Environmental Assessment for National Center for Coastal Ocean Science (NCCOS) Surveying and Mapping Cruise Activities in Puerto Rico and the United States Virgin Islands (USVI) for April 5-26, 2016

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1. Introduction

In March 1999, the National Centers Coastal Ocean Science (NCCOS) was formed within the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS) as the focal point for coastal ocean science. NCCOS conducts applied research, monitoring and assessments to build the scientific foundation for coastal management and resilient coastal ecosystems. NCCOS priority focus areas include 1) Environmental Stressor Response and Restoration, 2) Coastal Resilience and Climate Vulnerability, 3) Coastal and Marine Spatial Ecology, 4) Monitoring and Detecting Change, and 5) Social Science. Mapping and Surveying activities support NCCOS's Coastal and Marine Spatial Ecology priority.

This environmental assessment analyzes the potential environmental impacts of a proposed scientific research mission (cruise) on board the NOAA Ship Nancy Foster from April 5 to April 26, 2016 within the territorial waters of St. Thomas, United States Virgin Islands (USVI) and Puerto Rico. During this cruise, NCCOS will survey and map coral reef habitat and fishery resources using sonar, conduct ground truthing activities using an ROV and gliders, and collect oceanographic data and passive acoustic hydrophone information using conductivity, temperature, and depth instruments (CTD).

The potential environmental impacts from the proposed survey and related activities have previously been analyzed in the *Programmatic Environmental Assessment for the Office of Coast Survey Hydrographic Survey Projects* (OCS PEA May 2013), which is incorporated by reference and is available at http://www.nauticalcharts.noaa.gov/Legal/docs/2013-18%20NEPA%20OCS%20Final%20PEA.pdf. The OCS PEA analyzes the potential environmental impacts associated with NOS Office of Coast Survey hydrographic surveys and related activities in navigationally significant areas of United States coastal and continental shelf waters, including the USVI and Puerto Rico. Specifically, the OCS PEA provided an analysis of the potential environmental impacts of vessel operations and anchoring, use of multibeam and single beam echosounders (sonar), autonomous underwater vehicles, bottom sample collection, and sound speed data collection using CTD. While this environmental assessment relies on the OCS PEA, the environmental assessment was prepared to assess potential environmental impacts specific to the April 2016 cruise.

1.1 Purpose

The purpose of the proposed action is to collect multibeam sonar data to develop benthic seafloor habitat maps of coral reefs, and integrate with sonar information on fish distribution and biomass to produce high-resolution maps of coral reef habitats and fish use in the territorial waters off the coast of USVI and Puerto Rico (Figure 1A and 1B) to support ongoing conservation and management efforts in the region, and ensure that NCCOS carries out its mission, which is to deliver relevant, accurate, and timely scientific information and tools that

decision-makers and scientists use to gain a better understanding of the state of the natural resources and benthic habitat.

1.2 Need

Habitat maps enhance the ability of coastal managers to assess, protect, and preserve the condition of coral reef ecosystems. Maps provide not only past and present data on the condition of coral reefs and how they are utilized by fishes but they also reveal the effectiveness of coral reef conservation over time, which areas need further protection, and which need alternate management measures. The proposed project areas were identified as priority areas for mapping because detailed information on habitat type and distribution, and their use by fish communities is lacking in these areas.

2.0 Description of Proposed Action and Alternatives

2.1 Proposed Action (preferred alternative)

NCCOS Center for Coastal Monitoring and Assessment (CCMA) is proposing to conduct a scientific research mission on board the NOAA Ship Nancy Foster from April 5 to April 26, 2016 which would be funded by NOAA's Coral Reef Conservation Program within the action area of the territorial waters of St. Thomas, United States Virgin Islands (USVI) and Puerto Rico (Figure 1A and 1B). The habitat and fish distribution maps will be developed using the following combination of instruments:

- Multibeam echosounders (sonar) to characterize the seafloor;
- Single/split beam sonar to characterize broad scale fish abundance, biomass, utilization patterns, and to locate and document fish spawning aggregations;
- Remotely operated vehicle (ROV) for ground truthing and visual observation of seafloor habitats; and
- Slocum gliders and CTD to collect environmental, passive acoustics, and oceanographic data.

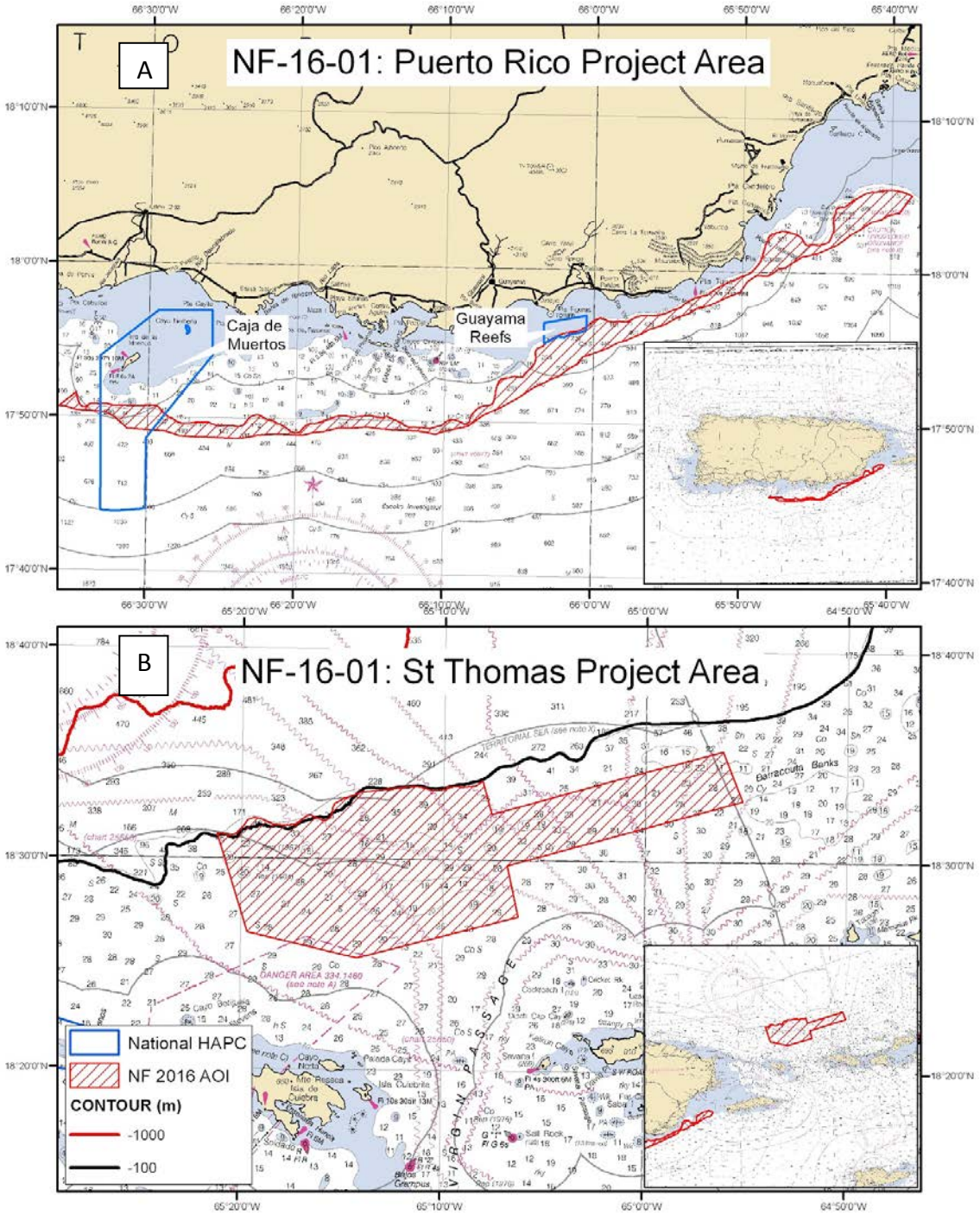

Figure 1. Map of action areas of the cruise, red hatched polygon depicts area of hydrographic and fisheries acoustics mapping, A. (top panel) Puerto Rico Project Area, B. (bottom panel) St. Thomas (USVI) Project Area, black line depicts location of shelf break.

2.1.1 Multibeam bathymetry surveys

Multibeam bathymetry surveys would be conducted to characterize the seafloor to produce benthic habitat maps. The specifications described below and the activities to be conducted are also incorporated by reference from Section 3.1.1 and 3.1.1.1 (pp. 14-15) of OCS PEA, which generally describes how hydrographic surveys are performed and the functions (including sound frequency range) of echosounder technology (sonar). Based on previous cruise experience, NCCOS anticipates that within the depth range to be surveyed from 10 to 1500 m, the ship would only be passing over a given area one time. NCCOS estimates that there is a 1% chance that an area would be ensonified up to two times in less than 24 hours, that is if any gaps in habitat map coverage are discovered. This applies to the single/split beam sonar surveys also, as they occur synergistically with the multibeam surveys. Given the maximum survey speed of 8 knots, surveying 16 hours per day over 20 operational days NCCOS anticipates completing an area no larger than 202 sq km in the USVI area and 388 sq km in St. Thomas area (Figure 1A and 1B).

- Multibeam would be collected using a hull mounted Kongsberg EM710 and Reson 7125 multibeam echosounders (sonar) with a potential for a 24 hour acquisition window and survey duration. Both types of sonar are downward oriented from the hull and spread up to 140 degrees across the ship width and by only 1-3 degrees along the track.
- Frequency of the Reson sonar is 400kHz, with effective operational depths from 10-100 m. The Kongsberg frequencies are between 65-100kHz with an effective operational depths from 100-2,000 m
- Power is set to the lowest possible level (approximately 190 - 210 dB re: 1 PA with a duty cycle or “ping rate” set also to the lowest possible level (10-30Hz)

2.1.2 Single/split beam sonar surveys

Single/split beam sonar would be used to characterize broad-scale fish and plankton abundance, biomass, utilization patterns, and to locate and document fish spawning aggregations. NCCOS incorporate by reference the activities described in in Section 3.1.1 and 3.1.1.1 (pp. 14-15) of the OCS PEA.

- Use Kongsberg/Simrad EK60 operating at frequencies of 38, 120 and 200kHz
- Power is set to lowest possible level, nominally 200 dB re: 1 PA, with a duty cycle of less than 10 Hz. Beam is maintained at less than 12 degree angle, which focuses the sound downward, with a small beam width.

2.1.3 Moderate depth ROV deployment and operation

Moderate depth Remote Operated Vehicle (ROV) deployment and operation would be used for delineation and identification of seafloor habitats (i.e., ground truthing) through visual observations. ROVs would be launched from the ship and lowered on a cable using a power winch. The ROV would be tethered at all times. NCCOS has included a discussion on protective measures, in the environmental consequences Section 4.1.3 of this EA and Appendix A, that would be adopted to avoid potential entanglement or habitat impact issues during use of ROVs.

2.1.4 Slocum glider operation

Two Slocum Glider G2s would be deployed from the NOAA ship to operate for 24 hours a day for the duration of the project. NCCOS incorporates by reference this activity as described in Section 3.1.8.3 (p. 26) of the OCS PEA, which provides a general description of autonomous underwater vehicles use in survey activities. The gliders would be operated continuously for the duration of the cruise instead of for 16 hours at a time as described in the OCS PEA. The payload would include a CTD to collect oceanographic data and passive acoustic hydrophone in listening mode only, no sonar would be used during glider operation. The vehicle would be programmed with a set path which would be monitored continuously by the Glider Operations Center, Stennis, Mississippi. The Glider path would be oriented to transit along the shelf edge in water depths ranging from 100-300m depth (Figure 1B, north of black line which depicts the shelf).

2.1.5 Underway CTD deployment

Sound speed data collection would be acquired by towing a CTD behind the ship for approximately 5 minutes every four hours. This activity is incorporated by reference from Section 3.1.6 (p. 20) of the OCS PEA, which explains that sound speed data is collected throughout the survey to determine the speed of sound in the water column at a given location and time and correct refraction errors in the echosounder data.

2.1.6 Vessel Transit Operations

The NOAA Ship Nancy Foster is a 187 foot oceanographic research vessel equipped with state of the art navigation, propulsion, and mission systems. The transit area would be from the United States Coast Guard (USCG) station in San Juan, Puerto Rico (port of embarkation) to the St Thomas, USVI action area then to the Puerto Rico action area and back to San Juan for debarkation. The potential vessel transit path is shown in Figure 2. However, the exact transit path would depend on the discretion of the crew and several variables, including prevailing wind, current, and sea conditions. This activity is incorporated by reference from Section 3.1.3 (p. 17) of the OCS PEA, which describes transit operations and the role of NOAA's Office of Marine Aviation in managing the fleet of research and survey vessels.

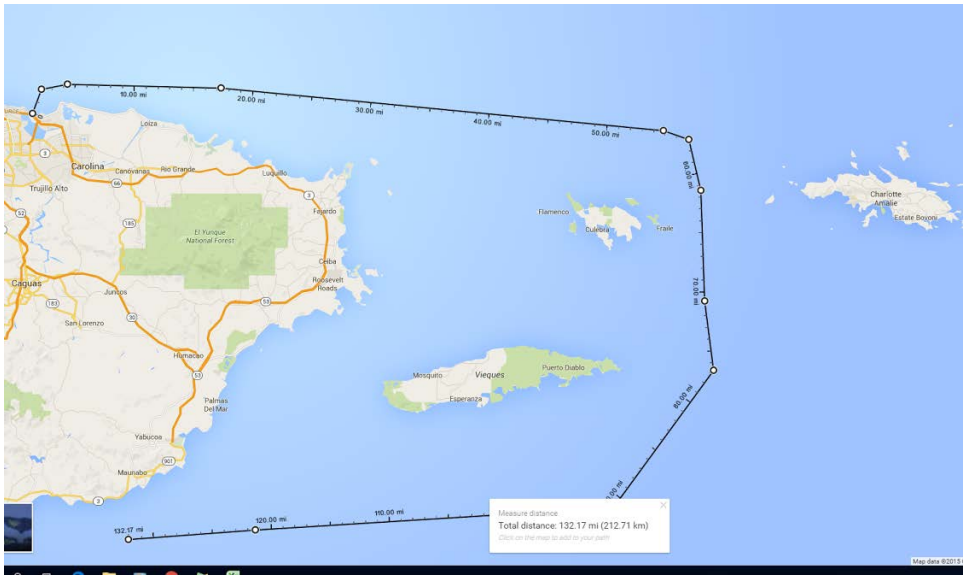

Figure 2. Map depicting a general transit path between San Juan (port of embarkation/debarkation and the two action areas. Actual path is dependent on many factors such as sea state and weather conditions and is at the discretion of the NOAA ship crew.

2.1.7 Anchoring

While anchoring is not anticipated for this cruise as a result of science activities, 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. NCCOS has incorporated by reference the discussion on anchoring activities in Section 3.1.4 (p. 18) of the OCS PEA.

2.1.8 Summary of Daily activities

From 1600-0800 or 16 hours straight to include overnight, NCCOS would simultaneously, conduct multibeam bathymetry surveys using the, Reson 7125 or EM710 (depending on depth), and fishery acoustics with the SIMRAD EK60 using an operating speed of 4-7 kts. Underway towed CTD casts would be every four (4) hours to 75% of water depth with remaining 25% predicted. Each cast would last approximately five (5) minutes.

From 0800-1600, NCCOS would conduct ROV transects at three to four (3-4) different locations within the action areas, in water depths 10-300m. The ROV would be operated at approximately 1m above the seafloor conducting pre-determined transects approximately two(2) hours in duration. The ROV and ship speed is typically 0.5-1 kts during ROV deployments. The ship operates only using Z-drives (no propellers) during ROV deployment. The ROV provides real-time video display, navigation and depths. The Chief scientists and ROV

operator would monitor bottom conditions to avoid disturbance of any essential fish habitat (EFH) specifically endangered coral species.

2.2 No Action alternative

Under the no-action alternative, NCCOS would not conduct a cruise in April 2016. NCCOS would not obtain critical information about the health, distribution of coral reefs, benthic habitat and fishery resources with the action area of St. Thomas, USVI and Puerto Rico (Figure 1A and B). NCCOS incorporates by reference the Section 3.3.1 and 3.3.2 (p. 28) from the OCS PEA that generally describes the alternatives considered but eliminated from further analysis. These activities include surveying with lidar exclusively and deriving water levels exclusively from ellipsoidally referenced surveys. NCCOS did not consider alternative locations because another location would not satisfy the purpose and need for NCCOS's mission and that of the Coral Reef Conservation Program for detailed high resolution habitat type and use maps of this area.

3.0 Affected Environment

There are two primary action areas for the proposed cruise activities, the Puerto Rico area off the southeast coast of Puerto Rico (Figure 1A) and the St Thomas, USVI action area (Figure 1B). The following discussion of the affected environment includes the two primary action areas and the general transit area. Transit area would be from San Juan ,United States Coast Guard (USCG) station to the St Thomas, USVI action area then to the Puerto Rico action area and back to San Juan for debarkation (Figure 2). The strategies developed for each survey area take into account the minimum depths, general bathymetry, and time allotment to maximize efficiency. While no detailed ecological characterization has been conducted in the action area of the proposed cruise, NCCOS anticipates the baseline environment and communities are similar to those of Vieques Puerto Rico, an island situated approximately halfway between the Puerto Rico and St. Thomas USVI Action areas (Bauer and Kendall 2010). The resources in the affected environment are the same for the Proposed Action and No Action Alternative.

3.1 Resources Not Analyzed

The following resources will not be described in detail in this EA as they are not impacted by project activities or the action area of this cruise, for the reasons described below.

3.1.2. Land

No resources on land would be impacted as a result of cruise activities therefore the land environment was excluded from further analysis.

3.1.3. Air

No air resources would be impacted as a result of cruise activities with exception of minimal emissions from the mechanical operation of the NOAA Ship Nancy Foster.

3.1.4. Noise

Noise from the operation of the NOAA Ship Nancy Foster would be minimal. Vessel noise from recreational boaters also adds to the baseline of noise pollution in the action and transit area.

3.2 Physical Environment

3.2.1 Marine Environment

The water depth within the survey and transit areas ranges from 10 -1,500 m. Physical characteristics of the seafloor within the area may include flat areas of unconsolidated calcium-carbonate sediments, interspersed with flat pavement (hardbottom substrate), pavement with sediment channels, and pavement colonized by hard and soft corals to high relief complex coral reef habitats and patch reefs (Bauer and Kendall 2010b). Existing ambient underwater noise from natural and anthropogenic sources is part of the physical marine environment. Surface waves and animal vocalizations provide the greatest source of naturally occurring ocean noise. Sources of anthropogenic noise in the area may include vessel propellers, standard vessel depth finders and hydrographic cruises.

3.3 Biological Environment

In 2010, NCCOS completed an Ecological Characterization Report of marine resources, including the benthic habitat and fishes, in Vieques, Puerto Rico (Bauer and Kendall 2010a). Due to the close proximity of Vieques, NCCOS used this report to characterize the baseline environmental conditions of the regions to be mapped during the proposed cruise. The benthic habitat consists of a mix of live coral, fire coral, macro algae, gorgonians, sponges, zooanthids, tunicates, anemones and bare substrate as described in Figure 3 (Bauer and Kendall 2010b). There may also be seagrasses in the proposed study area. NCCOS expects a similar benthic community composition in the areas to be mapped during the proposed cruise. The fish community is comprised of 110 species from 34 taxonomic families as detailed in Figure 4 (Bauer and Kendall 2010b). The highest density of fish species were from eight (8) different families. In decreasing density they are, Labridae, Pomacentridae, Scaridae, Carangidae, Acanthuridae, Gobiidae, Lutjanidae and Serranidae (Bauer and Kendall 2010b). No endangered species of fish were reported in the report.

Benthic Taxa	Mean (±SE) Percent Cover	Mean (±SE) Height (cm)	Mean (±SE) # Individuals
Live coral	**3.4 (0.5)**		
Montastrea annularis	0.9 (0.3)	x	x
Montastrea cavernosa	0.7 (0.1))	x	x
Porites astreoides	0.4 (0.1)	x	x
Diploria strigosa	0.4 (0.1)	x	x
Siderastrea siderea	0.2 (<0.1)	x	x
Siderastrea radians	0.2 (<0.1)	x	x
Diploria labyrinthiformis	0.1 (<0.1)	x	x
Porites porites	0.1 (<0.1)	x	x
Fire coral (*Millepora sp.*)	0.3 (<0.1)		
Algae	**41.9 (3.3)**		
Turf algae	19.0 (3.3)	x	x
Macroalgae	17.7 (2.6)	4.8 (0.3)	
Crustose algae	4.1 (0.8)	x	x
Cyanobacteria	0.6 (0.1)	0.9 (0.2)	x
Rhodoliths	0.3 (0.3)	<0.1 (<0.1)	x
Filamentous algae	0.2 (0.1)	0.4 (0.1)	x
Gorgonians	**5.9 (0.7)**		
Sea plume/rod/whip	4.6 (0.6)	34.2 (2.8)	5.2 (0.5)
Sea fans	1.1 (0.2)	12.7 (1.7)	0.6 (0.1)
Encrusting gorgonians	0.3 (0.1)	x	x
Sponges	**2.6 (0.3)**		
Barrel/tube/vase	2.0 (0.3)	11.0 (1.1)	2.6 (0.2)
Encrusting	0.7 (0.1)	x	x
Zoanthids	0.1 (<0.1)	x	x
Tunicates	<0.1 (<0.1)	x	x
Anemones	<0.1 (<0.1)	x	<0.1 (<0.1)
Bare substrate	45.7 (3.3)	x	x

Figure 3. Summary statistics for biotic composition across all Vieques surveys (Table 3.3 from Bauer and Kendall 2010b)

