



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
National Centers for Coastal Ocean Science
Silver Spring, Maryland 20910

MEMORANDUM FOR: The Record

FROM: Steven Thur, Ph.D.
Acting Director

SUBJECT: Categorical Exclusion for RESTORE ACT Award #NA17NOS4510096,
“Population Connectivity of Deepwater Corals in the Northern Gulf of Mexico”

NOAA Administrative Order (NAO) 216-216-6A, Environmental Review procedures, requires all proposed projects to be reviewed with respect to environmental consequences on the human environment. This memorandum addresses the determination that the activities described below for RESTORE ACT funded Grant project Titled “Population Connectivity of Deepwater Corals in the Northern Gulf of Mexico”, qualifies to be categorically excluded from further National Environmental Policy Act review.

Purpose and Need

During this project RESTORE ACT grant recipients and NCCOS researchers in collaboration with the Office of National Marine Sanctuaries (ONMS) Flower Gardens Banks National Marine Sanctuary (FGBNMS) would make non-lethal collections of four (4) deep coral species using a remotely operated vehicle (ROV). The vessel platform will depend on the depth range. There are four vessels proposed for this work. Project activities would take place in subsequent summers beginning in 2017 – 2019 (3 years).

This memo will:

- 1) Provide background and justification for the project
- 2) Describe project activities
- 3) Describe the biological resources potentially affected within the action areas and the associated environmental statutes
- 4) Provide the protective measures and Best Management Practices (BMPs) to be undertaken and added to the cruise plans to ensure compliance

Background and Justification for the Cruise:

The Gulf of Mexico (GoM) has experienced numerous environmental catastrophes (oil spills, anoxic events) in recent history. With continued anthropogenic threats in the marine environment coupled with global ocean change, there is an urgent need to make decisions that will lead to the effective management and conservation of vulnerable marine ecosystems in the GoM. Deepwater corals (i.e. heterotrophs living deeper than 50 m) play a foundational role in such ecosystems by generating three-dimensional structures that provide habitats for diverse and abundant invertebrate and fish communities,



including refuge and prey for commercially valuable fisheries (Baillon et al., 2012; Cordes et al., 2008; Husebø et al., 2002; Krieger and Wing, 2002; Ross and Quattrini, 2009; Stone, 2006).

As such, the GoM Fishery Management Council (FMC) is currently considering designating a number of deepwater coral areas in the GoM as Habitat Areas of Particular Concern (HAPCs) (M. Kilgour pers. comm., GoM FMC). Furthermore, FGBNMS has proposed to expand the boundaries of current protected areas to encompass additional mesophotic and deepwater coral sites (Office of National Marine Sanctuaries, 2016). These management activities are significant as they align well with the goals of this program: The establishment of marine protected areas (MPAs) is one of the **key restoration strategies** for deep benthic communities impacted by the *Deepwater Horizon* oil spill (PDARP, 2016).

More specifically this research would address fundamental gaps in our understanding of the processes that shape population connectivity patterns in key habitat-forming deepwater and mesophotic corals, focusing on species directly impacted by the DWH oil spill, across the northern GoM. We will target species occurring at three depth ranges: mesophotic (50-150 m), upper continental slope (400-1100 m), and lower continental slope (1300-2400 m). The results of project findings will be communicated directly to resource managers in the GoM through interim reports and a synthesis workshop to be held at the FGBNMS headquarters near the end of the project. This collaborative effort explicitly links basic research that will enhance our understanding of GoM ecosystems with concrete restoration and conservation initiatives to ensure recovery of degraded deepwater coral communities.

To achieve these objectives we will be conducting the following activities on this project

1. Biological sampling (corals) using ROV:
 - a. *Hypnogorgia pendula* (50 – 150 m),
 - b. *Swiftia exserta* (50-150 m),
 - c. *Callogorgia delta* (400-1100 m),
 - d. *Paramuricea biscaya* (1300-2400 m)
2. Video imagery will be collected with the ROV at each site.

Action Areas and Vessel Platforms: Research activities would be focused on some areas currently protected or being considered for protection by the FGBNMS and the GoM FMC. More specifically sample collections will occur within known locations of the four deep water coral species targeted for this project. There are 21 specific sites where the target coral species are found in high enough densities to achieve the sampling goal of ~30 individuals in one or two ROV dives (Figure 1).

Platforms: There are four vessels operating within the Gulf of Mexico that are viable platforms for these cruise activities depending on the depth range of the cruise:

- 1) [*R/V Manta*](#) (homeport Galveston (FGBNMS)) - 82' long, 30' wide vessel with a 6' draft and cruise speed of 25 knots. [ROV Mohawk 18](#).
- 2) [*NOAA Ship Nancy Foster*](#) (Charleston, SC), 187'. long, 40'. wide steel hulled research ship, with a 13.5' draft and a cruising speed of 10.5 knots, ROV Global Explorer
- 3) [*MSV Ocean Intervention II*](#) (Morgan City LA), 254' long, 53.5' wide, with a 15' draft and a cruising speed of 10 knots. – could be Comanche ROV or Global Explorer ROV

- 4) [R/V Pelican](#) (homeport: Cocodrie, LA), 116' long, 26' wide vessel with a 9.5' draft and cruise speed of 9.2 knots. – could be Comanche ROV or Global Explorer ROV
- 5) [R/V Point Sur](#) (homeport: Gulfport, MS), 135' long, 32' wide vessel with 9' draft and a cruising speed of 9.5 knots – could be Comanche ROV or Global Explorer ROV
- 6) [Ocean Project](#) (homeport Morgan City LA) 200 ' long, 46' wide vessel with 13' maximum draft with an unknown cruising speed at this time - could be Comanche ROV or Global Explorer ROV

