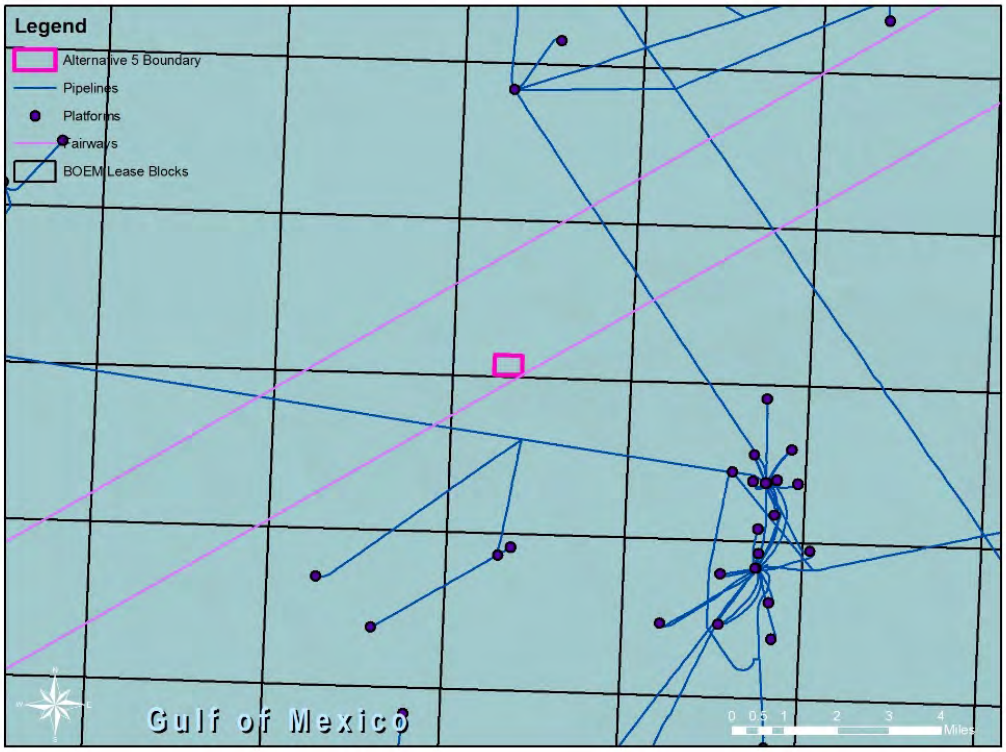


Figure C3. USS *Hatteras* Alternative 5 boundary, existing regulatory zones, and infrastructure

C.3 "Monterrey" Wrecks

Bottom Depth: ~4,363 feet

In April 2012, the National Oceanic and Atmospheric Administration (NOAA) ship *Okeanos Explorer* conducted the first reconnaissance of a shipwreck site as part of an interdisciplinary exploration mission focusing on deep water hard-bottom habitat, naturally occurring gas seeps, and potential shipwrecks in the Gulf of Mexico (NOAA 2012). First identified as a side scan sonar target in 2011, the brief remotely operated vehicle (ROV) dive discovered a shipwreck that appears to be an undisturbed, early 19th century, wooden-hulled, copper-clad sailing vessel containing artillery, firearms, navigation instruments, cooking and food storage items, medicines, and personal artifacts.

The sonar target first came to light when Shell Oil notified BOEM and BSEE that a side scan sonar target resembling a shipwreck had been found in their lease area 90 miles south of Flower Garden Banks National Marine Sanctuary. The target imaged in the sonar data collected by Fugro Geosciences revealed a tightly contained site with a sharp hull-formed outline measuring approximately 84 feet long by 26 feet wide with indications off one beam of what were thought to be the remains of two masts. This discovery is one of the more significant shipwreck sites discovered in the Gulf of Mexico to date because of its degree of preservation from a critical

period in history in which new nations were forming at the end of Colonial era and the Gulf was opening to global trade. As it has not yet been identified, the wreck is referred to as the "Monterrey Shipwreck" after Shell's name for their proposed development.

In a partnership between the Meadows Center for Water and the Environment at Texas State University and the Ocean Exploration Trust at the University of Rhode Island, a team archaeologists and other scientists from NOAA's Office of Ocean Exploration and Research and Office of National Marine Sanctuaries, BOEM, BSEE, and the Texas Historical Commission (THC) returned to the site in July 2013 for detailed documentation and the recovery of a small number of artifacts in order to determine the historical and socio-cultural context within which it operated and, hopefully, to identify the shipwreck. The goal of the project was to systematically study the shipwreck through in-depth documentation, including mapping the site using ROV technology. In addition, the expedition recovered 60 diagnostic artifacts for conservation, analysis, exhibition, future study, and public outreach. To accomplish this complex operation, the team worked on board the research vessel *E/V Nautilus* stationed at the surface of the water, 4,300 feet over the site. After the mapping and documentation of the Monterrey wreck was completed and the artifacts were recovered, Nautilus navigated to two other potential wreck sites also identified by the Shell survey.

The targets were determined to not only be other shipwrecks, but also to be vessels likely associated with the first wreck. Now known as Monterrey A, B and C, these three vessels appear to be a privateer (vessel A), or a pirate vessel with two ships, possibly prizes captured by the first vessel. All three vessels, sharing common characteristics in the form of the artifacts seen on board, appear to have been sunk together, most likely in a violent storm. Wreck B is a small, un-coppered wooden vessel that sank with a cargo of bound rolls of cattle hides, horn and blocks of an unidentified substance that could be tallow (beef fat) or rubber, which were found preserved on the wreck. The third vessel, Wreck C, seemingly without a cargo, was a larger, copper-clad vessel with a huge anchor and stone ballast. If it did have a cargo, the cargo may have been something perishable that was not preserved. The preliminary indications have suggested to the team that if Wreck A is a privateer and wrecks B and C are its prizes, that this may be the first time ever archaeologists have discovered a privateer/pirate ship with its captures.

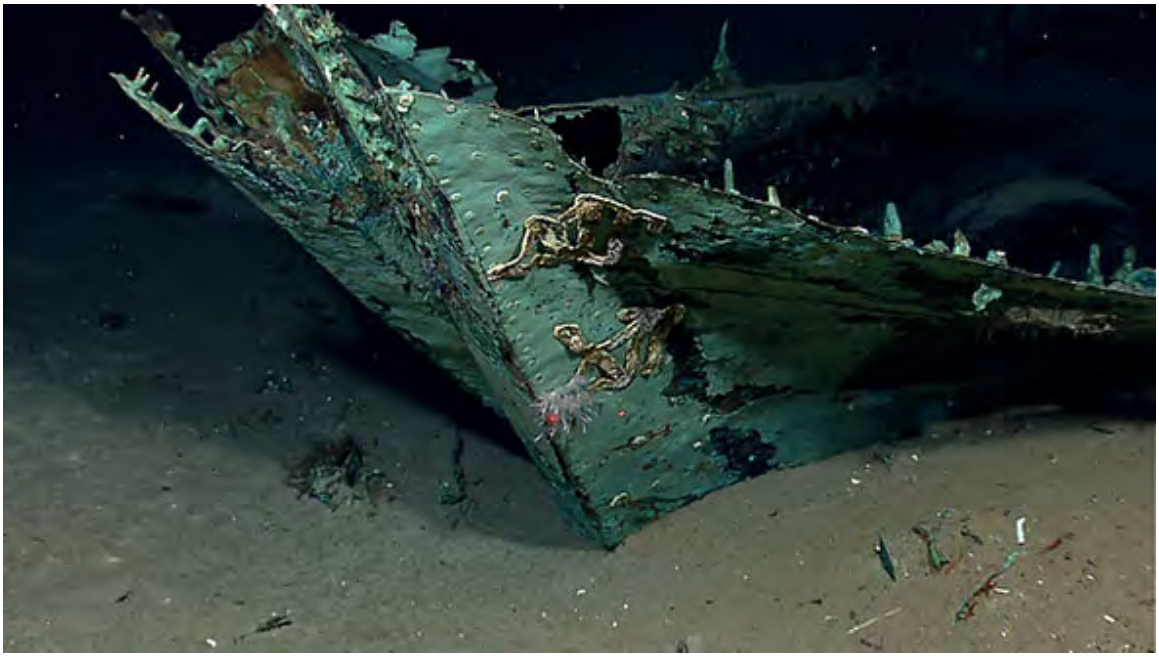


Figure C4. Copper sheathing covers the stern post of Monterrey A. Image credit NOAA Okeanos Explorer Program.

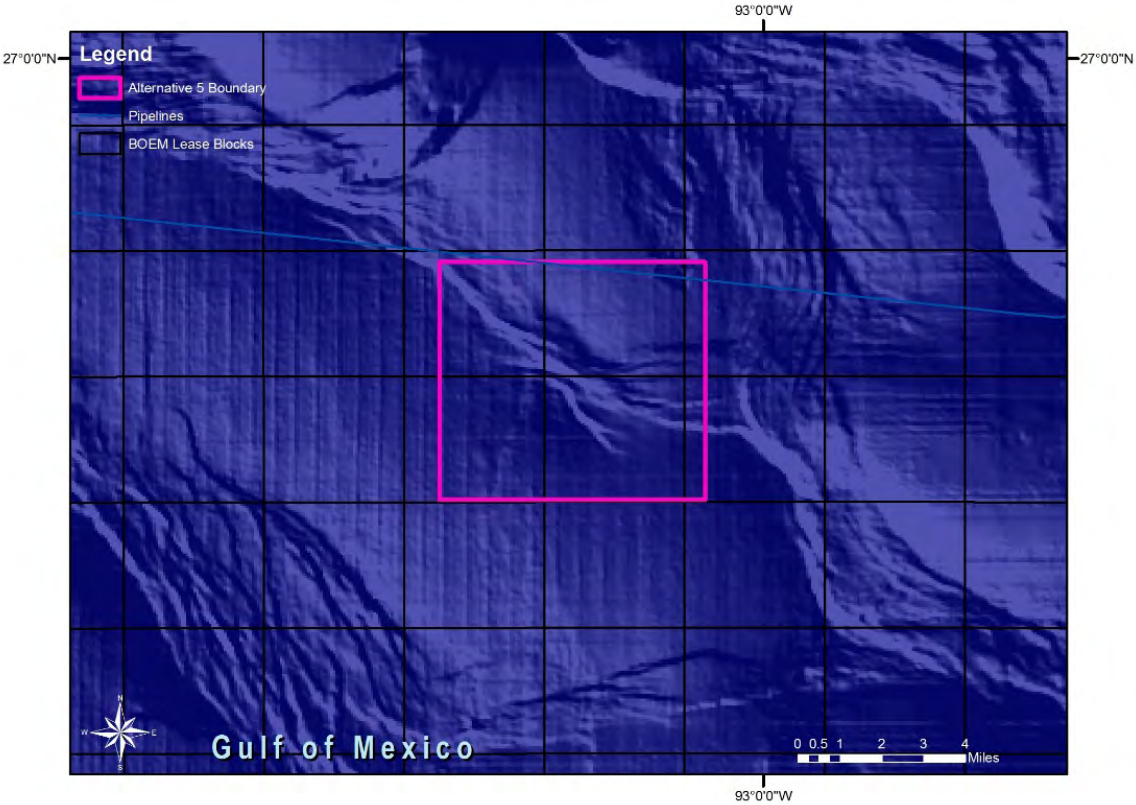


Figure C5. "Monterrey" wrecks Alternative 5 boundary, existing regulatory zones, and infrastructure

C.4 SS *Gulfoil*

Bottom Depth: ~4,363 feet

The SS *Gulfoil* was a tanker built in 1912 for the Gulf Oil Corporation by the New York Shipbuilding Company. It measured 406 x 51 x 30 ft (124 x 16 x 9 m), and was 5,188 gross tons, with primary cargos of refined oil, crude oil, and asphalt. *Gulfoil* was unique for being the first American built oil tanker to incorporate the British Isherwood system of ship construction, which used longitudinal hull framing in place of the traditional transverse framing method that was used in wooden ship construction. On May 16, 1942, the fully loaded *Gulfoil* was en route from Port Arthur, Texas, to New York, when it was struck by two torpedoes from the German U-boat, U-*506*. The tanker sank so quickly that the crew did not have time to launch the lifeboats. Twenty-one of the forty crewmen perished in the attack.

Gulfoil was first discovered in 2005 after a sonar and ROV survey to document sections of pipe lost from an oil rig during Hurricane Katrina. An additional industry geophysical survey recorded the wreck later in 2005, and in 2008 *Gulfoil* was included in a BOEM-funded archaeological investigation of deep water shipwrecks in the Gulf of Mexico. The site consists of the main hull as well as an extensive debris field that covers an area of approximately 17 acres (9 hectares). Numerous artifacts remain *in situ* and the main hull is also covered with an abundance of *Lophelia* coral communities. *Gulfoil* is one of 56 Allied vessels that were sunk by German U-boat attacks in the Gulf of Mexico between May 1942 and December 1943, making it a representative of a significant period in Gulf of Mexico maritime history, as well as one of the deadliest periods anywhere in the world for merchant mariners during World War II. The site is eligible for listing in the NRHP as a contributing member to the *World War II Shipwrecks along the East Coast and Gulf of Mexico* multiple properties nomination. It is also historically significant because of the unique Isherwood framing system used in its construction.

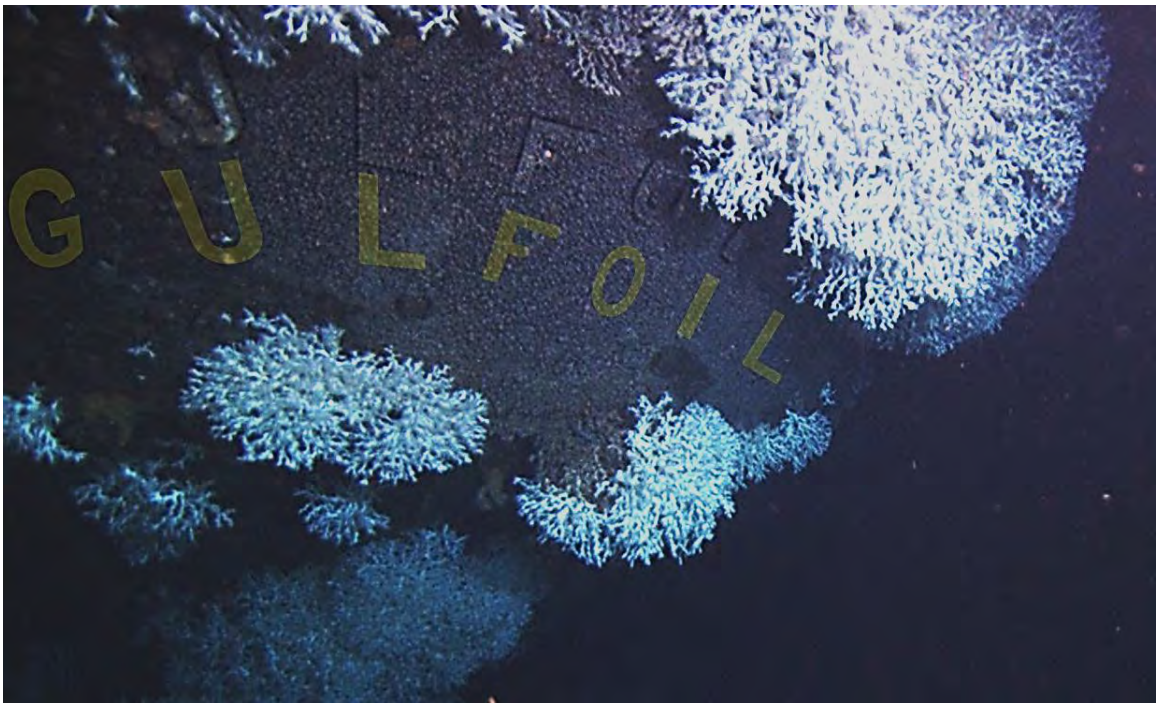


Figure C6. The transom of *GulfOil* showing *Lophelia* growth. Image credit: Brooks et al. (in review).

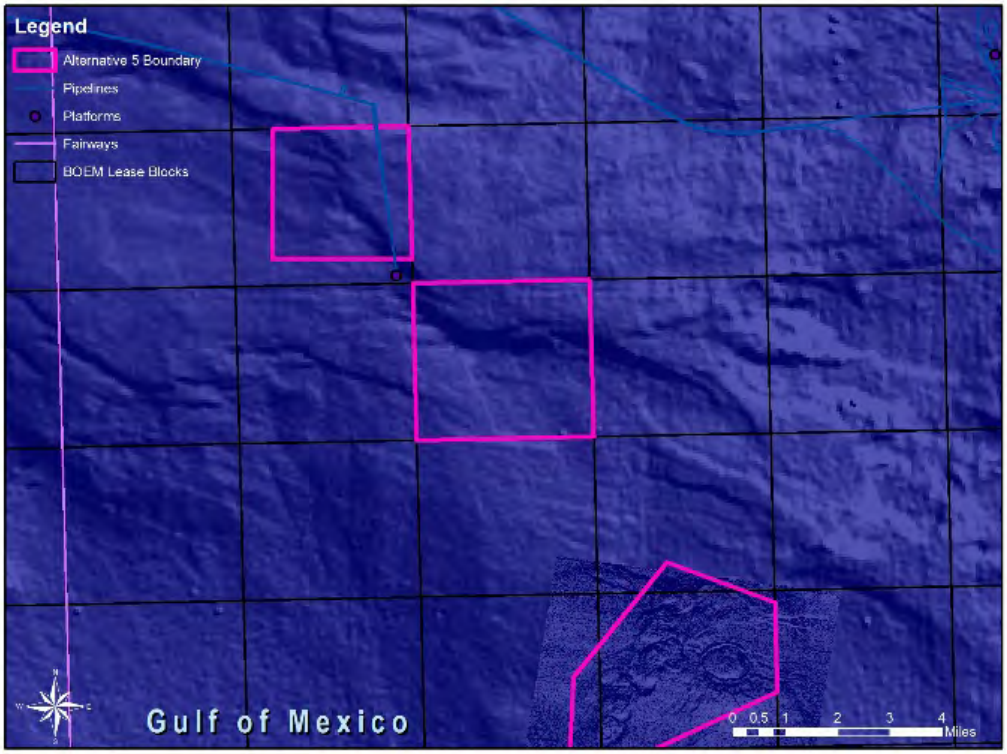


Figure C7. GulfOil Alternative 5 boundary (center), existing regulatory zones, and infrastructure

C.5 SS Gulfpenn

Bottom Depth: ~1,820 feet

The SS *Gulfpenn,* originally named *Agwhihavre*, was a tanker built in 1921 for the Atlantic, Gulf, and West Indies Steamship Line of New York, and later sold to the Gulf Oil Corporation of Philadelphia and renamed *Gulfpenn.* The 8,862 gross-ton vessel was a screw steamer powered by a quadruple expansion engine, and measured 481 x 66 x 37 ft (147 x 20 x 11 m). On May 13, 1942, *Gulfpenn* was transporting 90,000 barrels of gasoline from Port Arthur, Texas, to Philadelphia, Pennsylvania, when it was attacked and sunk by the German U-boat, U-*506*. The tanker sank stern-first in five minutes; 12 of the 38 crew perished from the torpedo explosion and an additional crewmember died in the lifeboat.

Gulfpenn was discovered during an oil industry remote-sensing survey in 1994, and further investigated by ROV during a BOEM-funded archaeological study of deep water shipwrecks in the Gulf of Mexico (Church et al. 2007). That study determined that the wreck and its associated debris field cover an area of approximately 10 acres (4 hectares). Numerous artifacts remain *in situ* and the main hull is also covered with an abundance of *Lophelia* coral communities. *Gulfpenn* is one of 56 Allied vessels that were sunk by German U-boat attacks in the Gulf of Mexico between May 1942 and December 1943, making it a representative of a significant period in Gulf of Mexico maritime history, as well as one of the deadliest periods for merchant mariners during World War II. The site is eligible for listing in the NRHP as a contributing member to the *World War II Shipwrecks along the East Coast and Gulf of Mexico* multiple properties nomination

Figure C8. The bow of *GulfPenn* showing *Lophelia* growth. Image credit: Brooks et al. (in review).

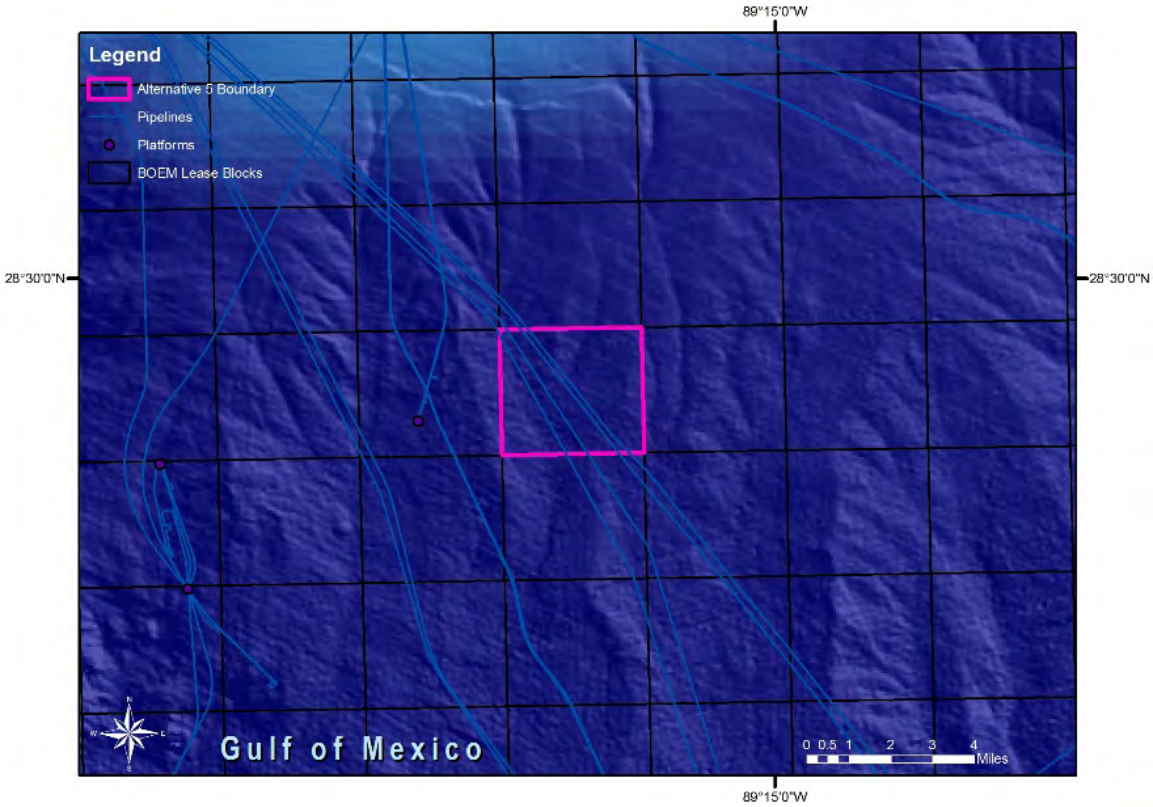


Figure C9. *GulfPenn* Alternative 5 boundary, existing regulatory zones, and infrastructure

C.6 SS *Robert E. Lee* and *U-166*

Bottom Depth: ~5,000 feet

The shipwrecks of the American freighter Robert E. Lee and the German U-boat U-166 mark the location of one of the most noteworthy hostile encounters in the Gulf of Mexico during the Second World War. Built in 1925, the 373 x 54 x 17 foot Robert E. Lee was en route from Port-of-Spain, Trinidad, to New Orleans with a freight cargo, approximately 270 passengers, six Merchant Marine officers, and 131 general crewmembers, when it was attacked by U-166 on July 30, 1942, southeast of the Mississippi River's Southwest Pass. A single torpedo sank the freighter within 10 minutes, killing 10 crewmembers and 15 passengers. The U.S. Navy Patrol Craft 566, traveling in escort of Robert E. Lee, immediately dropped depth charges on the U-166, sinking it with all hands on board. The remains of Robert E. Lee and U-166 were discovered during a pre-construction remote-sensing survey of a pipeline route in 2001. Their combined debris fields cover an area approximately 65 acres (26 hectares) wide, and include the main hull of Robert E. Lee, two broken hull sections of U-166, two lifeboats and miscellaneous scattered debris. Together, these wrecks are a NRHP-eligible battlefield site that represents the deadliest period in the Gulf of Mexico during World War II. Between May of 1942 and December 1943, 56 allied vessels were sunk by 21 German U-boats, only two of which, including U-166, were themselves lost. The vast majority of these allied casualties were sunk during the spring and summer of 1942,

making this the most destructive period, in terms of vessel tonnage lost, of any area in the world during the German U-boat campaign of World War II. Of the 56 allied vessels lost, 15 have been relocated as of this writing. Archaeologists with C&C Technologies, through a study funded by BOEM, conducted additional ROV investigations of Robert E. Lee and U-166 in 2003 and 2004 (Church et al., 2007). These sites have been determined eligible for listing in the NRHP as a contributing member to the World War II Shipwrecks along the East Coast and Gulf of Mexico multiple properties nomination. These wrecks are encompassed by the Alternative 5 boundary for the Biloxi Dome site.

Figure C10. The stern of SS *Robert E. Lee* showing anemone growth. Image credit: Ocean Exploration Trust.

Figure C11. The conning tower of the *U-166*. Image credit: Ocean Exploration Trust.

