

Environmental Assessment for  
National Center for Coastal Ocean Science (NCCOS)  
RESTORE Act Science Program to fund a project titled  
"Linking habitat to recruitment: evaluating the importance of pelagic *Sargassum* to fisheries  
management in the Gulf of Mexico"

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Prepared by:  
National Oceanic and Atmospheric Administration  
National Ocean Service  
National Centers for Coastal Ocean Science  
1305 East-West Highway  
Silver Spring MD 20910

For more information contact:  
Paula Whitfield  
NCCOS Environmental Compliance Coordinator  
[paula.whitfield@noaa.gov](mailto:paula.whitfield@noaa.gov)

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# 1. Introduction

In 2012, the National Oceanic and Atmospheric Administration (NOAA) established the NOAA RESTORE Act Science Program pursuant to the Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies (RESTORE) of the Gulf States Act (Public Law 112-141, Section 1604). The mission of NOAA's RESTORE Act Science Program is to carry out research, observation, and monitoring to support, to the maximum extent practicable, the long-term sustainability of the ecosystem, fish stocks, fish habitat, and the recreational, commercial, and charter-fishing industry in the Gulf of Mexico (GOM).

The NOAA RESTORE ACT Science program proposes to fund a project titled: "Linking habitat to recruitment: evaluating the importance of pelagic Sargassum to fisheries management in the Gulf of Mexico". This Environmental Assessment (EA) evaluates the potential environmental impacts of NOAA's proposal to fund this project. Researchers from the University of Southern Mississippi and sub-awardees propose to evaluate the nursery function and role(s) of *Sargassum* for fisheries in the Gulf of Mexico (GOM) ecosystem, with a focus on recruitment of economically important fish species. Project activities include the collection of *Sargassum* and juvenile fishes associated with *Sargassum* and non-*Sargassum* habitats using Neuston nets, plankton purse seines, light traps and opportunistic hook-and-line sampling with Sabiki rigs.

The following enclosures will be included as part of the administrative record for this project and incorporated by reference as needed as part of this EA.

- ENCLs:
- (1) NMFS Sargassum Biological Opinion (FPR-2047-9216)(July 20, 2017)
  - (2) Reinitiation of consultation for ESA Section 7 Methot frame trawl
  - (3) NMFS LOC for Methot frame trawl
  - (4) Essential Fish Habitat Letter of Concurrence
  - (5) EFH Methot trawl correspondence
  - (6) Interim measures memo for July 2017 cruise
  - (7) LOA MSFCMA managed fish species
  - (8) Highly Migratory Species Permit (HMS-SRP-17-03)
  - (9) Amendment to Permit HMS-SRP-17-03

## *1.1 Purpose and Need*

Sargassum is a holopelagic brown algae complex composed of *Sargassum natans* and *S. fluitans* found in neritic and oceanic waters of the western North Atlantic Ocean, including the Gulf of Mexico (GOM). The structural complexity of Sargassum provides surface area for sessile epibiota, such as hydroids, bryozoans, and other algae (Maples 1984, Stoner et al. 1984, Rooker et al. 2006), which combined form the base of a Sargassum "community", and provide an oasis of structure in an otherwise featureless open ocean.

The purpose of the proposed action is to quantify the abundance of Sargassum in the GOM. Holopelagic Sargassum is a presumed 'nursery habitat' for many managed fish species, yet quantitative (habitat-specific) assessments of nursery function are lacking and little is known about the environmental and climatic factors that drive variability in Sargassum biomass and

distribution. Data from this research should assess the relationship between a “good” *Sargassum* year and “good” recruitment of managed species by attempting to quantify survivorship advantages (in terms of food web dynamics, diet, growth, and condition) for juvenile fishes associated with *Sargassum*.

To evaluate the nursery function and importance of *Sargassum* to fisheries in a context useful to managers, the action would focus on the following objectives:

1. quantifying *Sargassum* variability and environmental controls on *Sargassum* variability in distribution and biomass in the northern Gulf of Mexico;
2. quantifying the nursery-role function of *Sargassum* relative to temporal/spatial variability, habitat morphology, and open water habitats; and
3. develop and test the efficacy of remote sensing and field-derived habitat indices for population assessments of managed species associated with *Sargassum*.