Each year, researchers would conduct up to two 5-day (24h operations per day) ‘mesophotic’ cruises (50-150 m), departing/returning to Galveston, TX, on the R/V Manta, operated through the FGBNMS. The focus of these cruises would be to collect *H. pendula* and *S. exserta* samples from sites west of the Mississippi Canyon as this region is within the optimal operational range for the R/V Manta (50 to 150 m). Samples would be collected from currently protected West and East Flower Garden Banks, and banks that are being considered for protection through the expansion of the FGBNMS boundaries (including McGrail Bank, Parker Bank, Geyer Bank, and Alderdice Bank, Figure 2). In addition, researchers would conduct one, 20-day ‘full depth’ cruise onboard the R/V Sea Scout or the R/V Pelican with the ROV Comanche, or comparable vessel such as MSV Ocean Intervention II. This cruise may depart/return from either Morgan City LA, Gulf Port LA, Cocodrie LA or Galveston TX. The focal area for the full depth cruise would be to make collections in locations both west and east of the Mississippi canyon in the full range of depths to make collections of the four target coral species to meet the goals of this project.

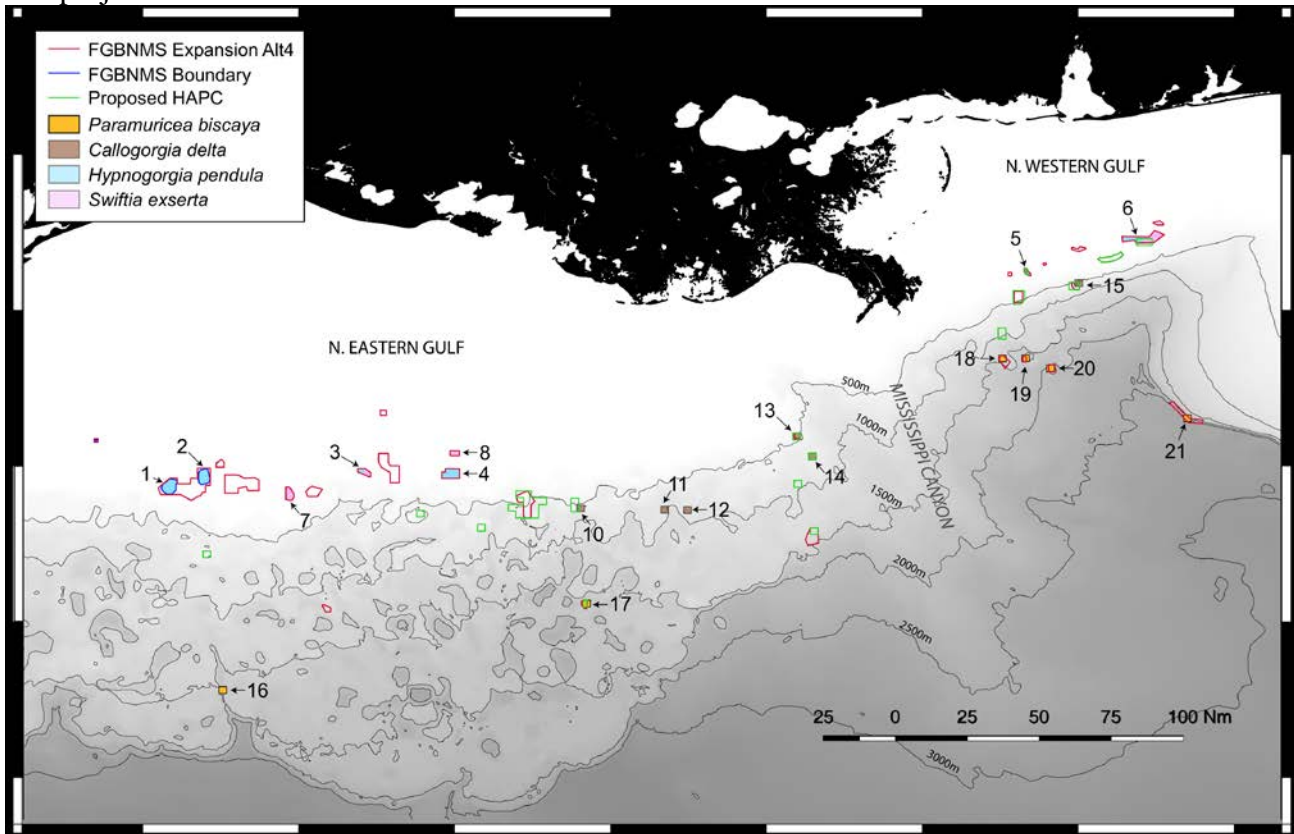


Figure 1. Potential locations for coral sampling and benthic mapping within the Flower Gardens National Marine Sanctuary and proposed expansion area (Alternative 4) and the proposed Habitat Areas of Particular Concern. Excerpted by permission from Santiago Herrera.