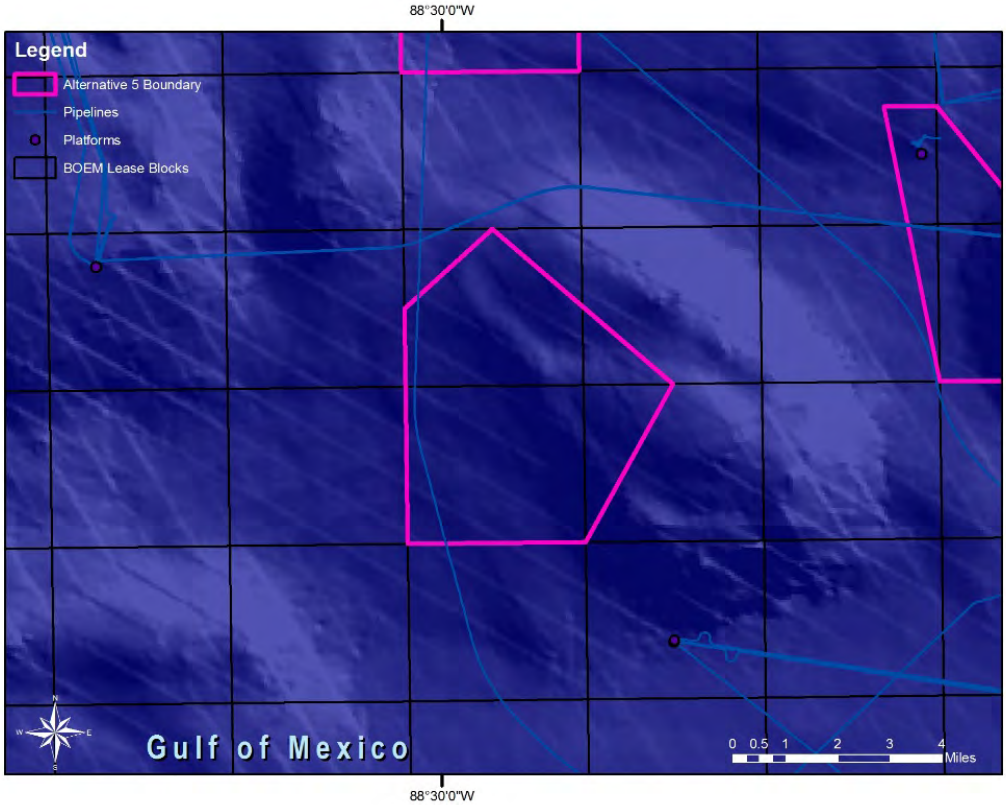


Figure C12. SS *Robert E. Lee* and *U-166* Alternative 5 boundary (center), existing regulatory zones, and infrastructure

C.7 "Mardi Gras" Wreck

Bottom Depth: ~4,300 feet

The "Mardi Gras" shipwreck was first identified on sonar in 2002 during a pre-construction remote-sensing survey for a deep water pipeline route. A subsequent ROV investigation confirmed that it was an historic, early nineteenth century shipwreck, and in 2007 it was partially excavated by archaeologists from Texas A&M University and the Minerals Management Service (now BOEM; Ford et al., 2008). The site is located off the coast of Louisiana and is named after the Mardi Gras pipeline that was installed approximately 150 ft (48 m) west of the site, since the actual identity of the wreck remains unknown.

The 2007 excavation concluded that the "Mardi Gras" shipwreck is likely a schooner, measuring approximately 50-ft (15.2 m) long, which wrecked circa 1815. Over 1,000 artifacts were recovered, all of which dated between 1780 and 1820, and with origins in Great Britain, France, Mexico, and possibly the United States. Recovered and observed artifacts included a cannon, small arms, bottles, ceramics and navigation instruments. The function of the vessel is unknown, but the artifact assemblage indicates that it was likely either an armed merchant vessel or a privateer, and its location suggests that it was entering or leaving the port of New Orleans when it

sank due to an unknown cause. The characteristics of the "Mardi Gras" shipwreck make it a NRHP-eligible archaeological site that is associated with a highly volatile period in the Gulf of Mexico, when several nations were in conflict over the economic development and control of the Gulf of Mexico coast. Continued research at this site is likely to yield significant information on seafaring technology and maritime history during the early American Republic period

Figure C13. Cannon from "Mardi Gras wreck before recovery and conservation. Image credit: BOEM.

Figure C14. Cannon from "Mardi Gras wreck after recovery and conservation. Image credit: BOEM.

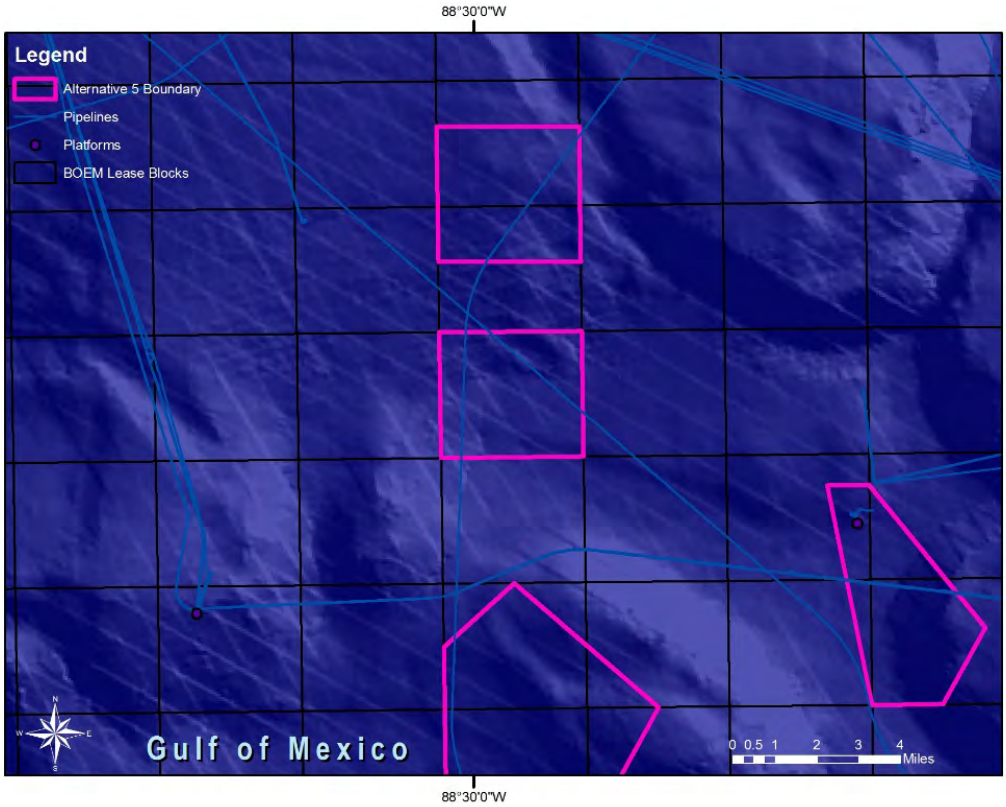


Figure C15. Mardi Gras wreck Alternative 5 boundary (center), existing regulatory zones, and infrastructure

C.8 *Deepwater Horizon*

Bottom Depth: ~4,363 feet

Deepwater Horizon was an "ultra-deepwater" self-propelled, dynamically positioned, semi-submersible, column stabilized mobile offshore drilling unit, ~374 feet in length by 256 feet in breadth with a gross tonnage of 32,588 tons. Capable of operating in water depths up to 10,000 feet and drilling up to 35,000 feet, it was owned by Transocean, commissioned by R&B Falcon, built in 2000 in South Korea by Hyundai Heavy Industries, and registered in the Marshall Islands under lease to BP until 2013. In 2009, the rig drilled the deepest oil well completed to that point, at a vertical depth of 35,050 feet and measured depth of 35,055 feet, in the Tiber Oil Field at Keathley Canyon lease block 102, approximately 250 miles southeast of Houston, in 4,132 feet of water. On April 20, 2010, while drilling at the Macondo well in Mississippi Canyon lease block 252, an explosion on the rig caused by a blowout caused a fire that could not be extinguished, and eventually it sank into the Gulf of Mexico (Figure 1.1-1), resulting in a massive release of oil and other substances from BP's Macondo well. Tragically, 11 workers were killed and 17 injured by the explosion and fire. Initial efforts to cap the well following the explosion were unsuccessful, and for 87 days after the explosion, the well continuously and uncontrollably discharged oil and natural gas into the northern Gulf of Mexico. Approximately 3.19 million barrels (134 million

gallons) of oil were released into the ocean (U.S. v. BP et al. 2015), by far the largest offshore oil spill in the history of the United States. The volume of oil discharged during the *Deepwater Horizon* spill was equivalent to the *Exxon Valdez* oil spill re-occurring in the same location every week for 12 weeks (DWH NRDA Trustees 2016). The remains of the workers killed in the incident, the drilling unit, riser pipe and other debris related to the wreck, and substantial volumes of oil and dispersant remain on the sea floor near the wellhead, making it important as a memorial to the tragic event and as a site for study related to oil spill impacts and recovery over time.

Figure C16. *Deepwater Horizon* mobile offshore drilling unit. Image credit: Transocean.

Figure C17. *Deepwater Horizon* mobile offshore drilling unit on fire. Image credit: New York Times.

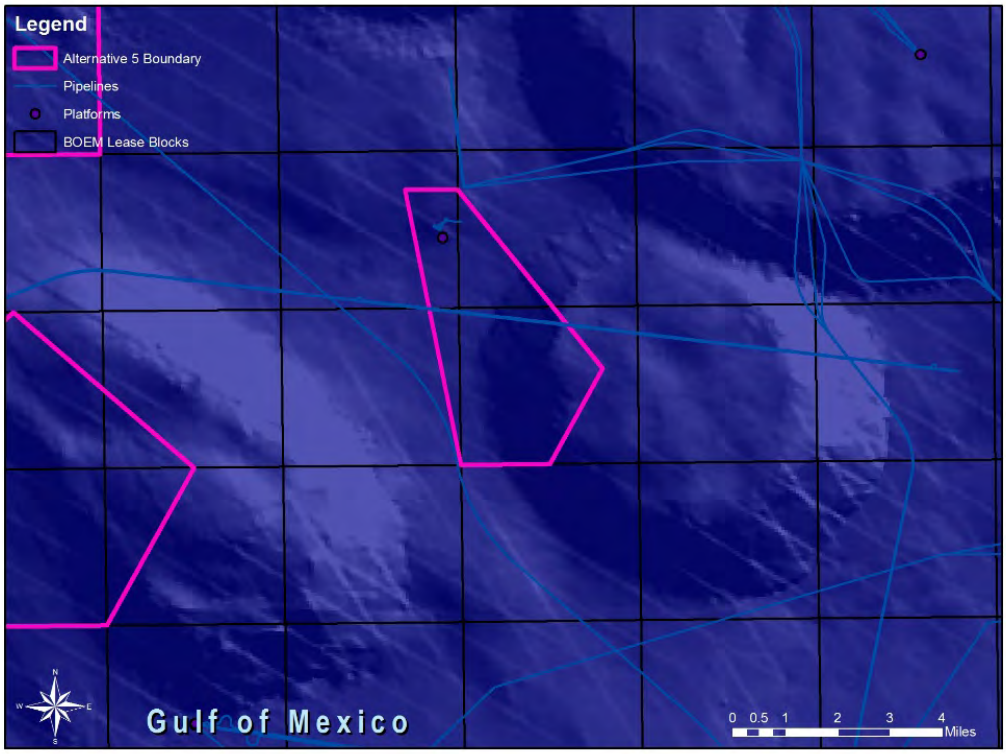


Figure C18. *Deepwater Horizon* Alternative 5 boundary, existing regulatory zones, and infrastructure

C.9 Anona

Bottom Depth: ~4,363 feet

Anona was a 117-foot (35.6-meter) long, steel-hulled, propeller-driven steam yacht built in 1904 for use on the Great Lakes by wealthy Detroit industrialist Theodore DeLong Buhl. It was built at the George Lawley & Sons shipyard, Boston, Massachusetts, which was itself nationally renowned for producing two America's Cup-winning racing yachts. The Buhl family sold *Anona* in 1924, beginning a 19 year period where the yacht was repeatedly sold to a succession of Canadian owners. In 1943 *Anona* ceased service as a recreational yacht and was converted to a freighter for the Pan-American Banana Producers Association, hauling cargo between the West Indies and North America. In June 1944, *Anona* was bound for the British West Indies with a load of potatoes when its lower steel hull plates buckled and it sank off the coast of Louisiana, though all nine crew were rescued. *Anona* was located lying on its keel in approximately 4,000 ft (1,129m) of water during an oil industry survey in 1995. The wreck's identity was determined during a subsequent archaeological survey in 2002 and further investigated by ROV during a BOEM-funded study in 2003 and 2004 (Church et al. 2007). *Anona* has been determined eligible for listing in the NRHP as an archaeological site, a rare example of a recreational steam yacht, and because of its association with the Lawley and Sons Shipyard, a master designer and shipbuilder. Recent investigations of the site during a BOEM funded study of potential oil spill impacts to shipwreck sites observed evidence that *Anona* has been subjected to illegal salvage of artifacts since 2004, indicating that the site is vulnerable to additional salvage and loss of diagnostic archaeological data unless afforded further federal protection and oversight. These recent investigations also identified a colony of chemosynthetic tube worms living inside the vessel's hull and on its deck.

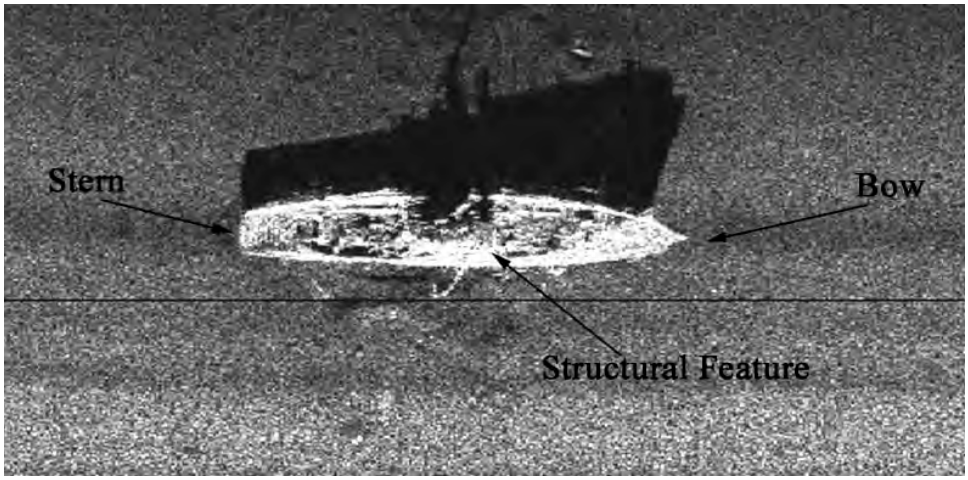


Figure C19. Remote sensing imagery of the *Anona* wreck. Image credit: BOEM.

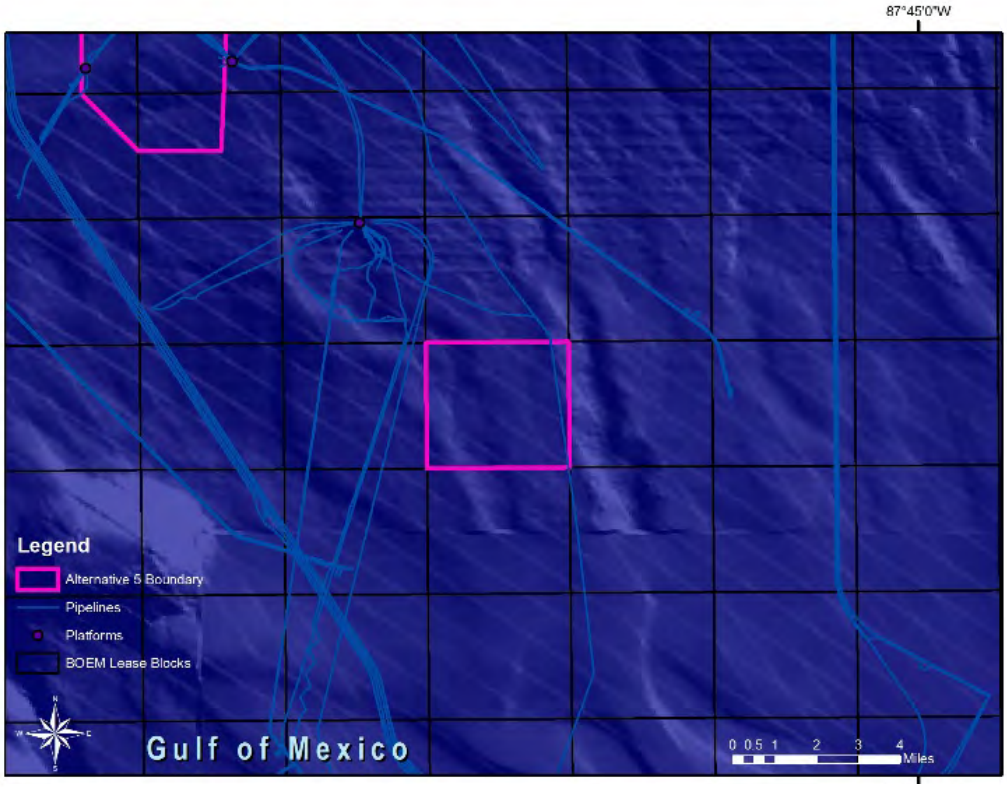


Figure C20. *Anona* Alternative 5 boundary, existing regulatory zones, and infrastructure

Appendix D

ESSENTIAL FISH HABITAT (EFH) AND HABITAT AREAS OF PARTICULAR CONCERN (HAPCs)

Species listed in the Fishery Management Plans (FMPs) of the Gulf of Mexico Fishery Management Council with EFH in the study area evaluated in this DEIS. Maps of EFH for these species are shown in Figures D-1a and D-1b.

Common and scientific names of finfishes are from the most recent list of names of fishes published by the American Fisheries Society (Nelson et al. 2004).

D.1 Coastal Migratory Pelagics FMP (Gulf and South Atlantic Councils joint plan)

D.1.1 Species in the Management Unit

king mackerel	*Scomberomorus cavalla*
Spanish mackerel	*Scomberomorus maculatus*
cobia	*Rachycentron canadum*

D1.2 Species in the Fishery but Not in the Management Unit

cero	*Scomberomorus regalis*
little tunny	*Euthynnus alletteratus*
dolphin	*Coryphaena hippurus*
bluefish	*Pomatomus saltatrix* (Gulf of Mexico only)

D.2 Red Drum FMP

Species in the Management Unit

red drum	*Sciaenops ocellatus*

D.3 Reef Fish FMP

Species in the Management Unit

Snappers - Lutjanidae Family

queen snapper	*Etelis oculatus*
mutton snapper	*Lutjanus analis*

blackfin snapper	*Lutjanus buccanella*
red snapper	*Lutjanus campechanus*
cubera snapper	*Lutjanus cyanopterus*
gray (mangrove) snapper	*Lutjanus griseus*
lane snapper	*Lutjanus synagris*
silk snapper	*Lutjanus vivanus*
yellowtail snapper	*Ocyurus chrysurus*
wenchman	*Pristipomoides aquilonaris*
vermilion snapper	*Rhomboplites aurorubens*

Groupers - Serranidae Family

speckled hind	*Epinephelus drummondhayi*
yellowedge grouper	*Epinephelus flavolimbatus**
goliath grouper	*Epinephelus itajara*
red grouper	*Epinephelus morio*
warsaw grouper	*Epinephelus nigritus**
snowy grouper	*Epinephelus niveatus**
black grouper	*Mycteroperca bonaci*
yellowmouth grouper	*Mycteroperca interstitialis*
gag	*Mycteroperca microlepis*
scamp	*Mycteroperca phenax*
yellowfin grouper	*Mycteroperca venenosa*

* Some recent publications use the genus name *Hyporthodus* rather than *Epinephelus* for yellowedge, warsaw and snowy grouper based on a revision recommended by Craig and Hastings (2007). However, it is the Council's policy to use the names listed by the American Fisheries Society in the reference above.

Tilefishes - Malacanthidae (Branchiostegidae) Family

goldface tilefish	*Caulolatilus chrysops*
blueline tilefish	*Caulolatilus microps*
tilefish	*Lopholatilus chamaeleonticeps*

Jacks - Carangidae Family

greater amberjack	*Seriola dumerili*
lesser amberjack	*Seriola fasciata*
almaco jack	*Seriola rivoliana*
banded rudderfish	*Seriola zonata*

Triggerfishes - Balistidae Family

gray triggerfish	*Balistes capriscus*

Wrasses - Labridae Family

hogfish	*Lachnolaimus maximus*

Common and scientific names of shrimps and lobsters are from the most recent list of names of crustaceans published by the American Fisheries Society (McLaughlin et al. 2005).

D.4 Shrimp FMP

Species in the Management Unit

brown shrimp	*Penaeus aztecus*
white shrimp	*Penaeus setiferus*
pink shrimp	*Penaeus duorarum*
royal red shrimp	*Pleoticus robustus*

Common and scientific names of corals are from the most recent list of names of cnidaria and ctenophora published by the American Fisheries Society (Cairns et al. 2002) or from Felder and Camp (2009).

D.5 Coral and Coral Reefs FMP

Species in the Management Unit

Corals of the class Hydrozoa (stinging and hydrocorals)
Corals of the class Anthozoa (stony corals)

Note: The FMP does not list individual species comprising the management unit. The following species are referred to in the FMP as being in the class Hydrozoa and Anthozoa occurring in Gulf of Mexico and/or South Atlantic waters:

Class Hydrozoa

Order Milleporina (fire, stinging corals)
Family Milleporidae

branching fire coral	*Millepora alcicornis*
blade fire coral	*Millepora complanata*
box fire coral	*Millepora squarrosa*

Order Stylasterina (hydrocorals)

	Stylaster duchassaingi
	Stylaster punctata
	Distichopora foliacea
	Pliobothrus symmetricus

Subclass Zoantharia

Order Scleractinia (stony corals)
Family Astrocoeniidae

blushing star coral	*Stephanocoenia intersepta*

Family Acroporidae

staghorn coral	*Acropora cervicornis*
elkhorn coral	*Acropora palmata*
fused staghorn	*Acropora prolifera*

Family Agariciidae

lettuce coral	*Agaricia agaricites*
thin leaf lettuce coral	*Agaricia tenifolia*
Lamarck's sheet coral	*Agaricia lamarcki*
fragile saucer coral	*Agaricia fragilis*
saucer coral	*Helioseris cucullata*

Family Faviidae

golfball coral	*Favia fragum*
knob coral	*Favia gravida*
grooved brain coral	*Diploria labyrinthiformis*
knobby brain coral	*Pseudodiploria clivosa*
symmetrical brain coral	*Pseudodiploria strigosa*
rose coral	*Manicina aerolata aerolata*
	Colpophyllia amaranthus
boulder brain coral	*Colpophyllia natans*
	Colpophyllia breviserialis
tube coral	*Cladocora arbuscular*
thin tube coral	*Cladocora debilis*
great start coral	*Montastrea cavernosa*

boulder star coral	*Orbicella annularis*
mountainous star coral	*Orbicella faveolata*
boulder star coral	*Orbicella franksi*
knobby star coral	*Solenastrea hyades*
smooth star coral	*Solenastrea bournoni*

Family Pocillopridae

striate finger coral	*Madracis myriaster*
ten-ray star coral	*Madracis decactis*
eight-ray finger coral	*Madracis Formosa*
yellow pencil coral	*Madracis auretenra*
pointed pencil coral	*Madracis asperula*
	Madracis brueggemanni

Family Portidae

blue crust coral	*Porites branneri*
finger coral	*Porites porites*
mustard hill coral	*Porites astreoides*
	(green and brown color morph)

Family Rhizangiidae

northern star coral	*Astrangia poculata*
	Astrangia danae
dwarf cup coral	*Astrangia solitaria*
hidden cup coral	*Phyllangia americana*

Family Siderastreidae

lesser starlet coral	*Siderastrea radians*
massive starlet coral	*Siderastrea siderea*

Family Fungiidae

	Fungiacyathus pusillus
	Fungiacyathus symmetricus
	Fungiacyathus crispus

Family Oculinidae

zigzag coral	*Madrepora oculata*
Pourtales fan coral	*Madrepora carolina*
compact ivory bush coral	*Oculina arbuscular*
fused ivory tree coral	*Oculina varicosa*
delicate ivory bush coral	*Oculina tenella*
diffuse ivory coral	*Oculina diffusa*
robust ivory tree coral	*Oculina robusta*

Family Meandrinidae

maze coral	*Meandrina meandrites*
pancake star coral	*Dichocoenia stellaris*
ellipitical star coral	*Dichocoenia stokesii*
pillar coral	*Dendrogyra cylindrus*

Family Mussidae

large flower coral	*Mussa angulosa*
Atlantic mushroom coral	*Scolymia lacera*
artichoke coral	*Scolymia cubensis*
lesser cactus coral	*Isophyllia multiflora*
sinuous cactus coral	*Isophyllia sinuosa*
rough star coral	*Isophyllastrea rigida*
ridged cactus coral	*Mycetophyllia lamarkiana*
lowridge cactus coral	*Mycetophyllia danaana*
rough cactus coral	*Mycetophyllia ferox*
knobby cactus coral	*Mycetophyllia aliciae*

Family Anthemiphylliidae

Anthemiphllia patera patera

Family Caryophyllidae

Caryophyllia berteriana
Caryophyllia horologium
Caryophyllia polygona
Caryophyllia cornuformi
Caryophyllia ambrosia caribbeana
Caryophyllia parvula
Concentrotheca laevigate

	Layrinthocyathus facetus
	Layrinthocyathus langi
	Cyathoceras squiresi
	Layrinthocyathus facetus
	Layrinthocyathus langi
	Oxysmilia rotundifolia
	Trochocyathus rawsonii
	Tethocyathus cylindraceus
	Tethocyathus variabilis
papillose cup coral	*Paracyathus pulchullas*
	Deltocyathus moseley
	Deltocyathus calcar
	Deltocyathus italicus
	Deltocyathus eccentricus
	Deltocyathus pourtalesi
smooth flower coral	*Eusmilia fastigiata*
	Pourtalosmilia conferta
speckled cup coral	*Rhizosmilia maculata*
	Stephanocyathus diadema
	Stephanocyathus paliferus
	Stephanocyathus laevifundus
	Stephanocyathus coronatus
	Peponcyathus folliculus
	Peponcyathus stimpsonii
	Desmophyllum cristagalli
	Thalamophyllia gombergi
	Lophelia prolifera
	Anomocora fecunda
	Coenosmilia arbuscular
	Dasmosmilia variegata
	Solenosmilia variabilis
	Asterosmila prolifera
	Asterosmila marchadi
two-tone cup coral	*Phacelocyathus flos*