## *1.2 Consultation and Project History*

### 1.2.1 Endangered Species Act

The Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. 1531 et seq.) establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat they depend on. Section 7(a)(2) of the ESA requires Federal agencies to insure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their designated critical habitat. NCCOS incorporates by reference the entire consultation history in the “Biological Opinion on National Ocean Service, National Centers for Coastal Ocean Science’s proposed action to fund a project under the RESTORE ACT: “Linking habitat to recruitment: evaluating the importance of pelagic *Sargassum* to fisheries management in the Gulf of Mexico” (NMFS *Sargassum* BiOp).

The abridged version of the consultation history is summarized here. However, we incorporate by reference the entire consultation history from the NMFS *Sargassum* BiOp (Encl 1, Section 1.2 Pp. 6-7). On May 2, 2017, NCCOS requested informal ESA Section 7(a)(2) consultation with NMFS Office of Protected Resources (OPR). On May 23, 2017, NMFS informed NCCOS of the recommendation for formal consultation due to the potential for sea turtle ‘take’ as a result of project activities. Information previously submitted was deemed sufficient to initiate formal consultation on this date. On July 20, 2017, NCCOS received the NMFS *Sargassum* BiOp and the Incidental Take Statement (ITS) from NMFS authorizing the ‘take’ of one Northwest Atlantic distinct population segment (DPS) loggerhead, one North Atlantic DPS green, one hawksbill, and one Kemp’s ridley sea turtle may be captured during each cruise in the proposed action (See Section 4.1.2.4.1 below).

On November 28, 2017, NCCOS reinitiated consultation with NMFS OPR due to a proposed sampling gear change (Encl 2). In a memorandum, NCCOS proposed the incorporation of a sampling gear type called the “Methot Frame Trawl” that was not previously analyzed in the *Sargassum* BiOp received July 20, 2017. Therefore, as required by 50 C.F.R. §402.16 and pursuant to the “Reinitiation Notice” within the *Sargassum* BiOp (Encl. 1, Section 16, Pg. 63), reinitiation of consultation was required if, *the identified action is subsequently modified in a*

*manner that causes an effect to ESA-listed species or designated critical habitat that was not considered in this opinion (Encl. 1, Section 16).* On February 16, 2018, NCCOS received the NMFS LOC, agreeing that the proposed sampling gear, is not likely to adversely affect NMFS ESA-listed species and/or designated critical habitat (Encl 3).

### 1.2.2 Magnuson Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) requires that Federal agencies consult with NMFS on actions that “may adversely affect” Essential Fish Habitat (EFH) (16 U.S.C. §1855(b)(2)). NCCOS requested informal consultation with NMFS Southeast Regional Office (SERO) on May 3, 2017 with the determination that project activities would not adversely affect EFH. On May 11, 2017 NCCOS received the Letter of Concurrence (LOC) (Encl 4) from NMFS SERO concurring that project activities “would not affect” EFH resources. Further, NMFS states in the LOC that, “*EFH consultation on this action is not necessary unless future modifications are proposed and you believe that resulting activities may result in adverse impacts to EFH*”. On December 19, 2017, NCCOS informed NMFS of the proposed new gear type, the “Methot frame Trawl” and NMFS responded via email that no further consultation is required (Encl 5).

However, NMFS requires the Principal Investigator (PI) for the project apply for a letter of acknowledgement (LOA) and a special research permit (SRP) for scientific research activities. LOAs are issued by NMFS under the authority of the MSFCMA for situations where research activities would normally prohibited by Federal fishing regulations. Activities acknowledged as scientific research by NMFS are exempt from the fishing regulations developed under the MSFCMA.

### 1.2.3 Cruise History

There has been one cruise conducted as part of this project from July 20 to 28, 2017 in the same geographic area (GOM, Figure 1) and with the exception of the Methot frame trawl, using the exact same methods as those proposed in this EA. After receiving the NMFS Sargassum BiOp of ‘no jeopardy’ and the LOC from the informal EFH consultation NCCOS completed a memorandum to the record which analyzed the impacts of all cruise related activities and established interim measures (Encl 6, signed July 14, 2017) for further minimizing adverse impacts of project activities. This was completed in lieu of an EA for the first cruise in July 2017. There was no incidental take of turtles during the July 2017 cruise. However, there are three additional cruises proposed for this project and this EA completes the environmental review for this project pursuant to the National Environmental Policy Act (NEPA).