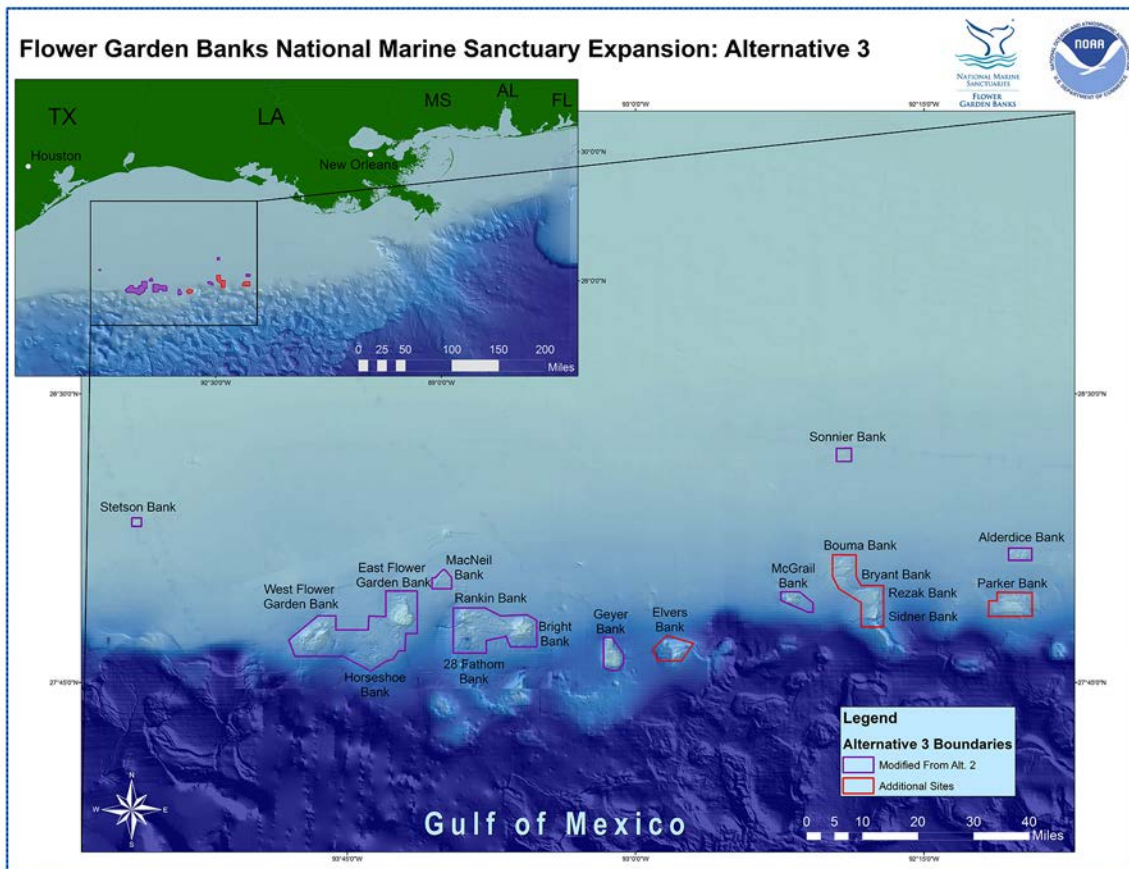


Figure 2. Map of the Flower Gardens Banks National Marine Sanctuary and Expansion Alternative 3 that illustrates individual names of the banks. Excerpted from <http://flowergarden.noaa.gov/welcome.html>

Proposed Activities:

This 3 year project would be conducted on board the ONMS RV Manta for the ‘mesophotic’ depth range (50-150 m) and on board one of the vessels listed above (pg. 2-3) for the ‘full depth’ range 50-2400 m. For a maximum of 30 days per year in the summer months from (May – Nov). The first cruise in 2017 will occur in July.

The specific activities described below will be conducted and coordinated on a daily basis.

1. **ROV deployment and operation** –The purpose is to make non-lethal collections of tissue samples from coral colonies belonging to the four different species (*Hypnorgia pendula* (50 – 150 m), *Swiftia exserta* (50-150 m), *Callogorgia delta* (400-1100 m), *Paramuricea biscaya* (1300-2400 m). Approximately thirty (30) individuals from each of the eighteen (18) sites will be collected. Imagery and documentation of species associations will also be conducted on the ROV dives.

The ROV for the mesophotic cruises will be a Mohawk 18 ROV operated by the [University of North Carolina Undersea Vehicles Program](#) and owned by the National Sanctuaries Foundation. For the full depth cruises the ROV may be the Global Explorer or the ROV Maxiumm or similar type. Generally, the ROVs will be launched from the ship and lowered on a cable using a power winch. During ROV deployment, researchers will use an acoustic telemetry system to track the

ROV underwater. The acoustic tracking system is an ultra-short baseline (USBL) telemetry system and operates similarly on each ROV. The tracking system consists of a transponder unit and receiving beacon. The receiving beacon responds by sending an acoustic signal back to the hydrophone (transponder), which is used to determine the location of the ROV. The hydrophone (transponder) will send out a signal every two seconds to track the ROV's location. The transponder system transmits an omni-directional signal in the mid-frequency range (8-30 kHz) with short pulses (ranging from 1-15 milliseconds (ms) per pulse) and a sound pressure level of 190 decibels (dB re 1 μ Pa at 1m) at about one meter from the source. The receiving beacon also transmits signals in the mid-frequency range (21.5 to 43.2 kHz) with a sound pressure level of 183 dB at the source. The ROV may also possess high-frequency imaging sonar (675 kHz) and an altimeter (e.g. Tritech PA500/6-S altimeter -500 kHz). The ROV would be operated at approximately 1m above the seafloor conducting pre-determined transects approximately two hours in duration. The ROV and ship speed is typically 0.5-1 kts during ROV deployments. The ROV would be tethered at all times. Sample collections are made using the cutting implementation tool on the ROV. Approximately 10 cm are cut from distal branches of each coral colony to avoid mortality.

ROV Mohawk 18 (operated by UNCW, owned by FGBNMS) –

- LinkQuest TrackLink 1500HA USBL acoustic tracking system: Directionality 120-150 degrees, 31 – 43.2 kHz, 190dB re 1 μ Pa@1m
- LinkQuest TN1505b transponder omni-directional, 31-43.2 kHz, 25 Watts, 185dB re 1 μ Pa@1m
- Tritech PA500/6-S altimeter: directionality 6 degrees conical downward, 500 kHz
- Imagenex 881 sonar – 675 kHz

Global Explorer ROV – This ROV may be used if operations are conducted from the MSV Ocean Intervention II platform. The ship has the acoustic tracking equipment on it.