Family Flabellidae

	Flabellum moseleyi
	Flabellum fragile
	Javania cailleti

	Polymyces fragile
	Gardineria paradoxa

Family Guyniidae

	Guynia annulata
	Schizocyathus fissile
	Stenocyathus vermiformis
	Pourtalocyathus hispidus

Family Dendrophylliidae

porous cup coral	*Balanophyllia floridana*
	Balanophyllia palifera
	Dendrophyllia cornucopia
	Dendrophyllia gaditana
	Dendrophyllia alternata
	Enallopsammia profunda
	Enallopsammia rostrata
	Thecopsammia socialis
	Bathypsammia tintinnabulum
	Bathypsammia fallosocialis
	Rhizopsammia manuelensis
	Trochopsammia infundibulum
orange cup coral	*Tubastrea coccinea* (invasive species)

Order Antipatharia (black corals)

whip coral	*Stichopathes desbonni*
wire coral	*Stichopathes leutkeni*
black coral	*Stichopathes sp.*
feather black coral	*Plumapathes pennacea*
hair net black coral	*Antipathes lenta*
bushy black coral	*Antipathes sp.*

D.6 Map figures for EFH categories managed by the Gulf of Mexico Fishery Management Council in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5)

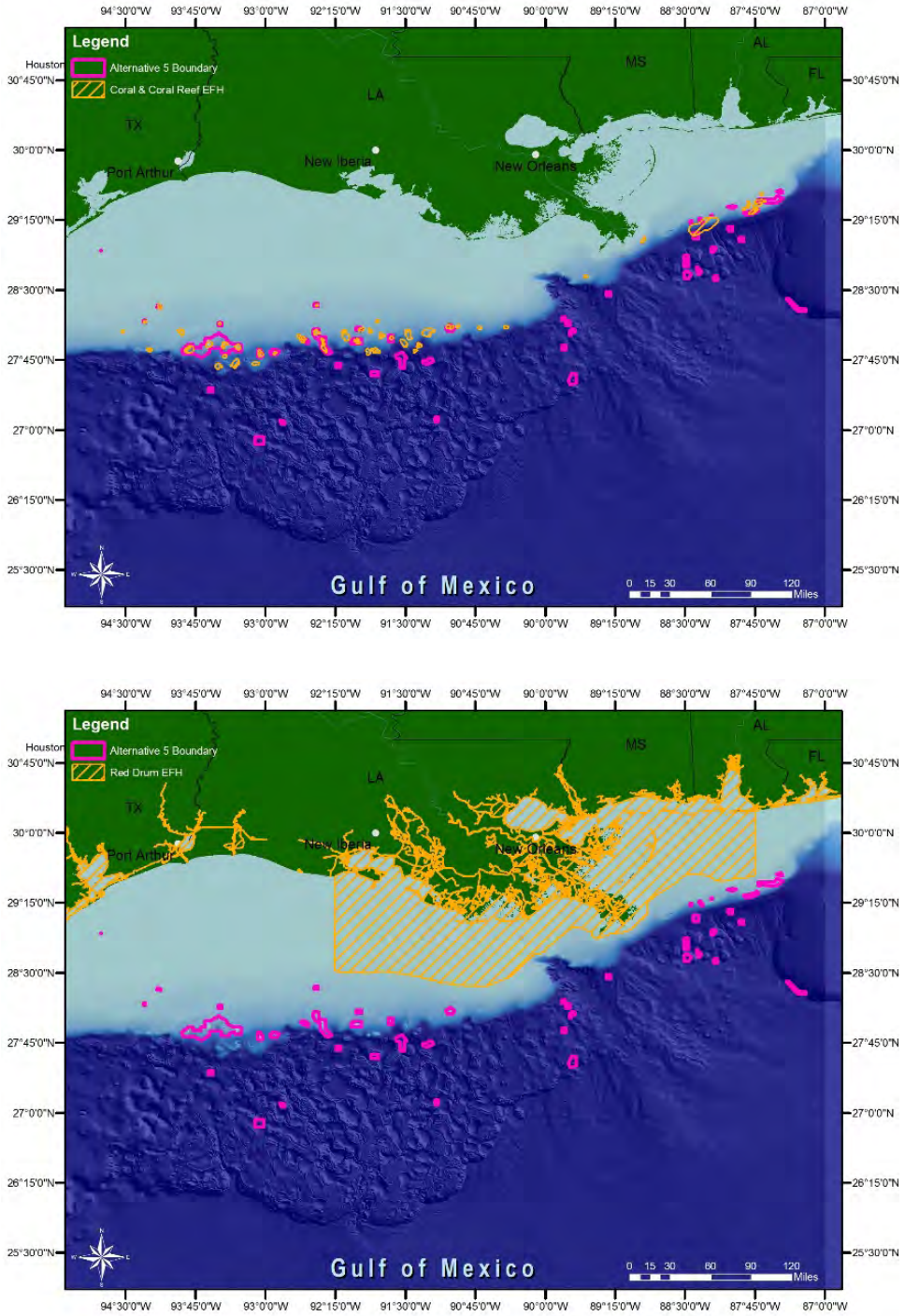
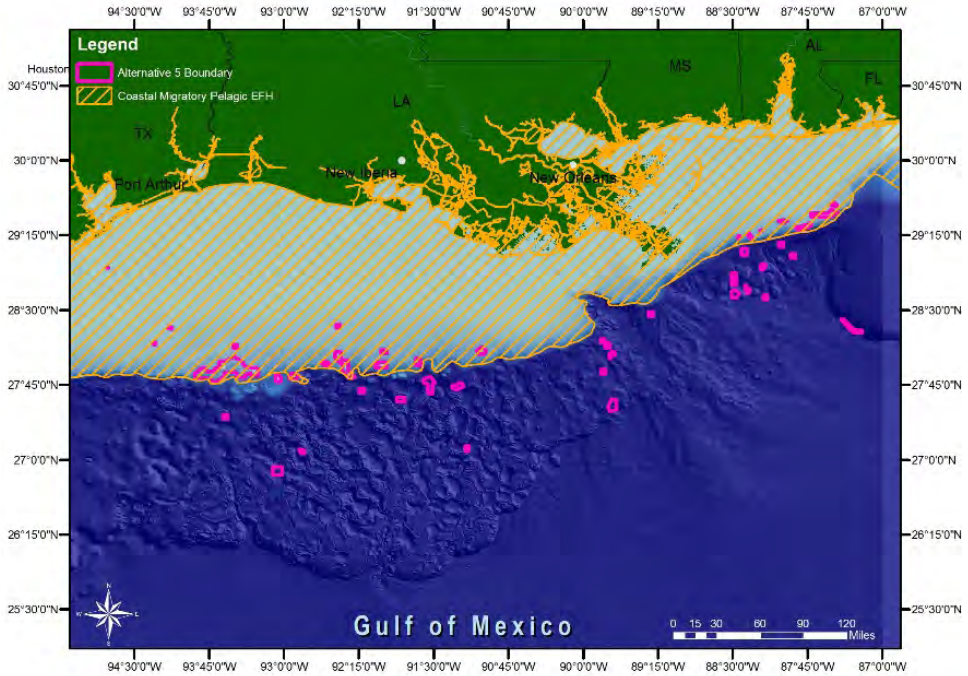


Figure D-1a. EFH categories managed by the Gulf of Mexico Fishery Management Council in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): Coral and Coral Reef EFH (top) and Red Drum EFH (bottom).



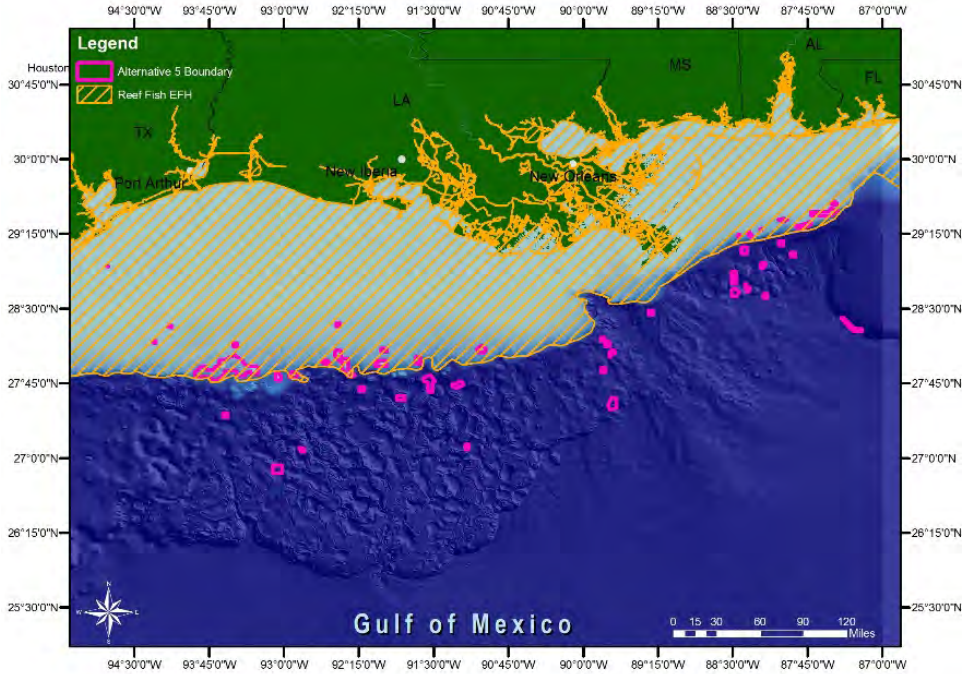


Figure D-1b. EFH categories managed by the Gulf of Mexico Fishery Management Council in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): Coastal Migratory Pelagic Resources EFH (top) and Reef Fish EFH (bottom).

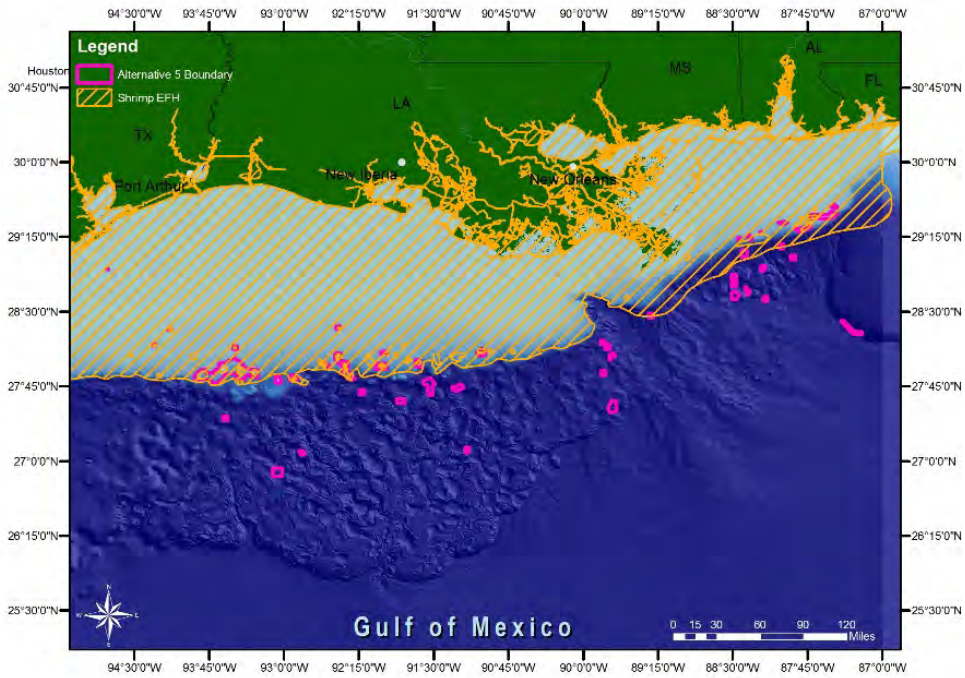


Figure D-1c. EFH categories managed by the Gulf of Mexico Fishery Management Council in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): Shrimp EFH.

D.7 Map figures for Categories of EFH for Highly Migratory Species managed by the National Marine Fisheries Service in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5)

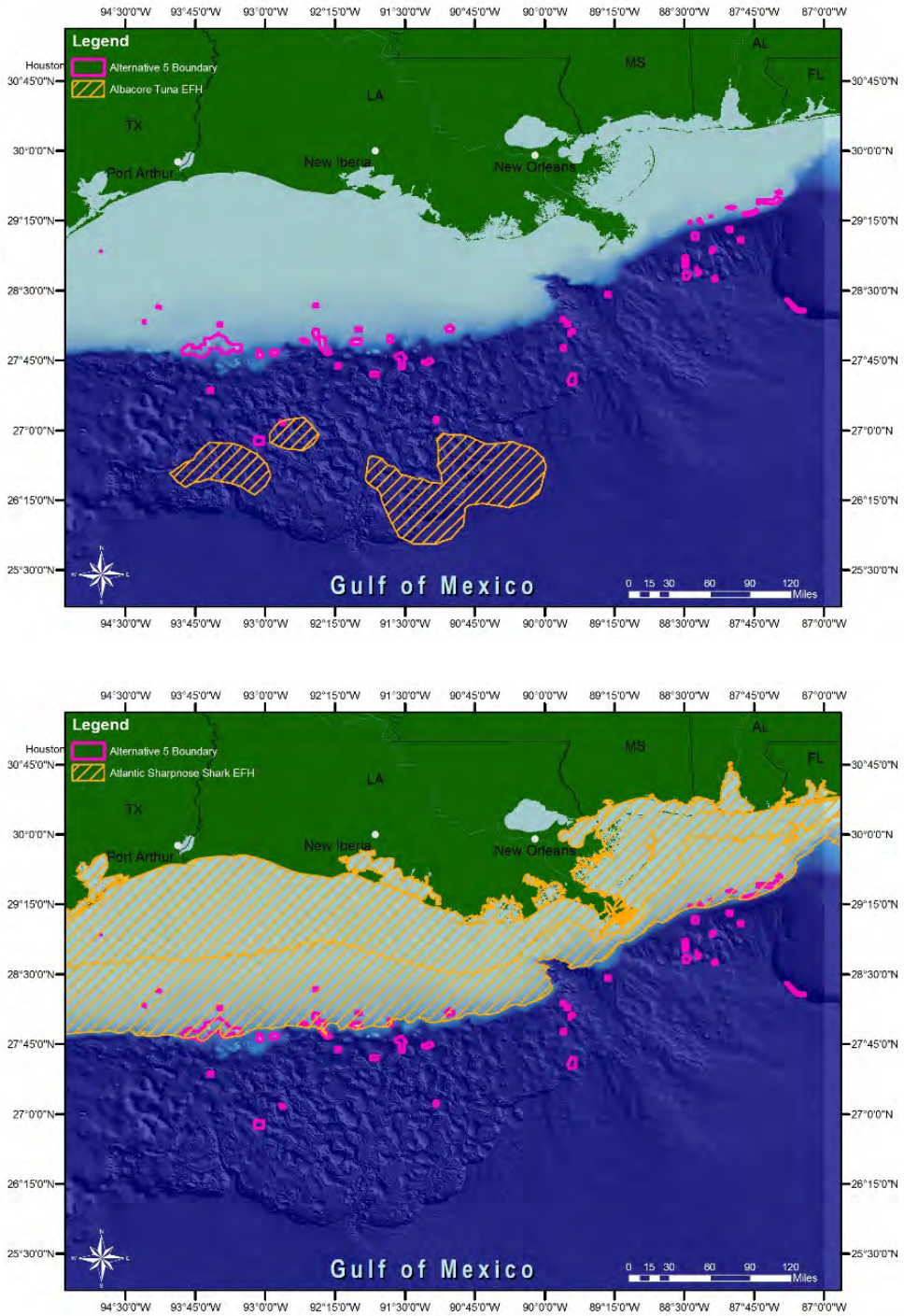
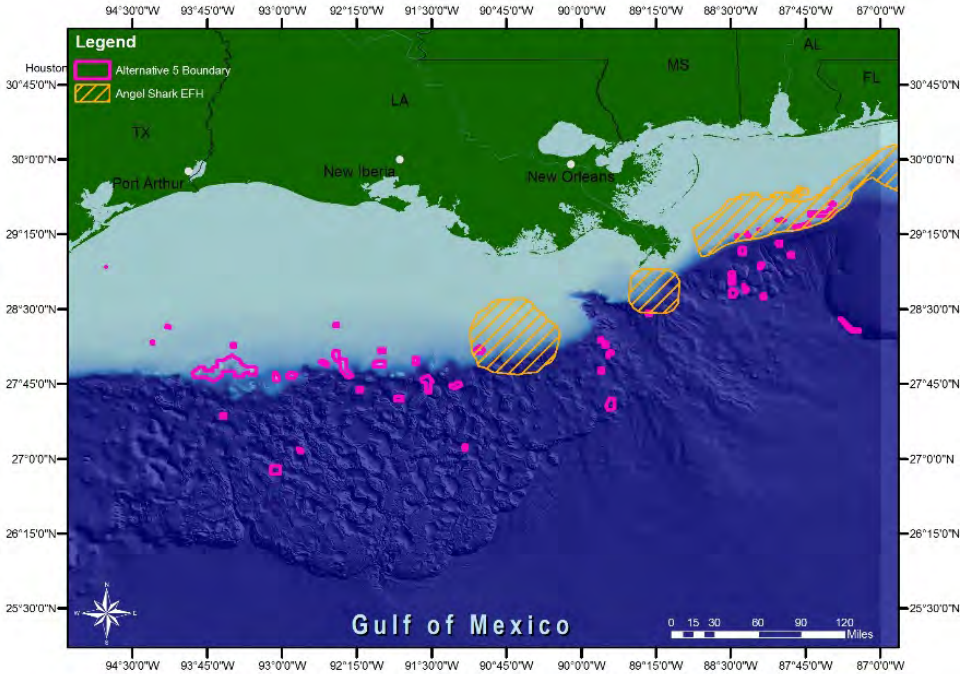


Figure D-2a. Categories of EFH for Highly Migratory Species managed by the National Marine Fisheries Service in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): Albacore Tuna EFH (top) and Atlantic Sharpnose Shark EFH (bottom).



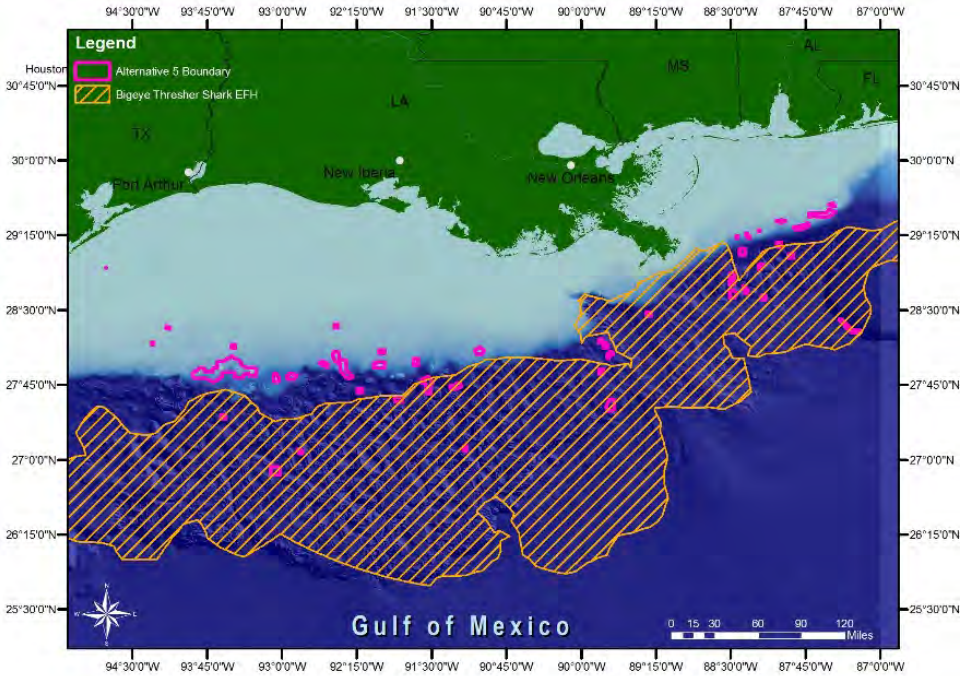


Figure D-2b. Categories of EFH for Highly Migratory Species managed by the National Marine Fisheries Service in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): Angel Shark EFH (top) and Bigeye Thresher Shark EFH (bottom).

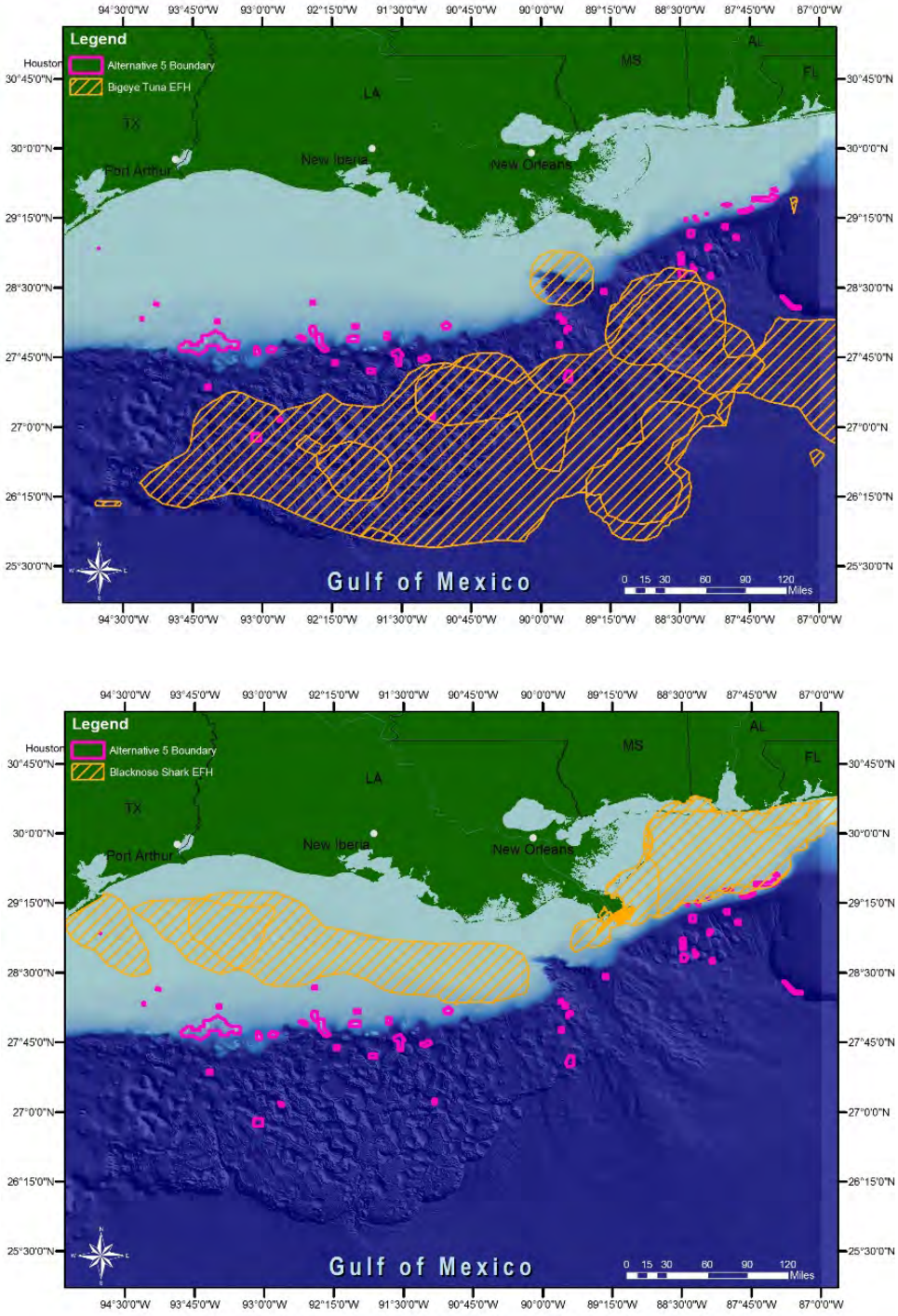
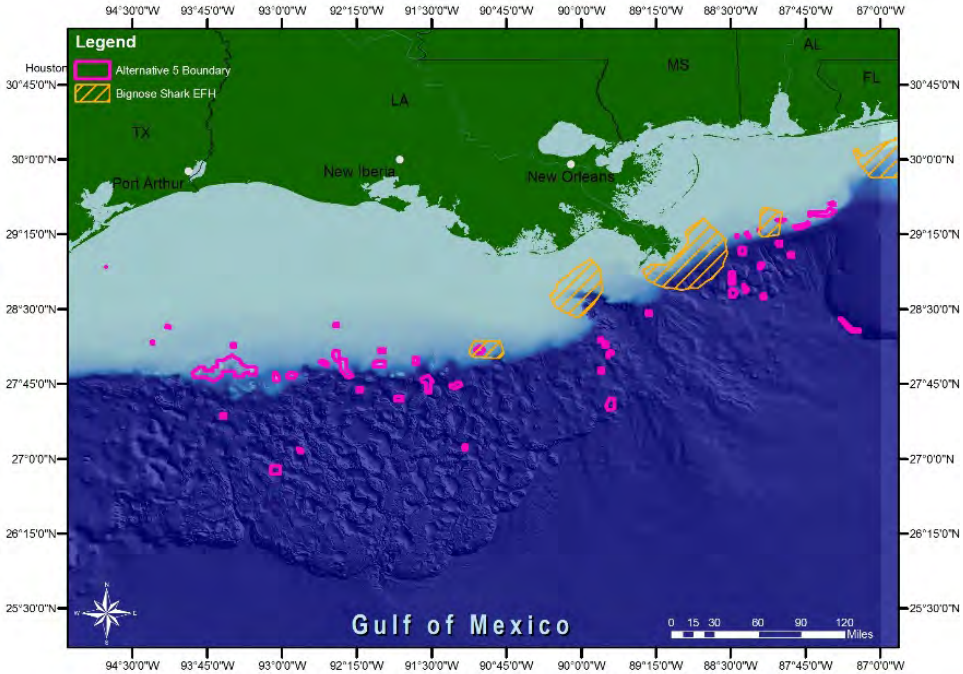


Figure D-2c. Categories of EFH for Highly Migratory Species managed by the National Marine Fisheries Service in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): Bigeye Tuna EFH (top) and Blacknose Shark EFH (bottom).