## 2.0 Description of Proposed Action and Alternatives

Action area means all areas affected directly, or indirectly, by the Federal action, and not just the immediate area involved in the action (50 C.F.R. §402.02). Thus the action area for this project would be the northern GOM between 86°W and 92°W longitude, and bordered to the south by the EEZ or 24°N latitude (Figure 1). The actual area to be sampled will be informed by remote

sensing and ship-based indices. Operations will occur aboard the R/V Point Sur which is a 135' long, 32' wide vessel with 9' draft and a cruising speed of 9.5 knots. The R/V Point Sur is owned by the University of Southern Mississippi, and operated by Louisiana Universities Marine Consortium (LUMCON). The R/V Point Sur will transit from its homeport of Gulfport, MS to the project action area.

In total, four, 9-day cruises aboard R/V *Point Sur* are proposed to collect *Sargassum* and juvenile fishes associated with *Sargassum* and non-*Sargassum* habitats (open water). Cruise 1 was completed from July 20 - 28, 2017 (Encl 6, Interim measures memo). For the purpose of this EA, the following cruises are considered: Cruise 2 (May/June 2018), Cruise 3 (July/August 2018), and Cruise 4 (May/June 2019). During each cruise the principal investigators (PIs) propose to sample in both neritic (<200 m) and oceanic (>200 m) waters in the northern GOM. The offshore distribution of *Sargassum* is highly variable, and depends on factors such as riverine discharge, wind patterns, currents etc. Nominally, researchers do not anticipate sampling in waters < 40 m depth, although in low discharge years or periods of southerly winds, *Sargassum* may be located further inshore.

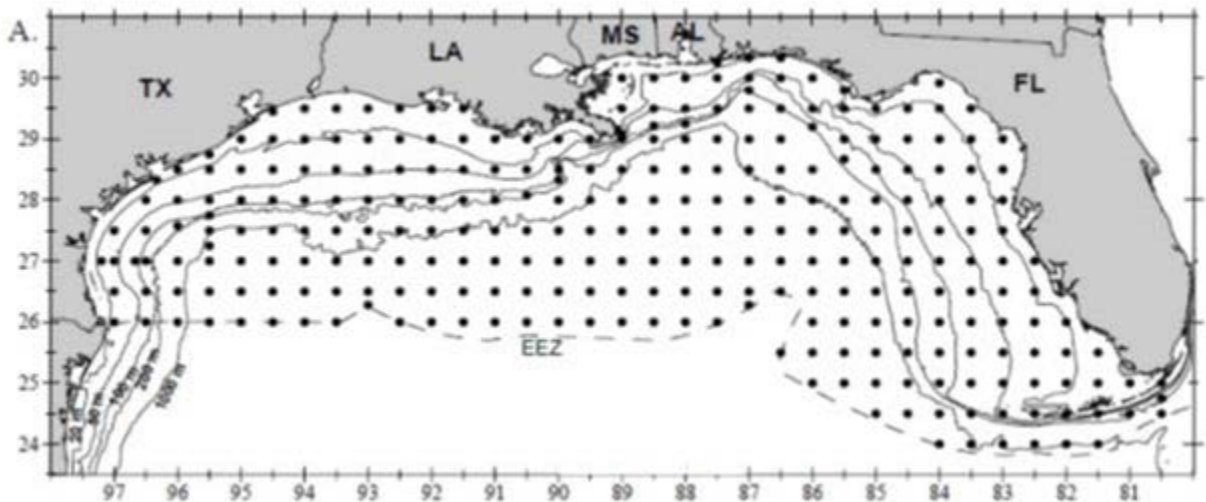


Figure 1. Proposed action area for *Sargassum* research activities. Map depicts the range of fall and spring SEAMAP Plankton Surveys which is the same location that will be sampled in this proposed project.

## 2.1 Proposed Action (preferred alternative)

### 2.1.1 Collection of Fish associated with *Sargassum* and non-*Sargassum* habitats

The proposed activity (preferred alternative) is to award NOAA RESTORE Act Science Program funds to support the study of the nursery function and role(s) of *Sargassum* for fisheries in the GOM by the University of Southern Mississippi and sub-awardees.