Species	Common Name	Family	Trophic group	% of Surveys	Mean Density (SE)	Mean Biomass (SE)
Abudefduf saxatilis	Sergeant major	Pomacentridae	I	7%	0.20 (0.09)	8.30 (6.14)
Acanthemblemaria spp.	Blenny species	Chaenopsidae	I	7%	0.05 (0.03)	0.02 (0.01)
Acanthostracion quadricornis	Scrawled cowfish	Ostraciidae	I	1%	0.01 (0.01)	0.09 (0.09)
Acanthurus bahianus	Ocean surgeonfish	Acanthuridae	H	89%	6.73 (0.68)	434.29 (64.44)
Acanthurus chirurgus	Doctorfish	Acanthuridae	H	21%	0.44 (0.17)	33.29 (16.86)
Acanthurus coeruleus	Blue tang	Acanthuridae	H	76%	3.95 (0.51)	339.24 (61.78)
Amblycirrhitus pinos	Redspotted hawkfish	Cirrhitidae	Z	4%	0.14 (0.08)	0.02 (0.01)
Anisotremus virginicus	Porkfish	Haemulidae	I	4%	0.06 (0.03)	14.09 (8.99)
Aulostomus maculatus	Trumpetfish	Aulostomidae	P	7%	0.08 (0.04)	6.20 (2.86)
Balistes vetula	Queen triggerfish	Balistidae	I	15%	0.19 (0.09)	140.49 (53.89)
Bodianus rufus	Spanish hogfish	Labridae	I	13%	0.12 (0.04)	19.16 (7.73)
Calamus calamus	Saucereye porgy	Sparidae	I	25%	0.50 (0.19)	87.53 (44.36)
Canthidermis sufflamen	Ocean triggerfish	Balistidae	I	1%	<0.01 (<0.01)	5.51 (5.51)
Canthigaster rostrata	Sharpnose puffer	Tetraodontidae	I	23%	0.44 (0.12)	3.49 (2.34)
Carangoides ruber	Bar jack	Carangidae	P	27%	0.98 (0.57)	14.02 (3.92)
Cephalopholis cruentata	Graysby	Serranidae	P	11%	0.21 (0.09)	26.12 (10.73)
Cephalopholis fulva	Coney	Serranidae	P	23%	0.35 (0.10)	41.45 (13.21)
Chaenopsis limbaughi	Yellowface pikeblenny	Chaenopsidae	I	1%	0.01 (0.01)	0.10 (0.10)
Chaetodon capistratus	Foureye butterflyfish	Chaetodontidae	I	51%	1.30 (0.20)	34.51 (8.41)
Chaetodon ocellatus	Spotfin butterflyfish	Chaetodontidae	I	1%	0.03 (0.03)	1.83 (1.83)
Chaetodon sedentarius	Reef butterflyfish	Chaetodontidae	I	4%	0.04 (0.03)	1.04 (0.75)
Chaetodon striatus	Banded butterflyfish	Chaetodontidae	I	20%	0.28 (0.07)	5.02 (1.74)
Chromis cyanea	Blue chromis	Pomacentridae	Z	27%	4.09 (1.44)	20.74 (6.87)
Chromis multilineata	Brown chromis	Pomacentridae	Z	19%	1.59 (0.72)	3.88 (2.46)
Clepticus parrae	Creole wrasse	Labridae	Z	3%	6.57 (6.28)	515.70 (515.59)
Coryphopterus glaucofraenum	Bridled goby	Gobiidae	H	20%	1.45 (0.84)	1.42 (0.67)
Coryphopterus personatus/ hyalinus	Masked/Glass goby	Gobiidae	H	4%	1.26 (1.09)	0.82 (0.71)
Ctenogobius saepepallens	Dash goby	Gobiidae	H	1%	<0.01 (<0.01)	<0.01 (<0.01)
Decapterus macarellus	Mackerel scad	Carangidae	Z	3%	11.33 (10.96)	901.79 (891.31)
Diodon holocanthus	Balloonfish	Diodontidae	I	1%	0.02 (0.02)	5.55 (5.55)
Epinephelus adscensionis	Rock hind	Serranidae	I	1%	0.01 (0.01)	0.94 (0.94)
Epinephelus guttatus	Red hind	Serranidae	P	29%	0.40 (0.09)	129.77 (43.40)
Gerres cinereus	Yellowfin mojarra	Gerreidae	I	3%	0.04 (0.03)	1.99 (1.61)
Ginglymostoma cirratum	Nurse shark	Ginglymostomatidae	P	1%	<0.01 (<0.01)	<0.01 (<0.01)
Gnatholepis thompsoni	Goldspot goby	Gobiidae	H	15%	0.37 (0.15)	0.38 (0.30)
Gobiosoma evelynae	Sharknose goby	Gobiidae	I	15%	0.28 (0.09)	0.07 (0.02)
Gramma loreto	Fairy basslet	Grammatidae	I	8%	0.21 (0.10)	0.34 (0.21)
Gymnothorax miliaris	Goldentail moray	Muraenidae	P	1%	<0.01 (<0.01)	0.03 (0.03)
Gymnothorax moringa	Spotted moray	Muraenidae	P	1%	<0.01 (<0.01)	<0.01 (<0.01)
Haemulon aurolineatum	Tomtate	Haemulidae	I	1%	0.03 (0.03)	2.93 (2.93)
Haemulon carbonarium	Caesar grunt	Haemulidae	I	7%	0.12 (0.07)	17.05 (8.36)
Haemulon chrysargyreum	Smallmouth grunt	Haemulidae	I	1%	0.03 (0.03)	1.00 (1.00)
Haemulon flavolineatum	French grunt	Haemulidae	I	25%	0.64 (0.16)	59.99 (17.26)
Haemulon plumierii	White grunt	Haemulidae	I	20%	0.92 (0.38)	267.34 (119.39)
Haemulon sciurus	Bluestriped grunt	Haemulidae	I	4%	0.06 (0.04)	8.12 (4.73)
Haemulon spp.	Grunt species	Haemulidae	I	1%	0.03 (0.03)	0.01 (0.01)
Halichoeres bivittatus	Slippery dick	Labridae	I	48%	5.19 (1.40)	19.51 (6.19)
Halichoeres garnoti	Yellowhead wrasse	Labridae	I	64%	5.75 (0.80)	32.74 (4.49)
Halichoeres maculipinna	Clown wrasse	Labridae	I	27%	0.57 (0.16)	0.68 (0.53)
Halichoeres poeyi	Blackear wrasse	Labridae	I	11%	0.13 (0.05)	1.56 (0.89)
Halichoeres radiatus	Puddingwife	Labridae	I	25%	0.26 (0.07)	1.69 (0.71)

Figure 4. Mean (+/- SE) freqency, density and biomass for fish species observed at Vieques in May 2007 survey. H=Herbivore, P=Piscivore, I=Invertivore, Z=Zooplantivore (From Table 3.4 Bauer and Kendall 2010b)

3.3.1 Marine Mammals

There are five (5) species of threatened and endangered marine mammals with the potential to be present within the action area of the proposed cruise (see Table 1). These include, Humpback Whale *(Megaptera novaeangliae),* Blue Whale *(Balaenoptera musculus),* Fin Whale (*Balaenoptera physalus*) , Sei Whale (*Balaenoptera borealis*) and Sperm Whale (*Physeter macrocephalus*). According to the National Marine Fisheries Service, Office of Protected Resources Website (http://www.nmfs.noaa.gov/pr/species/mammals/#whales), all five (5) species of whales described above exhibit some kind of migratory behavior spending winter months in closer proximity to temperate, sub-tropical or tropical locations and migrating poleward during the summer months. However, migratory patterns are considered unpredictable, and whales can also remain in certain locations year round.

3.3.2 Endangered Species and Critical Habitat

There are eight (8) species of corals, five (5) marine mammal species, six (6) turtle species and five (5) fish species within the proposed action area that are listed as either endangered, threatened, candidate or a species of concern (see Table 1). In addition, there is also designated critical habitat for Elkhorn coral (Acropora palmata) and Staghorn coral (Acropora cervicornis) in the proposed action area. No other Critical habitat falls within the action or transit area of the proposed cruise.

Table 1. ESA listed species and designated critical habitat within the St. Thomas, U.S. Virgin Island and Puerto Rico action area of the cruise. Source is NOAA Fisheries Southeast region Protected Resources.

Status	Species Name	Critical Habitat
Corals		
T	Elkhorn Coral (*Acropora palmata*)	not likely to destroy or adversely modify[ß]
T	Staghorn Coral (Acropora cervicornis)	not likely to destroy or adversely modify[ß]
T	Pillar coral (Dendrogyra cylindrus)	N/A
T	Lobed Star Coral (Orbicella annularis)	N/A
T	Boulder Star Coral (*Orbicella franksi*)	N/A
T	Rough Cactus Coral (Mycetophyllia ferox)	N/A
T	Mountainous Star Coral (Orbicella faveolata)	N/A

SOC	Ivory Tree Coral *Oculina varicose*	N/A
Mammals		
E	Humpback Whale (Megaptera novaeangliae) Baleen	N/A
E	Blue Whale (Balaenoptera musculus) baleen	N/A
E	Fin Whale (Balaenoptera physalus) baleen	N/A
E	Sei Whale (Balaenoptera borealis) baleen	N/A
E	Sperm Whale (*Physeter macrocephalus*) (toothed)	N/A
Sea Turtles		
E, T*	Green Turtle (*Chelonia mydas*)	N/A
E	Hawksbill Turtle (Eretmochelys imbricata)	N/A
E	Kemp's Ridley Turtle (*Lepidochelys kempii*)	N/A
E	Leatherback Sea Turtle (*Dermochelys coriacea*)	not likely to destroy or adversely modify
E, T*	Loggerhead Sea Turtle (*Caretta caretta*)	N/A
E, T*	Olive Ridley Sea Turtle (*Lepidochelys oliveacea*)	N/A
Fishes		
C	Dwarf Seahorse (Hippocampus zosterae)	N/A
PT	Nassau Grouper (Epinephelus striatus)	not likely to destroy or adversely modify
T/E	Scalloped hammerhead shark (*Sphyrna lewini*)	N/A
C	Smooth Hammerhead Shark (Sphyrna zygaena)	N/A
C	Caribbean Electric Ray *(Narcine bancroftii)*	N/A

C=candidate species
E=endangered
T=threatened

P= Proposed
SOC=Species of concern)
ß - indicates the language is from the NMFS ESA Section 7 Consultation and Biological Opinion for the Office of Coast Survey hydrographic survey activities (pg 70), available at http://www.nmfs.noaa.gov/pr/consultation/opinions/biop_ocs_04302013.pdf.
*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

3.3.3 Essential Fish Habitat

The following species/taxa have essential fish habitat (EFH) designated within the proposed action area, corals, queen conch, spiny lobster, reef fish, yellow fin tuna blue marlin, longbill spearfish, lemon shark, nurse shark, oceanic whitetip shark, tiger shark. Other species that may be found near the proposed transit or action area but not in it include: big eye tuna, roundscale spearfish, sailfish, white marlin, bigeye thresher shark, caribbean reef shark.

According to the NOAA Habitat Conservation EFH mapper, two habitat areas of particular concern are present in the Puerto Rico action area, Guayama Reefs and Caja de Muertos (Figure 1A).

3.4 Cultural Environment

Several shipwrecks as denoted by the shipwreck symbol on NOAA nautical chart 25640 are in the proposed region of transit but none are located within the area proposed to be mapped or in the glider operation area. NCCOS notified SHPO contacts and received informal concurrence for cruise activities on March 25, 2016 (email available on request). Based on this contact and previous experience in the region, NCCOS makes the determination that it is unlikely there are any unknown cultural resources such as shipwrecks within the proposed action area of cruise activities.

3.5 National Marine Sanctuaries

There are no National Marine Sanctuaries located within the region of transit, in the hydrographic mapping or in the glider activity areas.

4.0 Environmental Consequences

4.1 Proposed Action (preferred alternative)

4.1.1 Multibeam bathymetry survey

4.1.1.2 Physical Environment

4.1.1.2.1 Marine Environment

No adverse impacts to the water column or the benthic environment are anticipated as a result of multibeam bathymetry surveys.

4.1.1.2 Biological Environment

4.1.1.2.1 Marine Mammals

All marine mammals are protected under the Marine Mammal Protection Act (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). Surveying activities that use active acoustic sources in the water have the potential to result in Level B harassment in the form of potential avoidance behavior.

The description and analysis of the potential impacts of multibeam or split beam sonar on marine mammals is analyzed in the OCS PEA at 5.1.1.3 (pp. 38-41), and is incorporated by reference. In the OCS PEA, NOAA calculated acoustic take estimates using a method of calculating threshold radii of echosounders (Weber 2008) based on Southall, et al. (2007) and Richardson, et al. (1995) (OCS PEA at 5.1.1.3 (p. 39). The OCS PEA did assess generally the impacts of multibeam echolocators and single beam sonar to the particular marine mammal species found in the action area, so this analysis is incorporated by reference. The OCS PEA did not include behavioral modeling "take estimates" from the Caribbean region in their analysis because at the time of the assessment, no surveys in this region were anticipated.

In January 2013, OCS filed an application with the Office of Protected Resources of the National Marine Fisheries Service (NMFS OPR) requesting a letter of authorization (LOA) for the take of marine mammals incidental to hydrographic surveys excluding coastal waters in the Caribbean, Hawaii, and other Pacific islands. Currently, OCS is in continued consultation with NMFS OPR regarding their LOA request (Federal register notice link: (http://www.nmfs.noaa.gov/pr/permits/incidental/research.htm#ocs). An LOA is not expected to be completed by time of the NCCOS proposed action

Based on the sonar frequency and downward oriented characteristics of the acoustic sources proposed for use in this project, NCCOS determines that cruise activities are not likely to adversely affect the five (5) species of marine mammals found within the proposed action area of the cruise and that delaying the proposed action to wait for completion of modelling is unwarranted. As explained in more detail in the OCS PEA at pg. 40, the downward-facing orientation of the transmit beam in shallower depths subject to survey result in the majority of energy lost to interaction with the seabed rather than reaching wide ranges in the water column, and as a result, would be barely noticeable. Second, the functional hearing range of ESA-listed baleen whales (humpback, blue, fin and sei whales) is 7 Hz and 25 kHz. The single/split beam sonar, the ROV and both multibeam echosounders operate outside the functional hearing range of these whales, meaning that operation of these devices are not likely to affect ESA-listed baleen whales (Table 2).

Toothed whales, including sperm whales, have a functional hearing range of 150 Hz to 160 kHz. The multibeam echosounder Reson, the single/split beam sonar, and the ROV operate outside this range. However, the multibeam echosounder Kongsberg sonar will operate at a range within the functional hearing range of sperm whales.

Sperm whales have been observed in Puerto Rico and the Virgin Islands; in a summary of cetacean sightings in the region over 40 years, 43 sperm whales were sighted. According to the available data, sperm whales are rarely seen within the action area from April through September (Mignucci-Giannoni 1998). As such, we believe it is very unlikely that sperm whales will be exposed to the proposed action, since the action takes place in April. The minimization measures further reduce the likelihood of exposure. Multibeam echosounder transmissions will be suspended when ESA-listed whales are within range. The research vessel will also avoid approaching cetaceans within 200 yards (600 ft). Due to the minimization measures and that it is unlikely that sperm whales will be present in the action area, we conclude that the effects of the proposed action to sperm whales would be discountable.

The description and analysis of the risk of vessel strikes to marine mammals is presented in the OCS PEA at 5.1.3.1 (p. 47) and is incorporated by reference. Specifically, NCCOS also does not anticipate adverse impacts to mammals as a result of vessel strike as NCCOS survey ships operate routinely at slow speeds (4-8 knots) during survey activities. Therefore NCCOS determines that effects from vessel strikes during survey operations is discountable.

Further, impacts of sound and vessel strike are minimized because NCCOS adopts all best management practices (BMPs) appropriate for the proposed action as required by the Memorandum from VADM Michael S. Devany, Deputy Under Secretary for Operations, Department of Commerce, dated August 22, 2014 (Appendix C). NCCOS ensures execution of the applicable BMPs (Appendix A) by requiring their inclusion in each NCCOS survey vessel's cruise plans and communication with the NOAA ship crew. These BMPs include a requirement to use the lowest possible power and ping rates when conducting multi and single beam surveys, and the use of trained marine mammal observers to identify if any marine mammals

are in the vicinity during a survey. Observers will also assist vessel drivers in avoiding any sighted marine mammals in the transit or survey path. Therefore, NCCOS determines that the proposed cruise activities are not likely to adversely affect the five (5) species of marine mammals found within the proposed action area of the cruise. The Marine Mammal Protection act allows that action proponents may determine without concurrence that the action does not have a reasonable likelihood of resulting in the incidental take of marine mammals.

The following protective measures would be incorporated into the cruise plan and are listed below as described in Section 2.9, (p. 9), of the OCS Biological Opinion and included in Appendix A.

Minimize vessel disturbance and ship strike potential

a. Slow speeds (4-8 knots), when mapping;
b. Reduced speeds (<13 knots) when transiting through ranges of ESA-listed cetaceans (unless otherwise required, e.g., NOAA Sanctuaries);
c. 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);
d. Trained observers aboard all vessels; 100% observer coverage; and
e. Species identification keys (for marine mammals, sea turtles, corals, abalone, and seagrasses) available on all vessels.

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; and
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.
e. Multibeam echosounder transmissions will be suspended when ESA-listed whales are within range.

Upon Sighting Protected Species:

a. For large whales, attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the animal has left the area.
b. Reduce vessel speed to 10 knots or less as safety permits when whales are observed near an underway vessel. Always proceed with caution when a whale is sighted at the surface, as there may be additional submerged animals in the vicinity.
c. When whales are sighted directly in the vessel's path or in close proximity to a moving vessel, reduce speed and shift the engine to neutral, as safety allows. Do not engage the engines until the animals are clear of the area.

d. Maintain a distance of I 00 yards or greater from large whales. Maintain a distance of 50 yards or greater from sea turtles or small marine mammals when possible.
e. Vessels are prohibited from coming within 100 yards of humpback whales.

In addition, the Chief Scientist would obtain from the NOAA Ship the Marine Mammal and Turtle Observer Log Summaries and provide them to the NMFS Office of Protected Resources (OPR) designated point of contact following cruise completion. Information includes the date, time, location, species, number of individuals, and response behavior (if any) and digital photograph if possible. The information from the Observation Logs would be compiled, summarized, and provided to the Office of Protected Resources at the end of each year.

Table 2. 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, including bowhead, fin, humpback, and sei whales)	7 Hz to 25 kHz
Mid-frequency (MF) cetaceans (Only sperm whale found in in action area)	150 Hz to 160 kHz
High-frequency (HF) cetaceans None found in action area.)	200 Hz to 180 kHz

*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.

4.1.1.3.2 Endangered Species and Critical Habitat

Section 7 (a)(2) of the Endangered Species Act (ESA) 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. Similar to the discussion in Section 4.1.1.2.1 for effects to marine mammals, NCCOS determines that with the employment of minimization

measures in in Section 4.1.1.2.1 and Appendix A any effects of multibeam activities on ESA listed species of marine mammals, corals, turtles or fish species (Table 1) are discountable or insignificant. There are no USFWS managed species in the proposed action area, therefore, NCCOS determined no consultations with USFWS was needed.

According to the NOAA Habitat Conservation EFH mapper, two habitat areas of particular concern are present in the proposed Puerto Rico action area, Guayama Reefs and Caja de Muertos (Figure 1A). No adverse impacts are expected from the proposed activities. There would be no specimen collections of any kind and no permits are required by the territorial governments for the proposed cruise activities.

Chief Scientist would obtain from the NOAA Ship the Marine Mammal and Turtle Observer Log Summaries and provide them to the NMFS OPR designated contact, following cruise completion (see details in Section 4.1.1.2.1).

Data collected during the cruise would be made accessible on the NCCOS website.

NCCOS conducted a consultation with NMFS OPR ESA Division. NCCOS sent a request for concurrence regarding the proposed cruise activities on Jan 05, 2016. NCCOS received a draft letter of concurrence from NMFS OPR that NCCOS proposed activities on this cruise are not likely to adversely affected any ESA-listed whale, sea turtle, fish, or invertebrate on April 1, 2016. The final LOC is expected April 1, 2015(see Appendix B).

4.1.1.3.3 Essential Fish Habitat

The 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*)). No adverse effects from the multibeam activities, either direct or indirect, are anticipated for any essential fish habitat within the proposed action or transit area as hydrographic equipment would not come into contact with the seafloor and would not reduce the quantity or quality of essential fish habitat. The analysis of effects is incorporated by reference from OCS PEA section 5.1.1.5 pg. 42.

NCCOS conducted an informal consultation with NMFS Office of Habitat Conservation on Essential Fish Habitat. NCCOS sent a request for concurrence regarding the proposed cruise activities on December 30, 2015. NCCOS received e-mail confirmation from the Southeast Regional Coordinator that no additional EFH conservation recommendations would be needed for any of the proposed activities on January 21, 2016 (available on request).

4.1.1.4 Cultural Environment

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to take into account the effects of their actions on historic resources (16 U.S.C. §§ 470 et seq), based on previous experience the likelihood of locating a previously unknown cultural resource is low,

however, if an uncharted/unknown shipwreck were discovered as a result of surveying operations no adverse direct or indirect 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 Historic Preservation Officer (SHPO) of the USVI or Puerto Rico as appropriate (Contact information in Section. In addition, to prevent misuse of the historic resource by the public, NCCOS would not disclose information, prior to consultation with the SHPO.

4.1.1.5 National Marine Sanctuaries

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.). However, as no activities would be conducted within a National Marine Sanctuary, NCCOS would not be requesting a letter of concurrence pursuant to this act.

4.1.2 Single/Split beam sonar surveys

Single/Split beam sonar surveys are conducted at the same time and have similar characteristics as those described for multibeam hydrographic mapping surveys. Therefore, the potential impacts would be the same as described in Section 4.1.1 of this EA. There are no additional direct and indirect effects of these activities beyond those of the hydrographic mapping activities.

4.1.3 Moderate depth ROV deployment and operation

ROVs are used for delineation and identification of seafloor habitats (ground truthing) through visual observations. ROVs would be launched from the ship and lowered on a cable using a power winch. ROVs would be tethered at all times. ROV transects would be conducted at three to four (3-4) different locations within the proposed action areas, in water depths 10-300m. 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.

4.1.3.1 Physical Environment

4.1.3.1.1 Marine Environment

No adverse direct or indirect effects to the water column or the benthic environment are anticipated as a result of ROV deployment or operation. The ROV would be monitored at all times and is not designed to come in contact with the seafloor.

4.1.3.2 Biological Environment

4.1.3.2.1 Marine Mammals

No adverse effects are anticipated to marine mammals as a result of ROV deployment or operation. The ROV is a small size (Mohawk ROV is 53" x 31.25" x 42") and is equipped with a camera and depth finder. Its position within the water column would be monitored both visually via a topside video monitor and by depth. All efforts would be made to minimize entanglement of marine mammals, including not deploying the ROV in the presence of marine mammals or turtles. Other BMPs to avoid entanglement include:

a. Use of stiffer line materials for towing and to keep taut during operations to reduce potential for entanglement;
b. Reduce knots in the line as much as possible; and
c. Clearly mark lines in the event an animal does become entangled so that NMFS experts can identify the gear.

In addition, the ship strike potential would be low during ROV activities due to the reduced operating speed of the ship. The ROV and ship speed is typically 0.5-1 kts during ROV deployments.

4.1.3.2.2 Endangered Species and Critical Habitat

The same analysis and strategy described in the Marine Mammals section would apply to this section to protect endangered species and minimize adverse effects to critical habitat. NCCOS determines that with the employment of best management practices there will be no direct or indirect adverse effects to endangered species or critical habitat.

4.1.3.2.3 Essential Fish Habitat

The same analysis and strategy described in the Marine Mammals section would apply to this section and help to minimize adverse effects to essential fish habitat. NCCOS determines that with the employment of best management practices there will be no direct or indirect adverse effects to essential fish habitat.

4.1.3.3 Cultural Environment

The same analysis and strategy described in the Marine Mammals section would apply to this section and help to minimize adverse effects to any cultural resources. Additionally, the depth finder would be observed for the potential presence of unknown cultural resource, like a shipwreck, prior to lowering of the ROV from the ship. If unknown cultural resources are identified, the information would be collected and provided to the SHPOs upon completion of the cruise. No information would be released to the public without consent of the SHPO. NCCOS determines that with the employment of best management practices there will be no direct or indirect adverse effects to cultural resources.

4.1.3.4 National Marine Sanctuaries

The proposed cruise activities would not take place in a National Marine Sanctuary.

4.1.4 Slocum glider operation

Two Slocum Glider G2s would be deployed from the NOAA ship to operate for the 24 hours a day for the duration of the project. The payload would include a CTD to collect oceanographic data and passive acoustic hydrophone in listening mode only, no sonar would be used on gliders. The vehicle would be programmed with a set path which would be monitored continuously by the Glider Operations Center, Stennis, Mississippi.

4.1.4.1 Physical Environment

4.1.4.1.1 Marine Environment

No adverse direct or indirect impacts to the water column or the benthic environment are anticipated as a result of Slocum glider operations.

4.1.4.2 Biological Environment

4.1.4.2.1 Marine Mammals

NCCOS determines that there will be no direct or indirect adverse effects to marine mammals from Slocum glider operations as the footprint of the glider is small, and speed does not exceed 4 knots and would be easily avoided by a marine mammal. There is no entanglement hazard associated with the glider. No adverse impacts to the environment are anticipated from glider operations. Gliders would be programmed to avoid known obstructions, avoid striking the sea floor and to hover 1-2 meters above the benthos and to pause, reverse or surface in the unlikely event of a collision.

4.1.4.2.2 Endangered Species and Critical Habitat

NCCOS determines that there will be no direct or indirect adverse effects to endangered species or their critical habitat from glider operations. Gliders would be programmed to avoid known obstructions, avoid striking the sea floor and to hover 1-2 meters above the benthos and to pause, reverse or surface in the unlikely event of a collision.

4.1.4.2.3 Essential Fish Habitat

NCCOS determines that there will be no direct or indirect adverse effects to essential fish habitat from glider operations. Gliders would be programmed to avoid known obstructions, avoid striking the sea floor and to hover 1-2 meters above the benthos and to pause, reverse or surface in the unlikely event of a collision.

4.1.4.3 Cultural Environment

NCCOS determines that there will be no direct or indirect adverse effects to cultural resources from glider operations. Gliders would be programmed to avoid known obstructions, avoid

striking the sea floor and to hover 1-2 meters above the benthos and to pause, reverse or surface in the unlikely event of a collision.

4.1.4.4 National Marine Sanctuaries

The proposed cruise activities would not take place in a National Marine Sanctuary.

4.1.5 Underway CTD deployment

Sound speed data collection would be acquired by towing a CTD behind the ship for approximately 5 minutes every four hours.