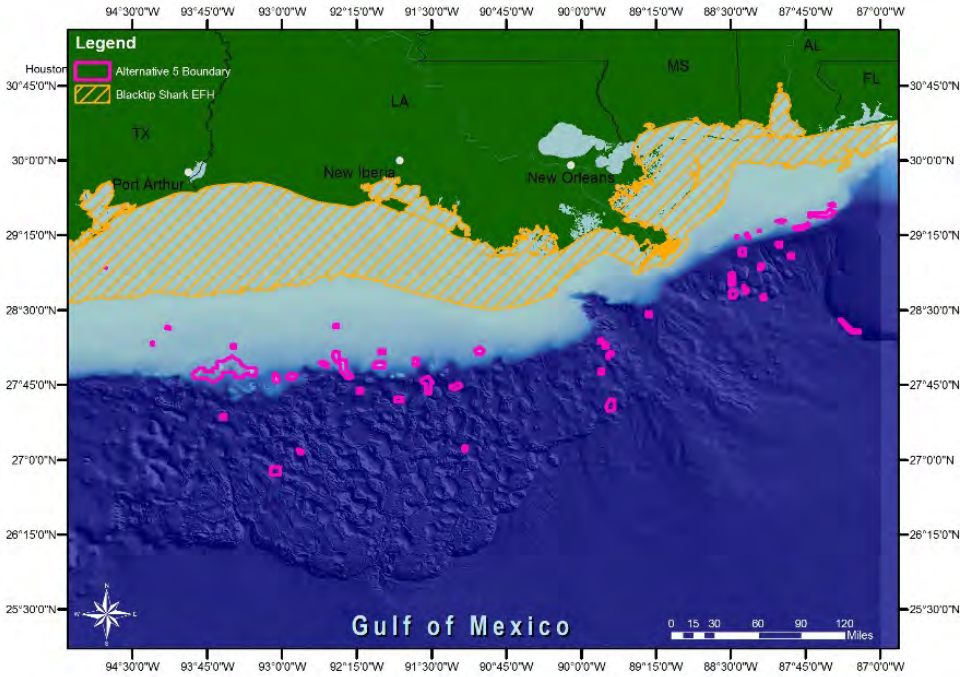


Figure D-2d. Categories of EFH for Highly Migratory Species managed by the National Marine Fisheries Service in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): Bignose Shark EFH (top) and Blacktip Shark EFH (bottom).

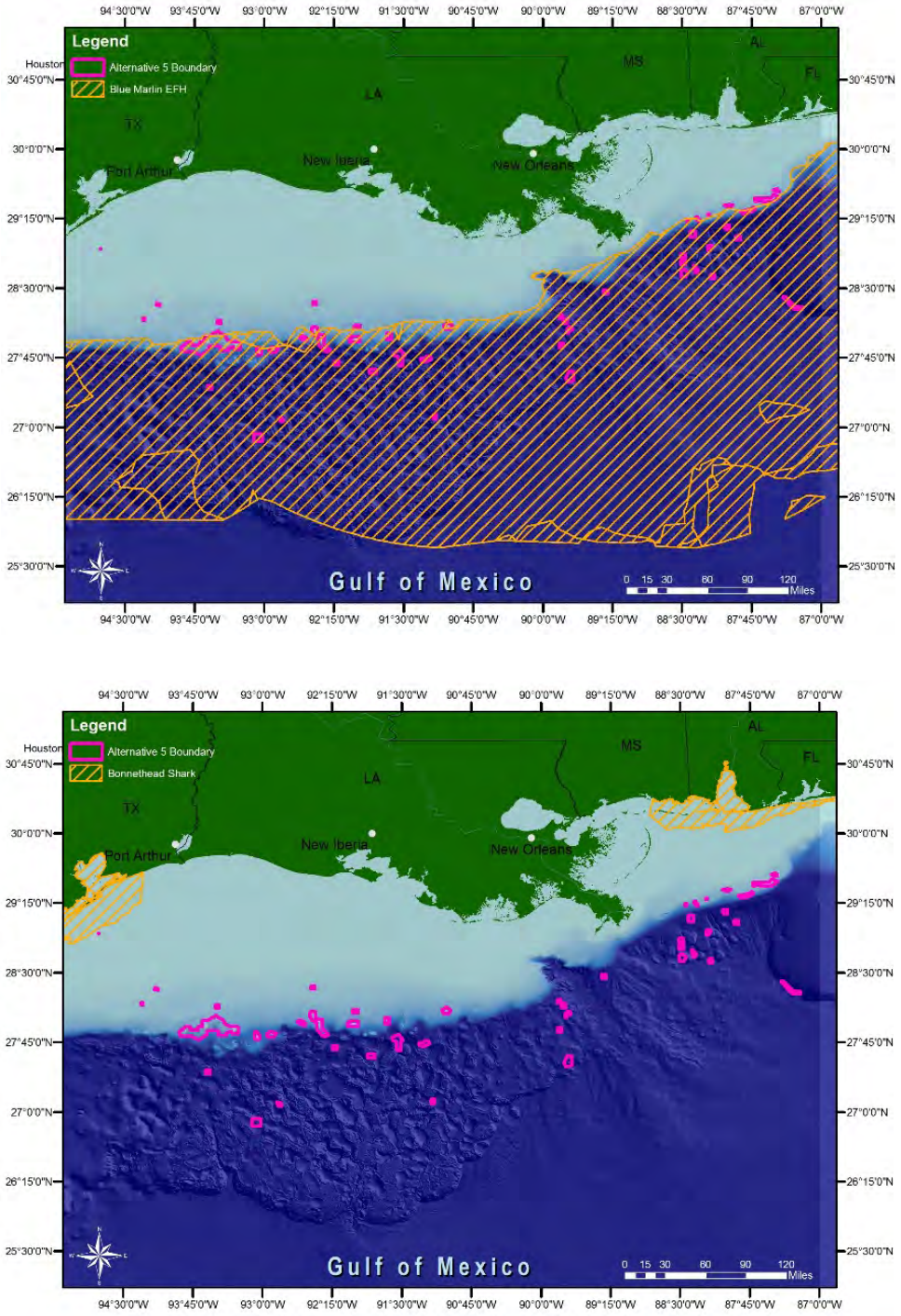


Figure D-2e. Categories of EFH for Highly Migratory Species managed by the National Marine Fisheries Service in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): Blue Marlin EFH (top) and Bonnethead Shark EFH (bottom).

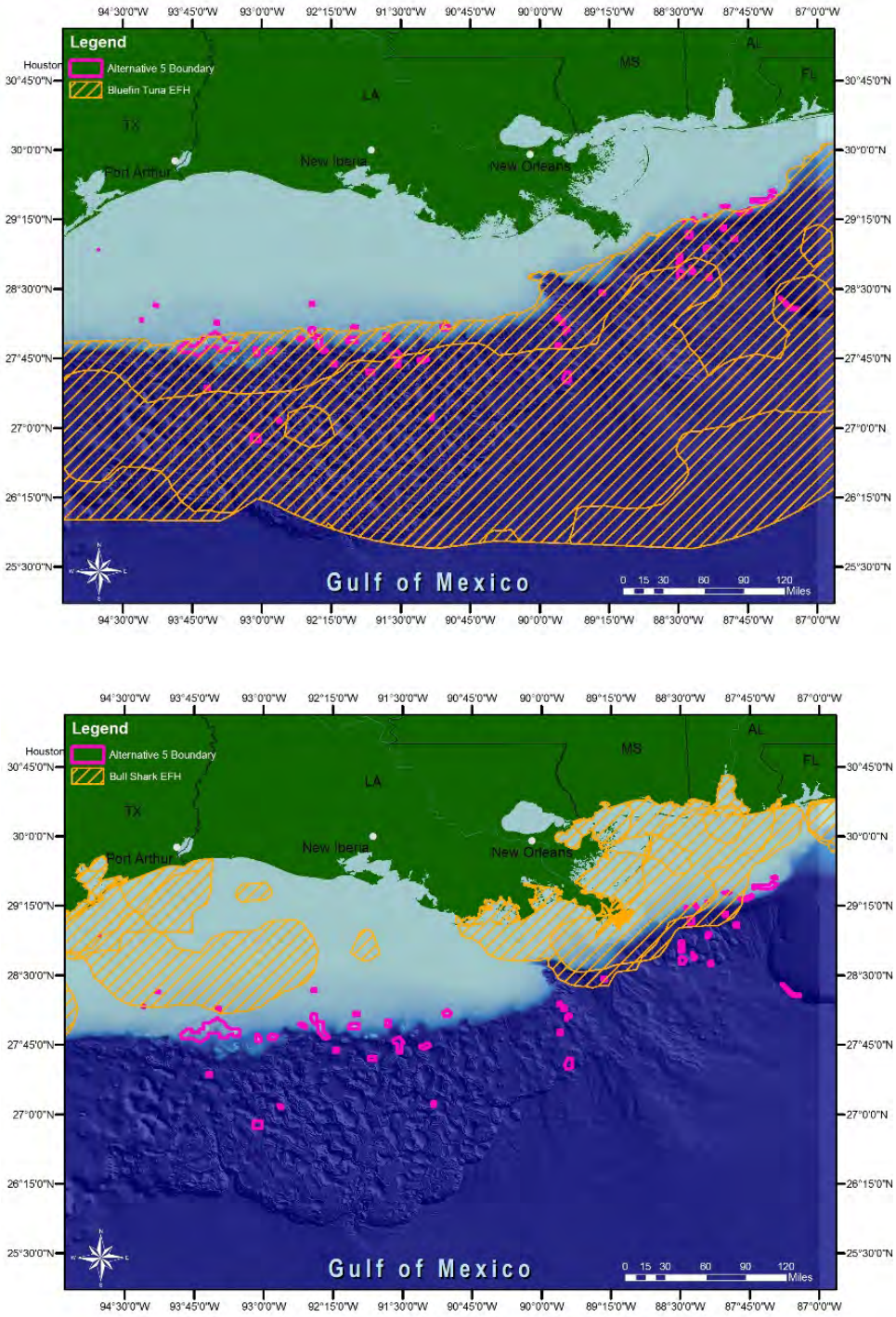


Figure D-2f. Categories of EFH for Highly Migratory Species managed by the National Marine Fisheries Service in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): Bluefin Tuna EFH (top) and Bull Shark EFH (bottom).

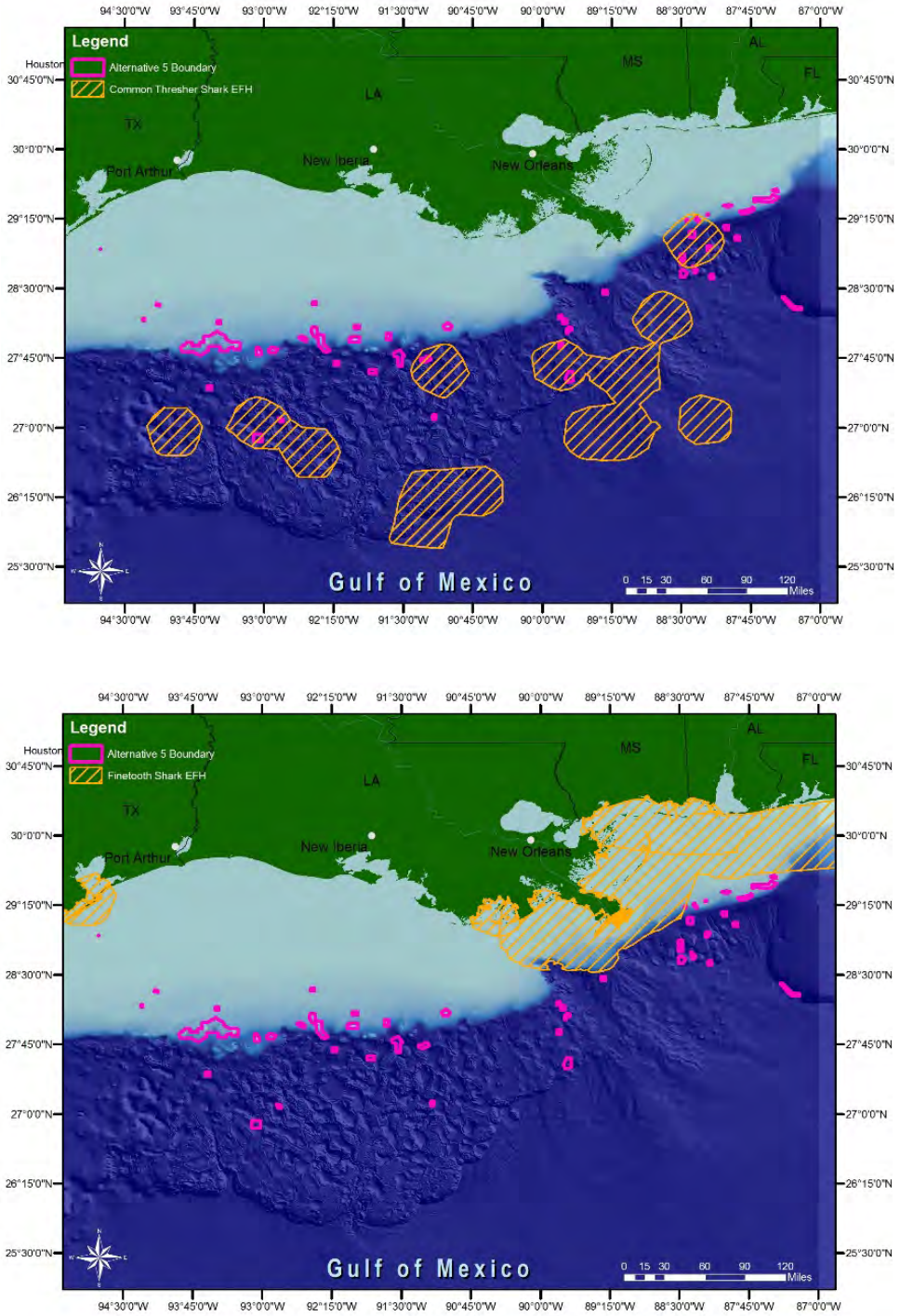


Figure D-2g. Categories of EFH for Highly Migratory Species managed by the National Marine Fisheries Service in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): Common Thresher Shark EFH (top) and Finetooth Shark EFH (bottom).

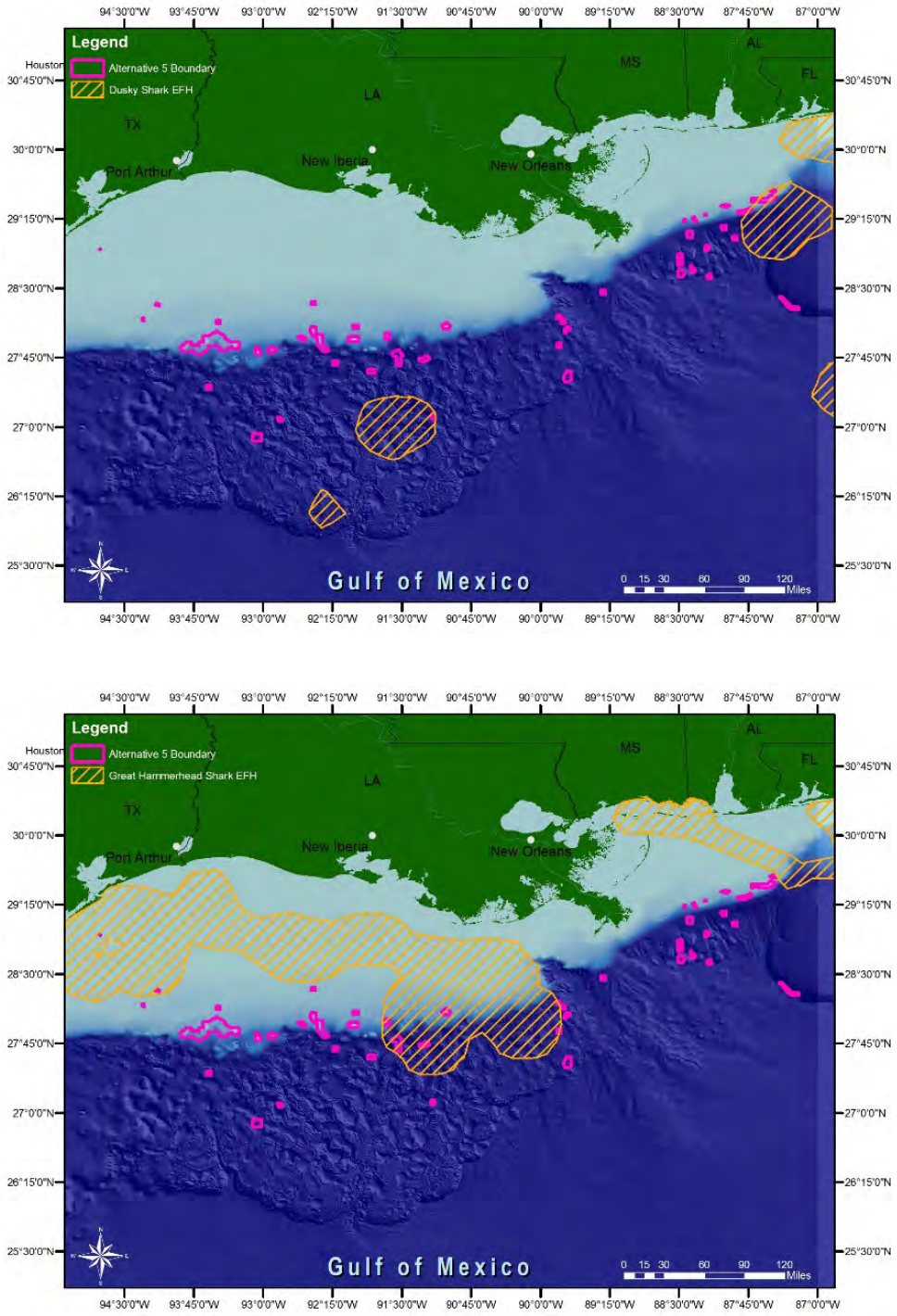


Figure D-2h. Categories of EFH for Highly Migratory Species managed by the National Marine Fisheries Service in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): Dusky Shark EFH (top) and Great Hammerhead Shark EFH (bottom).

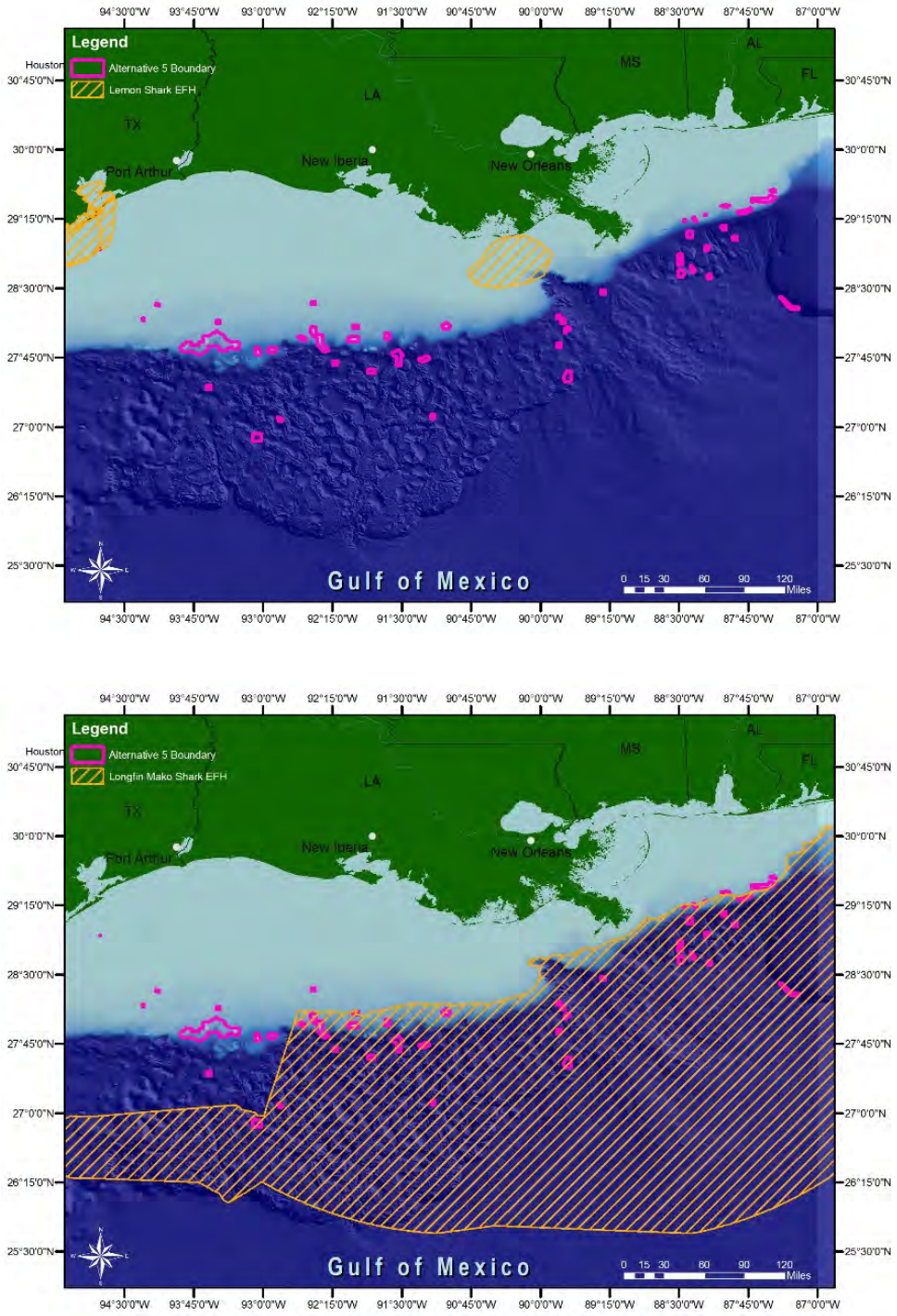


Figure D-2i. Categories of EFH for Highly Migratory Species managed by the National Marine Fisheries Service in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): Lemon Shark EFH (top) and Longfin Mako Shark EFH (bottom).

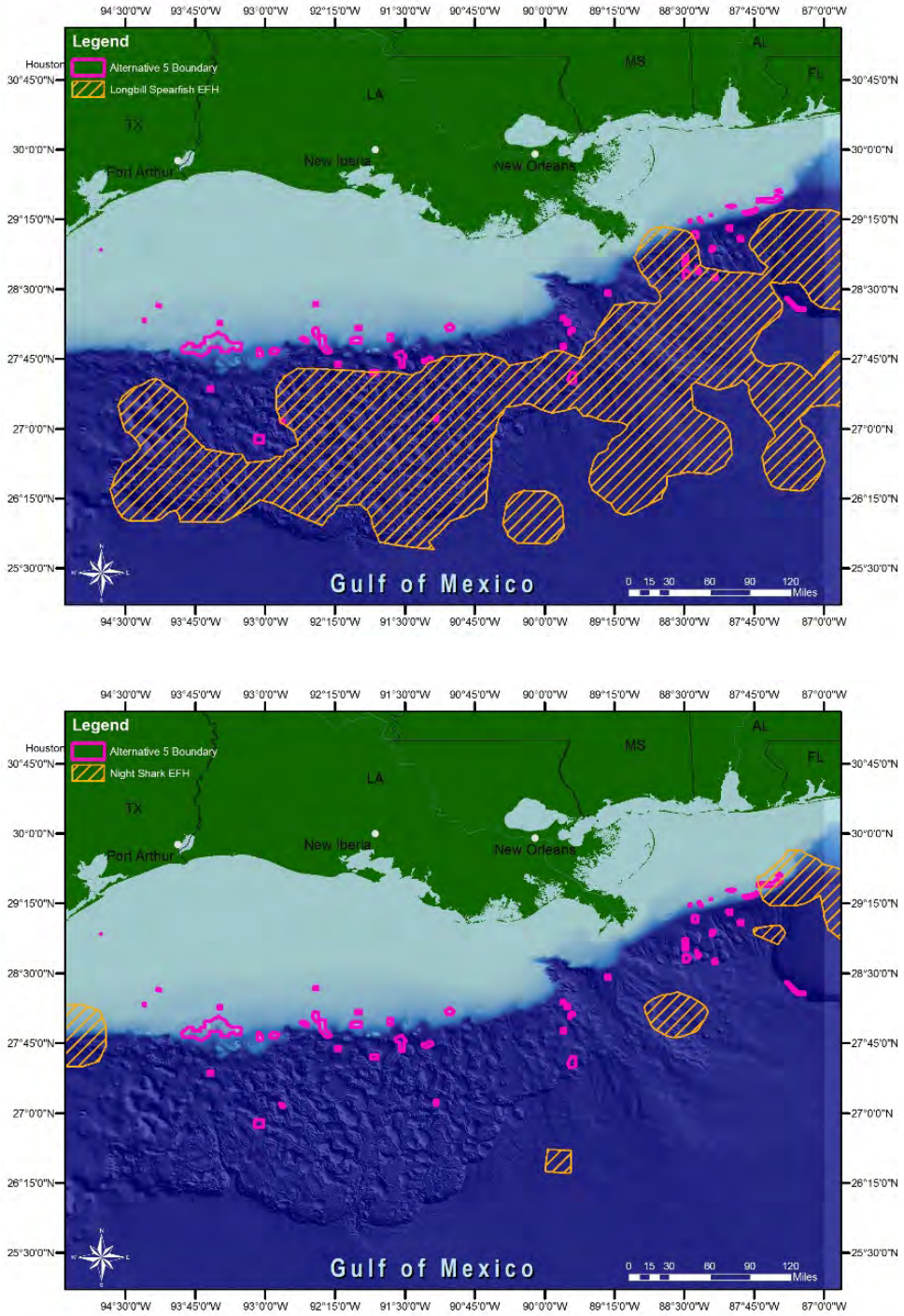


Figure D-2j. Categories of EFH for Highly Migratory Species managed by the National Marine Fisheries Service in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): Longbill Spearfish EFH (top) and Night Shark EFH (bottom).