Neuston tows - A primary activity of this work is to collect juvenile fishes associated with *Sargassum* and non-*Sargassum* habitats. The primary sampler would be a 1 x 2 m neuston net (500  $\mu$ m or 1000  $\mu$ m mesh) towed through *Sargassum* features and through open water (Figure 2). Neuston net tows through *Sargassum* would be less than 1 minute in duration (often less than

30 seconds), as the net fills up quickly with *Sargassum*. Neuston tows in open water would be for 10 minutes in duration, following NOAA SEAMAP [protocols](#). *Sargassum* collected in the neuston net would be brought directly on board. In both environments, tows would occur at the surface.

*Methot frame trawl* - In open water habitats (away from *Sargassum* habitats), the Methot frame trawl would be used in addition to the other open water sampling types (neuston net, light trap). The Methot Frame Trawl is a 5-m<sup>2</sup> aluminum frame with a 3.1-mm knotless mesh net. The net has a total length of 13.1-m (43 feet) (Methot 1986, see Figure 2 and 3). The frame can be towed up to 5 knots. Floats may be attached to the bridle, as needed, to maintain a constant sampling depth. The net will be deployed off the stern of the vessel (*R/V Point Sur*) and will be fished at a speed of approximately 4 knots. Anticipated fishing duration will be 10-20 minutes, though this may be adjusted based on the size of catch. The net will be fished within 1-2 m of the surface and a flowmeter will be attached to estimate volume of water filtered. The purpose of adding the Methot Frame Trawl, which was not used during the first cruise, is to collect relatively larger, faster juveniles that easily avoid other samplers (like the neuston net) in open water habitats. The efficacy of this gear has been demonstrated in numerous studies (e.g., Methot 1986; Dickey-Collas et al. 1997; Wilhelm et al. 2005; Brodeur et al. 2011).

*Purse Seine* - Larger *Sargassum* habitats (e.g., mats, weedlines) may be sampled using 10 x 3 m plankton purse seine (1000 µm mesh) to capture mobile juveniles that school below the *Sargassum* canopy (Figure 2). During the first cruise (July 2017), researchers opted not to use the plankton purse seine (previously analyzed in the *Sargassum* BiOp). This decision was primarily based on the anticipated time it would have taken to deploy, retrieve and process the sample. Researchers will continue to bring the purse seine, and it may or may not be used going forward, depending on sampling needs. If used researchers would follow the methods of Wells and Rooker (2004) to deploy and sample with the purse seine. Each sample would be standardized per unit effort, as well as by *Sargassum* biomass for comparisons between seasons, region, and morphologies. The purse seine would not be used to sample open water stations. The net would be deployed from a small vessel as it encircles a patch of *Sargassum*. While, *Sargassum* collected in the Neuston net would be brought directly on board, *Sargassum* collected in the purse seine may be lifted directly on board, or off-loaded first into shrimp baskets, so as not to tear the net (e.g., if the *Sargassum* volume is large). Once on board, *Sargassum* would be rinsed of fishes and invertebrates in a 'sorting trough' designed for processing *Sargassum* and minimizing stress on organisms.

*Mid Camera Stereo Rigs* - Following the low-cost (Go-Pro) design of Letessier *et al.* (2013), mid-water stereo camera rigs would be deployed for 30-minute intervals during daylight hours to estimate abundances of larger, mobile juveniles that school below the *Sargassum* canopy and avoid net samplers.

*Light Traps* - To maximize vessel time, the researchers would maintain position near *Sargassum* features at dusk, and use light-traps to sample *Sargassum* and open water habitats at night. Light traps are an ideal sampler for *Sargassum*, in that they are selective for juvenile stage fishes and are ideal for sampling within complex structure where more traditional gears underestimate fish abundances. Multiple light-traps would be deployed within each habitat; nominal soaks times of



1 hour would be used, though this may be shortened or lengthened based on catch success. Light-trap samples would be standardized as catch-per-unit-effort.

Sabiki rigs - Opportunistic hook-and-line sampling with Sabiki rigs may be used to collect larger, mobile juvenile fishes associated with *Sargassum* and in open water habitats (*i.e.*, carangids). However, Sabiki rigs were not successful in open water during the first cruise and may or may not be used in open water during future cruises.