4.1.5.1 Physical Environment

NCCOS determines that there will be no direct or indirect adverse effects from CTD deployment as the frequency and duration of the CTD cast is minimal and would only be lowered to 75% of the total depth avoiding any contact with the seafloor.

4.1.5.2 Biological Environment

4.1.5.2.1 Marine Mammals

NCCOS determines that there will be no direct or indirect adverse effects to marine mammals from CTD deployment as the frequency and duration of the CTD cast is minimal. CTD would not be lowered in the presence of marine mammals and all necessary measures for avoiding habitat impact and animal entanglement would be employed.

4.1.5.2.2 Endangered Species and Critical Habitat

NCCOS determines that there will be no direct or indirect adverse effects from CTD deployment on endangered species or their critical habitat as the frequency and duration the CTD cast is minimal and would only be lowered to 75% of the total depth avoiding any contact with the seafloor. All necessary measures for avoiding habitat impact and animal entanglement would be employed.

4.1.5.2.3 Essential Fish Habitat

NCCOS determines that there will be no adverse effects from CTD deployment on essential fish habitat as the frequency and duration the CTD cast is minimal and would only be lowered to 75% of the total depth avoiding any contact with the seafloor or any essential fish habitat. All necessary measures for avoiding habitat impact and animal entanglement would be employed.

4.1.5.3 Cultural Environment

NCCOS determines that there will be no direct or indirect adverse effects to cultural resources from CTD deployments are anticipated. As the CTD would not be lowered onto known cultural resources, and would only be lowered to 75% of the total depth avoiding any contact with the seafloor or any potential cultural resources.

4.1.5.4 National Marine Sanctuaries

The proposed cruise would not take place in a National Marine Sanctuary.

4.1.6 Vessel Transit Operations

The potential adverse effects of transit operations are similar to those involved in operating vessels during survey operations. Transit operations would be from San Juan United States Coast Guard (USCG) station to the St Thomas, USVI action area then to the Puerto Rico action area and back to San Juan for debarkation (Figure 2).

4.1.6.1 Physical Environment

NCCOS determines that no adverse direct or indirect impacts to the physical environment are anticipated from vessel transit operations.

4.1.6.2 Biological Environment

4.1.6.2.1 Marine Mammals

The risk of a vessel strike is a direct threat to marine mammals, therefore NCCOS would employ, specific best management practices to minimize the risk during vessel transit operations. These practices are similar to those employed during survey operations. During transits, the ship may travel at higher speeds than 10 knots, but marine mammal observers would be required by NCCOS. Marine mammal observers would alert the captain when whale species are observed in the ship's path, and would slow to a safe speed of 10 knots, remaining at least 500 yards away from any observed whales. Propeller noise during transit operations may have an indirect adverse effect on marine mammals and employing BMPs in their presence would be employed to minimize effects (see below and Appendix A). Therefore NCCOS determines that effects to marine mammals during vessel transit would be insignificant.

Minimize vessel disturbance and ship strike potential

a. Slow speeds (4-8 knots), when mapping;
b. Reduced speeds (<13 knots) when transiting through ranges of ESA-listed cetaceans (unless otherwise required, e.g., NOAA Sanctuaries);
c. 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);
d. Trained observers aboard all vessels; 100% observer coverage; and species identification keys (for marine mammals, sea turtles, corals, abalone, and seagrasses) available on all vessels.

4.1.6.2.2 Endangered Species and Critical Habitat

The risk of a vessel strike is a direct threat to endangered species, therefore NCCOS would employ BMPs similar to those for marine mammals during transit to minimize impacts to endangered species (see Appendix A). In addition vessel transit operations are not expected to have an adverse effect on critical habitat, as these activities do not reduce the quality or the quantity of critical habitat. Therefore, NCCOS determines that during vessel transit activities,

the effects to endangered species would be insignificant and the effect to critical habitat would be discountable.

4.1.6.2.3 Essential Fish Habitat

NCCOS determines that there is no direct or indirect adverse effects of vessel transit operations on essential fish habitat. Vessel transit operations would not reduce the quantity or quality of habitat.

4.1.6.3 Cultural Environment

NCCOS determines that there is not likely to be adverse effects of vessel transit operations on cultural resources. Vessel transit operations would not impact any cultural resources.

4.1.6.4 National Marine Sanctuaries

The proposed cruise would not take place in a National Marine Sanctuary.

4.1.7 Anchoring

4.1.7.1 Physical Environment

No anchoring is anticipated for the proposed cruise as a result of science activities. However, anchoring may be required for other reasons, such as avoidance of adverse weather conditions or in the unlikely event of an engine malfunction. No adverse direct or indirect effects are anticipated to the physical environment as result of anchoring activities as BMPs would be employed to ensure that if anchoring were necessary, vessel operators would select the anchor location based on depth, protection from seas and wind, and bottom type (see Appendix A). Preferred bottom types include sticky mud or sand; they would not anchor on rocky or coral reefs. Hydrographic data would always be collected to inform the decision on where to drop the anchor (i.e. to avoid coral reefs and rocky seabed areas, cultural resources etc.).

4.1.7.2 Biological Environment

4.1.7.2.1 Marine Mammals

Anchoring would have no direct or indirect adverse effects on marine mammals.

4.1.7.2.2 Endangered Species and Critical Habitat

No adverse direct or indirect effects are anticipated to endangered species or their critical habitat. NCCOS would use BMPs when anchoring described in Section 4.1.6.1, if needed.

4.1.7.2.3 Essential Fish Habitat

No adverse direct or indirect effects to essential fish habitat are anticipated. NCCOS would use BMPs when anchoring described in Section 4.1.6.1, if needed.

4.1.7.3 Cultural Environment

No adverse direct or indirect effects to cultural resources are anticipated. NCCOS would use BMPs when anchoring described in Section 4.1.6.1, if needed.

4.1.7.4 National Marine Sanctuaries

The proposed cruise would not take place in a National Marine Sanctuary.

4.2 No-Action Alternative

Under the no action alternative, no cruise activities would be conducted therefore there would be no adverse effects to the physical, biological, or cultural environment.

4.3 Comparison of Environmental Consequences for Alternatives

Comparison Matrix of Environmental Effects to resources of all alternatives are summarized in Table 3. The impacts of the No-Action and proposed action (preferred alternative), are described in more detail in Section 4.0 Environmental Consequences, of this EA.

Table 3. Comparison of impacts to resources analyzed for the Proposed Action (Preferred Alternative) and No-Action Alternative.

	Resources	Proposed Action (Preferred Alternative)	No-Action Alternative
Physical resources	Marine	Same as No Action but practices would be employed to minimize impacts to the benthos from anchoring, ROV, glider and CTD operations	No impacts
	Land	Same as No Action	No impacts
	Air	Same as No Action	No impacts
Biological Resources	Marine Mammals	Not likely to adversely effect marine mammals due minimal overlap of acoustic frequency with marine mammals in the area and downward orientation of the sonar. Minimization measures to be employed to reduce risk of vessel strike and sound further.	No impacts
	Endangered species and critical habitat	Risk of vessel strike during transit is insignficant and during surveying are discountable. Practices will	No impacts

		be employed to minimize risk further. Quality or quantity of critical habitat would not be impacted	
	Essential fish Habitat	Same as No-action, quantity or quality would not be impacted and therefore effects are discountable.	No impacts
Cultural resources		Same as No-action, except practices would focus on minimizing any potential contact from ROV, CTD operations. Some beneficial impact due to potential for new cultural resources could be found	No impacts
National Marine Sanctuaries		Same as No-Action	No impacts

5.0 Cumulative Effects

NCCOS is incorporating by reference the cumulative effects discussion in the OCS PEA section 5.3 (pp. 50-51), including potential climate change effects which NCCOS agrees would be negligible. However, as the OCS PEA does not include an analysis of the Caribbean region, NCCOS has included information regarding potential cumulative effects from the Puerto Rico and USVI region.

According to the USCG, the areas of highest volume vessel traffic in 2014 was centered primarily in the areas of transit between the port San Juan Puerto Rico, where the NOAA Ship Nancy Foster would be docked and St Thomas Harbor USVI (areas of red/orange, Figure 3). The proposed action areas, where hydrographic mapping would occur, have a relatively low traffic volume as depicted in Figure 5.

Other NOAA hydrographic survey activities which occurred in the region during 2014 and 2015 are listed below:

- Okeanus Explorer 2015 (OER)
- Nancy Foster 2015 (NOS)
- Nancy Foster 2015 (OAR)

- Pisces 2015 (NMFS)
- Nancy Foster 2014 (NOS)
- Nancy Foster 2014 (OAR)

In the reasonably foreseeable future NCCOS expects NOAA to continue to conduct 2-3 hydrographic cruises per year in this region that are a similar to these previous ones. geographic and temporal scope as previous years.

Maps reviewed from marinecadastre.gov website show there are no oil or gas platforms present in the region of the proposed cruise and no known seismic surveys are being conducted or have been conducted within the last 2 years in the area.

NCCOS determines that given the likelihood of adverse effects (based on this EA), the limited duration, infrequent occurrence and geographic scope of this cruise, that cumulative effects of these activities or reasonably foreseeable activities are minimal. In addition, any future activities that could result in significant effects would undergo further Environmental Compliance and NEPA analysis on a case-by-case basis.

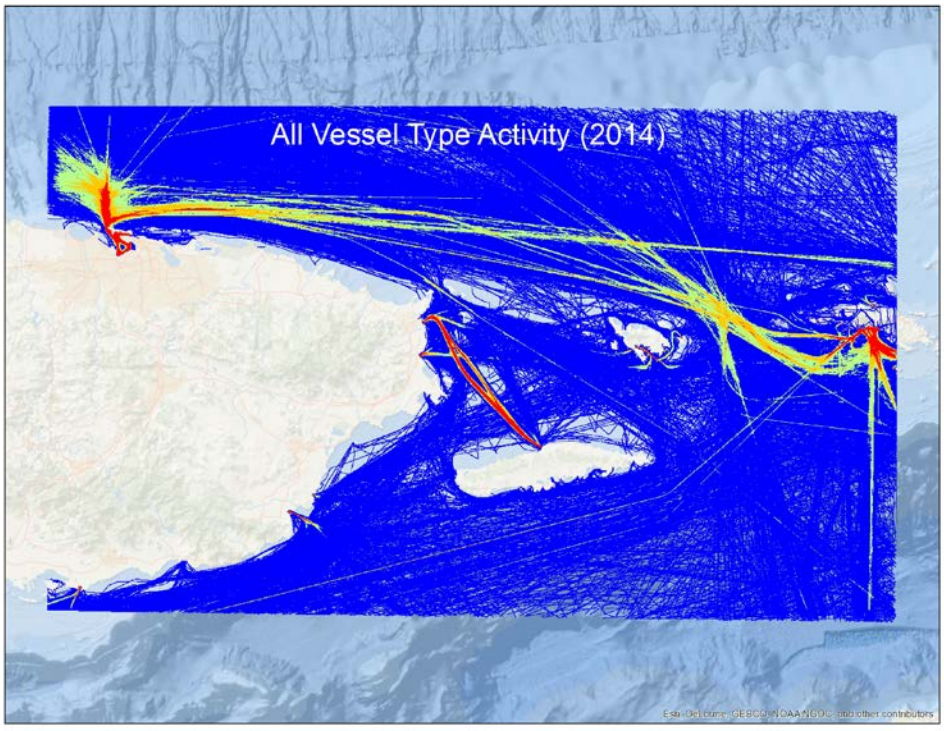

Figure 5. Color coding depicts level of vessel traffic for the action areas and area of transit in 2014 for the cruise. Red is the highest vessel activity and blue lines are the lowest the United States Coast Guard is the source of the information.

6.0 References

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Appendix A: Protective Measures and Best Management Practices

The following protective measures would be incorporated into the cruise plan and are listed below as described in Section 2.9 of the OCS Biological Opinion. However, there are additional measures set forth by DUSO VADM Michael Devany's memo of August 22, 2014, concerning entanglement measures and habitat impact precautions that would also be incorporated and are included here:

1. Minimize vessel disturbance and ship strike potential
    a. Slow speeds (4-8 knots), when mapping;
    b. Reduced speeds (<13 knots) when transiting through ranges of ESA-listed cetaceans (unless otherwise required, e.g., NOAA Sanctuaries);
    c. 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);
    d. Trained observers aboard all vessels; 100% observer coverage; and
    e. Species identification keys (for marine mammals, sea turtles, corals, abalone, and seagrasses) available on all vessels.

2. Upon Sighting Protected Species
    a. Multibeam echosounder transmissions will be suspended when ESA-listed whales are within range.
    b. For large whales, attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the animal has left the area.
    c. Reduce vessel speed to 10 knots or less as safety permits when whales are observed near an underway vessel. Always proceed with caution when a whale is sighted at the surface, as there may be additional submerged animals in the vicinity.
    d. When whales are sighted directly in the vessel's path or in close proximity to a moving vessel, reduce speed and shift the engine to neutral, as safety allows. Do not engage the engines until the animals are clear of the area.
    e. Maintain a distance of 200 yards (600 ft) or greater from large whales. Maintain a distance of 50 yards or greater from sea turtles or small marine mammals when possible.
    f. Vessels are prohibited from coming within 100 yards of humpback whales.

3. 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; and
    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.

e. Multibeam echosounder transmissions will be suspended when ESA-listed whales are within range.

4. Minimize vessel discharges (including aquatic nuisance species)
    a. Meet all Environmental Protection Agency 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; and
    g. Rinse anchor with high-powered hose after retrieval.

5. 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; and
    d. Minimize anchor drag.

6. Avoid collecting bottom samples in seagrass critical habitat
    a. There would be no sample collections of any kind conducted during this cruise.

7. Cetaceans
    a. Avoid approaching within 200 yards (182.9 m), 500 yards for right whales;
    b. Avoid critical habitat, when possible;
    c. Avoid using sonar frequencies < 180 kHz, when possible;
    d. Suspend multibeam sonar transmissions of < 125 kHz, when susceptible ESA-listed species (i.e., Southern Resident killer whale and Cook Inlet beluga whale [not in USVI/PR area) are within hearing range; and
    e. Suspend single beam sonar transmissions of 30 kHz when ESA-listed species are within hearing range.

8. Sea Turtles and Manatees
    a. Avoid approaching within 50 yards.

9. Entanglement Protective Measures (towed Conductivity Temperature and Depth recorder and ROV)
    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; and

c. Clearly mark lines in the event an animal does become entangled so that NMFS experts can identify the gear.

10. Habitat Protection
    a. Avoid contact of gear, towed or lowered, with the sensitive bottom habitat (e.g. submerged aquatic vegetation (SAV) and hard bottom); and
    b. Report deep sea coral bycatch and collect a sample of each species for species identification.

Appendix B. Consultation Requests and Letters of Concurrence

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

Memorandum

To: Pat Montanio, Director, Office of Habitat Conservation

From: Steve Thur, Deputy Director, NCCOS

Digitally signed by THUR.STEVEN.M.1365841299
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=THUR.STEVEN.M.1365841299
Date: 2016.03.15 14:53:06 -04'00'

Date: 03/15/2016

Subject: Request for abbreviated EFH consultation for activities to be conducted on the NCCOS cruise titled "Mapping Essential Fish Habitat in the US Caribbean to Inform MPA Management" (April 5-28, 2016)

Purpose of Memo:

Pursuant to 50 CFR 600.920 (h) and per the guidance set forth in DUSO VADM Michael Devany's memo of August 22, 2014 (available on request), NCCOS is requesting an abbreviated EFH consultation under §305(b) of the Magnuson-Stevens Fishery Consultation and Management Act (MSA;16 U.S.C. 1855(b)), that activities to be conducted during the March 25 to April 28, 2016 Nancy Foster cruise are not likely to adversely affect essential fish habitat (EFH) within the jurisdiction of NMFS. During this cruise NCCOS will map coral reef habitat and fishery resources using sonar and conduct ground truthing activities using ROVs and gliders.

This memo will:

1) Provide background and justification for the cruise
2) Describe activities and action area
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 plan to ensure compliance

Background and Justification for the Cruise:

NCCOS's Center for Coastal Monitoring and Assessment (CCMA) will be conducting the fourteenth year of an ongoing scientific research mission on board NOAA Ship Nancy Foster, (March 25-April 28, 2016), funded by NOAA's Coral Reef Conservation Program. The purpose of the cruise will be to collect multibeam sonar data to develop benthic seafloor habitat maps and integrate with sonar information on fish distribution and biomass to produce high-resolution maps of the coral reef habitats and fish use within the action area of the territorial waters of St. Thomas, USVI and Puerto Rico (Figure 1A 1B).

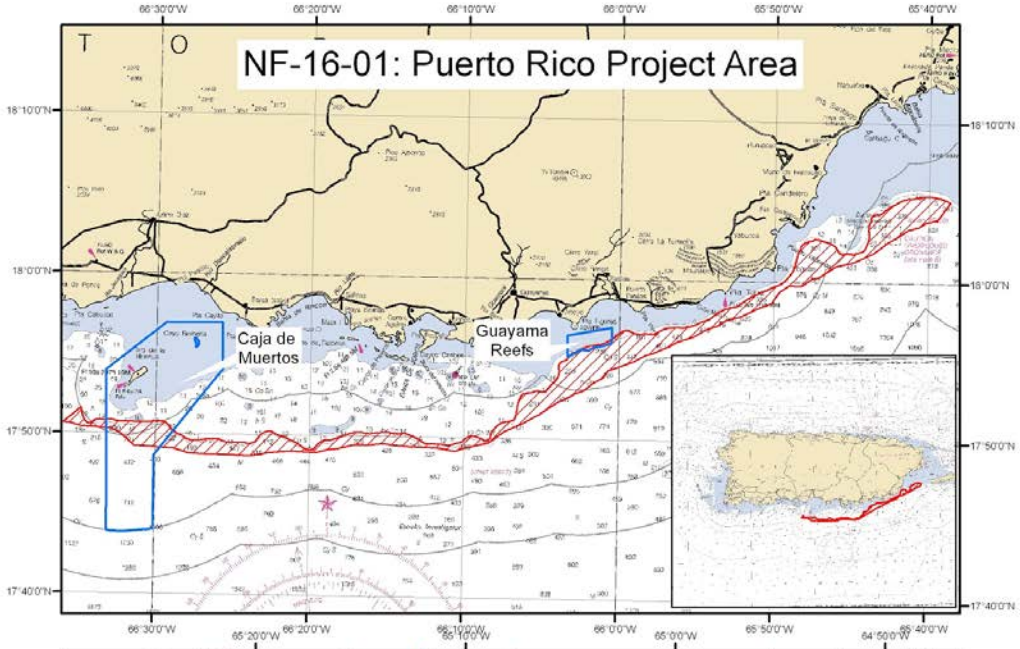
These habitat maps enhance the ability of coastal managers to assess, protect, and preserve the condition of coral reef ecosystems. Maps provide not only past and present data on the condition of coral reefs and how they are utilized by fishes but they also reveal the effectiveness of coral reef conservation over time, which areas need further protection, and which need alternate management measures.

To achieve our objectives we will be conducting the following activities on this cruise:

1. Multibeam sonar surveys (benthic habitat mapping - detecting seafloor)
2. Split beam sonar surveys (mapping fishery resources - within water column)
3. ROV ground-truthing deployment
4. Slocum glider deployment
5. Underway CTD deployment - Sound speed data collection

Action Areas: There are two primary action areas for cruise activities, the Puerto Rico area off the southeast coast of Puerto Rico (Figure 1A) and the St Thomas action area (Figure 1B). The strategies developed for each survey area take into account the minimum depths, general bathymetry, and time allotment to maximize efficiency. Transit area will be from San Juan USCG station to the St Thomas action area then to the Puerto Rico action area and back to San Juan for debarkation (Figure 2). It is anticipated that the two action areas will be comprised of a mix of habitat type including, but not limited to: unconsolidated sediment and hardbottom, colonized by live hard and soft coral, sponges and algae. Surveys in other areas in the vicinity, suggest that these locations will likely be dominated by algae with a patchy distribution of low density coral (0-25%). The water depth within the survey areas will range from 10 -1,500 m.

Figure 1. Map of action areas of the cruise, red hatched polygon depicts area of hydrographic and fisheries acoustics mapping, A. (top panel) Puerto Rico Project Area, B. (bottom panel) St. Thomas (USVI) Project Area, black line depicts location of shelf break. Glider will fly continuous operations north of the black line in this area throughout the duration of the cruise.


NF-16-01: Puerto Rico Project Area
Caja de Muertos
Guayama Reefs

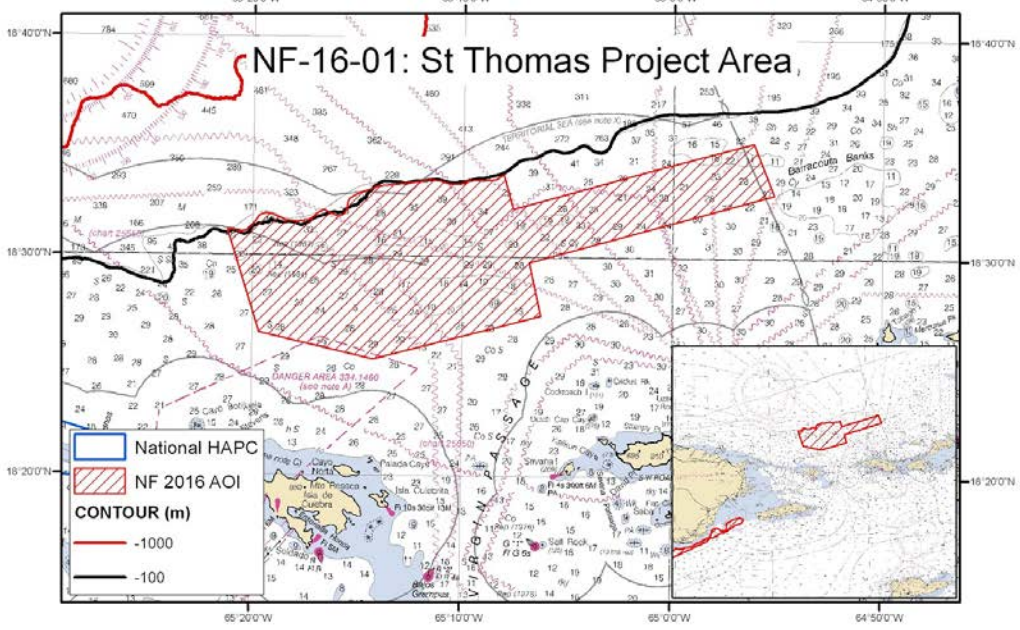
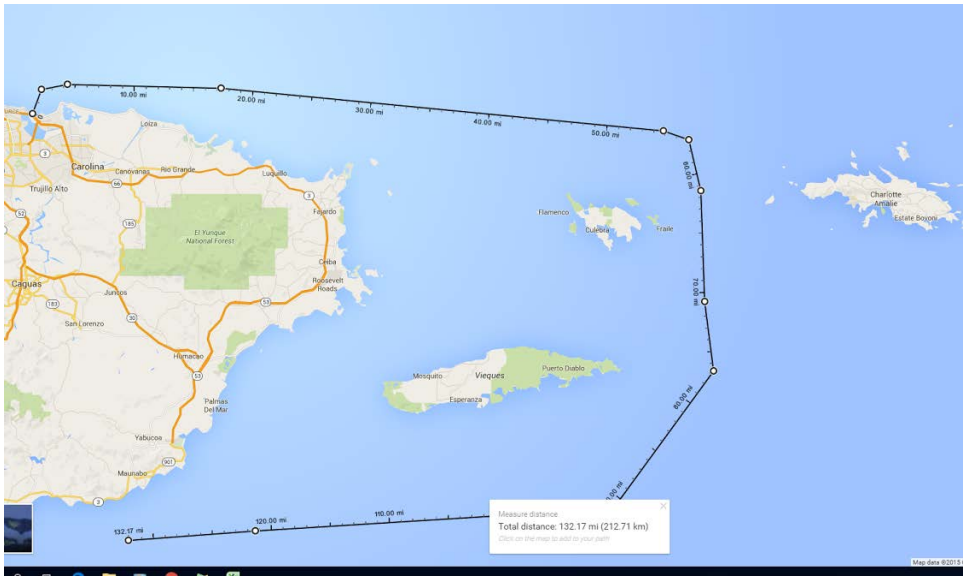

NF-16-01: St Thomas Project Area
National HAPC
NF 2016 AOI
CONTOUR (m)
-1000
-100

Figure 2. Map depicting a general transit path between San Juan (port of embarkation/debarkation and the two action areas. Actual path is dependent on many factors such as sea state and weather conditions and is at the discretion of the NOAA ship crew.