- Altimeter - Datasonics PSA-916 Programmable Sonar Altimeter, Operating frequency – 200 kHz, Beam Width - 14 degree conical, pulse width 250 microseconds, pulse rate 5 per second,
- Kongsberg MS900 sonar – 675Khz

Comanche ROV - This ROV may be used if operations are conducted from the MSV Ocean Intervention II platform. The ship has the acoustic tracking equipment on it.

- Kongsberg-Simrad 1007 – Operation frequency 200kHz, 10 degree conical angle, source level 209 dB re 1 μ Pa@1m

USBL Systems in use on Ocean Intervention II and Ocean Project platforms

- [HiPAP 350](#) standard features – Receive frequency band: 21 – 31 kHz, Telemetry frequency band: 21 – 31 kHz, Transmit frequency band: 21 – 24.5 kHz, 160/120 degree cone of sound, 206 dB re 1 μ Pa@1m (see Figure 3)
- Sonardyne Ranger Pro 2 Transponder – operational frequencies 19-34 kHz, beam shape omni-directional, source level 187 - 193dB re 1 μ Pa@1m (depending on model, spec sheet for sonardyne 83.70 and 8300 available on request)
- HPT 5000 transceiver – frequency band 19-34 kHz, Up to 90 degree angle, source level 206dB (<https://www.sonardyne.com/wp-content/uploads/2016/06/HPT-Transceiver.pdf>)

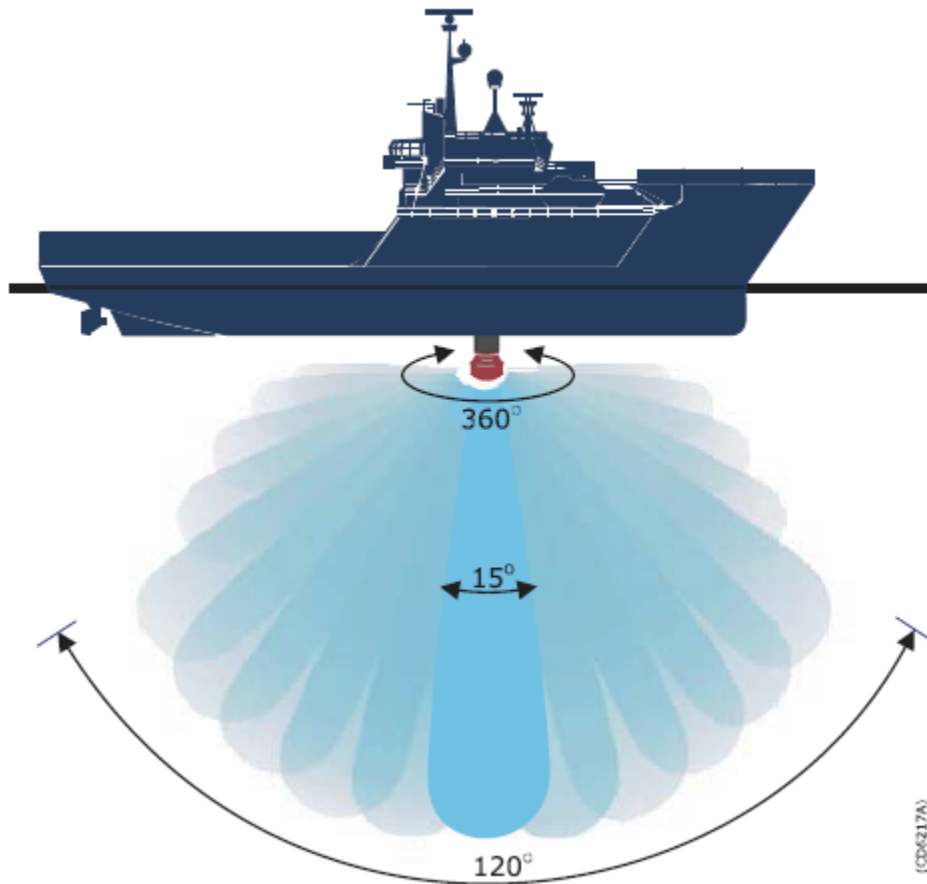


Figure 3. HiPap 350 acoustic telemetry system on the MSV Intervention II. Angle and directionality of the sound source below the ship is shown.

2. Vessel Transit Operations - Vessel transit paths will change depending on the availability of the platform and will be subject to prevailing wind, currents and sea conditions and the available platform. The potential ports of call are Galveston TX, Cocodrie LA, Morgan City LA and Gulfport MS. Note the Nancy Foster port is Charleston SC, but transit is usually from last port of call which is unknown at this time.
3. Anchoring - While anchoring is not anticipated for this cruise as a result of science activities, but, anchoring may be required for other reasons, such as avoidance of adverse weather conditions or in the unlikely event of an engine malfunction. While the choice of anchoring location is at the discretion of the ship's crew, if anchoring were necessary, vessel operators would select the anchor location based on depth, protection from seas and wind, and bottom type. Preferred bottom types include sticky mud or sand; they would not anchor on rocky or coral reefs. Existing benthic habitat maps will be used to the extent practicable to determine bottom type. When working in a previously unsurveyed area, the vessel would first collect echosounder data to provide information on where to drop the anchor (i.e., to avoid coral reefs and rocky seabed areas). Anchoring in deep coral areas would be avoided

Summary of Daily activities are:

- At 0500-0600, the ship will arrive at the study site. Upon arrival, the ROV will be prepared for launch. The ROV will be launched by 0700 each day.