*Figure 2. Plankton purse seine. Top: encircling Sargassum with a plankton purse seine; Bottom Left: collecting Sargassum with a neuston net; Bottom Right: Rinsing Sargassum in sorting trough.*

### 2.1.2 Sargassum and fish sample processing

*Sargassum* collected in neuston net and purse seine samples will be rinsed, sorted for species type and associated organisms, and (wet) weighed (Figure 2). The rinsate from the *Sargassum* cleaning will be size fractionated through a series of sieves. Samples of *Sargassum natans* and *S. fluitans* (<100 g of each), sorted fishes and invertebrates, and the size-fractionated subsamples would be further processed on board for stable isotope analysis or preserved in ethanol for further diet, growth and condition analyses (see below). The vast majority of the *Sargassum* would be returned to the water once these samples have been collected. Gear-specific fish

abundances, richness, and diversity would be calculated and compared between seasons, regions, and morphologies.

- Both *Sargassum* samples and epibiotic samples from *Sargassum* rinsate would be freeze dried and ground into a fine powder for laboratory analyses.
- All collected and sorted fish and invertebrate samples would be identified to the lowest taxonomic level and frozen. Managed species (state, national, and international) that are captured would be used for *Sargassum*-fish association and biomass data to formulate a *Sargassum* index for recruitment in the GOM.
- The stomach contents of juvenile fishes preserved in ethanol would be identified.
  - Prior to freezing fish, blood and liver samples would be taken. Liver would be frozen; whole blood would be centrifuged to separate red blood cells from plasma and then they would be frozen separately.

#### 2.1.3 Remote Sensing and Environmental Data collection

- Remote Sensing would be used in this project for spectral analysis of *Sargassum* and fine-tuning the multi-band algorithms and for data product validation. Researchers would utilize the *Sargassum* Watch System (SaWS, <http://optics.marine.usf.edu/projects/saws.html>), which uses MODIS and L8/OLI to produce and distribute *Sargassum*-related products in near real-time.
- Environmental Data would be collected from several sources to help understand the observed *Sargassum* distribution patterns. Three data types would be obtained from NASA's Giovanni system, including: 1) cloud fraction data from the Atmospheric Infrared Sounder AIRX3STM v006; 2) precipitation data from the Tropical Rainfall Measuring Mission TRMM\_3b43 v7; and 3) aerosol optical depth (AOD, 500 nm) data from the Ozone Monitoring Instrument OMAERUVd v003. In addition, data for sea surface temperature anomaly; photosynthetically available radiation; Mississippi River discharge; Archiving, Validation and Interpretation of Satellite Oceanographic data altimetry (AVISO), and Navy Coastal Ocean Model (NCOM) surface current would all be obtained from their corresponding sources.

#### 2.1.4 Vessel Operations

Operations would be conducted aboard the R/V Point Sur which is a 135' long, 32' wide vessel with 9' draft and a cruising speed of 9.5 knots. The R/V Point Sur is owned by the University of Southern Mississippi, and operated by LUMCON. The R/V Point Sur would transit from its homeport of Gulfport, MS to the project area. A small rib would be launched to conduct some of the sampling such as pulling the purse seine in tandem with the R/V Point Sur (Figure 2).

#### 2.1.5 Anchoring

Anchoring is not anticipated for any of the three cruises. However, 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 and avoidance of all sensitive habitats.

## *2.2 No Action alternative*

Under the no-action alternative, NOAA RESTORE Act Science Program would not support researchers from the University of Southern Mississippi and sub-awardees to conduct the three proposed 9-day cruises. NCCOS would not obtain critical information about the distribution of *Sargassum* habitat and associated species needed to evaluate the nursery function and importance of *Sargassum* to fisheries in a context useful to managers in the Gulf of Mexico. NCCOS considers a no action alternative in Section 4.2 that generally describes the alternatives considered but eliminated from further analysis.

## **3.0 Affected Environment**

The Affected Environment Section includes the project action area as described above under Section 2.0 and includes the northern GOM between 86°W and 92°W longitude, bordered to the south by the EEZ or 24°N latitude (Figure 1).

### *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.

#### 3.1.1. Land

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

#### 3.1.2. Air

No air resources would be impacted as a result of cruise activities with exception of minimal emissions from the mechanical operation of the R/V Point Sur.

#### 3.1.3. Noise

Noise from the operation of the R/V Point Sur 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 Gulf of Mexico Large Marine Ecosystem

The project action area is within the Gulf of Mexico Large Marine Ecosystem (GOMLME). Globally, LMEs are the source of 80 to 95 percent of the world's marine fish harvest, and are centers of economic activity for oil and gas, shipping, and tourism industries. The LME concept provides a practical framework for the application of ecosystem-based approaches to fisheries assessment and management, habitat restoration, and research on pollution and ecosystem health ([SEFSC DPEA April 2016](#) pg. 3-3). Within the GOMLME there is one primary research area, the Gulf of Mexico Research Area (GOMRA).