Proposed Activities:

The specific activities described below will be conducted and coordinated on a daily basis, with the exception of the Slocum Gliders, which will be deployed on day 1 of operations in the St. Thomas project area, and will be picked up on last day of study.

1. Multibeam bathymetry surveys - suitable for seafloor characterization to produce benthic habitat maps. The Nancy Foster will make a series of linear transects "mowing the lawn" at slow speeds (4-8 knots) using the echosounders described below, the choice of echosounder is dependent on depth.
    a. Multibeam will be collected using a hull mounted Kongsberg EM710 and Reson 7125 multibeam echosounders (sonar) with a potential for a 24 hour acquisition window and survey duration.
    b. Frequency of the Reson sonar is 400kHz, with effective operational depths from 10-100 m. The Kongsberg frequencies are between 65-100kHz with an effective operational depths from 100-2,000 m
    c. Power is set to the lowest possible level (approximately 190 - 210 dB re: 1 μPA with a duty cycle or "ping rate" set also to the lowest possible level (10-30Hz)

2. Single/Split beam sonar surveys - characterize broad-scale fish and plankton abundance, biomass, utilization patterns, and to locate and document fish spawning aggregations. These surveys occur concurrently with the multibeam bathymetry surveys described above.
    a. Use Kongsberg/Simrad EK60 operating at frequencies of 38, 120 and 200kHz
    b. Power is set to lowest possible level, nominally 200 dB re: 1 μPA, with a duty cycle of less than 10 Hz. Beam is maintained at less than 12 degree angle, which focuses the sound downward, with a small beam width.

3. Moderate depth ROV deployment and operation - purpose is for delineation and identification of seafloor habitats (ground truthing) through visual observations. ROV is launched from the ship and lowered on a cable using a power winch. ROV is tethered at all times. ROV will only be used in adequate visibility conditions and be maintained 1 to 2 meters above the substrate. We will employe BMPs and Protective measures to avoid, potential entanglement or habitat impact issues (see Last section).

4. Slocum glider operation - Two Slocum Glider G2s will be deployed from the NOAA ship to operate 24 hours a day for the duration of the project. The payload will include a CTD to collect oceanographic data and passive acoustic hydrophone in listening mode only, no sonar will be used on gliders. The vehicle will be programmed with a set path which will be monitored continuously by the Glider Operations Center, Stennis, MS. The Glider path will be oriented to transit along the shelf edge in water depths ranging from 100-300m depth (Figure 1B north of black line which depicts the shelf). No adverse impacts to the environment are anticipated from glider operations they will be programmed to avoid known obstructions, avoid striking the sea floor and to hover 1-2 meters above the benthos and to surface in the unlikely event of a collision.

5. Underway CTD deployment - Sound speed data collection will be acquired by towing a CTD behind the ship for approximately 5 minutes every four hours, to 75% of water depth with remaining 25% predicted. The purpose of this activity is to correct for refraction errors in echosounder data. All necessary measures for avoiding habitat impact and animal entanglement will be employed (see Last section).

6. Vessel Transit Operations - A depiction of a potential vessel transit path is shown in Figure 2, however the exact path is unknown, and will be subject to prevailing wind, currents and sea conditions. See Last Section of this document for a description of Protective Measures and BMPs for this activity.

7. Anchoring - While no anchoring is anticipated for this cruise as a result of science activities. 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. When working in a previously unsurveyed area or an area that has not been surveyed in many years, the vessel would first collect hydrographic data to provide information on where to drop the anchor (i.e., to avoid coral reefs and rocky seabed areas).

Summary of Daily activities are:

- From 1600-0800 (16 hours straight, overnight) - We will simultaneously, conduct multibeam bathymetry surveys using the, Reson 7125 or EM710 (depending on depth), and fishery acoustics with the SIMRAD EK60 using an operating speed of 4-7 kts. Underway towed CTD casts will be every 4 hours to 75% of water depth with remaining 25% predicted. Each cast will last approximately 5 minutes.

- From 0800-1600 - We will conduct ROV transects at 3-4 different locations within the action areas, in water depths 10-300m. The ROV will 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 ship operates only using Z-drives during ROV deployment. The ROV provides real-time video display, navigation and depths. The Chief scientists and ROV operator monitor bottom conditions to avoid disturbance of any EFH (i.e. ESA Corals)

Biological Resources and Environmental Statutes:
While this memo, is specific to an EFH abbreviated consultation request, here we include our analysis of the ship cruise activities and the potential environmental consequences not only as they relate to EFH but all of the following Environmental Statutes:

- 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 will be impacting resources under the USFWS, so no consultations with USFWS will be sought.

  There are 8 species of corals, 5 marine mammal species, 6 turtle species and 5 fish species within the action area that are listed as either endangered, threatened, candidate or a species of concern (Table 1). In addition there is also designated critical habitat for Elkhorn coral (Acropora palmata) and Staghorn coral (Acropora cervicornis) in the action area. No other Critical Habitat falls within the action or transit area of this cruise.

- 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). Surveying activities that use active acoustic sources in the water have the potential to result in Level B harassment and are the primary concern.

There are five species of threatened and endangered marine mammals whose potential ranges overlap with the action area of this cruise (Table 1). These include, Humpback Whale *(Megaptera novaeangliae),* Blue Whale *(Balaenoptera musculus),* Fin Whale (*Balaenoptera physalus*) *,* Sei Whale (*Balaenoptera borealis*) and Sperm Whale (*Physeter macrocephalus*). With the incorporation of protective measures we do not expect any adverse impacts to marine mammals as a result of cruise activities. There is minimal overlap between the functional hearing ranges of most marine mammal species in this area and the frequencies of the sonar to be used (Table 2). Therefore we conclude that these cruise activities are not likely to adversely affect the 5 species of marine mammals that with ranges that overlap with the action area of this cruise. However, we will be employing the Protective Measures and BMPs described in the Last Section of this document.

- 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 following species/taxa have essential fish habitat designated within the action area, Corals, Queen Conch, spiny lobster, Reef Fish, yellow fin tuna, blue marlin, Longbill Spearfish, Lemon Shark, Nurse Shark, Oceanic Whitetip Shark, Tiger Shark. Other species that may be found near the transit or the action area but not in it, include: big eye tuna, roundscale spearfish, sailfish,White Marlin, Bigeye Thresher Shark, Caribbean Reef shark. No adverse impacts are anticipated for these species as a result of cruise activities.

  According to the NOAA Habitat Conservation EFH mapper, two habitat areas of particular concern reside in the Puerto Rico action area, Guayama Reefs and Caja de Muertos (Figure 1A). No adverse impacts are expected from the activities on this cruise and there will be no specimen collections of any kind and no permits are required by the territorial governments for cruise activities.

- 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.). However, as no activities will be conducted within a National Marine Sanctuary, we will not be requesting a letter of concurrence pursuant to this act.

- 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, if an uncharted/unknown shipwreck were discovered as a result of 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 (Puerto Rico), contact information will be provided in cruise plan. In addition, to prevent misuse of the historic resource by the public, NCCOS will not disclose information, prior to consultation with the State Preservation Officer.

Protective Measures and Best Management Practices Incorporated into the Action

The following protective measures and BMPs will be incorporated into the cruise plan and are listed below. These include all applicable BMPs set forth by DUSO VADM Michael Devany's memo of August 22, 2014, concerning entanglement measures and habitat impact precautions.

1. Minimize vessel disturbance and ship strike potential
    a. Slow speeds (4-8 knots), when mapping
    b. Reduced speeds (<13 knots) when transiting through ranges of ESA-listed cetaceans (unless otherwise required, e.g., NOAA Sanctuaries)
    c. 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)
    d. Trained observers aboard all vessels; 100% observer coverage
    e. Species identification keys (for marine mammals, sea turtles, corals, abalone, and seagrasses) 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 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
    c. Avoid using sonar frequencies < 180 kHz, when possible
    d. Suspend multibeam sonar transmissions of < 125 kHz, when susceptible ESA-listed species (i.e., Southern Resident killer whale and Cook Inlet beluga whale) are within hearing range, however these species are not in action area.
    e. Suspend single beam sonar transmissions of 30 kHz when ESA-listed species are within hearing range

7. Sea Turtles and Manatees
    a. Avoid approaching within 50 yards

8. Entanglement Protective Measures (towed CTD and ROV)
    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)
    b. Avoid using ROV in low water visibility conditions, to ensure no impact with EFH or critical habitat.
    c. Report deep sea coral bycatch and collect a sample of each species for species identification

Tables

Table 1: U.S. Virgin Island's Threatened and Endangered Species from NOAA Fisheries Southeast region Protected Resources division (C=candidate species, E=endangered, T=threatened, P= Proposed, SOC=Species of concern) (see pdf found here)

Status	Species Name	Critical Habitat	Determination
Corals			
T	Elkhorn Coral (*Acropora palmata*)	not likely to destroy or adversely modify	TBD
T	Staghorn Coral (*Acropora cervicornis*)	not likely to destroy or adversely modify	TBD
T	Pillar coral *(Dendrogyra cylindrus)*	N/A	TBD
T	Lobed Star Coral *(Orbicella annularis*)	N/A	TBD
T	Boulder Star Coral (*Orbicella franksi*)	N/A	TBD
T	Rough Cactus Coral *(Mycetophyllia ferox)*	N/A	TBD
T	*Mountainous Star Coral* (*Orbicella faveolata*)	N/A	TBD
SOC	Ivory Tree Coral *Oculina varicosa*	N/A	TBD
Mammals			
E	Humpback Whale *(Megaptera novaeangliae)* baleen	N/A	TBD
E	Blue Whale (*Balaenoptera musculus*) baleen	N/A	TBD
E	Fin Whale (*Balaenoptera physalus*) baleen	N/A	TBD
E	Sei Whale (*Balaenoptera borealis*) baleen	N/A	TBD
E	Sperm Whale (*Physeter macrocephalus*) (toothed)	N/A	TBD
Sea Turtles			
E, T*	Green Turtle (*Chelonia mydas*)	N/A	TBD
E	Hawksbill Turtle (*Eretmochelys imbricata*)	N/A	TBD
E	Kemp's Ridley Turtle (*Lepidochelys kempii*)	N/A	TBD
E	Leatherback Sea Turtle	not likely to destroy or	TBD

	(*Dermochelys coriacea*)	adversely modify	
E, T*	Loggerhead Sea Turtle (*Caretta caretta*)	N/A	TBD
E, T*	Olive Ridley Sea Turtle (*Lepidochelys oliveacea*)	N/A	TBD
Fishes			
C	Dwarf Seahorse (*Hippocampus zosterae*)		TBD
PT	Nassau Grouper (*Epinephelus striatus*)	not likely to destroy or adversely modify	TBD
T/E	Scalloped hammerhead shark (*Sphyrna lewini*)		TBD
C	Smooth Hammerhead Shark *(Sphyrna zygaena)*		TBD
C	Caribbean Electric Ray *(Narcine bancroftii)*		TBD

*Some populations are considered threatened and others are considered endangered.
http://www.nmfs.noaa.gov/pr/species/esa/candidate.htm
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TABLE 2: 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

- **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.*

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

Memorandum

To: Cathy Tortorici (F/PR5)
Chief, Endangered Species Act Interagency Cooperation Division
Office of Protected Resources

From: Steven Thur,
Deputy Director, National Centers for Coastal Ocean Science

Digitally signed by THUR.STEVEN.M.1365841299
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=THUR.STEVEN.M.1365841299
Date: 2016.02.23 10:33:27 -05'00'

Date: 01/05/2016

Subject: Request for ESA section 7 letter of concurrence for activities to be conducted on the NCCOS cruise titled "Mapping Essential Fish Habitat in the US Caribbean to Inform MPA Management" (April 5 -28, 2016)

Purpose of Memo:
Per the guidance set forth in Deputy Under Secretary for Operations (DUSO) VADM Michael Devany's memo of August 22, 2014, National Centers for Coastal Ocean Science is requesting a letter of concurrence, under Section 7 of the Endangered Species Act, that activities to be conducted during the April 5-28, 2016 cruise are not likely to affect ESA-listed species or to destroy or adversely modify designated critical habitat or essential fish habitat (EFH) within the jurisdiction of NMFS. During this cruise NCCOS will map coral reef habitat and fishery resources using sonar and conduct ground truthing activities using ROVs and gliders.

With the exception of ROV activities, all activities to be conducted during this cruise are covered under the Coast Survey ESA Section 7 Biological Opinion (FPR-2013-9029 NMFS' Biological Opinion on OCS' Hydrographic Survey Program), hereafter referred to as OCS Biological Opinion.

This memo will:

1) Provide background and justification for the cruise
2) Describe activities and how they are covered (where applicable) under the OCS biological opinion)
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 plan to ensure compliance

Background and Justification for the Cruise:

NCCOS's Center for Coastal Monitoring and Assessment (CCMA) will be conducting the fourteenth year of an ongoing scientific research mission on board NOAA Ship Nancy Foster, (March 25-April 28, 2016), funded by NOAA's Coral Reef Conservation Program. The purpose of the cruise will be to collect multibeam sonar data to develop benthic seafloor habitat maps and integrate with sonar information on fish distribution and biomass to produce high-resolution maps of the coral reef habitats and fish use within the action area of the territorial waters of St. Thomas, USVI and Puerto Rico (Figure 1A 1B).

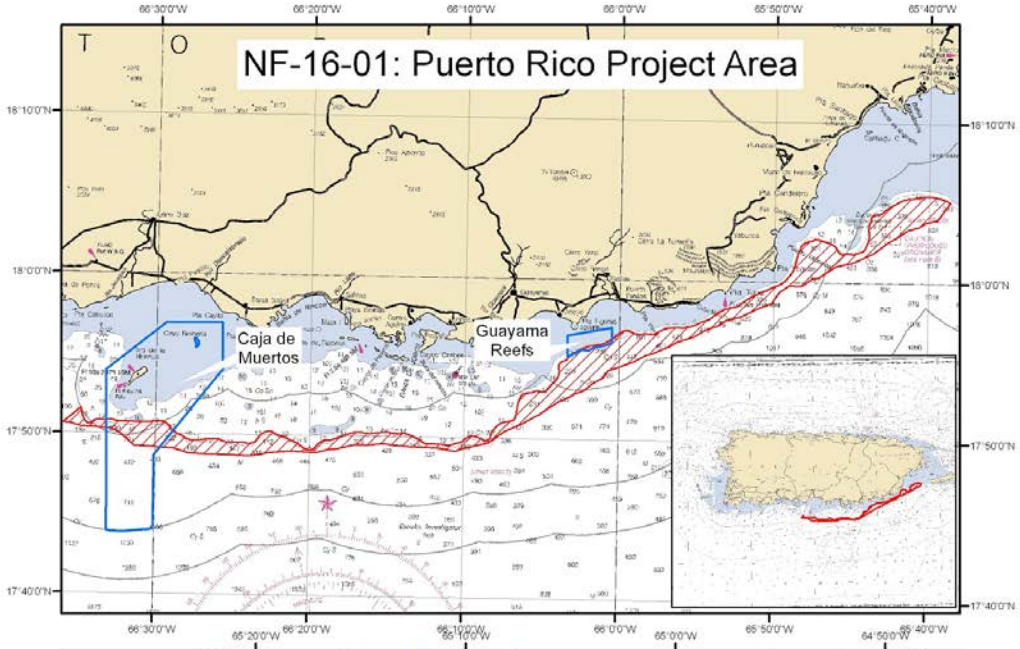
These habitat maps enhance the ability of coastal managers to assess, protect, and preserve the condition of coral reef ecosystems. Maps provide not only past and present data on the condition of coral reefs and how they are utilized by fishes but they also reveal the effectiveness of coral reef conservation over time, which areas need further protection, and which need alternate management measures.

To achieve our objectives we will be conducting the following activities on this cruise:

1. Multibeam sonar surveys (benthic habitat mapping - detecting seafloor)
2. Split beam sonar surveys (mapping fishery resources - within water column)
3. ROV ground-truthing deployment
4. Slocum glider deployment
5. Underway CTD deployment - Sound speed data collection

Action Areas: There are two primary action areas for cruise activities, the Puerto Rico area off the southeast coast of Puerto Rico (Figure 1A) and the St Thomas action area (Figure 1B). The strategies developed for each survey area take into account the minimum depths, general bathymetry, and time allotment to maximize efficiency. Transit area will be from San Juan USCG station to the St Thomas action area then to the Puerto Rico action area and back to San Juan for debarkation (Figure 2). It is anticipated that the two action areas will be comprised of a mix of habitat type including, but not limited to: unconsolidated sediment and hardbottom, colonized by live hard and soft coral, sponges and algae. Surveys in other areas in the vicinity, suggest that these locations will likely be dominated by algae with patchy distribution of low density coral (0-25%). The water depth within the survey areas will range from 10 -1,500 m.

Figure 1. Map of action areas of the cruise, red hatched polygon depicts area of hydrographic and fisheries acoustics mapping, A. (top panel) Puerto Rico Project Area, B. (bottom panel) St. Thomas (USVI) Project Area, black line depicts location of shelf break. Glider will fly continuous operations north of the black line in this area throughout the duration of the cruise.


NF-16-01: Puerto Rico Project Area
Caja de Muertos
Guayama Reefs

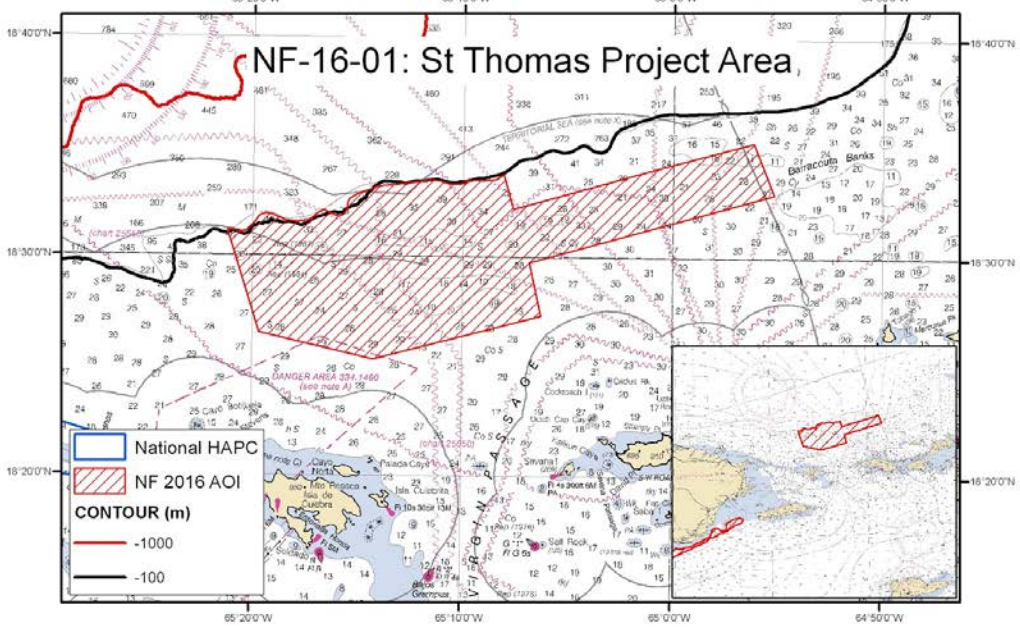
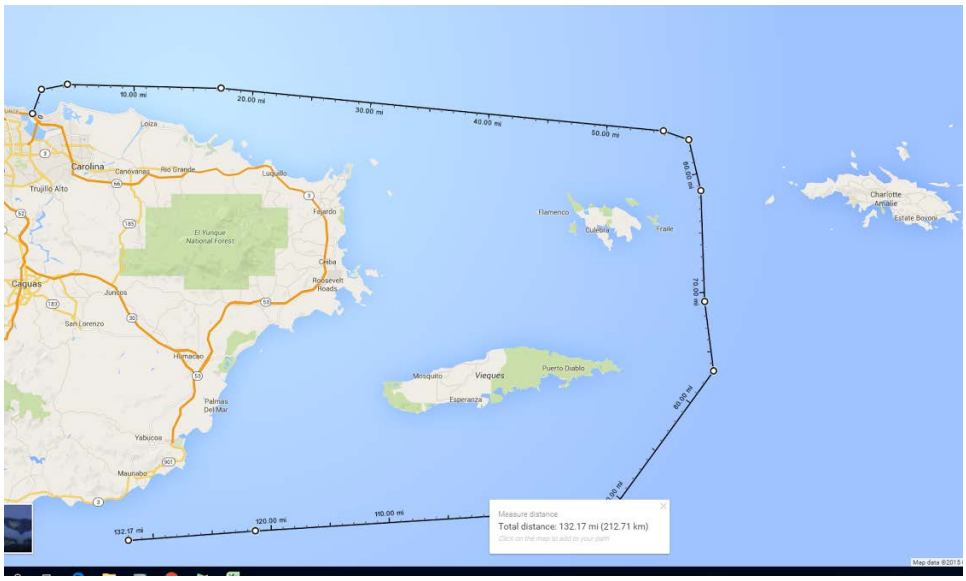

NF-16-01: St Thomas Project Area
National HAPC
NF 2016 AOI
CONTOUR (m)
-1000
-100

Figure 2. Map depicting a general transit path between San Juan (port of embarkation/debarkation and the two action areas. Actual path is dependent on many factors such as sea state and weather conditions and is at the discretion of the NOAA ship crew.



Proposed Activities:

The specific activities described below will be conducted and coordinated on a daily basis, with the exception of the Slocum Gliders, which will be deployed on day 1 of operations in the St. Thomas project area, and will be picked up on last day of study.

1. Multibeam bathymetry surveys - suitable for seafloor characterization to produce benthic habitat maps. The specifications described below and the activities to be conducted are similar to those described in Section 2.3, of the OCS Biological Opinion. Based on previous cruise experience, we anticipate that within the entire depth range to be surveyed 10 to 1500 m, we will only be passing over a given area one time. We estimate that there is a 1% chance that an area may be ensonified up to two times in less than 24 hours if any gaps in habitat map coverage are discovered. This applies to the single/split beam sonar surveys also, as they occur synergistically. Given the maximum survey speed of 7 knots, surveying 16 hours per day over 20 operational days we anticipate completing an area no larger than 202 sq km in the USVI area and 388 sq km in St. Thomas area (Figure 1).
    a. Multibeam will be collected using a hull mounted Kongsberg EM710 and Reson 7125 multibeam echosounders (sonar) with a potential for a 24 hour acquisition window and survey duration.

b. Frequency of the Reson sonar is 400kHz, with effective operational depths from 10-100 m. The Kongsberg frequencies are between 65-100kHz with an effective operational depths from 100-2,000 m
c. Power is set to the lowest possible level (approximately 190 - 210 dB re: 1 μPA with a duty cycle or "ping rate" set also to the lowest possible level (10-30Hz)

2. Single/Split beam sonar surveys - characterize broad-scale fish and plankton abundance, biomass, utilization patterns, and to locate and document fish spawning aggregations. The specifications for these activities are covered in Section 2.3, of OCS Biological Opinion.
    a. Use Kongsberg/Simrad EK60 operating at frequencies of 38, 120 and 200kHz
    b. Power is set to lowest possible level, nominally 200 dB re: 1 μPA, with a duty cycle of less than 10 Hz. Beam is maintained at less than 12 degree angle, which focuses the sound downward, with a small beam width.

3. Moderate depth ROV deployment and operation - purpose is for delineation and identification of seafloor habitats (ground truthing) through visual observations. ROV is launched from the ship and lowered on a cable using a power winch. ROV is tethered at all times. This activity is not covered or described in the OCS Biological Opinion, however we include below protective measures that will be adopted to avoid, potential entanglement or habitat impact issues.