- From 0700-1900 - ROV team will conduct survey activities between 50-2400 (or 50-150) meters depth. We will conduct one ROV dive per site. The ROV and ship speed during deployment is typically 0.5-1 kts. The ROV will move at ~0.5 kts approximately 0.5-1 m above the seafloor, and will set down on the bottom at times for collections. Coral samples will be collected at each site. Approximately 10 cm of tissue will be collected from each coral colony. Following a full 12-hour dive, the ROV will be recovered. The ship will then relocate to the next dive site, and dives are repeated daily, as weather permits. The ROV provides real-time video display, navigation and depths to shipboard monitors. The Chief scientists and ROV operator monitor bottom conditions to minimize disturbance to the benthos.
- From 1900-0600, the ship will transit to the next study site to continue daily operations. During this time, the science team will process samples and plan for the next dive.

Biological Resources and Environmental Statutes: ESA and MMPA

Endangered Species Act (ESA) Section 7 (a)(2) requires that each federal agency, in consultation with NMFS and/or the U.S. Fish and Wildlife Service (USFWS), ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. No cruise activities would be in areas with resources under USFWS jurisdiction, so no consultations with USFWS will be sought.

Within the GoM, there are seven (7) species of corals, nine (9) fish species, five (5) turtle species and five (5) marine mammal species that are listed as either endangered, threatened or candidate species under the ESA (Table 1). With the exception of elkhorn coral *Acropora palmata*, all other listed coral species distributions are located south of the research and transit area for this cruise (Figure 1). There are two known colonies of the elkhorn coral located within the FGBNMS. These colonies would be avoided during this cruise, thus there would be no adverse effects to this species during cruise activities. There is no designated critical habitat for coral within the action area of the cruise.

NCCOS does not anticipate that any cruise activities such as the transit or ROV operations would have adverse effects on the nine (9) species of Endangered, Threatened or Candidate fish species. Although some of the ports of call may be in areas designated as critical habitat for the Gulf sturgeon (i.e Gulfport MS) NCCOS does not expect that vessel operation in this area would destroy or modify the essential features of this critical habitat or adversely affect any listed fish species. Therefore, fishes will not be analyzed further in this environmental review.

Table 1. Gulf of Mexico's Threatened and Endangered Species (Florida Bay to Texas border, includes Flower Gardens Banks) Status T – threatened, E – endangered, P – proposed, C – candidate.

Status	Species Name	Critical Habitat (in Gulf of Mexico)
Corals		
T	Elkhorn Coral (<i>Acropora palmata</i>) ¹	None in GOM
T	Staghorn Coral (<i>Acropora cervicornis</i>)	None in GOM

T	Lobed Star Coral (<i>Orbicella annularis</i>)	N/A
T	Boulder Star Coral (<i>Orbicella franksi</i>)	N/A
T	Rough Cactus Coral (<i>Mycetophyllia ferox</i>)	N/A
T	Pillar Coral (<i>Dendrogyra cylindrus</i>)	N/A
T	Mountainous Star Coral (<i>Orbicella faveolata</i>)	N/A
Mammals		
E	Fin Whale (<i>Balaenoptera physalus</i>) baleen	N/A
E	Sei Whale (<i>Balaenoptera borealis</i>) baleen	N/A
E	Sperm Whale (<i>Physeter macrocephalus</i>) (toothed)	N/A
E	Sperm Whale (<i>Physeter macrocephalus</i>)	N/A
PE	Bryde's Whale (<i>Balaenoptera edeni</i>)	N/A
Sea Turtles		
T ²	Green Turtle (<i>Chelonia mydas</i>) – North Atlantic DPS	N/A
E	Hawksbill Turtle (<i>Eretmochelys imbricata</i>)	N/A
E	Kemp's Ridley Turtle (<i>Lepidochelys kempii</i>)	N/A
E	Leatherback Sea Turtle (<i>Dermochelys coriacea</i>)	N/A
E, T*	Loggerhead Sea Turtle (<i>Caretta caretta</i>) – NW Atlantic Ocean DPS	Yes linked here
Fishes		
T	Gulf Sturgeon (<i>Acipenser oxyrinchus desotoi</i>)	Yes, linked here
E	small tooth sawfish (<i>Pristis pectinata</i>)	Yes, linked here
T	Nassau Grouper (<i>Epinephelus striatus</i>)	N/A
C	Caribbean Electric Ray (<i>Narcine bancroftii</i>)	N/A
C	Manta spp. (<i>Manta birostris</i> , <i>M. alfredi</i>)	N/A
C	Dwarf Seahorse (<i>Hippocampus zosterae</i>)	N/A
C	Alabama Shad Range (<i>Alosa alabamae</i>)	N/A

C	Oceanic Whitetip Shark (<i>Carcharinus longimanus</i>)	N/A
C	Smooth hammerhead shark (<i>Sphyrna zygaena</i>)	N/A

¹ Colonies at Flower Gardens Banks

*Some populations are considered threatened and others are considered endangered

<http://www.nmfs.noaa.gov/pr/species/esa/candidate.htm>

<http://www.nmfs.noaa.gov/pr/species/esa/listed.htm>

Critical habitat for loggerhead sea turtle Northwest Atlantic Ocean DPS is designated in (LOGG-S-02, Sargassum), in the GoM and within the proposed action area. Critical habitat (LOGG-S-02, Sargassum) for loggerhead sea turtle Northwest Atlantic Ocean DPS breeding, migratory, winter, foraging and nearshore reproductive habitat is located within the GoM and within the action area of transit and research activities. The essential features identified for each of these critical habitat units is shown in Table 2.

The proposed action would not entail activities that affect the essential features of designated critical habitat, because the activities would not affect oceanographic conditions, water depth or temperature, prey availability, passage conditions, densities of reproductive loggerheads, or any other identified essential feature. Therefore, the proposed action would not destroy or adversely modify loggerhead sea turtle Northwest Atlantic Ocean DPS designated critical habitat.