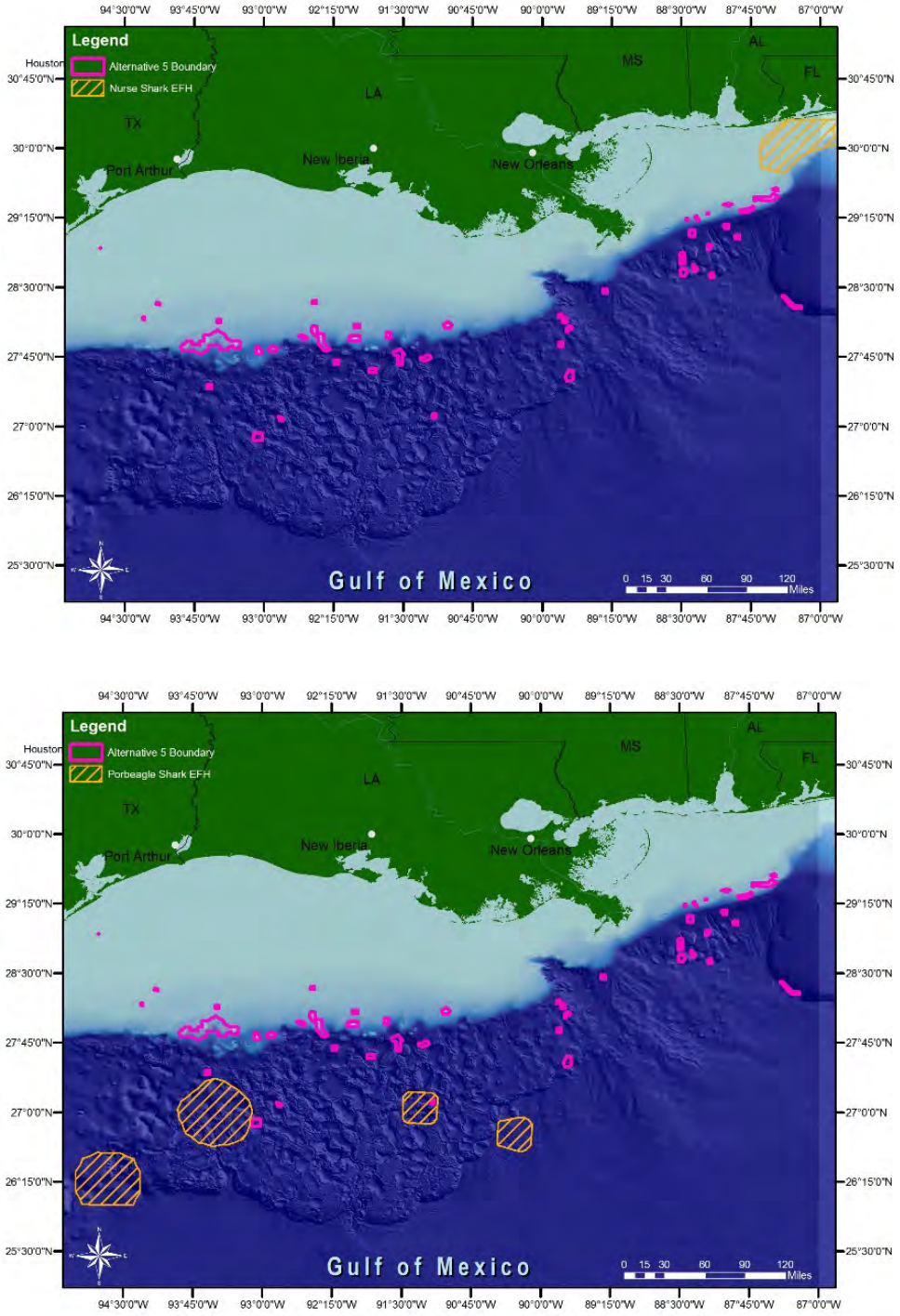


Figure D-2k. Categories of EFH for Highly Migratory Species managed by the National Marine Fisheries Service in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): Nurse Shark EFH (top) and Porbeagle Shark EFH (bottom).

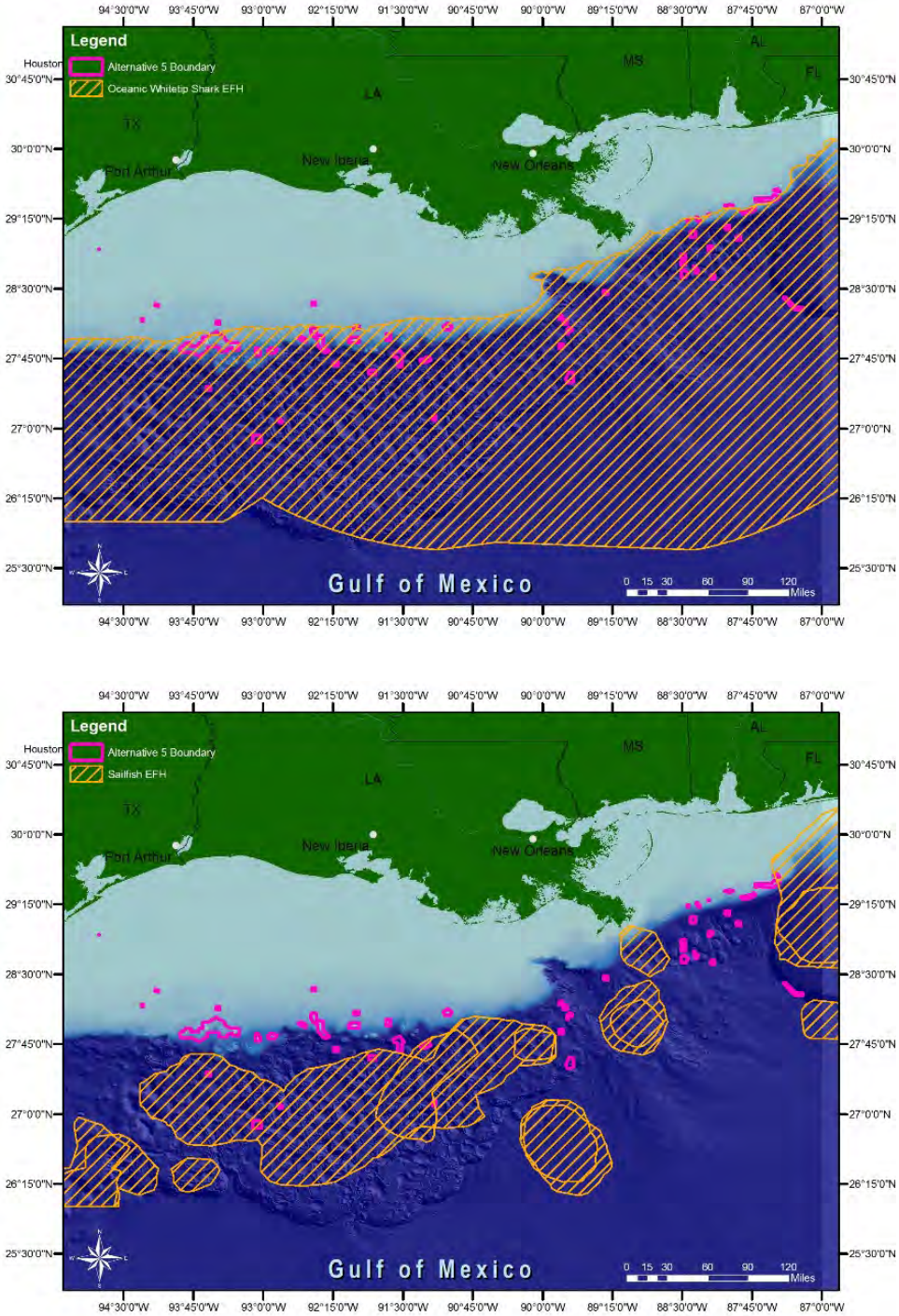


Figure D-2l. Categories of EFH for Highly Migratory Species managed by the National Marine Fisheries Service in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): Oceanic Whitetip Shark EFH (top) and Sailfish EFH (bottom).

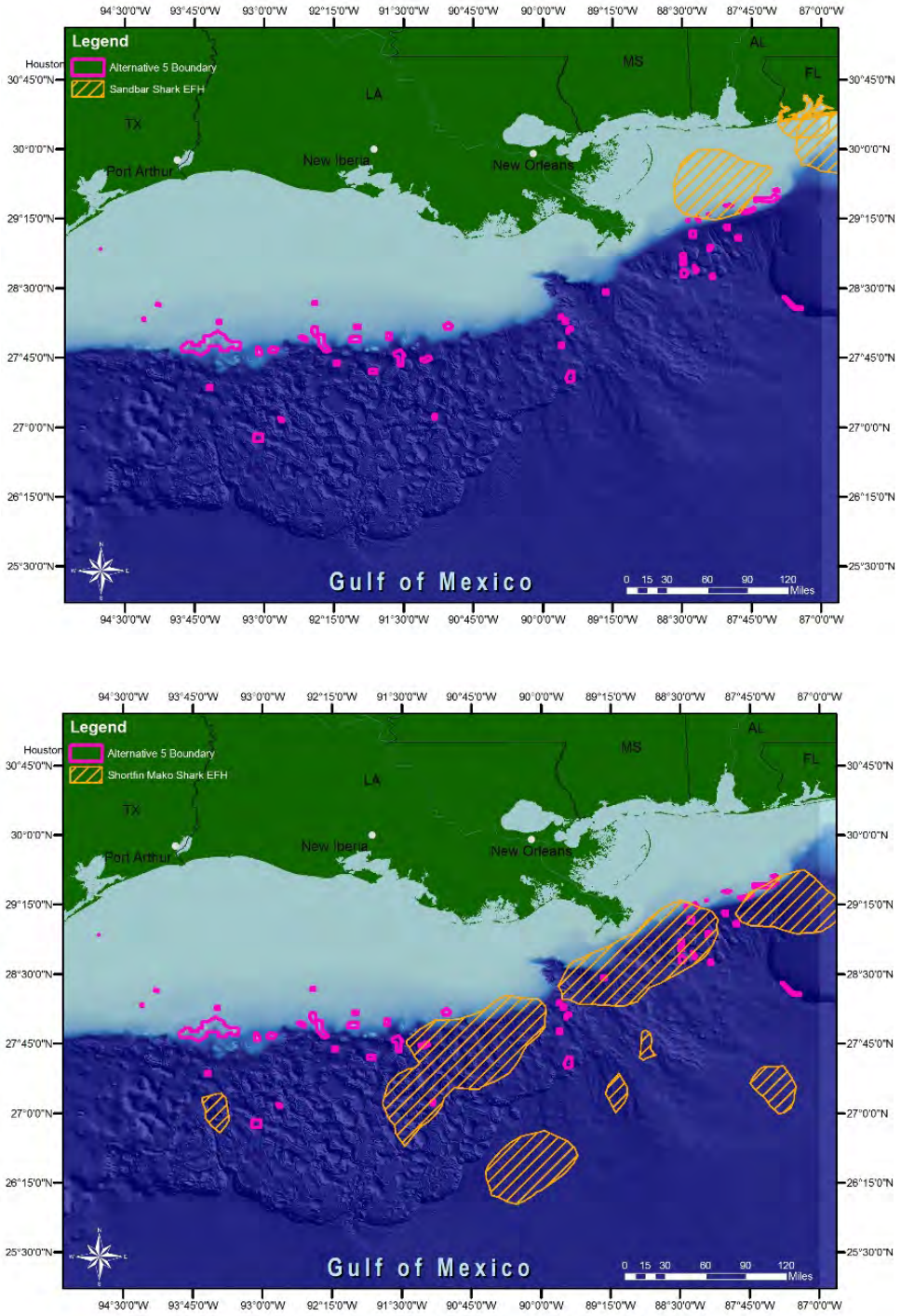


Figure D-2m. Categories of EFH for Highly Migratory Species managed by the National Marine Fisheries Service in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): Sandbar Shark EFH (top) and Shortfin Mako Shark EFH (bottom).

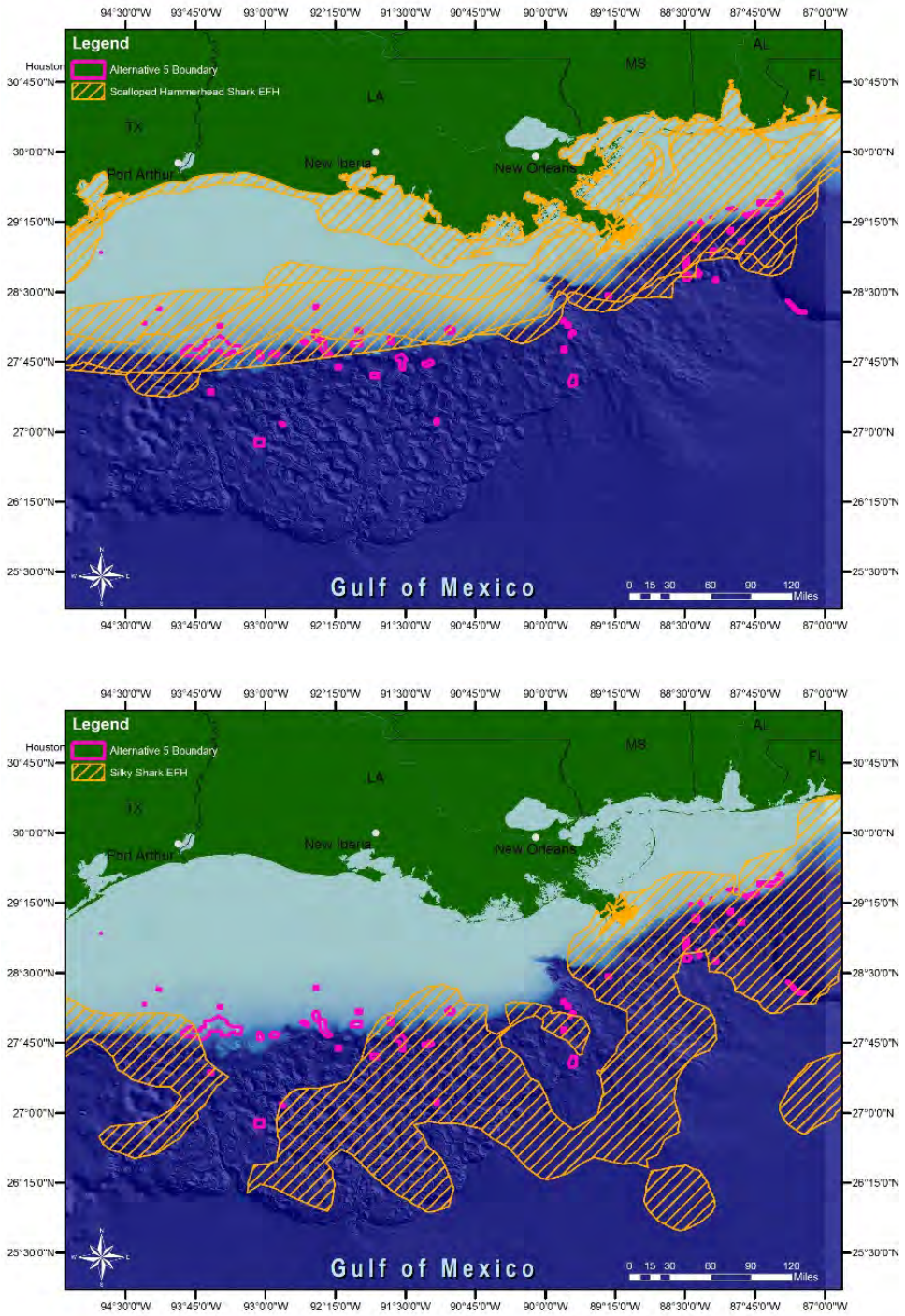


Figure D-2n. Categories of EFH for Highly Migratory Species managed by the National Marine Fisheries Service in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): Scalloped Hammerhead Shark EFH (top) and Silky Shark EFH (bottom).

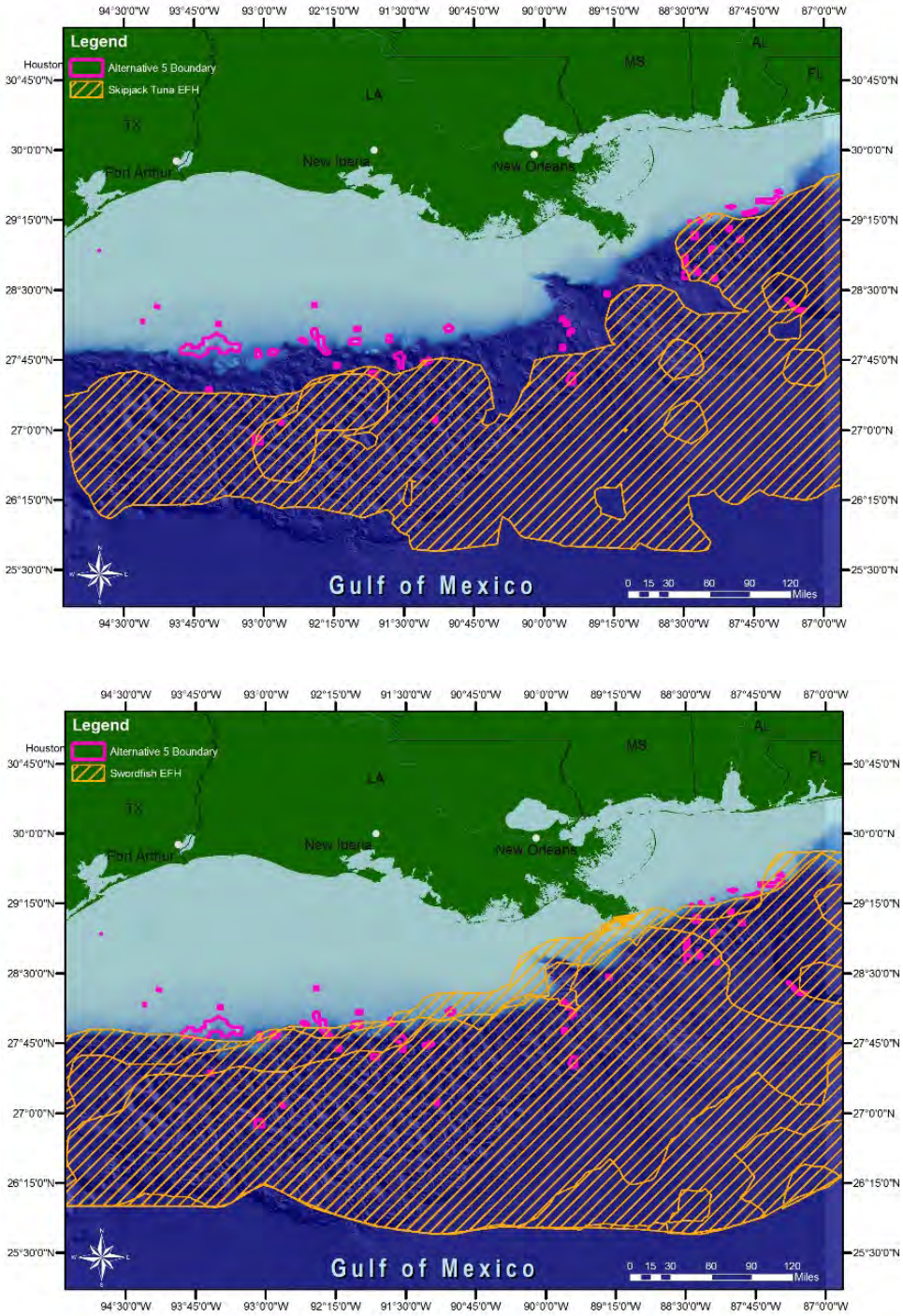


Figure D-2o. Categories of EFH for Highly Migratory Species managed by the National Marine Fisheries Service in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): Skipjack Tuna EFH (top) and Swordfish EFH (bottom).

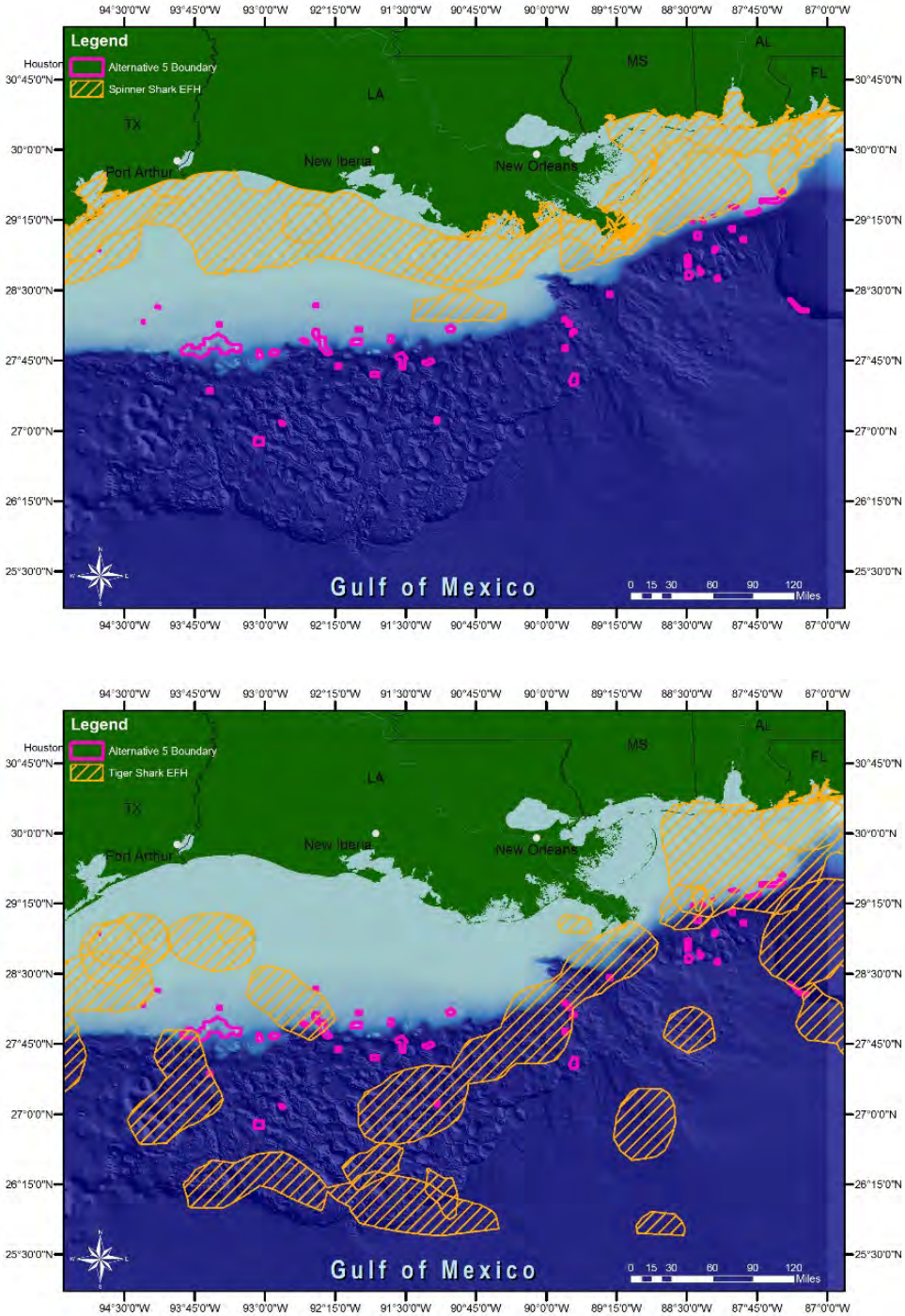


Figure D-2p. Categories of EFH for Highly Migratory Species managed by the National Marine Fisheries Service in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): Spinner Shark EFH (top) and Tiger Shark EFH (bottom).