4. Slocum glider operation - Two Slocum Glider G2s will be deployed from the NOAA ship to operate for the 24 hours a day for the duration of the project. This activity will be conducted as described under Section 2.7.3 of the OCS Biological Opinion. However, the gliders will be operated continuously for the duration of the cruise instead of for 16 hours at a time. The payload will include a CTD to collect oceanographic data and passive acoustic hydrophone in listening mode only, no sonar will be used on gliders. The vehicle will be programmed with a set path which will be monitored continuously by the Glider Operations Center, Stennis, MS. The Glider path will be oriented to transit along the shelf edge in water depths ranging from 100-300m depth (Figure 1B north of black line which depicts the shelf). No adverse impacts to the environment are anticipated from glider operations they will be programmed to avoid known obstructions, avoid striking the sea floor and to hover 1-2 meters above the benthos and to surface in the unlikely event of a collision.

5. Underway CTD deployment - Sound speed data collection will be acquired by towing a CTD behind the ship for approximately 5 minutes every four hours. This activity will be conducted as described under Section 2.4 of the OCS Biological Opinion. All necessary measures for avoiding habitat impact and animal entanglement will be employed.

6. Vessel Transit Operations - A depiction of a potential vessel transit path is shown in Figure 2, however the exact path is unknown, and will be subject to prevailing wind, currents and sea conditions. This activity is similar to description in Section 2.1 of the OCS Biological Opinion.

7. Anchoring - While no anchoring is anticipated for this cruise as a result of science activities. 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. When working in a previously unsurveyed area or an area that has not been surveyed in many years, the vessel would first collect hydrographic data to provide information on where to drop the anchor (i.e., to avoid coral reefs and rocky seabed areas).

Summary of Daily activities are:

- From 1600-0800 (16 hours straight, overnight) - We will simultaneously, conduct multibeam bathymetry surveys using the, Reson 7125 or EM710 (depending on depth), and fishery acoustics with the SIMRAD EK60 using an operating speed of 4-7 kts. Underway towed CTD casts will be every 4 hours to 75% of water depth with remaining 25% predicted. Each cast will last approximately 5 minutes.

- From 0800-1600 - We will conduct ROV transects at 3-4 different locations within the action areas, in water depths 10-300m. The ROV will 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 ship operates only using Z-drives during ROV deployment. The ROV provides real-time video display, navigation and depths. The Chief scientists and ROV operator monitor bottom conditions to avoid disturbance of any EFH (i.e. ESA Corals)

Biological Resources and Environmental Statutes:
This letter of concurrence request memo, examines the ship cruise activities and the potential environmental Consequences as they relate to the following Environmental Statutes:

- 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 will be impacting resources under the USFWS, so no consultations with USFWS will be sought.

  There are 8 species of corals, 5 marine mammal species, 6 turtle species and 5 fish species within the action area that are listed as either endangered, threatened, candidate or a species of concern (Table 1). In addition there is also designated critical habitat for Elkhorn coral

(Acropora palmata) and Staghorn coral (Acropora cervicornis) in the action area. No other Critical habitat falls within the action or transit area of this cruise.

Chief Scientist will obtain from the NOAA Ship the Marine Mammal and Turtle Observer Log Summaries and provide them to the NMFS OPR designated contact (please provide), following cruise completion.

Data collected during the cruise can be accessed at this website link. Specific information on accessing critical habitat or other information collected during the cruise can be accessed online or contact tim.battista@noaa.gov for more information.

- 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). Surveying activities that use active acoustic sources in the water have the potential to result in Level B harassment and are the primary concern.

  There are five species of threatened and endangered marine mammals whose potential ranges overlap with the action area of this cruise (Table 1). These include, Humpback Whale *(Megaptera novaeangliae),* Blue Whale *(Balaenoptera musculus),* Fin Whale (*Balaenoptera physalus*) *,* Sei Whale (*Balaenoptera borealis*) and Sperm Whale (*Physeter macrocephalus*). With the incorporation of protective measures we do not expect any adverse impacts to marine mammals as a result of cruise activities. There is minimal overlap between the functional hearing ranges of most marine mammal species in this area and the frequencies of the sonar to be used (Table 2). Therefore we conclude that these cruise activities are not likely to adversely affect the 5 species of marine mammals with ranges that overlap with the action area of this cruise. However, we will be employing the protective measures described in the section below.

  As stated above, Chief Scientist will obtain from the NOAA Ship the Marine Mammal and Turtle Observer Log Summaries and provide them to the NMFS OPR designated contact (please provide), following cruise completion. Associated habitat maps can be found at this link or by contacting tim.battista@noaa.gov.

- 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 following species/taxa have essential fish habitat designated within the action area, Corals, Queen Conch, spiny lobster, Reef Fish, yellow fin tuna blue marlin, Longbill Spearfish, Lemon Shark, Nurse Shark, Oceanic Whitetip Shark, Tiger Shark. Other species that may be found near the transit or the action area but not in it, include: big eye tuna, roundscale spearfish, sailfish,White Marlin, Bigeye Thresher Shark, Caribbean Reef shark. No adverse impacts are anticipated for these species as a result of cruise activities.

According to the NOAA Habitat Conservation EFH mapper, two habitat areas of particular concern reside in the Puerto Rico action area, Guayama Reefs and Caja de Muertos (Figure 1A). No adverse impacts are expected from the activities on this cruise and there will be no specimen collections of any kind and no permits are required by the territorial governments for cruise activities.

Data on critical habitat, EFH or other information collected during this cruise can be found at this link or by contacting tim.battista@noaa.gov.

- 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.). However, as no activities will be conducted within a National Marine Sanctuary, we will not be requesting a letter of concurrence pursuant to this act.

- 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, if an uncharted/unknown shipwreck were discovered as a result of 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 (Puerto Rico). In addition to prevent misuse of the historic resource by the public, NCCOS will not disclose information, prior to consultation with the State Preservation Officer.

Protective Measures and Best Management Practices Incorporated into the Action

The following protective measures will be incorporated into the cruise plan and are listed below as described in Section 2.9 of the OCS Biological Opinion. However, there are additional measures set forth by DUSO VADM Michael Devany's memo of August 22, 2014, concerning entanglement measures and habitat impact precautions that will also be incorporated and are included here:

1. Minimize vessel disturbance and ship strike potential
    a. Slow speeds (4-8 knots), when mapping
    b. Reduced speeds (<13 knots) when transiting through ranges of ESA-listed cetaceans (unless otherwise required, e.g., NOAA Sanctuaries)
    c. 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)
    d. Trained observers aboard all vessels; 100% observer coverage
    e. Species identification keys (for marine mammals, sea turtles, corals, abalone, and seagrasses) 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 abalone habitat (California vessels return to port, rather than anchor)
    d. Avoid anchoring in seagrass critical habitat
    e. Minimize anchor drag

5. Avoid collecting bottom samples in seagrass critical habitat
    a. There will be no sample collections of any kind conducted during this cruise

6. Underway CTD deployment
    a. Risk of vessel strike with Marine Mammals (BMPs) - (BMPs) and specs.
    b. Impacts on EFH (BMPs)
    c. Impacts on other ESA species (BMPs)
    d. Impacts to Habitat areas of particular concern (HAPC): Guayama Reefs, Caja de Muertos.
    e. Impacts from entanglement and minimization measures (BMPs)

7. Cetaceans
    a. Avoid approaching within 200 yards (182.9 m), 500 yards for right whales
    b. Avoid critical habitat, when possible
    c. Avoid using sonar frequencies < 180 kHz, when possible
    d. Suspend multibeam sonar transmissions of < 125 kHz, when susceptible ESA-listed species (i.e., Southern Resident killer whale and Cook Inlet beluga whale [not in USVI/PR area) are within hearing range

e. Suspend single beam sonar transmissions of 30 kHz when ESA-listed species are within hearing range

8. Sea Turtles and Manatees
    a. Avoid approaching within 50 yards

9. Entanglement Protective Measures (towed CTD and ROV)
    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.

10. Habitat Protection
    a. Avoid contact of gear, towed or lowered, with the sensitive bottom habitat (e.g. submerged aquatic vegetation (SAV) and hard bottom)
    b. Report deep sea coral bycatch and collect a sample of each species for species identification

Tables

Table 1: U.S. Virgin Island's Threatened and Endangered Species from NOAA Fisheries Southeast region Protected Resources division (C=candidate species, E=endangered, T=threatened, P= Proposed, SOC=Species of concern) (see pdf found here). ß - indicates the language was from the NMFS ESA Section 7 Consultation and Biological Opinion for the Office of Coast Survey hydrographic survey activities (pg 70).

Status	Species Name	Critical Habitat	Determination
Corals			
T	Elkhorn Coral (*Acropora palmata*)	not likely to destroy or adversely modify[ß]	TBD
T	Staghorn Coral (*Acropora cervicornis*)	not likely to destroy or adversely modify[ß]	TBD
T	Pillar coral *(Dendrogyra cylindrus)*	N/A	TBD
T	Lobed Star Coral *(Orbicella annularis*)	N/A	TBD
T	Boulder Star Coral (*Orbicella franksi*)	N/A	TBD
T	Rough Cactus Coral *(Mycetophyllia ferox)*	N/A	TBD
T	*Mountainous Star Coral* (*Orbicella faveolata*)	N/A	TBD
SOC	Ivory Tree Coral *Oculina varicosa*	N/A	TBD
Mammals			
E	Humpback Whale *(Megaptera novaeangliae)* baleen	N/A	TBD
E	Blue Whale (*Balaenoptera musculus*) baleen	N/A	TBD
E	Fin Whale (*Balaenoptera physalus*) baleen	N/A	TBD
E	Sei Whale (*Balaenoptera borealis*) baleen	N/A	TBD
E	Sperm Whale (*Physeter macrocephalus*) (toothed)	N/A	TBD
Sea Turtles			
E, T*	Green Turtle (*Chelonia mydas*)	N/A	TBD
E	Hawksbill Turtle (*Eretmochelys imbricata*)	N/A	TBD

E	Kemp's Ridley Turtle (*Lepidochelys kempii*)	N/A	TBD
E	Leatherback Sea Turtle (*Dermochelys coriacea*)	not likely to destroy or adversely modify	TBD
E, T*	Loggerhead Sea Turtle (*Caretta caretta*)	N/A	TBD
E, T*	Olive Ridley Sea Turtle (*Lepidochelys oliveacea*)	N/A	TBD
Fishes			
C	Dwarf Seahorse (*Hippocampus zosterae*)		TBD
PT	Nassau Grouper (*Epinephelus striatus*)	not likely to destroy or adversely modify	TBD
T/E	Scalloped hammerhead shark (*Sphyrna lewini*)		TBD
C	Smooth Hammerhead Shark *(Sphyrna zygaena)*		TBD
C	Caribbean Electric Ray *(Narcine bancroftii)*		TBD

*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

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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

- **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.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

APR - 1 2016

Mr. Steve Thur
Deputy Director
National Centers for Coastal Ocean Science
1305 East West Highway
Silver Spring, MD 20910

Re: Endangered Species Act Section 7(a)(2) concurrence letter for the activities to be conducted on the National Centers for Coastal Ocean Science cruise titled "Mapping Essential Fish Habitat in the U.S. Caribbean to inform MPA Management"

Refer to NMFS No: FPR-2013-9029

Dear Mr. Thur:

On January 5, 2016, NOAA's National Marine Fisheries Service (NMFS) received your request for concurrence that the activities conducted during the April 5-28, 2016, scientific research cruise in the U.S. Caribbean is not likely to adversely affect species listed as threatened or endangered or critical habitat designated under the Endangered Species Act (ESA). This response to your request was prepared by NMFS pursuant to section 7(a)(2) of the ESA, implementing regulations at 50 CFR 402, and agency guidance for preparation of letters of concurrence.

Below, we describe the proposed action, the ESA listed species that may be affected by the proposed action, and the minimization measures included in the proposed action; we consider the effects of the proposed action on listed species and critical habitats; and we explain the assumptions and uncertainties used in this evaluation.

Consultation History

On April 30, 2013, NMFS issued a biological opinion on the NOAA National Ocean Service Office of Coast Survey's proposal to conduct ongoing hydrographic (i.e., mapping) surveys in coastal waters nationwide. The formal consultation evaluated the effects of the suite of activities associated with the hydrographic surveys, including vessel transits, anchoring, hydrographic surveys, sound speed data collection, bottom sampling, tide gauge operations, testing of new survey products, and light detection and radar survey. The consultation concluded that the Office of Coast Survey's action was not likely to jeopardize any ESA-listed species, or adversely modify designated critical habitat. The National Centers for Coastal Ocean Science (NCCOS) Center for Coastal Monitoring and Assessment has been working with the Office of Protected Resources to develop a behavioral modeling technique for a Letter of Authorization under the Marine Mammal Protection Act.

On January 5, 2015, the NCCOS Center for Coastal Monitoring and Assessment submitted a memo requested a letter of concurrence under the ESA in a memorandum on its pending activities to take place in the U.S. Caribbean during its scientific research cruise funded by NOAA's Coral Reef Conservation Program.

Description of the Proposed Action

NCCOS proposes to conduct a coastal survey cruise April 5-28, 2016, in the territorial waters of St. Thomas, U.S. Virgin Islands, and Puerto Rico. The survey is being funded by the NOAA Coral Reef Conservation Program. The purpose of the cruise will be to develop benthic seafloor habitat maps using multibeam sonar data. These data will be integrated with sonar data on fish distribution and biomass to produce high-resolution maps of the coral reef habitats and fish use.

The habitat maps created as a result of this survey will allow coastal managers insight to the current status of coral reefs in the region, as well as fish distribution on the reefs. In addition, this information will allow enhanced management of coral reefs over time. Managers will be able to use the survey data to identify areas needing greater protection and evaluate conservation efforts.

To achieve research objectives, the cruise will conduct multibeam sonar surveys, split beam sonar surveys, remotely operated underwater vehicle ground-truthing deployment, Slocum glider deployment and underway sound speed profiler (e.g., an instrument that collects conductivity, temperature and depth data) deployment. Each technique is described below.

Multibeam Bathymetric Sonar Survey

NCCOS proposes to use high-frequency echosounders to conduct hydrographic surveys of the action area. An echosounder transmits an acoustic pulse, which travels through the water column, reflects off the seafloor and returns to the echosounder receiver. The time elapsed is multiplied by the speed of sound in water, measured independently throughout the survey, to measure water depth and ensonify (or visualize) the seafloor bottom.

In the proposed multibeam bathymetric sonar survey, NCCOS will use hull mounted Kongsberg EM710 and Reson 7125 multibeam echosounder sonar. Reson sonar operates at a frequency of 400 kHz, with effective operational depths from 10-100 m. The Kongsberg sonar operates at a frequency of 65-100 kHz with effective operational depths from 100-2,000 m. During operation, the power setting for both devices is at the lowest possible level (approximately 190-210 dB re: 1 µPA with a duty cycle set to 10-30 Hz). The proposed action will use two different multibeam echosounders because each has a unique operational depth and will thus be able to ensonify the sea floor at a variety of depths.

Split Beam Sonar Survey

For the proposed action, researchers will use a Kongsberg/Simrad EK60 operating at frequencies of 38, 120 and 200 kHz. Power will be set to the lowest possible level, nominally 200 dB re: 1 µPA, with a duty cycle of less than 10 Hz. The beam will be maintained at less than 12° angle, so that sound will be focused downward and with a small beam width. Single or split beam sonars are proposed for use in waters less than 20 m deep and in this survey will be used to characterize broad-scale fish and plankton abundance and use patterns.

Moderate Depth ROV Deployment and Operation
To delineate and identify seafloor habitats through visual observations, the proposed action will use a remotely operated vehicle (ROV) underwater. NCCOS will use a Mohawk ROV (53 x 31.25 x 25"). The ROV is equipped with a camera, and the visual images captured will be used to "ground-truth" the data collected by the other survey activities. This camera will also be used by the ROV operator and chief scientists to monitor sea floor conditions and avoid disturbance of any bottom features, essential fish habitat, ESA-listed corals or other species.

The ROV will be launched from the *R/V Nancy Foster* and lowered on a cable using a power winch. The ROV is tethered at all times. The ROV transects will be conducted at 3 to 4 different locations in water depths between 10 and 300 m. The ROV will be operated about 1 m above the sea floor. Transects will take approximately two hours. The ship and ROV will travel at about 0.5-1 knot during transects.

Slocum Glider Deployment
NCCOS proposes to use autonomous underwater vehicles (also known as gliders) for mapping activities. The gliders have depth ratings of 100-600 m, and can travel at speeds up to 4 knots. They will be programmed to avoid known obstructions, to avoid striking the sea floor, and to pause and reverse or surface in the event of a collision. During the cruise, two Slocum Glider G2s will be deployed and operate 24 hours a day for the duration of the cruise.

Action Area
Under the ESA, the "action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02).

The R/V *Nancy Foster* will transit from the San Juan U.S. Coast Guard Station to St. Thomas project area and then travel to the Puerto Rico project area before returning to San Juan (Figure 1). The action area for the proposed action includes the waters off the southeast coast of Puerto Rico, and St. Thomas U.S. Virgin Islands (Figure 2).

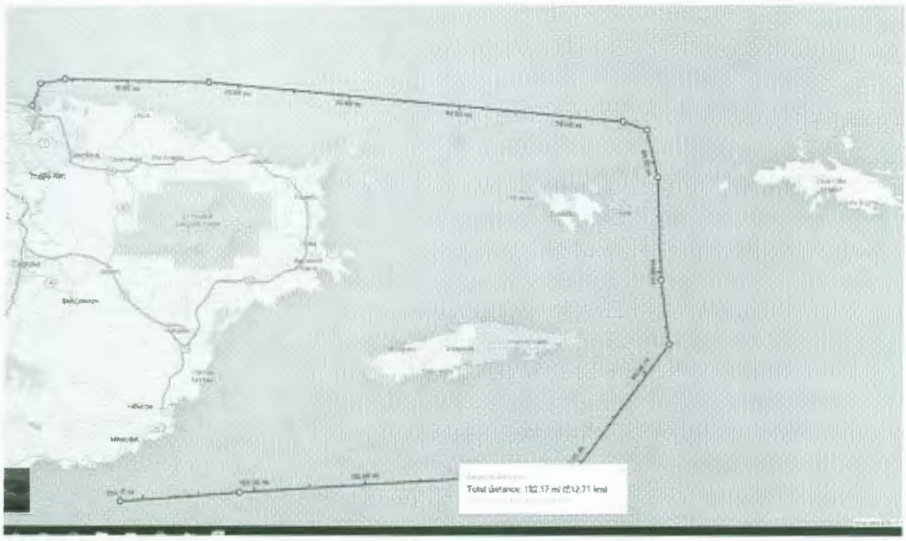

Figure 1 Map depicting the proposed general transit path of the NOAA Ship Nancy Foster during the NCCOS coastal survey. Image from Office of Coast Survey Memo 2016

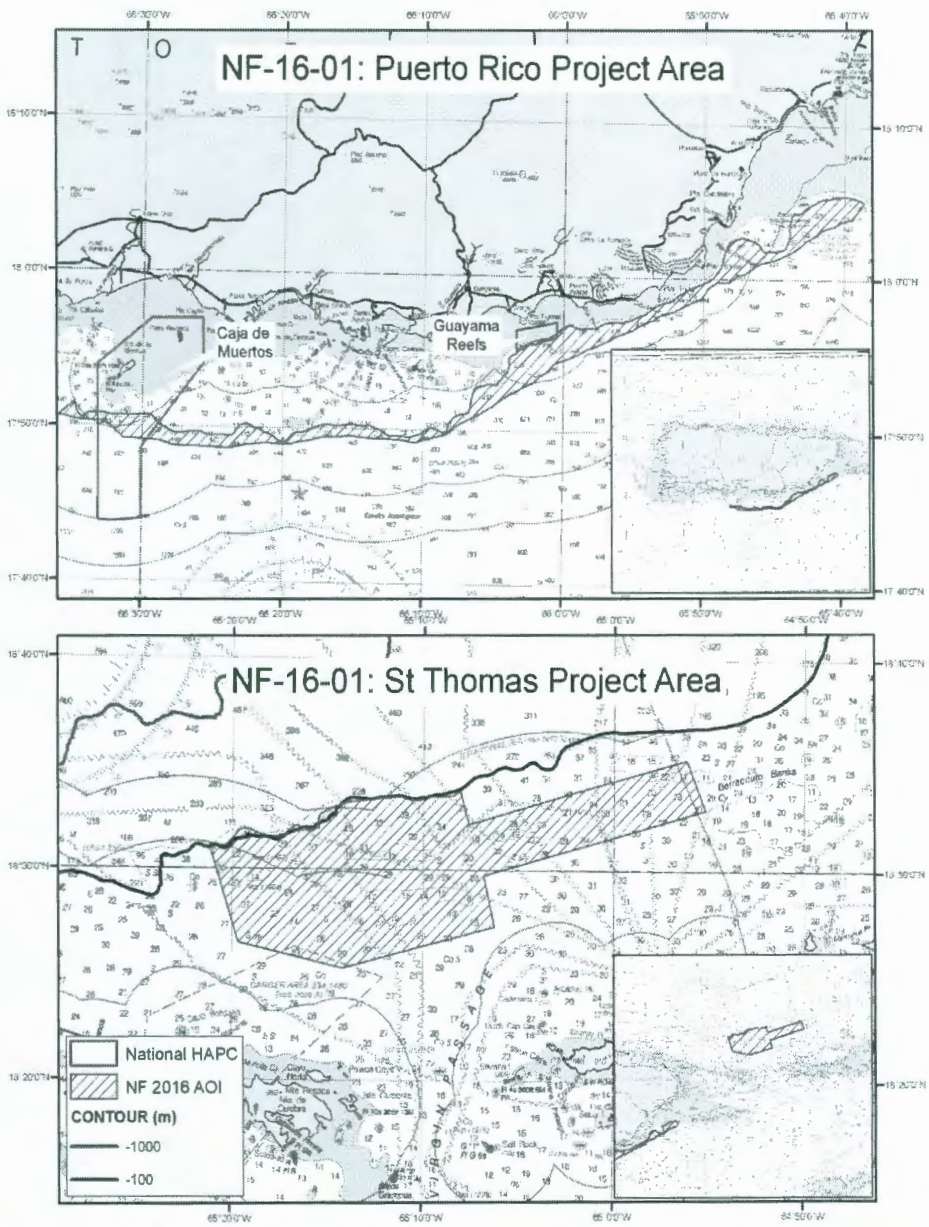

Figure 2 Map of the proposed action areas of the NCCOS coastal survey in Puerto Rico and St. Thomas. Image from Office of Coast Survey Memo 2016.

The benthic habitat in the action area is believed to be mixed, including unconsolidated sediment and hardbottom, colonized by live hard and soft coral, sponges and algae. Depths within the action area range from 10-1,500 m deep.

Minimization Measures

NCCOS's proposed action includes protective measures and best management practices to minimize or avoid exposure to ESA-listed resources. These measures are described in the 2013 biological opinion.

As discussed in the 2013 biological opinion, protected species observers would be on watch for ESA-listed species and other protected resources, providing 100% coverage during the survey. NCCOS would require any observations of marine mammals and sea turtles (the only ESA-listed species likely to be observed) to be recorded in their Observation Log, including the date, time, location, species, number of individuals, and response behavior (if any). They would also take a digital photograph. The information from the Observation Logs would be compiled, summarized, and provided to us at the end of each year.

NCCOS will provide the list of protective measures to all vessel captains and crew. They will explain that these measures are required to fulfill their ESA section 7 requirements, i.e., to ensure that their action does not jeopardize endangered or threatened species and does not adversely modify or destroy critical habitat. They will ensure compliance during surveys conducted aboard NOAA ships. They will strongly encourage compliance during transits aboard NOAA ships and record any instances of non-compliance.

In the event of unauthorized incidental take, NCCOS would suspend all activities causing such take and immediately contact us. They would request reinitiation in the event of unauthorized take, systematic noncompliance, unanticipated adverse effects, or modification of the action.

The minimization measures described below include those considered in the 2013 biological opinion, in addition to new measures. As a result of the August 22, 2014, memo from Deputy Under Secretary for Operations Vice Admiral Michael Devany, the Office of Coast Survey incorporated additional measures to mitigate concerns regarding entanglement and habitat impact precautions. These measures (released after the 2013 biological opinion) are also described here, as well as the measures concerning ROV deployment and operation, developed for this action.