The primary threat to sea turtles is from a vessel strike during transit. Although unlikely, to further reduce the risk, NCCOS would employ BMPs such as establishing observer monitoring, proposed vessel speeds and minimum approach distances (pg. 12). Thereby reducing the likelihood of encountering, striking or entangling a turtle. *Therefore, NCCOS determines that cruise activities may but are not likely to adversely affect turtles.*

Table 2. Essential features of loggerhead sea turtle Northwest Atlantic Ocean DPS designated critical habitat.

Loggerhead Critical Habitat Unit	Essential Features
Nearshore Reproductive Habitat	<ul style="list-style-type: none"> • Waters off of the highest density nesting beaches; • Waters sufficiently free of obstructions or artificial lighting; and • Waters with minimal manmade structures.
Constricted Migratory Habitat	<ul style="list-style-type: none"> • Constricted Continental Shelf area relative to nearby Continental Shelf waters; and • Passage conditions to allow for migration to and from nesting, breeding, and foraging areas.
Breeding Habitat	<ul style="list-style-type: none"> • High densities of reproductive males and females;

	<ul style="list-style-type: none"> ● Proximity to primary Florida migratory corridor; and ● Proximity to Florida nesting grounds.
Winter Habitat	<ul style="list-style-type: none"> ● Water temperatures above 10°C from November to April; ● Continental Shelf waters in proximity to the western boundary of the Gulf Stream; and ● Water depths between 20 and 100 m.
Foraging Habitat	<ul style="list-style-type: none"> ● Sufficient prey availability and quality, such as benthic invertebrates; and ● Water temperatures to support loggerhead inhabitation, generally above 10°C.

There are four (4) species of marine mammals currently listed as endangered and one (1) that is proposed and expected to be listed during the term of this project (Table 1). The primary risks to these marine mammals are from vessel strike during ship transit activities but also from potential behavioral effects related to the acoustic tracking telemetry for the ROVs. To reduce the risk of vessel strike NCCOS will employ Protective Measures and Best Management Practices (pg. 12). including the observer monitoring and the proposed vessel speeds and minimum approach distances. Thereby reducing the likelihood of encountering, striking or entangling an ESA-listed marine mammal. *Therefore NCCOS determines that vessel transit, including the best management practices, may but is not likely to adversely affect sea turtles.*

The only active acoustics that would be conducted as part of research activities is the ultra-short baseline telemetry (USBL) used to track the ROV underwater, altimeters or pingers. Altimeters and pingers are used to determine the distance to the substrate and are generally very high frequency (~500-675KHz) and thus do not overlap with the functional hearing range of ESA-listed species within the action area. To assess the potential behavioral effects related to the acoustic telemetry tracking system we consider the frequency, level, and duration of the sound produced by the system. NMFS' guidelines under the Marine Mammal Protect Act (MMPA) for determining when sound levels are likely to cause behavioral harassment (i.e., exposure to continuous sounds at a received level of 120 dB re 1µPa or impulsive sounds at a received level of 160 dB re 1µPa). The signals emitted by the acoustic tracking system are considered impulsive sounds, because the signals are emitted every two seconds for 1-15 ms per signal. Sound pressure levels in the range of 180 to 220 dB re 1µPa are needed to induce temporary hearing threshold shifts for most pinnipeds and cetaceans (NMFS 2013, Appendix C).

The functional hearing range varies by species (Table 3): (NMFS 2013)

- Sea turtles: 100 Hz to 3kHz
- Baleen whales: 7 Hz to 22 kHz (best hearing is generally below 1,000 Hz; higher frequencies result from humpback whales)
- Odontocete whales: 150 Hz to 160 kHz (best hearing is from approximately 10-120 kHz)
- Sharks: 10 Hz to 800 Hz

The acoustic signals emitted by the tracking system are within the mid-frequency range (8-36 kHz) and do not overlap with the functional hearing range of sea turtles or sharks, but do overlap with the functional hearing range of ESA-listed baleen whales. Thus, the acoustic signals are not likely to be heard by sea turtles or sharks, but are likely to be heard by marine mammals that might be within the action area. The sound pressure levels of the acoustic telemetry system (183 to 190 dB re 1 μ Pa at 1m) also exceed the levels at which behavioral harassment is expected to occur for impulsive sounds (160 dB re 1 μ Pa).

However, the acoustic signals emitted by the tracking system are not expected to cause adverse behavioral effects or temporary hearing threshold shifts in ESA-listed marine mammals within the action area. Although marine mammals of different species regularly occur in the vicinity of the action area, individual ESA-listed marine mammals would have to be very close to and also remain very close to the acoustic tracking system to receive multiple exposures to the signals at the levels needed to cause an adverse behavioral effect. For example, the transponder system sound pressure level of 190 dB 1 meter from the source would decrease to 160 dB within about 100 meters (approximately 110 yards) from the source based on practical spreading loss calculations. This is within the 200 yard zone proposed for use by observers to reduce or avoid impacts to marine mammals. In addition, the use of the systems will be limited to only navigation needs and locating the ROV and thus is not expected to be transmitting continuously during each day’s survey. The vessel, the ROV, and the acoustic tracking system will be moving during survey operations and we expect individual animals are likely to avoid the vessel and ROV based on either its physical presence or because of the active acoustic sounds being emitted. *Therefore, NCCOS determines that the effects of operating the ROV, including the best management practices may, but are not likely to adversely affect ESA listed and proposed marine mammals. NCCOS initiated an informal ESA Section 7 consultation with NMFS on March 29, 2017 requesting concurrence with our determination.*