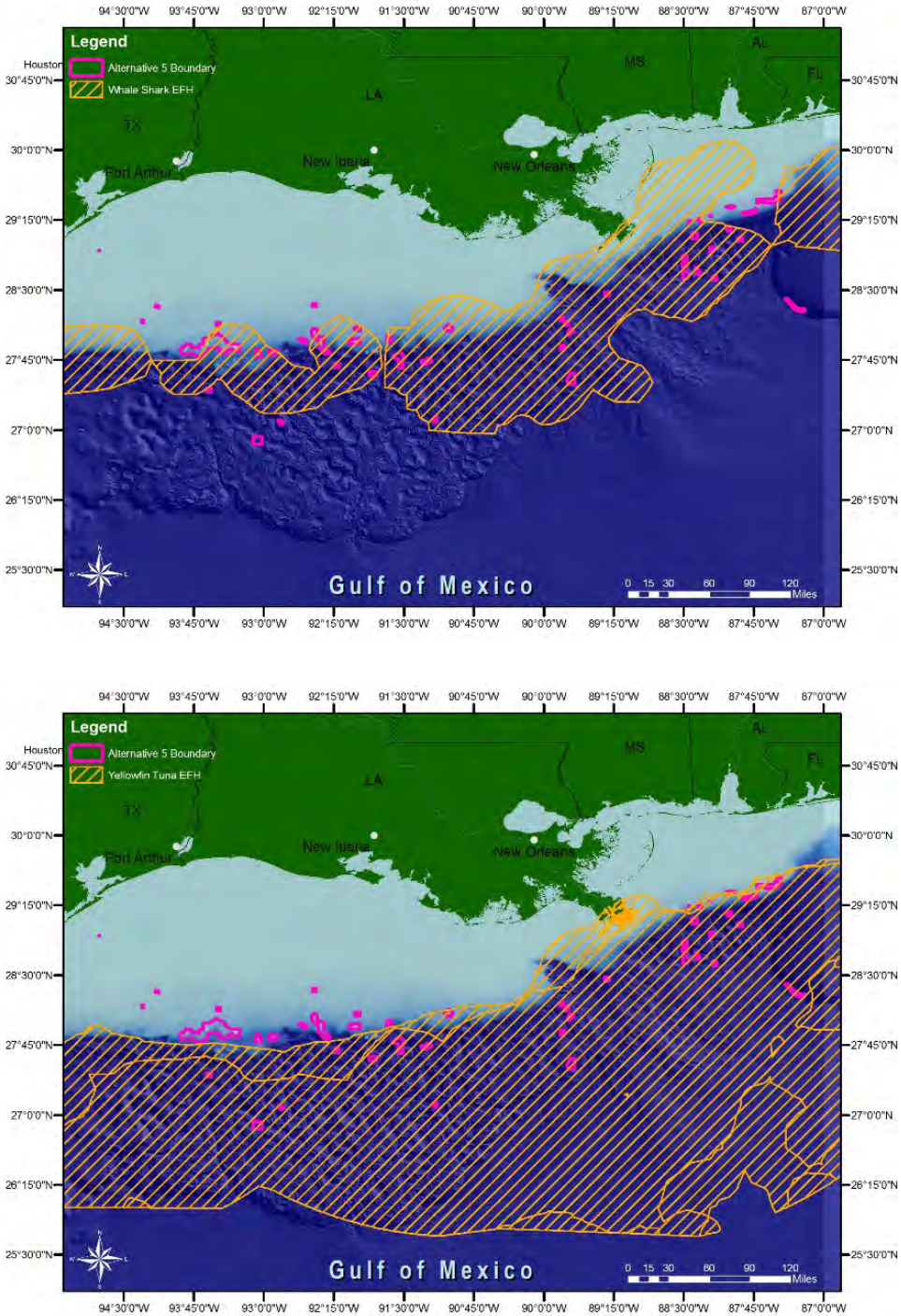


Figure D-2q. Categories of EFH for Highly Migratory Species managed by the National Marine Fisheries Service in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): Whale Shark EFH (top) and Yellowfin Tuna EFH (bottom).

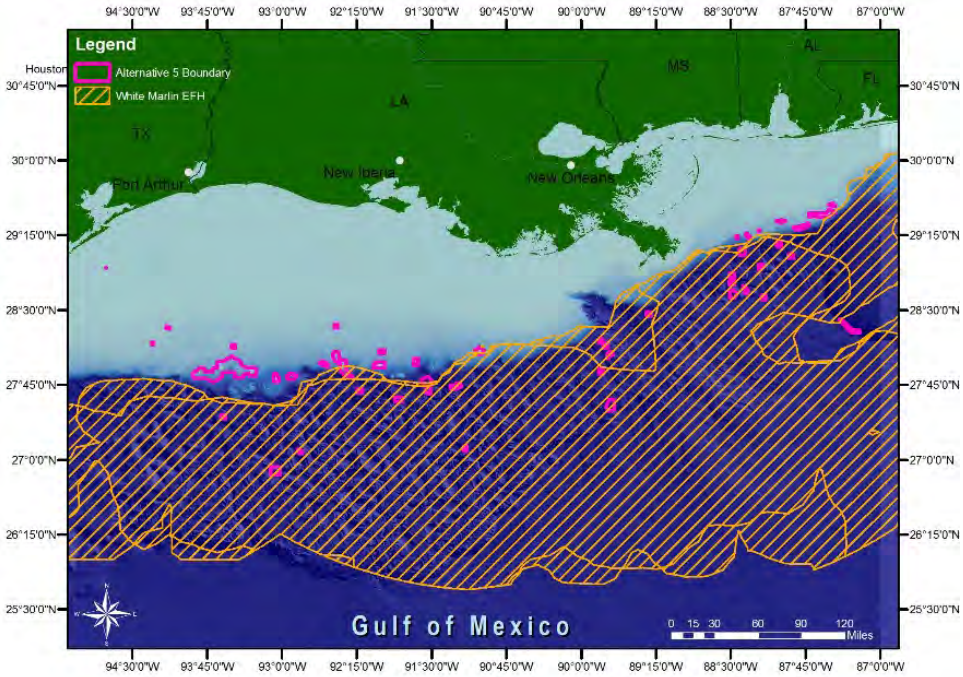


Figure D-2r. Categories of EFH for Highly Migratory Species managed by the National Marine Fisheries Service in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5): White Marlin EFH.

D.8 Map figure for HAPCs designated by the Gulf of Mexico Fishery Management Council in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5)

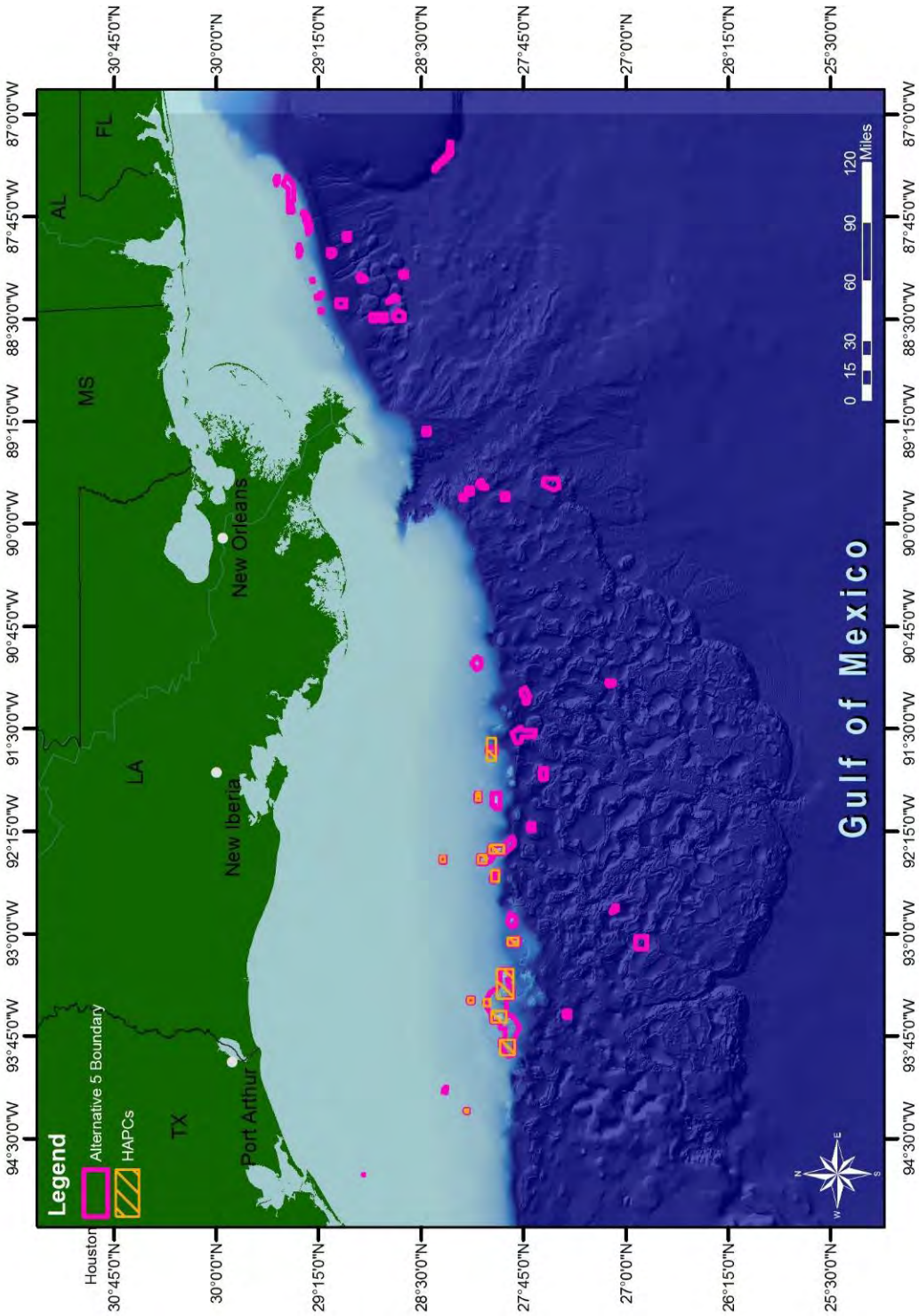


Figure D-3. HAPCs designated by the Gulf of Mexico Fishery Management Council in the study area, in relation to the most comprehensive proposed boundary alternative (Alternative 5).

Appendix E

NATIONAL MARINE SANCTUARIES ACT

National Marine Sanctuaries Act

Title 16, Chapter 32, Sections 1431 et seq. United States Code
As amended by Public Law 106-513, November 2000

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SEC. 301. [16 U.S.C. 1431] FINDINGS, PURPOSES, AND POLICIES; ESTABLISHMENT OF SYSTEM

(a) FINDINGS.—The Congress finds that—

(1) this Nation historically has recognized the importance of protecting special areas of its public domain, but these efforts have been directed almost exclusively to land areas above the high-water mark;

(2) certain areas of the marine environment possess conservation, recreational, ecological; historical, scientific, educational, cultural, archeological, or esthetic qualities which give them special national, and in some cases international, significance;

(3) while the need to control the effects of particular activities has led to enactment of resource-specific legislation, these laws cannot in all cases provide a coordinated and comprehensive approach to the conservation and management of special areas of the marine environment; and

(4) a Federal program which establishes areas of the marine environment which have special conservation, recreational, ecological, historical, cultural, archeological, scientific, educational, or esthetic qualities as national marine sanctuaries managed as the National Marine Sanctuary System will—

(A) improve the conservation, understanding, management, and wise and sustainable use of marine resources;

(B) enhance public awareness, understanding, and appreciation of the marine environment; and

(C) maintain for future generations the habitat, and ecological services, of the natural assemblage of living resources that inhabit these areas.

(b) PURPOSES AND POLICIES.—The purposes and policies of this chapter are—

(1) to identify and designate as national marine sanctuaries areas of the marine environment which are of special national significance and to manage these areas as the National Marine Sanctuary System;

(2) to provide authority for comprehensive and coordinated conservation and management of these marine areas, and activities affecting them, in a manner which complements existing regulatory authorities;

(3) to maintain the natural biological communities in the national marine sanctuaries, and to protect, and, where appropriate, restore and enhance natural habitats, populations, and ecological processes;

(4) to enhance public awareness, understanding, appreciation, and wise and sustainable use of the marine environment, and the natural, historical, cultural, and archeological resources of the National Marine Sanctuary System;

(5) to support, promote, and coordinate scientific research on, and long-term monitoring of, the resources of these marine areas;

(6) to facilitate to the extent compatible with the primary objective of resource protection, all public and private uses of the resources of these marine areas not prohibited pursuant to other authorities;

(7) to develop and implement coordinated plans for the protection and management of these areas with appropriate Federal agencies, State and local governments, Native American tribes and organizations, international organizations, and other public and private interests concerned with the continuing health and resilience of these marine areas;

(8) to create models of, and incentives for, ways to conserve and manage these areas, including the application of innovative management techniques; and

(9) to cooperate with global programs encouraging conservation of marine resources.

(c) ESTABLISHMENT OF SYSTEM.—There is established the National Marine Sanctuary System, which shall consist of national marine sanctuaries designated by the Secretary in accordance with this chapter.

SEC. 302. [16 U.S.C. 1432] DEFINITIONS

As used in this chapter, the term—

(1) "draft management plan" means the plan described in section 1434(a)(1)(C)(v) of this title;

(2) "Magnuson-Stevens Act" means the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.);

(3) "marine environment" means those areas of coastal and ocean waters, the Great Lakes and their connecting waters, and submerged lands over which the United States exercises jurisdiction, including the exclusive economic zone, consistent with international law;

(4) "Secretary" means the Secretary of Commerce;

(5) "State" means each of the several States, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, American Samoa, the Virgin Islands, Guam, and any other commonwealth, territory, or possession of the United States;

(6) "damages" includes—

(A) compensation for—

(i)(I) the cost of replacing, restoring, or acquiring the equivalent of a sanctuary resource; and (II) the value of the lost use of a sanctuary resource pending its restoration or replacement or the acquisition of an equivalent sanctuary resource; or

(ii) the value of a sanctuary resource if the sanctuary resource cannot be restored or replaced or if the equivalent of such resource cannot be acquired;

(B) the cost of damage assessments under section 1443(b)(2) of this title;

(C) the reasonable cost of monitoring appropriate to the injured, restored, or replaced resources;

(D) the cost of curation and conservation of archeological, historical, and cultural sanctuary resources; and

(E) the cost of enforcement actions undertaken by the Secretary in response to the destruction or loss of, or injury to, a sanctuary resource;

(7) "response costs" means the costs of actions taken or authorized by the Secretary to minimize destruction or loss of, or injury to, sanctuary resources, or to minimize the imminent risks of such destruction, loss, or injury, including costs related to seizure, forfeiture, storage, or disposal arising from liability under section 1443 of this title;

(8) "sanctuary resource" means any living or nonliving resource of a national marine sanctuary that contributes to the conservation, recreational, ecological, historical, educational, cultural, archeological, scientific, or aesthetic value of the sanctuary; and

(9) "exclusive economic zone" means the exclusive economic zone as defined in the Magnuson-Stevens Act; and

(10) "System" means the National Marine Sanctuary System established by section 1431 of this title.

SEC. 303. [16 U.S.C. 1433] SANCTUARY DESIGNATION STANDARDS

(a) STANDARDS.—The Secretary may designate any discrete area of the marine environment as a national marine sanctuary and promulgate regulations implementing the designation if the Secretary determines that—

(1) the designation will fulfill the purposes and policies of this chapter;

(2) the area is of special national significance due to—

(A) its conservation, recreational, ecological, historical, scientific, cultural, archaeological, educational, or esthetic qualities;

(B) the communities of living marine resources it harbors; or

(C) its resource or human-use values;

(3) existing State and Federal authorities are inadequate or should be supplemented to ensure coordinated and comprehensive conservation and management of the area, including resource protection, scientific research, and public education;

(4) designation of the area as a national marine sanctuary will facilitate the objectives stated in paragraph (3); and

(5) the area is of a size and nature that will permit comprehensive and coordinated conservation and management.

(b) FACTORS AND CONSULTATIONS REQUIRED IN MAKING DETERMINATIONS AND FINDINGS.—

(1) FACTORS.—For purposes of determining if an area of the marine environment meets the standards set forth in subsection (a) of this section, the Secretary shall consider—

(A) the area's natural resource and ecological qualities, including its contribution to biological productivity, maintenance of ecosystem structure, maintenance of ecologically or commercially important or threatened species or species assemblages, maintenance of critical habitat of endangered species, and the biogeographic representation of the site;

(B) the area's historical, cultural, archaeological, or paleontological significance;

(C) the present and potential uses of the area that depend on maintenance of the area's resources, including commercial and recreational fishing, subsistence uses, other commercial and recreational activities, and research and education;

(D) the present and potential activities that may adversely affect the factors identified in subparagraphs (A), (B), and (C);

(E) the existing State and Federal regulatory and management authorities applicable to the area and the adequacy of those authorities to fulfill the purposes and policies of this chapter;

(F) the manageability of the area, including such factors as its size, its ability to be identified as a discrete ecological unit with definable boundaries, its accessibility, and its suitability for monitoring and enforcement activities;

(G) the public benefits to be derived from sanctuary status, with emphasis on the benefits of long-term protection of nationally significant resources, vital habitats, and resources which generate tourism;

(H) the negative impacts produced by management restrictions on incomegenerating activities such as living and nonliving resources development;

(I) the socioeconomic effects of sanctuary designation;

(J) the area's scientific value and value for monitoring the resources and natural processes that occur there;

(K) the feasibility, where appropriate, of employing innovative management approaches to protect sanctuary resources or to manage compatible uses; and

(L) the value of the area as an addition to the System.

(2) CONSULTATION.—In making determinations and findings, the Secretary shall consult with—

(A) the Committee on Resources of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate;

(B) the Secretaries of State, Defense, Transportation, and the Interior, the Administrator, and the heads of other interested Federal agencies;

(C) the responsible officials or relevant agency heads of the appropriate State and local government entities, including coastal zone management agencies, that will or are likely to be affected by the establishment of the area as a national marine sanctuary;

(D) the appropriate officials of any Regional Fishery Management Council established by section 302 of the Magnuson-Stevens Act (16 U.S.C. 1852) that may be affected by the proposed designation; and

(E) other interested persons.

SEC. 304. [16 U.S.C. 1434] PROCEDURES FOR DESIGNATION AND IMPLEMENTATION

(a) SANCTUARY PROPOSAL.—

(1) NOTICE.—In proposing to designate a national marine sanctuary, the Secretary shall—

(A) issue, in the Federal Register, a notice of the proposal, proposed regulations that may be necessary and reasonable to implement the proposal, and a summary of the draft management plan;

(B) provide notice of the proposal in newspapers of general circulation or electronic media in the communities that may be affected by the proposal; and

(C) no later than the day on which the notice required under subparagraph (A) is submitted to the Office of the Federal Register, submit a copy of that notice and the draft sanctuary designation documents prepared pursuant to paragraph (2), including an executive summary, to the Committee on Resources of the House of Representatives, the Committee on Commerce, Science, and Transportation of the Senate, and the Governor of each State in which any part of the proposed sanctuary would be located.

(2) SANCTUARY DESIGNATION DOCUMENTS.—The Secretary shall prepare and make available to the public sanctuary designation documents on the proposal that include the following:

(A) A draft environmental impact statement pursuant to the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.).

(B) A resource assessment that documents—

(i) present and potential uses of the area, including commercial and recreational fishing, research and education, minerals and energy development, subsistence uses, and other commercial, governmental, or recreational uses;

(ii) after consultation with the Secretary of the Interior, any commercial, governmental, or recreational resource uses in the areas that are subject to the primary jurisdiction of the Department of the Interior; and

(iii) information prepared in consultation with the Secretary of Defense, the Secretary of Energy, and the Administrator of the Environmental Protection Agency, on any past, present, or proposed future disposal or discharge of materials in the vicinity of the proposed sanctuary. Public disclosure by the Secretary of such information shall be consistent with national security regulations.

(C) A draft management plan for the proposed national marine sanctuary that includes the following:

(i) The terms of the proposed designation.

(ii) Proposed mechanisms to coordinate existing regulatory and management authorities within the area.

(iii) The proposed goals and objectives, management responsibilities, resource studies, and appropriate strategies for managing sanctuary resources of the proposed sanctuary, including interpretation and education, innovative management strategies, research, monitoring and assessment, resource protection, restoration, enforcement, and surveillance activities.

(iv) An evaluation of the advantages of cooperative State and Federal management if all or part of the proposed sanctuary is within the territorial limits of any State or is superjacent to the subsoil and seabed within the seaward boundary of a State, as that boundary is established under the Submerged Lands Act (43 U.S.C. 1301 et seq.).

(v) An estimate of the annual cost to the Federal Government of the proposed designation, including costs of personnel, equipment and facilities, enforcement, research, and public education.

(vi) The proposed regulations referred to in paragraph (1)(A).

(D) Maps depicting the boundaries of the proposed sanctuary.

(E) The basis for the determinations made under section 1433(a) of this title with respect to the area.

(F) An assessment of the considerations under section 1433(b)(1) of this title.

(3) PUBLIC HEARING.—No sooner than thirty days after issuing a notice under this subsection, the Secretary shall hold at least one public hearing in the coastal area or areas that will be most affected by the proposed designation of the area as a national marine sanctuary for the purpose of receiving the views of interested parties.

(4) TERMS OF DESIGNATION.—The terms of designation of a sanctuary shall include the geographic area proposed to be included within the sanctuary, the characteristics of the area that give it conservation, recreational, ecological, historical, research, educational, or esthetic value, and the types of activities that will be subject to regulation by the Secretary to protect those characteristics. The terms of designation may be modified only by the same procedures by which the original designation is made.

(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. Draft regulations prepared by the Council, or a Council determination that regulations are not necessary pursuant to this paragraph, shall be accepted and issued as proposed regulations by the Secretary unless the Secretary finds that the Council's action fails to fulfill the purposes and policies of this chapter and the goals and objectives of 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 goals and objectives of the proposed designation. The Secretary shall prepare the fishing regulations, if the Council declines to make a determination with respect to the need for regulations, makes a determination which is rejected by the Secretary, or fails to prepare the draft regulations in a timely manner. Any amendments to the fishing regulations shall be drafted, approved, and issued in the same manner as the original regulations. The Secretary shall also cooperate with other appropriate fishery management authorities with rights or responsibilities within a proposed sanctuary at the earliest practicable stage in drafting any sanctuary fishing regulations.

(6) COMMITTEE ACTION.—After receiving the documents under subsection (a)(1)(C) of this section, the Committee on Resources of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate may each hold hearings on the proposed designation and on the matters set forth in the documents. If within the forty-five day period of continuous session of Congress beginning on the date of submission of the documents, either Committee issues a report concerning matters addressed in the documents, the Secretary shall

consider this report before publishing a notice to designate the national marine sanctuary.

(b) TAKING EFFECT OF DESIGNATIONS.—

(1) NOTICE.—In designating a national marine sanctuary, the Secretary shall publish in the Federal Register notice of the designation together with final regulations to implement the designation and any other matters required by law, and submit such notice to the Congress. The Secretary shall advise the public of the availability of the final management plan and the final environmental impact statement with respect to such sanctuary. The Secretary shall issue a notice of designation with respect to a proposed national marine sanctuary site not later than 30 months after the date a notice declaring the site to be an active candidate for sanctuary designation is published in the Federal Register under regulations issued under this Act, or shall publish not later than such date in the Federal Register findings regarding why such notice has not been published. No notice of designation may occur until the expiration of the period for Committee action under subsection (a)(6) of this section. The designation (and any of its terms not disapproved under this subsection) and regulations shall take effect and become final after the close of a review period of forty-five days of continuous session of Congress beginning on the day on which such notice is published unless, in the case of a national marine sanctuary that is located partially or entirely within the seaward boundary of any State, the Governor affected certifies to the Secretary that the designation or any of its terms is unacceptable, in which case the designation or the unacceptable term shall not take effect in the area of the sanctuary lying within the seaward boundary of the State.

(2) WITHDRAWAL OF DESIGNATION.—If the Secretary considers that actions taken under paragraph (1) will affect the designation of a national marine sanctuary in a manner that the goals and objectives of the sanctuary or System cannot be fulfilled, the Secretary may withdraw the entire designation. If the Secretary does not withdraw the designation, only those terms of the designation not certified under paragraph (1) shall take effect.

(3) PROCEDURES.—In computing the forty-five-day periods of continuous session of Congress pursuant to subsection (a)(6) of this section and paragraph (1) of this subsection—

(A) continuity of session is broken only by an adjournment of Congress sine die; and

(B) the days on which either House of Congress is not in session because of an adjournment of more than three days to a day certain are excluded.

(c) ACCESS AND VALID RIGHTS.—

(1) Nothing in this chapter shall be construed as terminating or granting to the Secretary the right to terminate any valid lease, permit, license, or right of subsistence use or of access that is in existence on the date of designation of any national marine sanctuary.

(2) The exercise of a lease, permit, license, or right is subject to regulation by the Secretary consistent with the purposes for which the sanctuary is designated.

(d) INTERAGENCY COOPERATION.—

(1) REVIEW OF AGENCY ACTIONS.—

(A) IN GENERAL.—Federal agency actions internal or external to a national marine sanctuary, including private activities authorized by licenses, leases, or permits, that are likely to destroy, cause the loss of, or injure any sanctuary resource are subject to consultation with the Secretary.

(B) AGENCY STATEMENTS REQUIRED.—Subject to any regulations the Secretary may establish each Federal agency proposing an action described in subparagraph (A) shall provide the Secretary with a written statement describing the action and its potential effects on sanctuary resources at the earliest practicable time, but in no case later than 45 days before the final approval of the action unless such Federal agency and the Secretary agree to a different schedule.

(2) SECRETARY'S RECOMMENDED ALTERNATIVES.—If the Secretary finds that a Federal agency action is likely to destroy, cause the loss of, or injure a sanctuary resource, the Secretary shall (within 45 days of receipt of complete information on the proposed agency action) recommend reasonable and prudent alternatives, which may include conduct of the action elsewhere, which can be taken by the Federal agency in implementing the agency action that will protect sanctuary resources.

(3) RESPONSE TO RECOMMENDATIONS.—The agency head who receives the Secretary's recommended alternatives under paragraph (2) shall promptly consult with the Secretary on the alternatives. If the agency head decides not to follow the alternatives, the agency head shall provide the Secretary with a written statement explaining the reasons for that decision.

(4) FAILURE TO FOLLOW ALTERNATIVE.—If the head of a Federal agency takes an action other than an alternative recommended by the Secretary and such action results in the destruction of, loss of, or injury to a sanctuary resource, the head of the agency shall promptly prevent and mitigate further damage and restore or replace the sanctuary resource in a manner approved by the Secretary.

(e) REVIEW OF MANAGEMENT PLANS.—Not more than five years after the date of designation of any national marine sanctuary, and thereafter at intervals not exceeding five years, the Secretary shall evaluate the substantive progress toward implementing the management plan and goals for the sanctuary, especially the effectiveness of site-specific management techniques and strategies, and shall revise the management plan and regulations as necessary to fulfill the purposes and policies of this chapter. This review shall include a prioritization of management objectives.

(f) LIMITATION ON DESIGNATION OF NEW SANCTUARIES.—

(1) FINDING REQUIRED.—The Secretary may not publish in the Federal Register any sanctuary designation notice or regulations proposing to designate a new sanctuary, unless the Secretary has published a finding that—

(A) the addition of a new sanctuary will not have a negative impact on the System; and

(B) sufficient resources were available in the fiscal year in which the finding is made to –

(i) effectively implement sanctuary management plans for each sanctuary in the System; and

(ii) complete site characterization studies and inventory known sanctuary resources, including cultural resources, for each sanctuary in the System within 10 years after the date that the finding is made if the resources available for those activities are maintained at the same level for each fiscal year in that 10 year period.