- Minimize vessel disturbance and ship strike potential
    - Slow speeds (4-8 knots), when mapping
    - Reduced speeds (less than13 knots) when transiting through ranges of ESA-listed cetaceans (unless otherwise required, e.g., NOAA Sanctuaries)
    - Reduced speeds (less than13 knots) while transiting through designated critical habitat (unless slower speeds are required, e.g., while traveling through a protected area)
    - Trained observers aboard all vessels; 100% observer coverage
    - Species identification keys (for marine mammals, sea turtles, corals, abalone, and seagrasses) available on all vessels
- Minimize noise
    - Reduced speed (see above)
    - Multibeam surveys using 50 kHz frequencies or higher, lowest possible power and ping-rate
    - Single beam surveys using 30 kHz frequencies or higher, lowest possible power and ping-rate, and 12° beam angle.
    - 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.

- Minimize vessel discharges (including aquatic nuisance species)
  - Meet all Environmental Protection Agency Vessel General Permits and Coast Guard requirements
  - Avoid discharge of ballast water in designated critical habitat
  - Use anti-fouling coatings
  - Clean hull regularly to remove aquatic nuisance species
  - Avoid cleaning of hull in critical habitat
  - Avoid cleaners with nonylphenols
  - Rinse anchor with high-powered hose after retrieval
- Minimize anchor impact to corals, seagrass or other Essential Fish Habitat
  - Use designated anchorage area when available
  - Use mapping data to anchor in mud or sand, to avoid anchoring on corals
  - Minimize anchor drag
- Cetaceans
  - Avoid approaching within 200 yards (182.9 m), 500 yards for right whales
  - Avoid designated critical habitat, when possible
  - Avoid using sonar frequencies less than 180 kHz, when possible
  - Suspend multibeam sonar transmissions of less than 125 kHz, when susceptible ESA-listed species (i.e., Southern Resident killer whale and Cook Inlet beluga whale [not in the action area]) are within hearing range
  - Suspend single beam sonar transmissions of 30 kHz when ESA-listed species are within hearing range
- Sea Turtles
  - Avoid approaching within 50 yards
- Entanglement Protective Measures (towed Conductivity Temperature and Depth recorder and ROV)
  - Use stiffer line materials for towing and keep taut during operations to reduce potential for entanglement
  - Reduce knots in the line as much as possible
  - Clearly mark lines in the event an animal does become entangled so that NMFS experts can identify the gear.
- Habitat Protection
  - Avoid contact of gear, towed or lowered, with the sensitive bottom habitat (e.g., submerged aquatic vegetation and hard bottom)

Affected Species and Critical Habitat

The proposed action has the potential to affect ESA-listed species that occur in the waters of the Atlantic Ocean surrounding Puerto Rico and the U.S. Virgin Islands. Only those species with current ranges or designated critical habitat that overlap the action area are included (Table 1).

Table 1. ESA-listed species and designated critical habitat that may be affected by the Office of Coast Survey's hydrographic survey in the waters of the Atlantic Ocean surrounding Puerto Rico and the U.S. Virgin Islands.

Species	ESA Status	Critical Habitat
Marine Mammals – Cetaceans		
Humpback whale (*Megaptera novaeangliae*)	Endangered	N/A
Blue whale (*Balaenoptera musculus*)	Endangered	N/A
Fin whale (*Balaenoptera physalus*)	Endangered	N/A
Sei whale (*Balaenoptera borealis*)	Endangered	N/A
Sperm whale (*Physeter macrocephalus*)	Endangered	N/A
Sea Turtles		
Green sea turtle (*Chelonia mydas*) (Florida & Mexico's Pacific coast colonies)	Endangered	N/A
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered	63 FR 46693
Kemp's Ridley sea turtle (*Lepidochelys kempii*)	Endangered	N/A
Leatherback sea turtle	Endangered	44 FR 17710
Loggerhead sea turtle (*Caretta caretta*) Northwest Atlantic Ocean Distinct Population Segment	Threatened	79 FR 39856
Olive Ridley sea turtle (*Lepidochelys olivacea*) All other areas	Threatened	N/A
Fishes		
Nassau grouper (*Epinephelus striatus*)	Proposed Threatened	N/A
Scalloped hammerhead shark (*Sphyrna lewini*) Central and Southwest Atlantic DPS	Threatened	N/A
Invertebrates		
Elkhorn coral (*Acropora palmate*)	Threatened	73 FR 72210
Staghorn coral (*Acropora cervicornis*)	Threatened	73 FR 72210
Pillar coral (*Dendrogyra cylindrus*)	Threatened	N/A
Lobed star coral (*Orbicella annularis*)	Threatened	N/A
Boulder star coral (*Orbicella franksi*)	Threatened	N/A
Rough cactus coral (*Mycetophyllia ferox*)	Threatened	N/A
Mountainous Star Coral (*Orbicella faveolata*)	Threatened	N/A

Effects of the Action

Under the ESA, "effects of the action" means the direct and indirect effects of an action on the listed species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action (50 CFR 402.02). The applicable standard to find that a proposed

action is not likely to adversely affect listed species or critical habitat is that all of the effects of the action are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species or critical habitat. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur.

Effects of the Action: Deployment and Operation of Survey Equipment

Stressors related to deployment and operation of survey equipment were identified in the 2013 biological opinion. These included injury due to anchoring, bottom sampling or buoy installation, noise disturbance due to tide gauge installation, and sonar noise. The proposed action will not include any bottom sampling, buoy installation, or tide gauge installation, so those aspects of the stressors are not discussed here. The equipment used during the proposed action could cause acoustic disturbance and sonar noise; these will be discussed below.

Equipment Operation

Deployment and operation of equipment during the proposed action could affect ESA-listed species through acoustic disturbance and interaction with deployed equipment. Marine mammals, sea turtles, fishes, and corals have been exposed to vessel noise in the area in the past, and no disturbances from or sensitivities to noise from winch operations are known although a response could occur. The distance between the vessel and observed marine mammals and sea turtles, per avoidance protocols, would minimize and possibly avoid the potential for acoustic disturbance from equipment operation. Therefore, acoustic disturbance effects from equipment operation would be insignificant.

The minimization measures integrated into the proposed action ensure that ESA-listed marine mammals and sea turtles would not likely interact with deployed instruments because equipment would be recovered if the vessel is in close proximity to a marine mammal or sea turtle or if either species is attracted to the instruments.

The minimization measures integrated into the proposed action ensure that ESA-listed fishes and corals would not by impacted by the deployment and operation of equipment. There is no biological sampling of any kind proposed for this action. The equipment is designed to operate in the water column. The ROV has a camera on it, making it possible for personnel to avoid fish and corals, and the Slocum glider is programmed to avoid collisions. The minimization measures in place ensure that ESA-listed resources will not be impacted by anchoring. We conclude that there is minimal likelihood that the equipment will hit substrate, corals, or fish while in use, and that the effects to ESA-listed fishes and corals are discountable.

Sonar Noise

Three devices proposed for use during the survey possess sonar that will operate at frequencies which could be within the hearing range of certain marine species—the multibeam echosounder, the single/split beam sonar, and the ROV (Table 2).

Table 2 Operating frequencies of devices proposed for use in the NCCOS hydrographic coast survey in the waters surrounding Puerto Rico and the U.S. Virgin Islands.

Device	Operating Frequency
Multibeam Echosounder Reson Sonar	400 kHz
Multibeam Echosounder Kongsberg	65-100 kHz
Single/Split Beam Sonar	38, 120, 200 kHz
ROV	310, 675 kHz or 1MHz

The functional hearing range of ESA-listed baleen whales (humpback, blue, fin and sei whales) is 7 Hz to 25 kHz. The single/split beam sonar, the ROV and both multibeam echosounders operate outside the functional hearing range of these whales, meaning that operation of these devices are not likely to affect ESA-listed baleen whales.

Toothed whales, including sperm whales, have a functional hearing range of 150 Hz to 160 kHz. The multibeam echosounder Reson, the single/split beam sonar, and the ROV operate outside this range. However, the multibeam echosounder Kongsberg sonar will operate at a range within the functional hearing range of sperm whales.

Sperm whales have been observed in Puerto Rico and the Virgin Islands; in a summary of cetacean sightings in the region over 40 years, 43 sperm whales were sighted. According to the available data, sperm whales are rarely seen within the action area from April through September (Mignucci-Giannoni 1998). As such, we believe it is very unlikely that sperm whales will be exposed to the proposed action, since the action takes place in April. The minimization measures further reduce the likelihood of exposure. Multibeam echosounder transmissions will be suspended when ESA-listed whales are within range. The research vessel will also avoid approaching cetaceans within 200 yards (600 ft). Due to the minimization measures and that it is unlikely that sperm whales will be present in the action area, we conclude that the effects of the proposed action to sperm whales would be discountable.

Slocum Gliders

The use of Slocum gliders was analyzed in the 2013 biological opinion; however, their use in the proposed action will be for a longer duration (24 hours) than analyzed in the consultation (16 hours). The gliders will be monitored continuously and travel on a predetermined route. They will be programmed to avoid known obstructions, avoid striking the sea floor, and to pause and reverse or surface in the event of a collision. There will be no sonar used on the gliders. We do not believe that there are any additional risks or effects from the Slocum gliders operating for a longer duration than previously analyzed, and conclude that the effects would be insignificant.

Remotely Operated Vehicles

The use of ROVs was not analyzed in the 2013 biological opinion, and the NCCOS has proposed to use a ROV in this survey. A ROV is an underwater observation vehicle connected to a computer operated by personnel on board the ship. The operator directs the ROV to use its camera to photograph the sea floor. The ROV is tethered at all times.

Possible stressors from the ROV during the proposed activities are similar to the other equipment in the action, and include entanglement from the tether during operation and equipment strike

(which could include the hitting coral reefs, substrate, or an ESA-listed species while in the water column).

The ROV is controlled by an operator who will have visual of the surroundings during operation, and thus avoid interaction by navigating the ROV away, thereby reducing the likelihood that the ROV will strike any ESA-listed resource while in use. To reduce the risk of entanglement from the tether attached to the ROV, the Office of Coast Survey proposed mitigation measures. These include using a stiff line material, keeping the line taut during operations and reducing knots in the line as much as possible. Due to the minimization measures which ensure that the proposed use of the ROV would not likely impact ESA-listed resources, the effects from ROV use are discountable.

Effects of the Action: Vessel Activity
The 2013 Biological Opinion identified several stressors associated with the Office of Coast Survey's hydrographic surveys in coastal waters. These included vessel activity (strike, noise, visual disturbance, transit, discharges, and introduction of aquatic nuisance species).

When the vessel transits to and from the survey areas, potential effects on the ESA-listed species include acoustic disturbance and vessel strikes. Combined vessel noise and presence could cause slight marine mammal response or behavioral interruptions, but they will be minor and insignificant as the vessel moves away from any marine mammals. The distance between the vessel and observed marine mammals, per avoidance protocols, will minimize the potential for acoustic disturbance from engine noise. Similarly, adherence to observation and avoidance procedures is expected to avoid vessel strikes. Therefore, effects from vessel transit would be insignificant.

Because the vessel will move at a very slow speed during the survey, a strike of marine mammals or sea turtles would be improbable and extremely unlikely. Therefore, effects from vessel strikes during the survey would be discountable.

Effects to critical habitat
The proposed action may occur within ESA-listed critical habitats that have been designated for: hawksbill and leatherback sea turtles, and elkhorn and staghorn coral.

Critical habitat for hawksbill sea turtle is located at Mona Island, off the southwest coast of Puerto Rico, outside the proposed action area. Critical habitat for leatherback sea turtle is located at St. Croix, U.S. Virgin Islands; the proposed action will take place in the coastal waters of St. Thomas, U.S. Virgin Islands. Therefore, the proposed action would not adversely affect hawksbill or leatherback sea turtle critical habitat.

Critical habitat for elkhorn and staghorn coral is designated within the action area, in the marine waters of Puerto Rico and St. Thomas. Activities which are identified as affecting coral critical habitat are those that impact water quality by increasing nutrients or sediments. The proposed action will not entail activities that impair the primary constituent elements of the critical habitat, because the activities will not affect bottom habitat. The researchers will use designated anchorage areas and use mapping data to only anchor in appropriate areas (e.g., mud or sand). In

addition, there will be no sample collections of any kind during the proposed research cruise, further reducing the likelihood of contact with substrate or corals. We conclude that the proposed action will not destroy or adversely modify designated critical habitat for elkhorn or staghorn coral.

Conclusion

After review of the proposed action including minimization measures, using substantive requirements of ESA section 7 and using the best scientific and commercially available data, we determined the likelihood of disturbance or injury from deployment or operation of research equipment would be discountable and that the likelihood of vessel strikes would be discountable. Therefore, we concur that the proposed action is not likely to adversely affect any ESA-listed whale, sea turtle, fish, or invertebrate.

NMFS also determined critical habitat for leatherback and hawksbill sea turtles and for staghorn and elkhorn coral is not likely to be adversely affected.

Reinitiation of Consultation

As provided in 50 CFR 402.16, the Office of Coast Survey must reinitiate ESA consultation if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, the action is modified in a manner causing effects to listed species or critical habitat not previously considered, or a new species is listed or critical habitat designated that may be affected by the action. The incidental take of ESA-listed species associated with this action, including behavioral harassment, injury, or mortality, is not anticipated nor exempted; thus, if take occurs as a result of the action, the Office of Coast Survey must immediately contact the NMFS Office of Protected Resources Interagency Cooperation Division to develop and implement mitigation to avoid additional take or initiate formal consultation in accordance with ESA section 7(a)(2). Our point of contact is Ms. Cathy Tortorici at (301) 427-8495 or cathy.tortorici@noaa.gov.

Please direct questions regarding this letter to Colette Cairns, NMFS Office of Protected Resources, at (301) 427-8414 or colette.cairns@noaa.gov.

Sincerely,

for Donna S. Wieting
Director
Office of Protected Resources

Literature Cited:

Mignucci-Giannoni, A. 1998. Zoogeography of cetaceans off Puerto Rico and the Virgin Islands. Caribbean Journal of Science. 34, 3-4. 173-190.

Appendix C – Aug 22, 2014 Memo and BMPs from Admiral Devaney

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UNITED STATES DEPARTMENT OF COMMERCE
The Deputy Under Secretary for Operations
Washington, D.C. 20230

AUG 2 2 2014

MEMORANDUM

TO: Dr. Holly Bamford, Assistant Administrator, NOS
Mark Paese, Assistant Administrator (Acting), NESDIS
Craig McLean, Assistant Administrator (Acting), OAR
Patricia Montanio, Assistant Administrator, PPI
RADM David Score, Director, OMAO
Eileen Sobeck, Assistant Administrator, NMFS
Dr. Louis Uccellini, Assistant Administrator, NWS

FROM: VADM Michael S. Devany, Deputy Under Secretary for Operations

SUBJECT: Promoting Compliance with NOAA's Environmental Statutes

PURPOSE:
To be better environmental stewards by improving NOAA's compliance with NOAA's environmental statutes by directing NOAA Line Offices to undertake specific, immediate compliance steps and by offering assistance to NOAA programs through training, coordination and regular communication on the subject of compliance.

BACKGROUND:
- Environmental statutes of particular concern are those which NOAA manages, including the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and the National Marine Sanctuary Act (NMSA).
- Each Line/Staff Office maintains responsibility for environmental compliance in all of its programs. Assistant Administrators (AAs) understand that significant progress must be made on non-compliant programs.
- Each Line Office[1] has designated an individual to serve as their environmental compliance lead (LO Lead), who is tasked with supporting their AA in ensuring compliance with the environmental statutes listed above. As of August 2014, the LO Leads are:

OAR:	Gary Matlock
NESDIS:	John Gironda
NMFS:	Steve Leathery
NOS:	David Holst
NWS:	Scott Burgoon
OMAO:	Bill Cunningham

[1] PPI does not maintain an LO Lead because its activities are entirely administrative. For the purposes of this memorandum, OMAO is considered a Line Office.

- This directive is largely derived from the work of the NOAA Compliance Working Group, including their NOAA Statutes Institutional Plan (which was never finalized). This memo provides the way forward for managing these issues at NOAA, including establishment of a successor working group.

DIRECTIVES TO PROMOTE ENVIRONMENTAL COMPLIANCE WITHIN THE LINE OFFICES:

1. **Establishment of the STATUTES Working Group:** This directive establishes the **S**upport, **T**raining **A**nd **T**echnical **U**nderstanding of **T**he **E**nvironmental **S**tatutes (STATUTES) Working Group. The STATUTES Working Group will be led by the NMFS Office of Protected Resources; its scope and mission will be:
    - **Membership:**
        - all Line Office Environmental Compliance Leads;
        - NOAA statute experts (at least one person for each NOAA statute - ESA, MMPA, NMSA, and MSA[2]); and
        - a representative from PPI with experience in NEPA.
    - **Training:** the STATUTES Working Group will develop and provide training for NOAA Line, Staff, and Program Offices.
    - **Issues:** the STATUTES Working Group will serve as a forum for sharing information, and raising and discussing environmental compliance issues as they arise.
    - **Compliance Resources:** the STATUTES Working Group will compile, assimilate, and post environmental compliance resources on line.

2. **Role of Line Office Compliance Leads:** In accordance with the "*Compliance with NOAA's Environmental Statutes*" memorandum (April 19, 2012), LO leads must assist the AA in executing the agreed-upon compliance steps for their respective office. This includes:
    - actively ensuring compliance with the NOAA environmental statutes for all Program Offices in their Line Office;
    - developing and overseeing the plan/schedule for maintaining/bringing programs into compliance;
    - identifying potential compliance challenges and elevating those issues to the DAA or AA as required; and
    - maintaining regular and direct access to their AA in order to keep Line Office leadership up-to-date on matters relevant to compliance with NOAA statutes.

3. **Implementation of Best Management Practices:** LOs must consider Best Management Practices for reducing impacts to resources protected by the NOAA statutes listed above, as appropriate for the mission or operation under consideration. The *Environmental Impact Avoidance and Mitigation Measures* guidance document (attached as Attachment A) includes

[2] Specifically, staff with expertise in ESA section 7 interagency consultations and section 10 permits; MMPA section 101 incidental take authorizations and section 104 directed take permits; NMSA sanctuary regulations for permits and section 304(d) consultations; and MSA consultations for Essential Fish Habitat (EFH).

a list of Best Management Practices that are broadly applicable to NOAA's operations and trust resources.

4. **Present Compliance Progress at the NOAA Executive Panel (NEP):** Deputy AAs must present recent progress made by their Line Office to me on a quarterly basis during scheduled meetings of the NEP. The specific issues to be addressed in these presentations are provided in Attachment B.

5. **Compliance Responsibilities for NOAA Programs onboard OMAO Platforms:** When a NOAA program makes use of an OMAO platform (ship, boat, aircraft, or other conveyance), the NOAA program undertaking the mission (the "mission office") will be responsible for determining what steps are required for the proposed cruise to bring NOAA into compliance with all applicable federal environmental laws, including the NOAA statutes listed above. These steps may include, but are not limited to, securing permits or authorizations, or completing formal or informal consultations.

   The mission office will perform all necessary identified compliance steps, with input provided by OMAO on any transiting, navigation, or other platform operations required to support or conduct the mission in question.

   Where possible (and in accordance with the application provisions of the applicable statutes), permits, authorizations, and/or consultations will be jointly assigned to the appropriate mission office staffer (often, the Chief Scientist) and to the OMAO Command[3], who is ultimately responsible for complying with permits/authorizations/consultations that govern actions taken on the platform. Where joint assignment is not possible, all permits, authorizations, and/or consultations will be physically delivered to the Command and this transmittal will be acknowledged by Command signature.

   The Action Office will discuss the permitting, authorization, and/or consultation process with OMAO:
   - In the ship time request;
   - In the aircraft support request;
   - In the Project Instructions; and
   - As needed throughout the project implementation.

   OMAO retains the sole responsibility for complying with all environmental statutes for those transit operations that are not connected to a mission requirement from another Line Office.

cc: NEP

[3] The term "Command" here means the Commanding Officer, Master, or any other term for the head of the OMAO platform at issue, whether it be a vessel or an aircraft.

Attachment A: Environmental Impact Avoidance and Mitigation Measures guidance document

Last Updated April 27, 2012
[most recent update available at https://nightshark.nmfs.noaa.gov/pr/compliance/]

ENVIRONMENTAL IMPACT AVOIDANCE AND MITIGATION MEASURES

Table of Contents

Last updated April 27, 2012.
Consultation and/or permitting is mandatory.

Introduction

NOAA is charged with administering and enforcing various laws enacted to conserve and protect marine resources, including the Endangered Species Act, Marine Mammal Protection Act, Essential Fish Habitat provisions of the Magnuson-Stevens Act, and the National Marine Sanctuaries Act. An overview of these statutes is available here.

In addition to administering these laws, NOAA also engages in many missions involving such activities as research, restoration, surveying, ship transiting, monitoring, maintenance, and other activities (hereinafter referred to as "operations") that may result in impacts to marine trust resources. NOAA has a responsibility to comply with the conservation and protection laws it administers. Compliance includes consultation, permitting, and adopting measures to avoid or mitigate adverse impacts.

NOAA program offices must begin permitting and consultation for operations that may result in impacts to trust resources. This document is intended to provide a compendium of interim measures that may help to reduce impacts to NOAA trust resources while the permitting and consultation process is underway. NOAA program offices should consider these measures for inclusion in existing field protocols and during the planning stages of relevant actions. These should be considered voluntary impact avoidance and mitigation measures for use in advance of consultations with relevant statute experts. However, it is important to note that **certain items listed below are mandatory** (e.g., reporting ship strikes).

Different regions and program offices may have already developed relevant protocols intended to protect trust resources. The measures listed here are not intended to displace or override other existing or future protocols, but are instead meant to supplement and inform. This is not an exhaustive list of avoidance and mitigation measures.

Adherence to these measures does not waive an office's responsibility to undergo necessary consultations and obtain permits. Further, if an incident occurs without proper permitting and/or consultation in place, parties in charge of the operation may be held responsible, even if suggested avoidance and mitigation measures are in place. If any marine mammal, sea turtle, or other protected species is injured, captured, or harassed, the incident must be immediately reported to the stranding program and the NMFS regional office so that proper steps can be taken. NOAA offices engaged in activities that may result in impacts to NOAA trust resources are responsible for environmental compliance, which requires analysis of the effects of an action under the National Environmental Policy Act (NEPA) as well as consultation with one or more regulatory offices. Note that protected species include marine mammals and many species of sea turtles, seabirds, and fish. Nearly all NOAA vessel operations are subject to consultation under Section 7 of the Endangered Species Act and those contemplating operations should contact relevant Offices and staff regarding consultations, permits, and authorization. Operators should provide ample lead time for these consultations and processing of authorizations.

Please be aware that the outcome of a consultation or permitting process **may result in different measures tailored to the specific action**. Absent full statutory compliance, the measures

contained herein are a valuable interim step toward full environmental compliance and are useful for planning.

Also, keep in mind that this document focuses on impact avoidance measures associated with specific statutes administered by NOAA for safeguarding trust resources. NOAA offices remain responsible for complying with all other applicable laws.

I. General Measures

a. Vessel Use

Ship Strike and Avoidance

Any time a vessel is under way, these measures should be used to mitigate the risk of ships striking protected species. Ship strikes must be reported immediately to the regional stranding network. Contact information is available on NOAA Fisheries' website and is listed at the end of this document.

At All Times:

- Vessels under way should have at least one person (operator or watchstander) maintaining watch for protected species.
- Understand and comply with region-specific regulations and guidelines for viewing and approaching marine mammals.
- Vessel operators should adhere to recommended shipping routes established along the east coast within the Northeast and Southeast regions.

Upon Sighting Protected Species:

- For large whales, attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the animal has left the area.
- Reduce vessel speed to 10 knots or less as safety permits when whales are observed near an underway vessel. Always proceed with caution when a whale is sighted at the surface, as there may be additional submerged animals in the vicinity.
- When whales are sighted directly in the vessel's path or in close proximity to a moving vessel, reduce speed and shift the engine to neutral, as safety allows. Do not engage the engines until the animals are clear of the area.
- Maintain a distance of 100 yards or greater from large whales.
- Maintain a distance of 50 yards or greater from sea turtles or small marine mammals when possible.
- Vessels are prohibited from coming within 100 yards of humpback whales. Vessels are also prohibited from coming within 200 yards of southern resident killer whales in the inland waters of Washington state.

Measures for North Atlantic Right Whales:

- If the whale is believed to be a North Atlantic right whale, vessels must maintain a minimum distance of 460 meters from the animal (50 CFR 224.103).