Marine Mammal Protection Act (MMPA) - All marine mammals are protected under the MMPA. Sections 101 (a)(5)(A) and (D) allow the incidental take of marine mammals only under special circumstances, where “take is defined as “ ... “to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal” (16 U.S.C. §§ 1361-1421h). Harassment includes any annoyance which has the potential to injure a marine mammal or stock (Level A) or disrupt its behavioral patterns (Level B). The use of active acoustic sources in the water have the potential to result in Level B harassment and are a potential concern along with accidental vessel strikes. Here we incorporate by reference the discussion under the ESA section above. *Similarly, NCCOS determines that cruise activities may but are not likely to adversely affect marine mammals based on the review within the ESA section above.*

Table 3. Functional Hearing Ranges for three Cetacean functional groups, only low and mid-frequency cetaceans are within the action area of this cruise (From DRAFT Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing July 23, 2015 pg 9 table 1)

Functional Hearing Group	Functional Hearing Range*
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 25 kHz
Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz

High-frequency (HF) cetaceans (true porpoises, Kogia, river dolphins, cephalorhynchid, Lagenorhynchus cruciger & L. australis)	200 Hz to 180 kHz
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**Represents frequency band of hearing for entire group as a composite (i.e., all species within the group), where individual species' hearing ranges are typically not as broad. Functional hearing is defined as the range of frequencies a group hears without incorporating non-acoustic mechanisms (Wartzok and Ketten 1999). This is ~60 to ~70 dB above best hearing sensitivity (Southall et al. 2007) for all functional hearing groups except LF cetaceans, where no direct measurements on hearing are available. For LF cetaceans, the lower range is based on recommendations from Southall et al. 2007 and the upper range is based on information on inner ear anatomy and vocalizations.*

Magnuson-Stevens Fishery Conservation and Management Act requires that federal agencies consult with the National Marine Fisheries Service on actions that “may adversely affect” essential fish habitat (EFH) (16 U.S.C. § 1855(b)(2)). The Flower Gardens Banks National Marine Sanctuary (FGBNMS) and the action area of this cruise including locations where deep coral collections would take place are designated as Habitat Areas of Particular Concern. Coral would be collected via the ROV at FGBNMS and other HAPCs such as McGrail Bank, Parker Bank, Geyer Bank, and Alderdice Bank (Figure 1).

There are a total of thirteen (13) HAPC designated and one (1) that is proposed (Figure 1, Table 1) within the project action area. These are; 29 Fathom, Alderdice Bank, Bouma Bank, East and West Flower Garden Banks, Geyer Bank, Jakkula Bank, MacNeil, McGrail Bank, Rankin Bright Bank, Rezak Sidner Bank, Stetson, and Sonnier Bank. In addition the project area of transit and sampling is designated as an HAPC for blue fin tuna. FGBNMS is also an EFH area protected from fishing

According to the NOAA Habitat Conservation [EFH mapper](#), the following species groups/taxa have essential fish habitat designated within the project action area (ROV operations or transit): transit only – indicates EFH is for the species is only in the range of transit for project activities.

1. Corals
2. Red Drum
3. Shrimp
4. Coastal Migratory Pelagics
5. Reef fish
6. Longfin Mako Shark
7. Angel Shark – transit only
8. Atlantic Sharpnose Shark – transit only
9. Blacknose Shark – transit only
10. Blacktip Shark
11. Blue Marlin
12. Bluefin Tuna
13. Bigeye Thresher Shark
14. Bull Shark - transit only
15. Finetooth Shark – transit only
16. Great Hammerhead shark – transit only
17. Longfin Mako Shark
18. Longbill Spearfish
19. Oceanic Whitetip Shark
20. Roundscale Spearfish

21. Sailfish
22. Scalloped Hammerhead Shark - transit only
23. Shortfin Mako Shark – transit only
24. Silky shark
25. Skipjack Tuna
26. Smooth Dogfish – transit only
27. Spinner Shark – transit only
28. Swordfish
29. Tiger Shark
30. Yellowfin Tuna
31. Whale Shark
32. White Shark
33. White Marlin

Coral collection methods used by the ROV are designed to have no adverse effects on the associated habitat. The ROV position is visually monitored topside along with location and depth to ensure no disturbance of the benthic environment. All activities will be conducted in collaboration with FGBNMS and in accordance with the terms and conditions of the FGBNMS research collection permit (application submitted). Thirty (30) individuals from each of the twenty-one (21) sites would be collected. Sample collections are made using the cutting implementation tool on the ROV. Approximately 10 cm are cut from distal branches of each coral colony to avoid mortality. ROV hovers off the substrate ~ 1 meter to avoid contact. Imagery and documentation of species associations will also be conducted on the ROV dives.

To further reduce the likelihood of adverse effects NCCOS will employ best management practices such as avoiding anchoring in sensitive areas and keeping the ROV umbilical taut to prevent entanglement with marine animals or the substrate.

National Marine Sanctuaries Act (NMSA) - Section 304(d) of the National Marine Sanctuaries Act requires the “action agency” to consult with the Office of National Marine Sanctuaries if the action is “likely to destroy, cause the loss of, or injure a sanctuary resource” (16 U.S.C. §§ 1431 et seq.). Applications for deep coral collection permits, have been submitted to the FGBNMS. All activities are being conducted in close collaboration with FGBNMS. All special terms and conditions of the permit will be adhered to and no other prohibited activities will be conducted within the sanctuary or proposed sanctuary expansion areas. *Special award conditions have been placed on the grant to ensure work does not begin until permit is finalized.*

National Historic Preservation Act (NHPA) - Section 106 requires federal agencies to take into account the effects of their actions on historic resources (16 U.S.C. §§ 470 et seq). There are currently no known Historic resources that are within the action area of cruise activities. However, in the unlikely event that an uncharted/unknown shipwreck were discovered as a result of ROV surveying operations no adverse effect is anticipated from project activities. If such a discovery were to occur, the location and survey data would be made available to the State Preservation Officer (California) and National Marine Sanctuaries personnel. In addition to prevent misuse of the historic resource by the public, NCCOS would not disclose information, prior to consultation with the State Preservation Officer.