(2) DEADLINE.—If the Secretary does not submit the findings required by paragraph (1) before February 1, 2004, the Secretary shall submit to the Congress before October 1, 2004, a finding with respect to whether the requirements of subparagraphs (A) and (B) of paragraph (1) have been met by all existing sanctuaries.

(3) LIMITATION ON APPLICATION.—Paragraph (1) does not apply to any sanctuary designation documents for—

(A) a Thunder Bay National Marine Sanctuary; or

(B) a Northwestern Hawaiian Islands National Marine Sanctuary.

SEC. 305. [16 U.S.C. 1435] APPLICATION OF REGULATIONS; INTERNATIONAL NEGOTIATIONS AND COOPERATION

(a) REGULATIONS.—This chapter and the regulations issued under section 1434 of this title shall be applied in accordance with generally recognized principles of international law, and in accordance with treaties, conventions, and other agreements to which the United States is a party. No regulation shall apply to or

be enforced against a person who is not a citizen, national, or resident alien of the United States, unless in accordance with—

(1) generally recognized principles of international law;

(2) an agreement between the United States and the foreign state of which the person is a citizen; or

(3) an agreement between the United States and the flag state of a foreign vessel, if the person is a crewmember of the vessel.

(b) NEGOTIATIONS.—The Secretary of State, in consultation with the Secretary, shall take appropriate action to enter into negotiations with other governments to make necessary arrangements for the protection of any national marine sanctuary and to promote the purposes for which the sanctuary is established.

(c) INTERNATIONAL COOPERATION.—The Secretary, in consultation with the Secretary of State and other appropriate Federal agencies, shall cooperate with other governments and international organizations in furtherance of the purposes and policies of this chapter and consistent with applicable regional and mutilateral arrangements for the protection and management of special marine areas.

SEC. 306. [16 U.S.C. 1436] PROHIBITED ACTIVITIES

It is unlawful for any person to—

(1) destroy, cause the loss of, or injure any sanctuary resource managed under law or regulations for that sanctuary;

(2) possess, sell, offer for sale, purchase, import, export, deliver, carry, transport, or ship by any means any sanctuary resource taken in violation of this section;

(3) interfere with the enforcement of this chapter by—

(A) refusing to permit any officer authorized to enforce this chapter to board a vessel, other than a vessel operated by the Department of Defense or United States Coast Guard, subject to such person's control for the purposes of conducting any search or inspection in connection with the enforcement of this chapter;

(B) resisting, opposing, impeding, intimidating, harassing, bribing, interfering with, or forcibly assaulting any person authorized by the Secretary to implement this chapter or any such authorized officer in the conduct of any search or inspection performed under this chapter; or

(C) knowingly and willfully submitting false information to the Secretary or any officer authorized to enforce this chapter in connection with any search or inspection conducted under this chapter; or

(4) violate any provision of this chapter or any regulation or permit issued pursuant to this chapter.

SEC. 307. [16 U.S.C. 1437] ENFORCEMENT

(a) IN GENERAL.—The Secretary shall conduct such enforcement activities as are necessary and reasonable to carry out this chapter.

(b) POWERS OF AUTHORIZED OFFICERS.—Any person who is authorized to enforce this chapter may—

(1) board, search, inspect, and seize any vessel suspected of being used to violate this chapter or any regulation or permit issued under this chapter and any equipment, stores, and cargo of such vessel;

(2) seize wherever found any sanctuary resource taken or retained in violation of this chapter or any regulation or permit issued under this chapter;

(3) seize any evidence of a violation of this chapter or of any regulation or permit issued under this chapter;

(4) execute any warrant or other process issued by any court of competent jurisdiction;

(5) exercise any other lawful authority; and

(6) arrest any person, if there is reasonable cause to believe that such person has committed an act prohibited by section 1436(3) of this title.

(c) CRIMINAL OFFENSES.—

(1) OFFENSES.—A person is guilty of an offense under this subsection if the person commits any act prohibited by section 1436(3) of this title.

(2) PUNISHMENT.—Any person that is guilty of an offense under this subsection—

(A) except as provided in subparagraph (B), shall be fined under title 18, imprisoned for not more than 6 months, or both; or

(B) in the case of a person who in the commission of such an offense uses a dangerous weapon, engages in conduct that causes bodily injury to any person authorized to enforce this chapter or any person authorized to implement the provisions of this chapter, or places any such person in fear of imminent bodily injury, shall be fined under title 18, imprisoned for not more than 10 years, or both.

(d) CIVIL PENALTIES.—

(1) CIVIL PENALTY.—Any person subject to the jurisdiction of the United States who violates this chapter or any regulation or permit issued under this chapter shall be liable to the United States for a civil penalty of not more than $100,000 for each such violation, to be assessed by the Secretary. Each day of a continuing violation shall constitute a separate violation.

(2) NOTICE.—No penalty shall be assessed under this subsection until after the person charged has been given notice and an opportunity for a hearing.

(3) IN REM JURISDICTION.—A vessel used in violating this chapter or any regulation or permit issued under this chapter shall be liable in rem for any civil penalty assessed for such violation. Such penalty shall constitute a maritime lien on the vessel and may be recovered in an action in rem in the district court of the United States having jurisdiction over the vessel.

(4) REVIEW OF CIVIL PENALTY.—Any person against whom a civil penalty is assessed under this subsection may obtain review in the United States district court for the appropriate district by filing a complaint in such court not later than 30 days after the date of such order.

(5) COLLECTION OF PENALTIES.—If any person fails to pay an assessment of a civil penalty under this section after it has become a final and unappealable order, or after the appropriate court has entered final judgment in favor of the Secretary, the Secretary shall refer the matter to the Attorney General, who shall recover the amount assessed in any appropriate district court of the United States. In such action, the validity and appropriateness of the final order imposing the civil penalty shall not be subject to review.

(6) COMPROMISE OR OTHER ACTION BY SECRETARY.—The Secretary may compromise, modify, or remit, with or without conditions, any civil penalty which is or may be imposed under this section.

(e) FORFEITURE.—

(1) IN GENERAL.—Any vessel (including the vessel's equipment, stores, and cargo) and other item used, and any sanctuary resource taken or retained, in any manner, in connection with or as a result of any violation of this chapter or of any regulation or permit issued under this chapter shall be subject to forfeiture to the United States pursuant to a civil proceeding under this subsection. The proceeds from forfeiture actions under this subsection shall constitute a separate recovery in addition to any amounts recovered as civil penalties under this section or as civil damages under section 1443 of this title. None of those proceeds shall be subject to set-off.

(2) APPLICATION OF THE CUSTOMS LAWS.—The Secretary may exercise the authority of any United States official granted by any relevant customs law relating to the seizure, forfeiture, condemnation, disposition, remission, and mitigation of property in enforcing this chapter.

(3) DISPOSAL OF SANCTUARY RESOURCES.—Any sanctuary resource seized pursuant to this chapter may be disposed of pursuant to an order of the appropriate court, or, if perishable, in a manner prescribed by regulations promulgated by the Secretary. Any proceeds from the sale of such sanctuary resource shall for all purposes represent the sanctuary resource so disposed of in any subsequent legal proceedings.

(4) PRESUMPTION.—For the purposes of this section there is a rebuttable presumption that all sanctuary resources found on board a vessel that is used or seized in connection with a violation of this chapter or of any regulation or permit issued under this chapter were taken or retained in violation of this chapter or of a regulation or permit issued under this chapter.

(f) PAYMENT OF STORAGE, CARE, AND OTHER COSTS.—

(1) EXPENDITURES.—

(A) Notwithstanding any other law, amounts received by the United States as civil penalties, forfeitures of property, and costs imposed under paragraph (2) shall be retained by the Secretary in the manner provided for in section 9607(f)(1) of title 42.

(B) Amounts received under this section for forfeitures and costs imposed under paragraph (2) shall be used to pay the reasonable and necessary costs incurred by the Secretary to provide temporary storage, care, maintenance, and disposal of any sanctuary resource or other property seized in connection with a violation of this chapter or any regulation or permit issued under this chapter.

(C) Amounts received under this section as civil penalties and any amounts remaining after the operation of subparagraph (B) shall be used, in order of priority, to—

(i) manage and improve the national marine sanctuary with respect to which the violation occurred that resulted in the penalty or forfeiture;

(ii) pay a reward to any person who furnishes information leading to an assessment of a civil penalty, or to a forfeiture of property, for a violation of this chapter or any regulation or permit issued under this chapter; and

(iii) manage and improve any other national marine sanctuary.

(2) LIABILITY FOR COSTS.—Any person assessed a civil penalty for a violation of this chapter or of any regulation or permit issued under this chapter, and any claimant in a forfeiture action brought for such a violation, shall be liable for the reasonable costs incurred by the Secretary in storage, care, and maintenance of any sanctuary resource or other property seized in connection with the violation.

(g) SUBPOENAS.—In the case of any hearing under this section which is determined on the record in accordance with the procedures provided for under section 554 of title 5, the Secretary may issue subpoenas for the attendance and testimony of witnesses and the production of relevant papers, books, electronic files, and documents, and may administer oaths.

(h) USE OF RESOURCES OF STATE AND OTHER FEDERAL AGENCIES.—The Secretary shall, whenever appropriate, use by agreement the personnel, services, and

facilities of State and other Federal departments, agencies, and instrumentalities, on a reimbursable or nonreimbursable basis, to carry out the Secretary's responsibilities under this section.

(i) COAST GUARD AUTHORITY NOT LIMITED.—Nothing in this section shall be considered to limit the authority of the Coast Guard to enforce this or any other Federal law under section 89 of title 14.

(j) INJUNCTIVE RELIEF.—If the Secretary determines that there is an imminent risk of destruction or loss of or injury to a sanctuary resource, or that there has been actual destruction or loss of, or injury to, a sanctuary resource which may give rise to liability under section 1443 of this title, the Attorney General, upon request of the Secretary, shall seek to obtain such relief as may be necessary to abate such risk or actual destruction, loss, or injury, or to restore or replace the sanctuary resource, or both. The district courts of the United States shall have jurisdiction in such a case to order such relief as the public interest and the equities of the case may require.

(k) AREA OF APPLICATION AND ENFORCEABILITY.—The area of application and enforceability of this chapter includes the territorial sea of the United States, as described in Presidential Proclamation 5928 of December 27, 1988, which is subject to the sovereignty of the United States, and the United States exclusive economic zone, consistent with international law.

(l) NATIONWIDE SERVICE OF PROCESS.—In any action by the United States under this chapter, process may be served in any district where the defendant is found, resides, transacts business, or has appointed an agent for the service of process.

SEC. 308. [16 U.S.C. 1439] REGULATIONS

The Secretary may issue such regulations as may be necessary to carry out this chapter.

SEC. 309. [16 U.S.C. 1440] RESEARCH, MONITORING, AND EDUCATION

(a) IN GENERAL.—The Secretary shall conduct, support, or coordinate research, monitoring, evaluation, and education programs consistent with subsections (b) and (c) of this section and the purposes and policies of this chapter.

(b) RESEARCH AND MONITORING.—

(1) IN GENERAL.—The Secretary may—

(A) support, promote, and coordinate research on, and long-term monitoring of, sanctuary resources and natural processes that occur in national marine sanctuaries, including exploration, mapping, and environmental and socioeconomic assessment;

(B) develop and test methods to enhance degraded habitats or restore damaged, injured, or lost sanctuary resources; and

(C) support, promote, and coordinate research on, and the conservation, curation, and public display of, the cultural,

archeological, and historical resources of national marine sanctuaries.

(2) AVAILABILITY OF RESULTS.—The results of research and monitoring conducted, supported, or permitted by the Secretary under this subsection shall be made available to the public.

(c) EDUCATION.—

(1) IN GENERAL.—The Secretary may support, promote, and coordinate efforts to enhance public awareness, understanding, and appreciation of national marine sanctuaries and the System. Efforts supported, promoted, or coordinated under this subsection must emphasize the conservation goals and sustainable public uses of national marine sanctuaries and the System.

(2) EDUCATIONAL ACTIVITIES.—Activities under this subsection may include education of the general public, teachers, students, national marine sanctuary users, and ocean and coastal resource managers.

(d) INTERPRETIVE FACILITIES.—

(1) IN GENERAL.—The Secretary may develop interpretive facilities near any national marine sanctuary.

(2) FACILITY REQUIREMENT.—Any facility developed under this subsection must emphasize the conservation goals and sustainable public uses of national marine sanctuaries by providing the public with information about the conservation, recreational, ecological, historical, cultural, archeological, scientific, educational, or esthetic qualities of the national marine sanctuary.

(e) CONSULTATION AND COORDINATION.—In conducting, supporting, and coordinating research, monitoring, evaluation, and education programs under subsection (a) of this section and developing interpretive facilities under subsection (d) of this section, the Secretary may consult or coordinate with Federal, interstate, or regional agencies, States or local governments.

SEC. 310. [16 U.S.C. 1441] SPECIAL USE PERMITS

(a) ISSUANCE OF PERMITS.—The Secretary may issue special use permits which authorize the conduct of specific activities in a national marine sanctuary if the Secretary determines such authorization is necessary—

(1) to establish conditions of access to and use of any sanctuary resource; or

(2) to promote public use and understanding of a sanctuary resource.

(b) PUBLIC NOTICE REQUIRED.—The Secretary shall provide appropriate public notice before identifying any category of activity subject to a special use permit under subsection (a) of this section.

(c) PERMIT TERMS.—A permit issued under this section—

(1) shall authorize the conduct of an activity only if that activity is compatible with the purposes for which the sanctuary is designated and with protection of sanctuary resources;

(2) shall not authorize the conduct of any activity for a period of more than 5 years unless renewed by the Secretary;

(3) shall require that activities carried out under the permit be conducted in a manner that does not destroy, cause the loss of, or injure sanctuary resources; and

(4) shall require the permittee to purchase and maintain comprehensive general liability insurance, or post an equivalent bond, against claims arising out of activities conducted under the permit and to agree to hold the United States harmless against such claims.

(d) FEES.—

(1) ASSESSMENT AND COLLECTION.—The Secretary may assess and collect fees for the conduct of any activity under a permit issued under this section.

(2) AMOUNT.—The amount of a fee under this subsection shall be equal to the sum of—

(A) costs incurred, or expected to be incurred, by the Secretary in issuing the permit;

(B) costs incurred, or expected to be incurred, by the Secretary as a direct result of the conduct of the activity for which the permit is issued, including costs of monitoring the conduct of the activity; and

(C) an amount which represents the fair market value of the use of the sanctuary resource.

(3) USE OF FEES.—Amounts collected by the Secretary in the form of fees under this section may be used by the Secretary—

(A) for issuing and administering permits under this section; and

(B) for expenses of managing national marine sanctuaries.

(4) WAIVER OR REDUCTION OF FEES.—The Secretary may accept in-kind contributions in lieu of a fee under paragraph (2)(C), or waive or reduce any fee assessed under this subsection for any activity that does not derive profit from the access to or use of sanctuary resources.

(e) VIOLATIONS.—Upon violation of a term or condition of a permit issued under this section, the Secretary may—

(1) suspend or revoke the permit without compensation to the permittee and without liability to the United States;

(2) assess a civil penalty in accordance with section 1437 of this title; or

(3) both.

(f) REPORTS.—Each person issued a permit under this section shall submit an annual report to the Secretary not later than December 31 of each year which describes activities conducted under that permit and revenues derived from such activities during the year.

(g) FISHING.—Nothing in this section shall be considered to require a person to obtain a permit under this section for the conduct of any fishing activities in a national marine sanctuary.

SEC. 311. [16 U.S.C. 1442] COOPERATIVE AGREEMENTS, DONATIONS, AND ACQUISITIONS

(a) AGREEMENTS AND GRANTS.—The Secretary may enter into cooperative agreements, contracts, or other agreements with, or make grants to, States, local governments, regional agencies, interstate agencies, or other persons to carry out the purposes and policies of this chapter.

(b) AUTHORIZATION TO SOLICIT DONATIONS.—The Secretary may enter into such agreements with any nonprofit organization authorizing the organization to solicit private donations to carry out the purposes and policies of this chapter.

(c) DONATIONS.—The Secretary may accept donations of funds, property, and services for use in designating and administering national marine sanctuaries under this chapter. Donations accepted under this section shall be considered as a gift or bequest to or for the use of the United States.

(d) ACQUISITIONS.—The Secretary may acquire by purchase, lease, or exchange, any land, facilities, or other property necessary and appropriate to carry out the purposes and policies of this chapter.

(e) USE OF RESOURCES OF OTHER GOVERNMENT AGENCIES.—The Secretary may, whenever appropriate, enter into an agreement with a State or other Federal agency to use the personnel, services, or facilities of such agency on a reimbursable or nonreimbursable basis, to assist in carrying out the purposes and policies of this chapter.

(f) AUTHORITY TO OBTAIN GRANTS.—Notwithstanding any other provision of law that prohibits a Federal agency from receiving assistance, the Secretary may apply for, accept, and use grants from other Federal agencies, States, local governments, regional agencies, interstate agencies, foundations, or other persons, to carry out the purposes and policies of this chapter.

SEC. 312. [16 U.S.C. 1443] DESTRUCTION OR LOSS OF, OR INJURY TO, SANCTUARY RESOURCES

(a) LIABILITY.—

(1) LIABILITY TO UNITED STATES.—Any person who destroys, causes the loss of, or injures any sanctuary resource is liable to the United States for an amount equal to the sum of—

(A) the amount of response costs and damages resulting from the destruction, loss, or injury; and

(B) interest on that amount calculated in the manner described under section 2705 of title 33.

(2) LIABILITY IN REM.—Any vessel used to destroy, cause the loss of, or injure any sanctuary resource shall be liable in rem to the United States for response costs and damages resulting from such destruction, loss, or injury. The amount of that liability shall constitute a maritime lien on the vessel and may be recovered in an action in rem in any district court of the United States that has jurisdiction over the vessel.

(3) DEFENSES.—A person is not liable under this subsection if that person establishes that—

(A) the destruction or loss of, or injury to, the sanctuary resource was caused solely by an act of God, an act of war, or an act or omission of a third party, and the person acted with due care;

(B) the destruction, loss, or injury was caused by an activity authorized by Federal or State law; or

(C) the destruction, loss, or injury was negligible.

(4) LIMITS TO LIABILITY.—Nothing in sections 181 to 188 of title 46, Appendix, or section 192 of title 46, Appendix, shall limit the liability of any person under this chapter.

(b) RESPONSE ACTIONS AND DAMAGE ASSESSMENT.—

(1) RESPONSE ACTIONS.—The Secretary may undertake or authorize all necessary actions to prevent or minimize the destruction or loss of, or injury to, sanctuary resources, or to minimize the imminent risk of such destruction, loss, or injury.

(2) DAMAGE ASSESSMENT.—The Secretary shall assess damages to sanctuary resources in accordance with section 1432(6) of this title.

(c) CIVIL ACTIONS FOR RESPONSE COSTS AND DAMAGES.—

(1) The Attorney General, upon request of the Secretary, may commence a civil action against any person or vessel who may be liable under subsection (a) of this section for response costs and damages. The Secretary, acting as trustee for sanctuary resources for the United States, shall submit a request for such an action to the Attorney General whenever a person may be liable for such costs or damages.

(2) An action under this subsection may be brought in the United States district court for any district in which—

(A) the defendant is located, resides, or is doing business, in the case of an action against a person;
(B) the vessel is located, in the case of an action against a vessel; or
(C) the destruction of, loss of, or injury to a sanctuary resource occurred.

(d) USE OF RECOVERED AMOUNTS.—Response costs and damages recovered by the Secretary under this section shall be retained by the Secretary in the manner provided for in section 9607(f)(1) of title 42, and used as follows:

(1) RESPONSE COSTS.—Amounts recovered by the United States for costs of response actions and damage assessments under this section shall be used, as the Secretary considers appropriate—
(A) to reimburse the Secretary or any other Federal or State agency that conducted those activities; and
(B) after reimbursement of such costs, to restore, replace, or acquire the equivalent of any sanctuary resource.

(2) OTHER AMOUNTS.—All other amounts recovered shall be used, in order of priority—
(A) to restore, replace, or acquire the equivalent of the sanctuary resources that were the subject of the action, including for costs of monitoring and the costs of curation and conservation of archeological, historical, and cultural sanctuary resources;
(B) to restore degraded sanctuary resources of the national marine sanctuary that was the subject of the action, giving priority to sanctuary resources and habitats that are comparable to the sanctuary resources that were the subject of the action; and
(C) to restore degraded sanctuary resources of other national marine sanctuaries.

(3) FEDERAL-STATE COORDINATION.—Amounts recovered under this section with respect to sanctuary resources lying within the jurisdiction of a State shall be used under paragraphs (2)(A) and (B) in accordance with the court decree or settlement agreement and an agreement entered into by the Secretary and the Governor of that State.

(e) STATUTE OF LIMITATIONS.—An action for response costs or damages under subsection (c) of this section shall be barred unless the complaint is filed within 3 years after the date on which the Secretary completes a damage assessment and restoration plan for the sanctuary resources to which the action relates.

SEC. 313. [16 U.S.C. 1444] AUTHORIZATION OF APPROPRIATIONS

There are authorized to be appropriated to the Secretary—

(1) to carry out this chapter—
(A) $32,000,000 for fiscal year 2001;
(B) $34,000,000 for fiscal year 2002;

(C) $36,000,000 for fiscal year 2003;
(D) $38,000,000 for fiscal year 2004;
(E) $40,000,000 for fiscal year 2005; and

(2) for construction projects at national marine sanctuaries, $6,000,000 for each of fiscal years 2001, 2002, 2003, 2004, and 2005.

SEC. 314. [16 U.S.C. 1445] U.S.S. MONITOR ARTIFACTS AND MATERIALS

(a) CONGRESSIONAL POLICY.—In recognition of the historical significance of the wreck of the United States ship Monitor to coastal North Carolina and to the area off the coast of North Carolina known as the Graveyard of the Atlantic, the Congress directs that a suitable display of artifacts and materials from the United States ship Monitor be maintained permanently at an appropriate site in coastal North Carolina.

(b) DISCLAIMER.—This section shall not affect the following:

(1) RESPONSIBILITIES OF SECRETARY.—The responsibilities of the Secretary to provide for the protection, conservation, and display of artifacts and materials from the United States ship Monitor.

(2) AUTHORITY OF SECRETARY.—The authority of the Secretary to designate the Mariner's Museum, located at Newport News, Virginia, as the principal museum for coordination of activities referred to in paragraph (1).

SEC. 315. [16 U.S.C. 1445A] ADVISORY COUNCILS

(a) ESTABLISHMENT.—The Secretary may establish one or more advisory councils (in this section referred to as an "Advisory Council") to advise and make recommendations to the Secretary regarding the designation and management of national marine sanctuaries. The Advisory Councils shall be exempt from the Federal Advisory Committee Act.

(b) MEMBERSHIP.—Members of the Advisory Councils may be appointed from among—

(1) persons employed by Federal or State agencies with expertise in management of natural resources;

(2) members of relevant Regional Fishery Management Councils established under section 1852 of this title; and

(3) representatives of local user groups, conservation and other public interest organizations, scientific organizations, educational organizations, or others interested in the protection and multiple use management of sanctuary resources.

(c) LIMITS ON MEMBERSHIP.—For sanctuaries designated after November 4, 1992, the membership of Advisory Councils shall be limited to no more than 15 members.

(d) STAFFING AND ASSISTANCE.—The Secretary may make available to an Advisory Council any staff, information, administrative services, or assistance the Secretary determines are reasonably required to enable the Advisory Council to carry out its functions.

(e) PUBLIC PARTICIPATION AND PROCEDURAL MATTERS.—The following guidelines apply with respect to the conduct of business meetings of an Advisory Council:

(1) Each meeting shall be open to the public, and interested persons shall be permitted to present oral or written statements on items on the agenda.

(2) Emergency meetings may be held at the call of the chairman or presiding officer.

(3) Timely notice of each meeting, including the time, place, and agenda of the meeting, shall be published locally and in the Federal Register, except that in the case of a meeting of an Advisory Council established to provide assistance regarding any individual national marine sanctuary the notice is not required to be published in the Federal Register.

(4) Minutes of each meeting shall be kept and contain a summary of the attendees and matters discussed.

SEC. 316. [16 U.S.C. 1445B] ENHANCING SUPPORT FOR NATIONAL MARINE SANCTUARIES

(a) AUTHORITY.—The Secretary may establish a program consisting of—

(1) the creation, adoption, and publication in the Federal Register by the Secretary of a symbol for the national marine sanctuary program, or for individual national marine sanctuaries or the System;

(2) the solicitation of persons to be designated as official sponsors of the national marine sanctuary program or of individual national marine sanctuaries;

(3) the designation of persons by the Secretary as official sponsors of the national marine sanctuary program or of individual sanctuaries;

(4) the authorization by the Secretary of the manufacture, reproduction, or other use of any symbol published under paragraph (1), including the sale of items bearing such a symbol, by official sponsors of the national marine sanctuary program or of individual national marine sanctuaries;

(5) the creation, marketing, and selling of products to promote the national marine sanctuary program, and entering into exclusive or nonexclusive agreements authorizing entities to create, market or sell on the Secretary's behalf;

(6) the solicitation and collection by the Secretary of monetary or in-kind contributions from official sponsors for the manufacture, reproduction or use of the symbols published under paragraph (1);

(7) the retention of any monetary or in-kind contributions collected under paragraphs (5) and (6) by the Secretary; and

(8) the expenditure and use of any monetary and in-kind contributions, without appropriation, by the Secretary to designate and manage national marine sanctuaries. Monetary and in-kind contributions raised through the sale, marketing, or use of symbols and products related to an individual national marine sanctuary shall be used to support that sanctuary.

(b) CONTRACT AUTHORITY.—The Secretary may contract with any person for the creation of symbols or the solicitation of official sponsors under subsection (a) of this section.