- Vessels 65 feet and over must comply with the ship speed restrictions designed to protect North Atlantic right whales by reducing speeds to 10 knots or less within Seasonal Management Areas. This is a mandatory regulation. (50 CFR 224.103).
    - Sovereign vessels such as those operated by OMAO are exempt from the speed restrictions, but adherence to the speed restrictions is a valuable avoidance and mitigation measure.
- Where possible, vessel operators should reduce speeds and/or avoid Dynamic Management Areas (where whales occur and Seasonal Management Measures are not in effect).
- When possible, vessel operators should not enter the Area to be Avoided (ATBA) in the Great South Channel between April 1 and July 31 when right whales face their highest risk of ship strikes.
- Vessel operators must comply with Mandatory Ship Reporting Systems in the Northeast and Southeast regions. This is a mandatory regulation.
- These measures and more information are listed on the Office of Protected Resources website.

Habitat Protection

Standard Measures:

- Have a plan in place in the case of accidental spillage.
- Use oil-absorbing materials in the bilge areas of all boats with inboard engines.
- Properly dispose of all waste.
- To avoid disturbance of sensitive habitats, vessels should be operated at sufficiently low speeds to reduce wake energy in nearshore areas.

b. Use of Sampling Gear

The deployment and operation of mobile or stationary gear is known to pose a risk to protected species in the area of operation. Therefore, NMFS recommends that gear is not deployed or operated when protected species are observed within the project area. During deployment, there may be a greater risk of entanglement, and the continued trawling or use of mobile gear while protected species are present will increase the risk of incidental capture and/or entanglement.

Monitoring Protocol

Standard Measures:

- The most important measure for avoiding gear interaction with protected species is to avoid deploying gear where protected species are present, when possible, and to keep watch whenever sampling gear is in the water. At least one dedicated observer should be used any time mobile or fixed gear is deployed (e.g., trawl nets, gill nets).
- The area peripheral to the sampling area (within line-of-sight) should be visually scanned for the presence of protected species for at least 30 minutes prior to gear deployment. Depending on the specific sampling activity and the species that may be present, it may be more appropriate to either accomplish this upon arrival at the location or during transit to the sampling location (deploying gear immediately upon arrival in order to reduce potential attraction of marine mammals).

- Observers should receive training on monitoring protocols, identification of protected species, handling and release protocols, and reporting requirements.
- Observers should be placed at the most suitable vantage point (e.g., highest point with 360° view of the surrounding seas).
- Observers should not be assigned any other duties during periods of gear deployment, except providing navigational hazard alerts.
- Observers should be equipped with equipment necessary to sight and identify protected species as well as to estimate location, distance, and bearing to animal.

Observer(s) are responsible for communicating sightings directly to the Commanding Officer, Chief Scientist, or other responsible party. As described for ship strike avoidance, during periods of active acoustic use and during transiting, crew on the bridge should opportunistically make observations for protected species and seek to avoid them during transits and/or periods of active acoustic use. Because good visibility is critical to effective observation and avoidance, sampling should be avoided in times of low visibility, including nighttime, when possible. If sampling cannot be avoided (i.e., protocols call for night sampling) visual monitoring should be conducted to the extent possible using the naked eye and existing lighting.

Visual monitoring should begin at least 30 minutes prior to the beginning of gear deployment. If a protected species is observed, the observer should note and monitor the position (including latitude/longitude of vessel and relative bearing and estimated distance to the animal) until the animal dives or moves out of visual range of the observer. Observers should continue to scan for additional animals that may surface in the area, as there may be multiple animals surfacing at varying time intervals. If protected species are observed, do not deploy or operate gear until the animals are clear of the area or not observed for 15 minutes for turtles and small marine mammals or 30 minutes in the case of large whales or other potentially deep-diving whales.

Visual monitoring should continue for the duration of active sampling. If protected species are sighted in the peripheral area during active sampling, observers should monitor the location of the protected species in relation to the deployed gear. In addition to observers scanning nearby waters, other crew should carefully observe any gear trailing from the vessel for signs of protected species entanglement.

Avoid Entanglement in Lines

Protected species are known to become entangled in a variety of lines associated with fishing gear; therefore, reducing any slack in associated lines may help reduce entanglement potential. Some slack in certain buoy lines is necessary to account for winds and tidal action; however, minimize slack where practical to minimize the potential for rope to become wrapped on an animal that is travelling through the area or interacting with the gear.

Knots in line increase entanglement risk, particularly in baleen. Maintaining rope so that it is as knotless as possible may reduce the likelihood of seriously injuring or killing a large whale.

Standard Measures:

- Reduce any unneeded slack in lines.

- Use stiffer line materials when possible, as these are less likely to make small coils and increase potential for entanglement.
- Reduce knots in line as much as possible.
- Clearly mark lines and buoys so that stranding personnel and other NMFS experts may identify the gear in the event an animal becomes entangled. In general, buoys, buoy lines, nets, etc. should be marked repeatedly along the gear using colors that are readily visible (e.g., red or black marks on white rope). This is particularly important for gear that is set for long periods of time or is not tended.

Habitat Protection

Standard Measures:

- Limit the time gear is deployed on the bottom to the minimum necessary to collect sample. The use of video monitoring of trawl opening can ensure the trawl is only open until a full sample is collected.
- Avoid contact (gear or anchors) with sensitive bottom habitat (e.g., submerged aquatic vegetation (SAV) and hard bottom)
- Report deep sea coral bycatch and collect a sample of each species for species confirmation.

II. Specific Gear Types

a. Buoys

Standard Measures:

- Avoid placing large buoys in areas supporting submerged aquatic vegetation. Locate in deep water to avoid light limitation and grounding impacts to the intertidal zone, and ensure that adequate water depth is available between the substrate and the bottom of the buoy throughout all tide cycles. (Johnson et al. 2008, pg. 52)
- Conduct in-water work during the time of year when managed species and prey species are least likely to be impacted. (Johnson et al. 2008, pg. 52)

b. Trawling and Dredging[1]

General Measures for Protected Species:

- Slow tow speeds and/or shorten trawl times/distances to the extent allowed by your sampling objectives.
- Limited tows to under 30 minutes if possible to reduce the risk of drowning a captured sea turtle.

[1] The measures described in this section address forms of gear that have significant potential to impact trust resources. In contrast, the following forms of gear have little potential for adverse environmental impacts: CTD and rosette samplers, radiometers, Bongo and Neuston nets, MOCNESS net systems, and vertically deployed or towed imaging systems.

- Avoid pinniped rookeries or haul-out sites or other areas known to have high densities of marine mammals, to the extent practicable.
- Gear should be configured, where possible, with Turtle Excluder Devices (TEDs). Dredges may use turtle deflector dredge frames.
- Clean nets prior to deployment to remove prey items that might attract marine mammals.. Do not discard fish products or offal prior to the operation, as this may attract protected species to the area of operation and cause them to become more susceptible to capture.
- Consider a "set first" rule – deploy gear immediately upon arrival at a sampling location to avoid attracting animals to a stationary vessel. Conduct additional sampling upon conclusion of tows.

Operational Measures:

- Do not discard fish products or offal during the operation.
- Follow monitoring protocols as described above.
- Crew members other than the Observer should watch the deployed gear for signs of an entangled animal throughout the operation.
- The ship should alter course or cancel sampling, where practicable, to avoid marine mammals sighted nearby.
- Immediately respond to any net disturbance during deployment, active sampling, and haul back to ensure the best chance of releasing the animal alive.

At-sea response to potential interaction with protected species requires the use of professional judgment on the part of the Commanding Officer, Chief Scientist, or other responsible party.

Representative scenarios upon sighting of protected speciess during active sampling will be context-specific, dependent upon concerns about human safety, and in accordance with best professional judgment. Scientists and other responsible parties should understand as much as possible the options available to them under various scenarios, which could include:

1. If marine mammals are observed after shooting the doors while the trawl is actively being deployed, the trawl may be rapidly retrieved (unless the CO deems it unsafe per protocols) and brought on deck to ensure no protected species are captured; OR,
2. The CS, per protocols and in consultation with the CO, may continue with trawl deployment to depth depending on various factors; OR,
3. If protected species are seen near the net, the ship should back down briefly, followed by retrieval of the net; AND,
4. If the trawl is retrieved, it should not be reset until the Chief Scientist, in consultation with the Commanding Officer and observer, determines the protected species are no longer in the area where they could be incidentally taken by the trawl or the ship shall move to the next sampling location.

Measures In the Event of a Live Protected Species Capture/Entanglement:

- Work from the vessel as quickly and carefully as possible to open the bag of the trawl for prompt release of the animal.
- If possible, the animal shall be released directly back into the water to avoid further injury from being brought aboard the ship.

- If the animal is not able to be released directly back into the water, the net shall be carefully placed on the deck of the ship, and the bag opened to prevent the animal from falling on the deck and becoming further injured.
- Ensure the animal's blowhole is free of obstructions and work quickly and carefully to return the animal to the water.
- Do not lift a sea turtle by the flippers.
- If a sea turtle has been partially drowned, follow the NMFS Sea Turtle Resuscitation Guidelines. 66 FR 67495, http://www.gpo.gov/fdsys/pkg/FR-2001-12-31/html/01-31976.htm.
- The event must be reported properly (see Reporting). This is mandatory.

Habitat Protection:

- Avoid areas with habitat types that are slow to recover from impacts, such as live bottom (corals, sponge, submerged aquatic vegetation)
- Implement seasonal restrictions to avoid impacts to habitat during species critical life history stages (e.g., spawning season, egg, and larval development period). Recommended seasonal work windows are generally specific to regional or watershed-level environmental conditions and species requirements. (NMFS Alaska 2011, pg. 2-15)
- Anchor away from submerged aquatic vegetation and hard bottoms.
- Avoid contact with sensitive bottom habitat (like submerged aquatic vegetation and hard bottom) when performing hydrographic surveys.
- Staff are encouraged to report deep sea coral bycatch and to collect a small sample of each species when possible for species confirmation at the science center.

c. Set Nets

Measures Before Beginning Operations:

- When practical, set nets in locations upstream of known marine mammal occurrences.
- Ensure the gillnet float line has buoys adequate in number, size, and color to ensure good visibility and properly float the top line, increasing the ability to detect if a marine mammal becomes entangled in the net.
- Inspect and repair nets before and between deployments as necessary. Damaged or ragged nets increase entanglement potential.
- Reduce bag in the net, by ensuring proper anchor weight is keeping the net mouth open. Additional anchor weights should be used during tidal changes or in areas of high current.

Measures During Operations:

- Tend the net regularly. The entire net should be hand-checked once per hour to ensure protected species are not entangled in the net. This may be achieved while the net remains in the water by pulling the net up from the buoy line and dropping it back in
- During sampling, an observer should continuously monitor the net and associated float buoys for potential signs of a protected species entanglement, such as splashing, buoys sinking below the waterline, or other notable disturbance in the net.
- If protected species are sighted in the peripheral sampling area during active sampling, immediately raise and lower the net leadline. If protected species do not depart the area,

haul the gear onto the vessel and avoid resetting the net until the area is clear of protected species.

Measures In the Event of a Live Protected Species Capture/Entanglement:

- For human safety, do not enter the water to attempt disentangling the animal. Do not try to stop or prevent the animal from further wrapping in the gear.
- For entangled large whales, do not attempt to secure the gear to the vessel. If the whale sounds with gear attached, the vessel may be capsized or swamped.
- Large whales are typically not in imminent danger. Do not try and free it at risk of injury, add a marker buoy if necessary and safe to do so, and disengage to protect yourself. Immediately call the Regional Stranding Coordinator and allow authorized responders with experience and proper tools attempt to assist.
- Handling a net containing a large, powerful, animal that is panicked and attempting escape increases the risk of entangling and/or injuring personnel. Maintain calm and work as quietly as possible to avoid further agitating animal. If the animal is small enough to bring aboard for disentanglement, it may be safer to do so.
- If the animal is too large or active to bring aboard, bring it alongside the vessel and support it at the surface while attempting to remove the gear. Maintain awareness when using hooks or knives for gear removal to avoid injuring personnel or further injuring the animal.
- Do not lift a sea turtle by the flippers.
- While continuing to cradle the animal, work to cut the net away from the animal. Ensure all net is cut away from the animal before release. Marine mammals should remain in the water as much as possible while working to disentangle them, as this increases chances of survival and ensures human safety.
- Once the animal is free from gear, prior to its release: (1) photograph the animal and any specific lesions or abrasions caused by the entanglement if possible; (2) note condition upon release and any injuries (e.g, swam away vigorously with no obvious injuries; did not swim away vigorously; surfaced to breathe); and (3) note pertinent details on the nature of the entanglement, such as, but not limited to, gear characteristics, where in the net the animal was entangled, etc.
- If an animal (including, sea turtles, dolphins, large whales) dies in the gear or is observed dead in the water, immediately call the Regional Stranding Coordinator or contact NOAA through the U.S. Coast Guard at VHF Ch. 16 for instructions.
- If a sea turtle has been partially drowned, follow the NMFS Sea Turtle Resuscitation Guidelines. 66 FR 67495, http://www.gpo.gov/fdsys/pkg/FR-2001-12-31/html/01-31976.htm.

d. Longlines

Protected Species Measures:

- Do not chum or discard offal or spent bait before or during gear deployment, as this may attract protected species.
- Combine use of large circle hooks (e.g., 18/0) and finfish bait to reduce sea turtle bycatch; circle hooks also reduce marine mammal bycatch.

- If practical, ensure branchlines are long enough for a hooked sea turtle to reach the surface to breathe depending on set depth.
- Follow the specific fishery regulations and requirements for your area and season.

Seabird Take:

- Tori lines consisting of paired streamers should be used to protect seabirds. This method has been shown to be effective, and is particularly important when performing longline surveys in the Alaska region.
- Alternatively, use set gear with weighted hooks over the side of the boat, rather than the stern.

Habitat Protection:

- Avoid the use of bottom longline gear in areas with live bottom (e.g., submerged aquatic vegetation, corals, sponges.

Measures In the Event of a Sea Turtle Capture/Entanglement:

- Follow the protocols issued by NMFS for releasing a hooked sea turtle in NOAA Technical Memorandum NMFS-SEFSC -580: Careful Release Protocols for Sea Turtle Release with Minimum Injury, http://www.sefsc.noaa.gov/turtles/TM_580_SEFSC_CRP.pdf

e. Traps

Standard Measures:

- Use selective gear suitable for the sampling objectives.
- Clearly mark the buoy and vertical line attached to the trap or anchor with colored bands using paint or tape. If using multiple traps strung together in "trawls", clearly mark groundlines.
- Carve the buoy with easily identifiable labels.
- Recover all traps to avoid leaving ghost traps.
- Avoid placement of traps in live hard bottom habitats with coral and sponges.
- Consider using pot trawls instead of single pots to reduce vertical lines in the water.

III. Active Acoustics

Standard Measures:

- 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.
- Note that seismic surveys, which use extremely powerful sound sources, will always require substantial mitigation measures developed during the consultation and permitting process.

IV. Aerial Surveys

The following measures should be followed any time NOAA engages in aerial surveys or any other activities involving overflight. Noise from overflight may disturb protected species below.

Standard Measures:

- Aircraft should maintain a minimum altitude of 1,000 feet when practical. When low altitude is not vital to operational objectives, altitudes above 1,500 feet are preferable.
- Aircraft personnel should maintain watch for protected species.
- If survey protocol dictates flight altitude below 1,000 feet, the aircraft should maneuver to avoid sensitive areas like pinniped haul-outs and rookeries, aggregations of marine mammals at sea, and mother-calf pairs.
- These areas should be avoided by a 1,000 foot lateral distance.
- In addition, flights conducted at altitudes lower than 1,000 feet may require a permit from the Office of National Marine Sanctuaries should the operation occur within the Gulf of the Farallones or Monterey Bay national marine sanctuaries. Flights conducted lower than 2,000 feet altitude occurring within the Olympic Coast National Marine Sanctuary may also require a sanctuary permit.

V. Reporting

Any time NOAA staff observe sick, injured, or entangled species, they must report the matter.

Standard Measures:

- Sick, injured or entangled protected species must be reported immediately to the regional stranding network. Contact information is available on NOAA Fisheries' website and is listed at the end of this document. The Regional stranding coordinator will provide immediate direction for how to proceed.
    - For large whale entanglements in the Atlantic, please contact Provincetown Center for Coastal Studies at 1-866-755-6622.
- The activity should cease pending discussions on the nature of the take and outcomes with NOAA Fisheries.
- Any take of a protected species must be reported to the NMFS Regional Office per consultation and/or permit requirements.
- Staff are encouraged to report deep sea coral bycatch and to collect a small sample of each species when possible for species confirmation at the science centers.

VI. Restoration Activities

NOAA engages in various habitat restoration efforts. The following measures should be considered, along with many other concerns, for all restoration efforts.

Standard Measures:

- Avoid restoration work during critical fish windows to reduce direct impacts to important ecological functions such as spawning, nursery, and migration. This requires scheduling

projects when managed species are not expected in the area. These periods should be determined prior to project implementation to reduce or avoid any potential impacts.
- Plan staging areas in advance and keep the areas as small as practical.
- Consider sensitive resources like rare plants and historic sites in advance of operations and use a buffer zone around these resources.
- Temporary access pathways should be established prior to restoration, and no other paths should be used.
- Provide adequate training and education to volunteers and project contractors to mitigate adverse impacts to the restoration site.
- During restoration, protect the water column through the use of turbidity curtains, haybales, and erosion mats.
- After restoration work is completed, remove and restore temporary access pathways and staging areas.

VII. Avoidance Measures for National Marine Sanctuaries and Papahanaumokuakea Marine National Monument

Federal agencies should consult the specific regulations for each sanctuary and the monument, and should avoid conducting their activities these areas if any activity may adversely affect sanctuary or monument resources.

All of the Avoidance Measures listed above are applicable to work in sanctuaries. For more information on sanctuary or monument permitting, consultations, or for site-specific avoidance measures, contact the appropriate sanctuary or monument superintendent.

VIII. Additional Information Regarding Avoidance Measures to Prevent Impacts on Essential Fish Habitat

The essential fish habitat avoidance and mitigation measures provided throughout this document should be regarded as a list of common measures and not an exhaustive list of all possible avoidance measures to reduce impacts to the quality and/or quantity of essential fish habitat. The following resources should be consulted for additional avoidance measures and more details about impacts to essential fish habitat from non-fishing and fishing activities:

- Hanson J, Helvey M, Strach R. (editors) 2003. Non-fishing impacts to essential fish habitat and recommended conservation measures. National Marine Fisheries Service (NOAA Fisheries), version 1. Southwest Region, Long Beach, CA.
- Johnson MR, Boelke C, Chiarella LA, Colosi PD, Greene K, Lellis K, Ludemann H, Ludwig M, McDermott S, Ortiz J, Rusanowsky D, Scott M, Smith J. February 2008. NOAA Technical Memorandum NMFS-NE-209L Impacts to Marine Fisheries Habitat from Nonfishing Activities in the Northeastern United States. (pg. 1-339).National Marine Fisheries Service, Alaska Region. November 2011. Impacts to Essential Fish Habitat from Non-fishing Activities in Alaska. (pg. 1-123).

- Stevenson D, Chiarella LA, Stephan D, Reid R, Wilhelm K, McCarthy J, Pentony M. January 2004. NOAA Technical Memorandum NMFS-NE-181 Characterization of the Fishing Practices and Marine Benthic Ecosystems of the Northeast U.S. Shelf and an Evaluation of the Potential Effects of Fishing on Essential Fish Habitat. (pg. 1-179).

IX. Marine Mammal Stranding and Entanglement Contact Numbers

(Contact Numbers Last Updated: April 10, 2012)

NMFS Alaska Region
Aleria Jensen, Stranding Coordinator
Phone: (907) 586-7248

NMFS Northeast Region
Mendy Garron, Stranding Coordinator
Phone: (978) 282-8478

Lanni Hall, Assistant Stranding Coordinator
Phone: (978) 282-8492

Jamison Smith, East Coast Disentanglement Coordinator
Phone: (978) 281-9336

NMFS Northwest Region
Brent Norberg, Stranding Coordinator
Phone: (206) 526-6550

Kristin Wilkinson, Assistant Stranding Coordinator
Phone: (206) 526-4747

NMFS Southeast Region
Blair Mase, Stranding Coordinator
Phone: (305) 361-4586

Erin Fougeres, Stranding Program Administrator
Phone: (727) 824-5323
Erin.Fougeres@noaa.gov

NMFS Southwest Region
Sarah Wilkin, Stranding Coordinator
Phone: (562) 980-3230

NMFS Pacific Islands Region
David Schofield, Stranding Coordinator
Phone: (808) 944-2269

NMFS National Enforcement Hotline for Violations

- 1-800-853-1964

Northeast Region Marine Mammal and Sea Turtle Stranding & Entanglement Network

Northeast Region Marine Mammal and Sea Turtle Stranding & Entanglement Hotline

- 866-755-6622

Southeast Region Marine Mammal Stranding Network (including Puerto Rico and U.S. Virgin Islands)

NMFS Southeast Marine Mammal Stranding Hotline

- 877-433-8299

Southwest Region Marine Mammal Stranding Network

California

- NMFS Southwest Regional Office
  Long Beach, CA
  562-980-3230

Northwest Region Marine Mammal Stranding Network

Northwest Marine Mammal Stranding and Enforcement Hotline

- 800-853-1964

Pacific Islands Region Marine Mammal Stranding Network (including Guam, American Samoa and Northern Mariana Islands)

Pacific Islands Region Marine Mammal Stranding & Entanglement Hotline

- 888-256-9840

Alaska Region Marine Mammal Stranding Network

Alaska Marine Mammal Stranding Hotline

- 1-877-9-AKR-PRD (1-877-925-7773)

Attachment B: Issues to be Addressed in Environmental Compliance Updates to the NEP

Issues to be Addressed by each Line Office DAA in Quarterly Environmental Compliance Updates to the NEP

1. Has your designated Line Office lead been in regular communication with you or the AA regarding environmental compliance issues for your Line Office?
2. Has your Line Office communicated the Best Management Practices (BMPs) to all potentially-affected programs?
3. Have these BMPs been adopted in all programs for which they are appropriate?
    a. Have they been effective?
    b. How are you tracking their effectiveness?
4. What is the status of environmental compliance efforts for your Line Office's *High Risk Projects and Programs*?
    a. What is the cause of any delays?
    b. How can the DUS/O assist you in completing these compliance efforts?
5. Has your Line Office identified any additional short- or long-term compliance issues that should be brought to the attention of NOAA leadership?
6. How has your Line Office made use of the STATUTES working group for training, coordination, or project-specific compliance help?

Last Updated April 27, 2012
[most recent update available at https://nightshark.nmfs.noaa.gov/pr/compliance/]

ENVIRONMENTAL IMPACT AVOIDANCE AND MITIGATION MEASURES

Table of Contents

Last updated April 27, 2012.
Consultation and/or permitting is mandatory.

Introduction

NOAA is charged with administering and enforcing various laws enacted to conserve and protect marine resources, including the Endangered Species Act, Marine Mammal Protection Act, Essential Fish Habitat provisions of the Magnuson-Stevens Act, and the National Marine Sanctuaries Act. An overview of these statutes is available here.

In addition to administering these laws, NOAA also engages in many missions involving such activities as research, restoration, surveying, ship transiting, monitoring, maintenance, and other activities (hereinafter referred to as "operations") that may result in impacts to marine trust resources. NOAA has a responsibility to comply with the conservation and protection laws it administers. Compliance includes consultation, permitting, and adopting measures to avoid or mitigate adverse impacts.

NOAA program offices must begin permitting and consultation for operations that may result in impacts to trust resources. This document is intended to provide a compendium of interim measures that may help to reduce impacts to NOAA trust resources while the permitting and consultation process is underway. NOAA program offices should consider these measures for inclusion in existing field protocols and during the planning stages of relevant actions. These should be considered voluntary impact avoidance and mitigation measures for use in advance of consultations with relevant statute experts. However, it is important to note that **certain items listed below are mandatory** (e.g., reporting ship strikes).

Different regions and program offices may have already developed relevant protocols intended to protect trust resources. The measures listed here are not intended to displace or override other existing or future protocols, but are instead meant to supplement and inform. This is not an exhaustive list of avoidance and mitigation measures.