Extraordinary Circumstances

Project activities described would be temporally small in scale (up to 30 days per year for three years) and focus on twenty-one (21) discrete locations within the Gulf of Mexico. The proposed activities and

their impacts would not result in public controversy, involve unique or known risks, result in adverse environmental impacts, involve non-native species, occur in a sensitive region of cultural or historical importance, affect public safety or health, or adversely impact threatened, endangered, or otherwise protected species. The proposed project does not have a disproportionately high and adverse effect on the health or the environment of minority or low-income communities, compared to the impacts on other communities (EO 12898). The project will not contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area or involve actions that may promote the introduction, growth, or expansion of the range of the species. There is no potential to violate Federal, State, or local law or requirements imposed for protection of the environment. There are no highly controversial environmental effects. These activities are not the subject of controversy based on potential environmental consequences and do not establish a precedent or decision in principle about future proposals. Thus, there are no other extraordinary circumstances present that may require further analysis in an EA or EIS.

Special Award Conditions

NCCOS initiated EFH and ESA Section 7 consultations with NMFS. Special award conditions have been placed on the award to ensure work does not begin until the consultations have been completed, protected measures (if any) have been incorporated and required permits obtained. An addendum to this memorandum will be completed once the consultations are concluded that includes any required protective measures resulting from the consultations. The special award conditions for the consultations will be removed once the addendum is complete.

Categorical Exclusion Determination

The Program Office has determined that the project activities described above are likely covered by the Categorical Exclusion E5. As defined in the NAO 216-6A Companion Manual, the E5 Categorical exclusion are activities involving invasive techniques or methods that are conducted for scientific purposes, when such activities are conducted in accordance with all applicable provisions of the Endangered Species Act, Marine Mammal Protection Act, Migratory Bird Treaty Act, and Magnuson-Stevens Fishery Conservation and Management Act. Such activities will be limited to impacting living resources on a small scale relative to the size of their populations, and limited to methodologies and locations to ensure that there are no long-term adverse ecosystem impacts, the proposed project falls within the scope of the E5 categorical exclusion. Cumulative effects are negligible. A final determination will be made in an addendum to this memorandum once any consultations described above (see **Special Award Conditions**) are complete.

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Protective Measures and Best Management Practices (BMPs) Incorporated into the Action

In the event of unauthorized incidental take, NCCOS would suspend all activities causing such take and immediately contact NMFS Office of Protected Resources (see contact below). NCCOS would request ESA Section 7 initiation in the event of unauthorized take, systematic noncompliance, unanticipated adverse effects, or modification of the action.

NMFS POC - Colette Cairns, colette.cairns@noaa.gov, 301-427-8414, NMFS OPR ESA-ICD

BMPs are required to be incorporated within project instructions, cruise plans and NEPA documentation including financial assistance awards and environmental review memoranda. All applicable BMPs must be communicated to the principal investigators, boat operators and field staff, and as necessary between ship's crew (Commanding Officer/master or designee(s), as appropriate) and scientific party in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.

1. Minimize vessel disturbance and ship strike potential
 - a. Reduced speeds (<13 knots) when transiting through ranges of ESA-listed cetaceans (unless otherwise required, e.g., NOAA Sanctuaries)
 - b. Reduced speeds (<13 knots) while transiting through designated critical habitat (unless slower speeds are required, e.g., < 10 knots in Right Whale critical habitat and management areas)
 - c. Trained observers aboard all vessels; 100% observer coverage
 - d. Species identification keys (for marine mammals, sea turtles,– as applicable) will be available on all vessels

2. Minimize noise
 - a. Reduced speed (see above)
 - b. Multibeam surveys using ≥ 50 kHz frequencies, lowest possible power and ping-rate
 - c. Single beam surveys using ≥ 30 kHz frequencies, lowest possible power and ping-rate, and 12° beam angle.
 - d. Reduce use of active acoustics as much as possible. Active acoustic sources should be used only when required for navigation or data collection and should be used at the lowest source level and highest frequency available that is suitable for the purpose.

3. Minimize vessel discharges (including aquatic nuisance species)
 - a. Meet all EPA Vessel General Permits and Coast Guard requirements.
 - b. Avoid discharge of ballast water in designated critical habitat.
 - c. Use anti-fouling coatings.
 - d. Clean hull regularly to remove aquatic nuisance species.
 - e. Avoid cleaning of hull in critical habitat.
 - f. Avoid cleaners with nonylphenols.
 - g. Rinse anchor with high-powered hose after retrieval.

4. Minimize anchor impact to corals, seagrass or other EFH
 - a. Use designated anchorage area when available
 - b. Use mapping data to anchor in mud or sand, to avoid anchoring on corals
 - c. Avoid anchoring in seagrass critical habitat
 - d. Minimize anchor drag
5. Avoid collecting bottom samples in seagrass critical habitat
 - a. There will be no bottom sample collections of any kind conducted during this cruise
6. Cetaceans
 - a. Avoid approaching within 200 yards (182.9 m), 500 yards for Right Whales.
 - b. Avoid critical habitat, when possible.
7. Sea Turtles and Manatees
 - a. Avoid approaching within 50 yards.
8. Entanglement Protective Measures
 - a. Use stiffer line materials for towing and keep taut during operations to reduce potential for entanglement
 - b. Reduce knots in the line as much as possible
 - c. Clearly mark lines in the event an animal does become entangled so that NMFS experts can identify the gear.
9. Habitat Protection
 - a. Avoid contact of gear, towed or lowered, with the sensitive bottom habitat (e.g. submerged aquatic vegetation (SAV) and hard bottom)