(c) RESTRICTIONS.—The Secretary may restrict the use of the symbols published under subsection (a) of this section, and the designation of official sponsors of the national marine sanctuary program or of individual national marine sanctuaries to ensure compatibility with the goals of the national marine sanctuary program.

(d) PROPERTY OF UNITED STATES.—Any symbol which is adopted by the Secretary and published in the Federal Register under subsection (a) of this section is deemed to be the property of the United States.

(e) PROHIBITED ACTIVITIES.—It is unlawful for any person—

(1) designated as an official sponsor to influence or seek to influence any decision by the Secretary or any other Federal official related to the designation or management of a national marine sanctuary, except to the extent that a person who is not so designated may do so;

(2) to represent himself or herself to be an official sponsor absent a designation by the Secretary;

(3) to manufacture, reproduce, or otherwise use any symbol adopted by the Secretary under subsection (a)(1) of this section, including to sell any item bearing such a symbol, unless authorized by the Secretary under subsection (a)(4) of this section or subsection (f) of this section; or

(4) to violate any regulation promulgated by the Secretary under this section.

(f) COLLABORATIONS.—The Secretary may authorize the use of a symbol adopted by the Secretary under subsection (a)(1) of this section by any person engaged in a collaborative effort with the Secretary to carry out the purposes and policies of this chapter and to benefit a national marine sanctuary or the System.

(g) AUTHORIZATION FOR NON-PROFIT PARTNER ORGANIZATION TO SOLICIT SPONSORS.—

(1) IN GENERAL.—The Secretary may enter into an agreement with a non-profit partner organization authorizing it to assist in the administration of the sponsorship program established under this section. Under an agreement entered into under this paragraph, the Secretary may authorize the non-profit partner organization to solicit persons to be official sponsors

of the national marine sanctuary system or of individual national marine sanctuaries, upon such terms as the Secretary deems reasonable and will contribute to the successful administration of the sanctuary system. The Secretary may also authorize the non-profit partner organization to collect the statutory contribution from the sponsor, and, subject to paragraph (2), transfer the contribution to the Secretary.

(2) REIMBURSEMENT FOR ADMINISTRATIVE COSTS.—Under the agreement entered into under paragraph (1), the Secretary may authorize the non-profit partner organization to retain not more than 5 percent of the amount of monetary contributions it receives from official sponsors under the agreement to offset the administrative costs of the organization in soliciting sponsors.

(3) PARTNER ORGANIZATION DEFINED.—In this subsection, the term "partner organization" means an organization that—

(A) draws its membership from individuals, private organizations, corporations, academic institutions, or State and local governments; and

(B) is established to promote the understanding of, education relating to, and the conservation of the resources of a particular sanctuary or 2 or more related sanctuaries.

SEC. 317. [16 U.S.C. 1445NT] SHORT TITLE

This title may be cited as the "The National Marine Sanctuaries Act".

SEC. 318 [16 U.S.C. 1445C] DR. NANCY FOSTER SCHOLARSHIP PROGRAM

(a) ESTABLISHMENT.—The Secretary shall establish and administer through the National Ocean Service the Dr. Nancy Foster Scholarship Program. Under the program, the Secretary shall award graduate education scholarships in oceanography, marine biology or maritime archeology, to be known as Dr. Nancy Foster Scholarships.

(b) PURPOSES.—The purposes of the Dr. Nancy Foster Scholarship Program are—

(1) to recognize outstanding scholarship in oceanography, marine biology, or maritime archeology, particularly by women and members of minority groups; and

(2) to encourage independent graduate level research in oceanography, marine biology, or maritime archeology.

(c) AWARD.—Each Dr. Nancy Foster Scholarship—

(1) shall be used to support graduate studies in oceanography, marine biology, or maritime archeology at a graduate level institution of higher education; and

(2) shall be awarded in accordance with guidelines issued by the Secretary.

(d) DISTRIBUTION OF FUNDS.—The amount of each Dr. Nancy Foster Scholarship shall be provided directly to a recipient selected by the Secretary upon receipt of certification that the recipient will adhere to a specific and detailed plan of study and research approved by a graduate level institution of higher education.

(e) FUNDING.—Of the amount available each fiscal year to carry out this chapter, the Secretary shall award 1 percent as Dr. Nancy Foster Scholarships.

(f) SCHOLARSHIP REPAYMENT REQUIREMENT.—The Secretary shall require an individual receiving a scholarship under this section to repay the full amount of the scholarship to the Secretary if the Secretary determines that the individual, in obtaining or using the scholarship, engaged in fraudulent conduct or failed to comply with any term or condition of the scholarship.

(g) MARITIME ARCHEOLOGY DEFINED.—In this section the term "maritime archeology" includes the curation, preservation, and display of maritime artifacts.

Appendix F

FLOWER GARDEN BANKS NATIONAL MARINE SANCTUARY REGULATIONS

Title 15: Commerce and Foreign Trade

PART 922—NATIONAL MARINE SANCTUARY PROGRAM REGULATIONS

Subpart L—Flower Garden Banks National Marine Sanctuary

§922.120 Boundary.

The Flower Garden Banks National Marine Sanctuary (the Sanctuary) consists of three separate areas of ocean waters over and surrounding the East and West Flower Garden Banks and Stetson Bank, and the submerged lands thereunder including the Banks, in the northwestern Gulf of Mexico. The area designated at the East Bank is located approximately 120 nautical miles (nmi) south-southwest of Cameron, Louisiana, and encompasses 19.20 nmi2. The area designated at the West Bank is located approximately 110 nmi southeast of Galveston, Texas, and encompasses 22.50 nmi2. The area designated at Stetson Bank is located approximately 70 nmi southeast of Galveston, Texas, and encompasses 0.64 nmi2. The three areas encompass a total of 42.34 nmi2 (145.09 square kilometers). The boundary coordinates for each area are listed in appendix A to this subpart.

[65 FR 81178, Dec. 22, 2000]

§922.121 Definitions.

As used in this subpart:

Attract or attracting means the conduct of any activity that lures or may lure any animal in the Sanctuary by using food, bait, chum, dyes, decoys (e.g., surfboards or body boards used as decoys), acoustics or any other means, except the mere presence of human beings (e.g., swimmers, divers, boaters, kayakers, surfers).

Clean means not containing detectable levels of harmful matter.

Disturb or disturbing a ray or whale shark means to, or attempt to touch, handle, ride, pursue, chase away, hunt, restrain, detain (no matter how temporarily), capture, collect, or conduct any other activity that disrupts or has the potential to disrupt any ray or whale shark in the Sanctuary by any means. Notwithstanding the above, the mere presence of human beings (e.g., swimmers, divers, boaters, kayakers) is exempted from this definition.

Harmful matter means any substance, or combination of substances, that because of its quantity, concentration, or physical, chemical, or infectious characteristics may pose a present or potential threat to Sanctuary resources or qualities, including but not limited to:

Fishing nets, fishing line, hooks, fuel, oil, and those contaminants (regardless of quantity) listed at 40 CFR 302.4 pursuant to 42 U.S.C. 9601(14) of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended.

No-activity zone means the two geographic areas delineated by the Department of the Interior in stipulations for OCS lease sale 112 over and surrounding the East and West Flower Garden Banks, and the geographic area delineated by the Department of the Interior in stipulations for OCS lease sale 171 over and surrounding Stetson Bank, as areas in which activities associated with exploration for, development of, or production of hydrocarbons are prohibited. The precise aliquot part description of these areas around the East and West Flower Garden Banks are provided in appendix B of this subpart; the no-activity zone around Stetson Bank is defined as the 52 meter isobath. These particular aliquot part descriptions for the East and West Flower Garden Banks, and the 52 meter isobath around Stetson Bank, define the geographic scope of the "no-activity zones" for purposes of the regulations in this subpart. The descriptions for the East and West Flower Garden Banks no-activity zones are based on the "1/41/41/4" system formerly used by the Department of the Interior, a method that delineates a specific portion of a block rather than the actual underlying isobath.
[77 FR 25068, Apr. 27, 2012]

§922.122 Prohibited or otherwise regulated activities.

(a) Except as specified in paragraphs (c) through (h) of this section, the following activities are prohibited and thus are unlawful for any person to conduct or to cause to be conducted:

(1) Exploring for, developing, or producing oil, gas, or minerals except outside of all no-activity zones and provided all drilling cuttings and drilling fluids are shunted to the seabed through a downpipe that terminates an appropriate distance, but no more than ten meters, from the seabed.

(2)(i) Anchoring any vessel within the Sanctuary.

(ii) Mooring any vessel within the Sanctuary, except that vessels 100 feet (30.48 meters) or less in registered length may moor to a Sanctuary mooring buoy.

(iii) Mooring a vessel in the Sanctuary without clearly displaying the blue and white International Code flag "A" ("alpha" dive flag) or the red and white "sports diver" flag whenever a SCUBA diver from that vessel is in the water and removing the "alpha" dive flag or "sports diver" flag after all SCUBA divers exit the water and return back on board the vessel, consistent with U.S. Coast Guard guidelines relating to sports diving as contained within "Special Notice to Mariners" (00-208) for the Gulf of Mexico.

(3)(i) Discharging or depositing from within or into the Sanctuary any material or other matter except:

(A) Fish, fish parts, chumming materials, or bait used in or resulting from fishing with conventional hook and line gear in the Sanctuary, provided that such discharge or deposit occurs during the conduct of such fishing within the Sanctuary;

(B) Clean effluent generated incidental to vessel use by an operable Type I or Type II marine sanitation device (U.S. Coast Guard classification) approved in accordance with section 312 of the Federal Water Pollution Control Act, as amended (FWPCA), 33 U.S.C. 1322. Vessel operators must lock marine sanitation devices in a manner that prevents discharge or deposit of untreated sewage;

(C) Clean vessel deck wash down, clean vessel engine cooling water, clean vessel generator cooling water, clean bilge water, or anchor wash;

(D) Engine exhaust;

(E) In areas of the Sanctuary outside the no-activity zones, drilling cuttings and drilling fluids necessarily discharged incidental to the exploration for, development of, or production of oil or gas in those areas and in accordance with the shunting requirements of paragraph (a)(1) of this section unless such discharge injures a Sanctuary resource or quality.

(ii) Discharging or depositing, from beyond the boundaries of the Sanctuary, any material or other matter, except those listed in paragraphs (a)(3)(i)(A) through (D) of this section, that subsequently enters the Sanctuary and injures a Sanctuary resource or quality.

(4) Drilling into, dredging, or otherwise altering the seabed of the Sanctuary (except as allowed under paragraph (c) of this section); or constructing, placing, or abandoning any structure, material, or other matter on the seabed of the Sanctuary.

(5) Injuring or removing, or attempting to injure or remove, any coral or other bottom formation, coralline algae or other plant, marine invertebrate, brine-seep biota, or carbonate rock within the Sanctuary.

(6) Taking any marine mammal or turtle within the Sanctuary, except as permitted by regulations, as amended, promulgated under the Marine Mammal Protection Act, as amended, 16 U.S.C. 1361 *et seq.,* and the Endangered Species Act, as amended, 16 U.S.C. 1531 *et seq.*

(7) Killing, injuring, attracting, touching, or disturbing a ray or whale shark in the Sanctuary. Notwithstanding the above, the incidental and unintentional injury to a ray or whale shark as a result of fishing with conventional hook and line gear is exempted from this prohibition.

(8) Injuring, catching, harvesting, collecting, or feeding, or attempting to injure, catch, harvest, collect, or feed, any fish within the Sanctuary by use of bottom longlines, traps, nets, bottom trawls, or any other gear, device, equipment, or means except by use of conventional hook and line gear.

(9) Possessing within the Sanctuary (regardless of where collected, caught, harvested or removed), except for valid law enforcement purposes, any carbonate rock, coral or other bottom formation, coralline algae or other plant, marine invertebrate, brine-seep biota, or fish (except for fish caught by use of conventional hook and line gear).

(10) Possessing or using within the Sanctuary, except possessing while passing without interruption through it or for valid law enforcement purposes, any fishing gear, device, equipment or means except conventional hook and line gear.

(11) Possessing, except for valid law enforcement purposes, or using explosives or releasing electrical charges within the Sanctuary.

(b) If any valid regulation issued by any Federal authority of competent jurisdiction, regardless of when issued, conflicts with a Sanctuary regulation, the regulation deemed by the Director as more protective of Sanctuary resources and qualities shall govern.

(c) The prohibitions in paragraphs (a)(2)(i), (a)(4), and (a)(11) of this section do not apply to necessary activities conducted in areas of the Sanctuary outside the no-activity zones and incidental to exploration for, development of, or production of oil or gas in those areas.

(d) The prohibitions in paragraphs (a)(2) through (11) of this section do not apply to activities necessary to respond to emergencies threatening life, property, or the environment.

(e)(1) The prohibitions in paragraphs (a)(2) through (11) of this section do not apply to activities being carried out by the Department of Defense as of the effective date of Sanctuary designation (January 18, 1994). Such activities shall be carried out in a manner that minimizes any adverse impact on Sanctuary resources and qualities. The prohibitions in paragraphs (a)(2) through (11) of this section do not apply to any new activities carried out by the Department of Defense that do not have the potential for any significant adverse impacts on Sanctuary resources or qualities. Such activities shall be carried out in a manner that minimizes any adverse impact on Sanctuary resources and qualities. New activities with the potential for significant adverse impacts on Sanctuary resources or qualities may be exempted from the prohibitions in paragraphs (a)(2) through (11) of this section by the Director after consultation between the Director and the Department of Defense. If it is determined that an activity may be carried out, such activity shall be carried out in a manner that minimizes any adverse impact on Sanctuary resources and qualities.

(2) In the event of threatened or actual destruction of, loss of, or injury to a Sanctuary resource or quality resulting from an untoward incident, including but not limited to spills and groundings, caused by a component of the Department of Defense, the cognizant component shall promptly coordinate with the Director for the purpose of taking appropriate actions to respond to and mitigate the harm and, if possible, restore or replace the Sanctuary resource or quality.

(f) The prohibitions in paragraphs (a)(2) through (11) of this section do not apply to any activity executed in accordance with the scope, purpose, terms, and conditions of a National Marine Sanctuary permit issued pursuant to §922.48 and §922.123 or a Special Use permit issued pursuant to section 310 of the Act.

(g) The prohibitions in paragraphs (a)(2) through (11) of this section do not apply to any activity authorized by any lease, permit, license, approval or other authorization issued after January 18, 1994, provided that the applicant complies with §922.49, the Director notifies the applicant and authorizing agency that he or she does not object to issuance of the authorization, and the applicant complies with any terms and conditions the Director deems necessary to protect Sanctuary resources and qualities.

(h) Notwithstanding paragraphs (f) and (g) of this section, in no event may the Director issue a National Marine Sanctuary permit under §922.48 and §922.123 or a Special Use permit under section 10 of the Act authorizing, or otherwise approve, the exploration for, development of, or production of oil, gas, or minerals in a no-activity zone. Any leases, permits, approvals, or other authorizations authorizing the exploration for, development of, or production of oil, gas, or minerals in a no-activity zone and issued after the January 18, 1994 shall be invalid.

[77 FR 25069, Apr. 27, 2012]

§922.123 Permit procedures and criteria.

(a) A person may conduct an activity prohibited by §922.122(a)(2) through (11) if conducted in accordance with the scope, purpose, terms, and conditions of a permit issued under this section and §922.48.

(b) Applications for such permits should be addressed to the Director, Office of National Marine Sanctuaries; Attn: Superintendent, Flower Garden Banks National Marine Sanctuary, 4700 Avenue U, Building 216, Galveston, TX 77551.

(c) The Director, at his or her discretion, may issue a permit, subject to such terms and conditions as he or she deems appropriate, to conduct an activity prohibited by §922.122(a)(2) through (11), if the Director finds that the activity will: Further research related to Sanctuary resources; further the educational, natural or historical resource value of the Sanctuary; further salvage or recovery operations in or near the Sanctuary in connection with a recent air or marine casualty; or assist in managing the Sanctuary. In

deciding whether to issue a permit, the Director shall consider such factors as: The professional qualifications and financial ability of the applicant as related to the proposed activity; the duration of the activity and the duration of its effects; the appropriateness of the methods and procedures proposed by the applicant for the conduct of the activity; the extent to which the conduct of the activity may diminish or enhance Sanctuary resources and qualities; the cumulative effects of the activity; and the end value of the activity. In addition, the Director may consider such other factors as he or she deems appropriate.

(d) It shall be a condition of any permit issued that the permit or a copy thereof be displayed on board all vessels or aircraft used in the conduct of the activity.

(e) The Director may, *inter alia,* make it a condition of any permit issued that any information obtained under the permit be made available to the public.

(f) The Director may, *inter alia,* make it a condition of any permit issued that a NOAA official be allowed to observe any activity conducted under the permit and/or that the permit holder submit one or more reports on the status, progress, or results of any activity authorized by the permit.

[60 FR 66877, Dec. 27, 1995, as amended at 65 FR 81178, Dec. 22, 2000; 77 FR 25070, Apr. 27, 2012]

Appendix A to Subpart L of Part 922—Flower Garden Banks National Marine Sanctuary Boundary Coordinates

This appendix contains a second set of boundary coordinates using the geographic positions of the North American Datum of 1983 (NAD 83). FGBNMS coordinates are now provided in both North American Datum of 1927 (NAD 27) and NAD 83.

Point	Latitude (N)	Longitude (W)
East Flower Garden Bank: (NAD 27)		
E-1	27° 52′ 53.82718″	93° 37′ 41.30310″
E-2	27° 53′ 34.83434″	93° 38′ 23.35445″
E-3	27° 55′ 13.64286″	93° 38′ 40.34368″
E-4	27° 57′ 30.71927″	93° 38′ 33.26982″
E-5	27° 58′ 27.66896″	93° 37′ 46.12447″
E-6	27° 59′ 01.41554″	93° 35′ 31.74954″

E-7	27° 59′ 00.50888″	93° 35′ 09.69198″
E-8	27° 55′ 22.38258″	93° 34′ 14.79162″
E-9	27° 54′ 04.05605″	93° 34′ 18.88720″
E-10	27° 53′ 26.70972″	93° 35′ 05.00978″
E-11	27° 52′ 52.06998″	93° 36′ 57.23078″
West Flower Garden Bank: (NAD 27)		
W-1	27° 49′ 10.16324″	93° 50′ 45.27154″
W-2	27° 50′ 12.35976″	93° 52′ 10.47158″
W-3	27° 51′ 12.82777″	93° 52′ 51.63488″
W-4	27° 51′ 32.41145″	93° 52′ 50.66983″
W-5	27° 52′ 49.88791″	93° 52′ 24.77053″
W-6	27° 55′ 00.93450″	93° 49′ 43.68090″
W-7	27° 54′ 58.33040″	93° 48′ 37.54501″
W-8	27° 54′ 35.26067″	93° 47′ 10.34866″
W-9	27° 54′ 14.80334″	93° 46′ 49.28963″
W-10	27° 53′ 35.63704″	93° 46′ 51.25825″
W-11	27° 52′ 57.34474″	93° 47′ 15.26428″
W-12	27° 50′ 40.26361″	93° 47′ 22.14179″
W-13	27° 49′ 10.89894″	93° 48′ 42.72307″
Stetson Bank: (NAD 27)		
S-1	28° 09′ 30.06738″	94° 18′ 31.34461″
S-2	28° 10′ 09.24374″	94° 18′ 29.57042″

S-3	28° 10′ 06.88036″	94° 17′ 23.26201″
S-4	28° 09′ 27.70425″	94° 17′ 25.04315″
East Flower Garden Bank: (NAD 83)		
E-1	27° 52′ 54.84288″	93° 37′ 41.84187″
E-2	27° 53′ 35.80428″	93° 38′ 23.89520″
E-3	27° 55′ 14.61048″	93° 38′ 40.88638″
E-4	27° 57′ 31.68349″	93° 38′ 33.81421″
E-5	27° 58′ 28.63153″	93° 37′ 46.66809″
E-6	27° 59′ 02.37658″	93° 35′ 32.28918″
E-7	27° 59′ 01.46983″	93° 35′ 10.23088″
E-8	27° 55′ 23.34849″	93° 34′ 15.32560″
E-9	27° 54′ 05.02387″	93° 34′ 19.42020″
E-10	27° 53′ 27.67871″	93° 35′ 05.54379″
E-11	27° 52′ 53.04047″	93° 36′ 57.76805″
West Flower Garden Bank: (NAD 83)		
W-1	27° 49′ 11.14452″	93° 50′ 45.83401″
W-2	27° 50′ 13.34001″	93° 52′ 11.03791″
W-3	27° 51′ 13.80672″	93° 52′ 52.20349″
W-4	27° 51′ 33.38988″	93° 52′ 51.23867″
W-5	27° 52′ 50.86415″	93° 52′ 25.33954″
W-6	27° 55′ 01.90633″	93° 49′ 44.24605″
W-7	27° 54′ 59.30189″	93° 48′ 38.10780″

W-8	27° 54′ 36.23221″	93° 47′ 10.90806″
W-9	27° 54′ 15.77527″	93° 46′ 49.84801″
W-10	27° 53′ 36.60997″	93° 46′ 51.81616″
W-11	27° 52′ 58.31880″	93° 47′ 15.82251″
W-12	27° 50′ 41.24120″	93° 47′ 22.69837″
W-13	27° 49′ 11.87936″	93° 48′ 43.28125″
Stetson Bank: (NAD 83)		
S-1	28° 09′ 31.02671″	94° 18′ 31.98164″
S-2	28° 10′ 10.20196″	94° 18′ 30.20776″
S-3	28° 10′ 07.83821″	94° 17′ 23.89688″
S-4	28° 09′ 28.66320″	94° 17′ 25.67770″

[65 FR 81178, Dec. 22, 2000]

Appendix B to Subpart L of Part 922—Coordinates for the Department of the Interior Topographic Lease Stipulations for OCS Lease Sale 171

ALIQUOT PART DESCRIPTION OF BIOLOGICAL STIPULATION AREA EAST GARDEN BANK

Block A-366 Texas Leasing Map No. 7C (High Island Area East Addition South Extension)

SE ¼ , SW ¼ ; S ½ , NE ¼ , SE ¼ ; SE ¼ , NW ¼ , SE ¼ ; S ½ , SE ¼ .

Block A-376

W ½ , NW ¼ , SW ¼ ; SW ¼ , SW ¼ , SW ¼ .

Block A-374

W ½ , NW ¼ , NW ¼ ; W ½ , SW ¼ , NW ¼ ; SE ¼ , SW ¼ , NW ¼ ; SW ¼ , NE ¼ , SW ¼ , W ½ , SW ¼ ; W ½ , SE ¼ , SW ¼ ; SE ¼ , SE ¼ , SW ¼ .

Block A-375

E ½ ; E ½ , NW ¼ ; E ½ , NW ¼ , NW ¼ ; SW ¼ , NW ¼ , NW ¼ ; E ½ , SW ¼ , NW ¼ ; NW ¼ , SW ¼ , NW ¼ ; SW ¼ .

Block A-388

NE ¼ ; E ½ , NW ¼ ; E ½ , NW ¼ , NW ¼ ; NE ¼ , SW ¼ , NW ¼ ; E ½ , NE ¼ , SW ¼ ; NW ¼ , NE ¼ , SW ¼ ; NE ¼ , NW ¼ , SW ¼ ; NE ¼ , SE ¼ , SW ¼ , NE ¼ ; NE ¼ , NE ¼ , SE ¼ ; W ½ , NE ¼ , SE ¼ ; NW ¼ ,

Block A-389

NE ¼ , NW ¼ ; NW ¼ , NW ¼ ; SW ¼ , NW ¼ ; NE ¼ , SE ¼ , NW ¼ ; W ½ , SE ¼ , NW ¼ ; N ½ , NW ¼ , SW ¼ .

ALIQUOT PART DESCRIPTION OF BIOLOGICAL STIPULATION AREA WEST GARDEN BANK

Block A-383 Texas Leasing Map No. 7C (High Island Area East Addition South Extension)

E ½ , SE ¼ , SE ¼ ; SW ¼ , SE ¼ , SE ¼ .

Block A-384

W ½ , SW ¼ , NE ¼ ; SE ¼ , SW ¼ , NE ¼ ; S ½ , SE ¼ , NE ¼ ; SE ¼ , NW ¼ ; E ½ , SW ¼ ; E ½ , NW ¼ , SW ¼ , SW ¼ , NW ¼ , SW ¼ ; SW ¼ , SW ¼ ; SE ¼ .

Block A-385

SW ¼ , SW ¼ , NW ¼ ; NW ¼ , SW ¼ ; NW ¼ , SW ¼ , SW ¼ .

Block A-397

W ½ , W ½ , NW ¼ ; W ½ , NW ¼ , SW ¼ ; NW ¼ ; SW ¼ , SW ¼ .

Block A-398

Entire block.

Block A-399

E ½ , SE ¼ , NE ¼ , NW ¼ ; E ½ , SE ¼ , NW ¼ ; E ½ , NE ¼ , SW ¼ ; SW ¼ , NE ¼ , SW ¼ ; NE ¼ , SE ¼ , SW ¼ .

Block A-401

NE ¼ , NE ¼ ; N ½ , NW ¼ , NE ¼ ; NE ¼ , SE ¼ , NE ¼ .

Block 134 Official Protraction Diagram NG15-02 (Garden Banks)

That portion of the block north of a line connecting a point on the east boundary of Block 134, X = 1,378,080.00′, Y = 10,096,183.00′, with a point on the west boundary of Block 134, X = 1,367,079,385′, Y = 10,096,183.000′, defined under the Universal Transverse Mercator grid system.

Block 135 Official Protraction Diagram NG15-02 (Garden Banks)

That portion of the block northwest of a line connecting the southeast corner of Texas Leasing Map No. 7C, Block A-398, X = 1,383,293.840′, Y = 10,103,281.930′, with a point on the west boundary of Official Protraction Diagram NG15-02, Block 135, X = 1,378,080.000′, Y = 10,096,183.000′, defined under the Universal Transverse Mercator grid system.

[65 FR 81180, Dec. 22, 2000]

Appendix G

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