Adherence to these measures does not waive an office's responsibility to undergo necessary consultations and obtain permits. Further, if an incident occurs without proper permitting and/or consultation in place, parties in charge of the operation may be held responsible, even if suggested avoidance and mitigation measures are in place. If any marine mammal, sea turtle, or other protected species is injured, captured, or harassed, the incident must be immediately reported to the stranding program and the NMFS regional office so that proper steps can be taken. NOAA offices engaged in activities that may result in impacts to NOAA trust resources are responsible for environmental compliance, which requires analysis of the effects of an action under the National Environmental Policy Act (NEPA) as well as consultation with one or more regulatory offices. Note that protected species include marine mammals and many species of sea turtles, seabirds, and fish. Nearly all NOAA vessel operations are subject to consultation under Section 7 of the Endangered Species Act and those contemplating operations should contact relevant Offices and staff regarding consultations, permits, and authorization. Operators should provide ample lead time for these consultations and processing of authorizations.

Please be aware that the outcome of a consultation or permitting process **may result in different measures tailored to the specific action**. Absent full statutory compliance, the measures

contained herein are a valuable interim step toward full environmental compliance and are useful for planning.

Also, keep in mind that this document focuses on impact avoidance measures associated with specific statutes administered by NOAA for safeguarding trust resources. NOAA offices remain responsible for complying with all other applicable laws.

I. General Measures

a. Vessel Use

Ship Strike and Avoidance

Any time a vessel is under way, these measures should be used to mitigate the risk of ships striking protected species. Ship strikes must be reported immediately to the regional stranding network. Contact information is available on NOAA Fisheries' website and is listed at the end of this document.

At All Times:

- Vessels under way should have at least one person (operator or watchstander) maintaining watch for protected species.
- Understand and comply with region-specific regulations and guidelines for viewing and approaching marine mammals.
- Vessel operators should adhere to recommended shipping routes established along the east coast within the Northeast and Southeast regions.

Upon Sighting Protected Species:

- For large whales, attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the animal has left the area.
- Reduce vessel speed to 10 knots or less as safety permits when whales are observed near an underway vessel. Always proceed with caution when a whale is sighted at the surface, as there may be additional submerged animals in the vicinity.
- When whales are sighted directly in the vessel's path or in close proximity to a moving vessel, reduce speed and shift the engine to neutral, as safety allows. Do not engage the engines until the animals are clear of the area.
- Maintain a distance of 100 yards or greater from large whales.
- Maintain a distance of 50 yards or greater from sea turtles or small marine mammals when possible.
- Vessels are prohibited from coming within 100 yards of humpback whales. Vessels are also prohibited from coming within 200 yards of southern resident killer whales in the inland waters of Washington state.

Measures for North Atlantic Right Whales:

- If the whale is believed to be a North Atlantic right whale, vessels must maintain a minimum distance of 460 meters from the animal (50 CFR 224.103).

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    - Sovereign vessels such as those operated by OMAO are exempt from the speed restrictions, but adherence to the speed restrictions is a valuable avoidance and mitigation measure.
- Where possible, vessel operators should reduce speeds and/or avoid Dynamic Management Areas (where whales occur and Seasonal Management Measures are not in effect).
- When possible, vessel operators should not enter the Area to be Avoided (ATBA) in the Great South Channel between April 1 and July 31 when right whales face their highest risk of ship strikes.
- Vessel operators must comply with Mandatory Ship Reporting Systems in the Northeast and Southeast regions. This is a mandatory regulation.
- These measures and more information are listed on the Office of Protected Resources website.

Habitat Protection

Standard Measures:

- Have a plan in place in the case of accidental spillage.
- Use oil-absorbing materials in the bilge areas of all boats with inboard engines.
- Properly dispose of all waste.
- To avoid disturbance of sensitive habitats, vessels should be operated at sufficiently low speeds to reduce wake energy in nearshore areas.

b. Use of Sampling Gear

The deployment and operation of mobile or stationary gear is known to pose a risk to protected species in the area of operation. Therefore, NMFS recommends that gear is not deployed or operated when protected species are observed within the project area. During deployment, there may be a greater risk of entanglement, and the continued trawling or use of mobile gear while protected species are present will increase the risk of incidental capture and/or entanglement.

Monitoring Protocol

Standard Measures:

- The most important measure for avoiding gear interaction with protected species is to avoid deploying gear where protected species are present, when possible, and to keep watch whenever sampling gear is in the water. At least one dedicated observer should be used any time mobile or fixed gear is deployed (e.g., trawl nets, gill nets).
- The area peripheral to the sampling area (within line-of-sight) should be visually scanned for the presence of protected species for at least 30 minutes prior to gear deployment. Depending on the specific sampling activity and the species that may be present, it may be more appropriate to either accomplish this upon arrival at the location or during transit to the sampling location (deploying gear immediately upon arrival in order to reduce potential attraction of marine mammals).

- Observers should receive training on monitoring protocols, identification of protected species, handling and release protocols, and reporting requirements.
- Observers should be placed at the most suitable vantage point (e.g., highest point with 360° view of the surrounding seas).
- Observers should not be assigned any other duties during periods of gear deployment, except providing navigational hazard alerts.
- Observers should be equipped with equipment necessary to sight and identify protected species as well as to estimate location, distance, and bearing to animal.

Observer(s) are responsible for communicating sightings directly to the Commanding Officer, Chief Scientist, or other responsible party. As described for ship strike avoidance, during periods of active acoustic use and during transiting, crew on the bridge should opportunistically make observations for protected species and seek to avoid them during transits and/or periods of active acoustic use. Because good visibility is critical to effective observation and avoidance, sampling should be avoided in times of low visibility, including nighttime, when possible. If sampling cannot be avoided (i.e., protocols call for night sampling) visual monitoring should be conducted to the extent possible using the naked eye and existing lighting.

Visual monitoring should begin at least 30 minutes prior to the beginning of gear deployment. If a protected species is observed, the observer should note and monitor the position (including latitude/longitude of vessel and relative bearing and estimated distance to the animal) until the animal dives or moves out of visual range of the observer. Observers should continue to scan for additional animals that may surface in the area, as there may be multiple animals surfacing at varying time intervals. If protected species are observed, do not deploy or operate gear until the animals are clear of the area or not observed for 15 minutes for turtles and small marine mammals or 30 minutes in the case of large whales or other potentially deep-diving whales.

Visual monitoring should continue for the duration of active sampling. If protected species are sighted in the peripheral area during active sampling, observers should monitor the location of the protected species in relation to the deployed gear. In addition to observers scanning nearby waters, other crew should carefully observe any gear trailing from the vessel for signs of protected species entanglement.

Avoid Entanglement in Lines

Protected species are known to become entangled in a variety of lines associated with fishing gear; therefore, reducing any slack in associated lines may help reduce entanglement potential. Some slack in certain buoy lines is necessary to account for winds and tidal action; however, minimize slack where practical to minimize the potential for rope to become wrapped on an animal that is travelling through the area or interacting with the gear.

Knots in line increase entanglement risk, particularly in baleen. Maintaining rope so that it is as knotless as possible may reduce the likelihood of seriously injuring or killing a large whale.

Standard Measures:

- Reduce any unneeded slack in lines.

- Use stiffer line materials when possible, as these are less likely to make small coils and increase potential for entanglement.
- Reduce knots in line as much as possible.
- Clearly mark lines and buoys so that stranding personnel and other NMFS experts may identify the gear in the event an animal becomes entangled. In general, buoys, buoy lines, nets, etc. should be marked repeatedly along the gear using colors that are readily visible (e.g., red or black marks on white rope). This is particularly important for gear that is set for long periods of time or is not tended.

Habitat Protection

Standard Measures:

- Limit the time gear is deployed on the bottom to the minimum necessary to collect sample. The use of video monitoring of trawl opening can ensure the trawl is only open until a full sample is collected.
- Avoid contact (gear or anchors) with sensitive bottom habitat (e.g., submerged aquatic vegetation (SAV) and hard bottom)
- Report deep sea coral bycatch and collect a sample of each species for species confirmation.

II. Specific Gear Types

a. Buoys

Standard Measures:

- Avoid placing large buoys in areas supporting submerged aquatic vegetation. Locate in deep water to avoid light limitation and grounding impacts to the intertidal zone, and ensure that adequate water depth is available between the substrate and the bottom of the buoy throughout all tide cycles. (Johnson et al. 2008, pg. 52)
- Conduct in-water work during the time of year when managed species and prey species are least likely to be impacted. (Johnson et al. 2008, pg. 52)

b. Trawling and Dredging[1]

General Measures for Protected Species:

- Slow tow speeds and/or shorten trawl times/distances to the extent allowed by your sampling objectives.
- Limited tows to under 30 minutes if possible to reduce the risk of drowning a captured sea turtle.

[1] The measures described in this section address forms of gear that have significant potential to impact trust resources. In contrast, the following forms of gear have little potential for adverse environmental impacts: CTD and rosette samplers, radiometers, Bongo and Neuston nets, MOCNESS net systems, and vertically deployed or towed imaging systems.

- Avoid pinniped rookeries or haul-out sites or other areas known to have high densities of marine mammals, to the extent practicable.
- Gear should be configured, where possible, with Turtle Excluder Devices (TEDs). Dredges may use turtle deflector dredge frames.
- Clean nets prior to deployment to remove prey items that might attract marine mammals.. Do not discard fish products or offal prior to the operation, as this may attract protected species to the area of operation and cause them to become more susceptible to capture.
- Consider a "set first" rule – deploy gear immediately upon arrival at a sampling location to avoid attracting animals to a stationary vessel. Conduct additional sampling upon conclusion of tows.

Operational Measures:

- Do not discard fish products or offal during the operation.
- Follow monitoring protocols as described above.
- Crew members other than the Observer should watch the deployed gear for signs of an entangled animal throughout the operation.
- The ship should alter course or cancel sampling, where practicable, to avoid marine mammals sighted nearby.
- Immediately respond to any net disturbance during deployment, active sampling, and haul back to ensure the best chance of releasing the animal alive.

At-sea response to potential interaction with protected species requires the use of professional judgment on the part of the Commanding Officer, Chief Scientist, or other responsible party.

Representative scenarios upon sighting of protected speciess during active sampling will be context-specific, dependent upon concerns about human safety, and in accordance with best professional judgment. Scientists and other responsible parties should understand as much as possible the options available to them under various scenarios, which could include:

1. If marine mammals are observed after shooting the doors while the trawl is actively being deployed, the trawl may be rapidly retrieved (unless the CO deems it unsafe per protocols) and brought on deck to ensure no protected species are captured; OR,
2. The CS, per protocols and in consultation with the CO, may continue with trawl deployment to depth depending on various factors; OR,
3. If protected species are seen near the net, the ship should back down briefly, followed by retrieval of the net; AND,
4. If the trawl is retrieved, it should not be reset until the Chief Scientist, in consultation with the Commanding Officer and observer, determines the protected species are no longer in the area where they could be incidentally taken by the trawl or the ship shall move to the next sampling location.

Measures In the Event of a Live Protected Species Capture/Entanglement:

- Work from the vessel as quickly and carefully as possible to open the bag of the trawl for prompt release of the animal.
- If possible, the animal shall be released directly back into the water to avoid further injury from being brought aboard the ship.

- If the animal is not able to be released directly back into the water, the net shall be carefully placed on the deck of the ship, and the bag opened to prevent the animal from falling on the deck and becoming further injured.
- Ensure the animal's blowhole is free of obstructions and work quickly and carefully to return the animal to the water.
- Do not lift a sea turtle by the flippers.
- If a sea turtle has been partially drowned, follow the NMFS Sea Turtle Resuscitation Guidelines. 66 FR 67495, http://www.gpo.gov/fdsys/pkg/FR-2001-12-31/html/01-31976.htm.
- The event must be reported properly (see Reporting). This is mandatory.

Habitat Protection:

- Avoid areas with habitat types that are slow to recover from impacts, such as live bottom (corals, sponge, submerged aquatic vegetation)
- Implement seasonal restrictions to avoid impacts to habitat during species critical life history stages (e.g., spawning season, egg, and larval development period). Recommended seasonal work windows are generally specific to regional or watershed-level environmental conditions and species requirements. (NMFS Alaska 2011, pg. 2-15)
- Anchor away from submerged aquatic vegetation and hard bottoms.
- Avoid contact with sensitive bottom habitat (like submerged aquatic vegetation and hard bottom) when performing hydrographic surveys.
- Staff are encouraged to report deep sea coral bycatch and to collect a small sample of each species when possible for species confirmation at the science center.

c. Set Nets

Measures Before Beginning Operations:

- When practical, set nets in locations upstream of known marine mammal occurrences.
- Ensure the gillnet float line has buoys adequate in number, size, and color to ensure good visibility and properly float the top line, increasing the ability to detect if a marine mammal becomes entangled in the net.
- Inspect and repair nets before and between deployments as necessary. Damaged or ragged nets increase entanglement potential.
- Reduce bag in the net, by ensuring proper anchor weight is keeping the net mouth open. Additional anchor weights should be used during tidal changes or in areas of high current.

Measures During Operations:

- Tend the net regularly. The entire net should be hand-checked once per hour to ensure protected species are not entangled in the net. This may be achieved while the net remains in the water by pulling the net up from the buoy line and dropping it back in
- During sampling, an observer should continuously monitor the net and associated float buoys for potential signs of a protected species entanglement, such as splashing, buoys sinking below the waterline, or other notable disturbance in the net.
- If protected species are sighted in the peripheral sampling area during active sampling, immediately raise and lower the net leadline. If protected species do not depart the area,

haul the gear onto the vessel and avoid resetting the net until the area is clear of protected species.

Measures In the Event of a Live Protected Species Capture/Entanglement:

- For human safety, do not enter the water to attempt disentangling the animal. Do not try to stop or prevent the animal from further wrapping in the gear.
- For entangled large whales, do not attempt to secure the gear to the vessel. If the whale sounds with gear attached, the vessel may be capsized or swamped.
- Large whales are typically not in imminent danger. Do not try and free it at risk of injury, add a marker buoy if necessary and safe to do so, and disengage to protect yourself. Immediately call the Regional Stranding Coordinator and allow authorized responders with experience and proper tools attempt to assist.
- Handling a net containing a large, powerful, animal that is panicked and attempting escape increases the risk of entangling and/or injuring personnel. Maintain calm and work as quietly as possible to avoid further agitating animal. If the animal is small enough to bring aboard for disentanglement, it may be safer to do so.
- If the animal is too large or active to bring aboard, bring it alongside the vessel and support it at the surface while attempting to remove the gear. Maintain awareness when using hooks or knives for gear removal to avoid injuring personnel or further injuring the animal.
- Do not lift a sea turtle by the flippers.
- While continuing to cradle the animal, work to cut the net away from the animal. Ensure all net is cut away from the animal before release. Marine mammals should remain in the water as much as possible while working to disentangle them, as this increases chances of survival and ensures human safety.
- Once the animal is free from gear, prior to its release: (1) photograph the animal and any specific lesions or abrasions caused by the entanglement if possible; (2) note condition upon release and any injuries (e.g, swam away vigorously with no obvious injuries; did not swim away vigorously; surfaced to breathe); and (3) note pertinent details on the nature of the entanglement, such as, but not limited to, gear characteristics, where in the net the animal was entangled, etc.
- If an animal (including, sea turtles, dolphins, large whales) dies in the gear or is observed dead in the water, immediately call the Regional Stranding Coordinator or contact NOAA through the U.S. Coast Guard at VHF Ch. 16 for instructions.
- If a sea turtle has been partially drowned, follow the NMFS Sea Turtle Resuscitation Guidelines. 66 FR 67495, http://www.gpo.gov/fdsys/pkg/FR-2001-12-31/html/01-31976.htm.

d. Longlines

Protected Species Measures:

- Do not chum or discard offal or spent bait before or during gear deployment, as this may attract protected species.
- Combine use of large circle hooks (e.g., 18/0) and finfish bait to reduce sea turtle bycatch; circle hooks also reduce marine mammal bycatch.

- If practical, ensure branchlines are long enough for a hooked sea turtle to reach the surface to breathe depending on set depth.
- Follow the specific fishery regulations and requirements for your area and season.

Seabird Take:

- Tori lines consisting of paired streamers should be used to protect seabirds. This method has been shown to be effective, and is particularly important when performing longline surveys in the Alaska region.
- Alternatively, use set gear with weighted hooks over the side of the boat, rather than the stern.

Habitat Protection:

- Avoid the use of bottom longline gear in areas with live bottom (e.g., submerged aquatic vegetation, corals, sponges.

Measures In the Event of a Sea Turtle Capture/Entanglement:

- Follow the protocols issued by NMFS for releasing a hooked sea turtle in NOAA Technical Memorandum NMFS-SEFSC -580: Careful Release Protocols for Sea Turtle Release with Minimum Injury, http://www.sefsc.noaa.gov/turtles/TM_580_SEFSC_CRP.pdf

e. Traps

Standard Measures:

- Use selective gear suitable for the sampling objectives.
- Clearly mark the buoy and vertical line attached to the trap or anchor with colored bands using paint or tape. If using multiple traps strung together in "trawls", clearly mark groundlines.
- Carve the buoy with easily identifiable labels.
- Recover all traps to avoid leaving ghost traps.
- Avoid placement of traps in live hard bottom habitats with coral and sponges.
- Consider using pot trawls instead of single pots to reduce vertical lines in the water.

III. Active Acoustics

Standard Measures:

- 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.
- Note that seismic surveys, which use extremely powerful sound sources, will always require substantial mitigation measures developed during the consultation and permitting process.

IV. Aerial Surveys

The following measures should be followed any time NOAA engages in aerial surveys or any other activities involving overflight. Noise from overflight may disturb protected species below.

Standard Measures:

- Aircraft should maintain a minimum altitude of 1,000 feet when practical. When low altitude is not vital to operational objectives, altitudes above 1,500 feet are preferable.
- Aircraft personnel should maintain watch for protected species.
- If survey protocol dictates flight altitude below 1,000 feet, the aircraft should maneuver to avoid sensitive areas like pinniped haul-outs and rookeries, aggregations of marine mammals at sea, and mother-calf pairs.
- These areas should be avoided by a 1,000 foot lateral distance.
- In addition, flights conducted at altitudes lower than 1,000 feet may require a permit from the Office of National Marine Sanctuaries should the operation occur within the Gulf of the Farallones or Monterey Bay national marine sanctuaries. Flights conducted lower than 2,000 feet altitude occurring within the Olympic Coast National Marine Sanctuary may also require a sanctuary permit.

V. Reporting

Any time NOAA staff observe sick, injured, or entangled species, they must report the matter.

Standard Measures:

- Sick, injured or entangled protected species must be reported immediately to the regional stranding network. Contact information is available on NOAA Fisheries' website and is listed at the end of this document. The Regional stranding coordinator will provide immediate direction for how to proceed.
    - For large whale entanglements in the Atlantic, please contact Provincetown Center for Coastal Studies at 1-866-755-6622.
- The activity should cease pending discussions on the nature of the take and outcomes with NOAA Fisheries.
- Any take of a protected species must be reported to the NMFS Regional Office per consultation and/or permit requirements.
- Staff are encouraged to report deep sea coral bycatch and to collect a small sample of each species when possible for species confirmation at the science centers.

VI. Restoration Activities

NOAA engages in various habitat restoration efforts. The following measures should be considered, along with many other concerns, for all restoration efforts.

Standard Measures:

- Avoid restoration work during critical fish windows to reduce direct impacts to important ecological functions such as spawning, nursery, and migration. This requires scheduling

projects when managed species are not expected in the area. These periods should be determined prior to project implementation to reduce or avoid any potential impacts.
- Plan staging areas in advance and keep the areas as small as practical.
- Consider sensitive resources like rare plants and historic sites in advance of operations and use a buffer zone around these resources.
- Temporary access pathways should be established prior to restoration, and no other paths should be used.
- Provide adequate training and education to volunteers and project contractors to mitigate adverse impacts to the restoration site.
- During restoration, protect the water column through the use of turbidity curtains, haybales, and erosion mats.
- After restoration work is completed, remove and restore temporary access pathways and staging areas.

VII. Avoidance Measures for National Marine Sanctuaries and Papahanaumokuakea Marine National Monument

Federal agencies should consult the specific regulations for each sanctuary and the monument, and should avoid conducting their activities these areas if any activity may adversely affect sanctuary or monument resources.

All of the Avoidance Measures listed above are applicable to work in sanctuaries. For more information on sanctuary or monument permitting, consultations, or for site-specific avoidance measures, contact the appropriate sanctuary or monument superintendent.

VIII. Additional Information Regarding Avoidance Measures to Prevent Impacts on Essential Fish Habitat

The essential fish habitat avoidance and mitigation measures provided throughout this document should be regarded as a list of common measures and not an exhaustive list of all possible avoidance measures to reduce impacts to the quality and/or quantity of essential fish habitat. The following resources should be consulted for additional avoidance measures and more details about impacts to essential fish habitat from non-fishing and fishing activities:

- Hanson J, Helvey M, Strach R. (editors) 2003. Non-fishing impacts to essential fish habitat and recommended conservation measures. National Marine Fisheries Service (NOAA Fisheries), version 1. Southwest Region, Long Beach, CA.
- Johnson MR, Boelke C, Chiarella LA, Colosi PD, Greene K, Lellis K, Ludemann H, Ludwig M, McDermott S, Ortiz J, Rusanowsky D, Scott M, Smith J. February 2008. NOAA Technical Memorandum NMFS-NE-209L Impacts to Marine Fisheries Habitat from Nonfishing Activities in the Northeastern United States. (pg. 1-339).National Marine Fisheries Service, Alaska Region. November 2011. Impacts to Essential Fish Habitat from Non-fishing Activities in Alaska. (pg. 1-123).

- Stevenson D, Chiarella LA, Stephan D, Reid R, Wilhelm K, McCarthy J, Pentony M. January 2004. NOAA Technical Memorandum NMFS-NE-181 Characterization of the Fishing Practices and Marine Benthic Ecosystems of the Northeast U.S. Shelf and an Evaluation of the Potential Effects of Fishing on Essential Fish Habitat. (pg. 1-179).

IX. Marine Mammal Stranding and Entanglement Contact Numbers

(Contact Numbers Last Updated: April 10, 2012)

NMFS Alaska Region
Aleria Jensen, Stranding Coordinator
Phone: (907) 586-7248

NMFS Northeast Region
Mendy Garron, Stranding Coordinator
Phone: (978) 282-8478

Lanni Hall, Assistant Stranding Coordinator
Phone: (978) 282-8492

Jamison Smith, East Coast Disentanglement Coordinator
Phone: (978) 281-9336

NMFS Northwest Region
Brent Norberg, Stranding Coordinator
Phone: (206) 526-6550

Kristin Wilkinson, Assistant Stranding Coordinator
Phone: (206) 526-4747

NMFS Southeast Region
Blair Mase, Stranding Coordinator
Phone: (305) 361-4586

Erin Fougeres, Stranding Program Administrator
Phone: (727) 824-5323
Erin.Fougeres@noaa.gov

NMFS Southwest Region
Sarah Wilkin, Stranding Coordinator
Phone: (562) 980-3230

NMFS Pacific Islands Region
David Schofield, Stranding Coordinator
Phone: (808) 944-2269

NMFS National Enforcement Hotline for Violations

- 1-800-853-1964

Northeast Region Marine Mammal and Sea Turtle Stranding & Entanglement Network

Northeast Region Marine Mammal and Sea Turtle Stranding & Entanglement Hotline

- 866-755-6622

Southeast Region Marine Mammal Stranding Network (including Puerto Rico and U.S. Virgin Islands)

NMFS Southeast Marine Mammal Stranding Hotline

- 877-433-8299

Southwest Region Marine Mammal Stranding Network

California

- NMFS Southwest Regional Office
  Long Beach, CA
  562-980-3230

Northwest Region Marine Mammal Stranding Network

Northwest Marine Mammal Stranding and Enforcement Hotline

- 800-853-1964

Pacific Islands Region Marine Mammal Stranding Network (including Guam, American Samoa and Northern Mariana Islands)

Pacific Islands Region Marine Mammal Stranding & Entanglement Hotline

- 888-256-9840

Alaska Region Marine Mammal Stranding Network

Alaska Marine Mammal Stranding Hotline

- 1-877-9-AKR-PRD (1-877-925-7773)