The GOM LME is bordered by Cuba, Mexico and the U.S and comprises more than 1.5 million km<sup>2</sup>, of which 1.57% is protected. The continental shelf is extensive, comprising about 30% of the total area and is topographically diverse. Oceanic water enters this LME from the Yucatan channel and exits through the Straits of Florida, creating the Loop Current, a major oceanographic feature and part of the Gulf Stream System (Lohrenz et al. 1999) The LME is strongly influenced by freshwater input from rivers, including the Mississippi-Atchafalaya, and has 47 major estuaries. In addition, the GOM LME is heavily impacted by human activities, including oil and gas extraction, commercial and private fishing and recreational tourism.

The project activities, including the survey and transit areas, has a water depth range from 10m - 2,000 m. Sampling would take place in necritic (< 200m depth) and oceanic (> 200m depth) environments.

### 3.2.2 Special Resource Areas and Essential Fish Habitat

#### *3.2.2.1 Essential Fish Habitat*

Essential Fish Habitat (EFH) is comprised of the waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S.C. § 1802 (10)). Regulatory guidelines explain that EFH should be sufficient to “support a population adequate to maintain a sustainable fishery and the managed species’ contributions to a healthy ecosystem” (50 C.F.R. 600, subpart J). EFH applies to federally managed species in both state and federal jurisdictional waters throughout the range of the species within U.S. waters. The designation of EFH by itself does not confer any protection of the areas from non-fishing or fishing impacts. Instead, it is a tool used by managers to reduce impacts and improve fisheries management. It is described and identified in Fishery Management Plans (FMPs) that are developed by regional fisheries management councils. NMFS regional offices implement FMPs to facilitate long-term protection of EFH through conservation and management measures.

The EFH for a managed species is designated separately for each life stage: eggs, larvae (normally pelagic), juveniles, and adults (pelagic and/or demersal). In certain species EFH is also designated for spawning adults. Many species require different habitats for different life stages, which means that the EFH for a single species may cover a large geographic area. As a result, when taken over all species and all life stages, EFH occurs almost everywhere within the project action area (Figure 1).

The following EFH may be found in the action:

1. Atlantic Highly Migratory Species (Table 1)
2. Coastal Migratory Pelagics (king mackerel, spanish mackerel, cobia)
3. Coral
4. Red Drum
5. Reef Fish
6. Shrimp;
7. Spiny Lobster.

In addition, the EFH of many highly migratory fish species are likely to be encountered during sampling within the Sargassum environment (Table 1).

Table 1. Essential Fish Habitats (EFH) within the project action area.

EFH	Species in Project Area
Tuna	Albacore, Bigeye, Bluefin, Skipjack, and Yellowfin Tuna  EFH Maps in <a href="#">Figures 5.15.13</a>
Swordfish	Swordfish ( <i>Xiphias gladius</i> )  EFH Maps in <a href="#">Figures 5.145.16</a>
Billfish	Blue Marlin ( <i>Makaira nigricans</i> ), Longbill Spearfish ( <i>Tetrapturus pfluegeri</i> ), Roundscale Spearfish, Sailfish ( <i>Istiophorus platypterus</i> ), and White Marlin ( <i>Tetrapturus albidus</i> )  EFH Maps in <a href="#">Figures 5.175.25</a>
Sharks	Angel, Bigeye Thresher, Bull, Common Thresher, Dusky, Great Hammerhead, Longfin Mako, Night, Nurse, Oceanic Whitetip, Porbeagle, Sandbar, Scalloped Hammerhead, Shortfin Mako, Silky, Smooth Dogfish, Spinner, Tiger, Whale, and White Sharks  EFH Maps in <a href="#">Figures 5.275.83</a>

### 3.2.2.2 Habitat Areas of Particular Concern

The EFH provisions of the Magnuson-Stevens Fishery Conservation and Management Act (50 C.F.R. part 600), recommend that specific areas of habitat within EFH are identified as “habitat areas of particular concern.” Habitat Areas of Particular Concern (HAPC) are discrete subsets of EFH that provide important ecological functions or are especially vulnerable to degradation.

There are fourteen (14) designated habitat areas of particular concern (HAPC) that are also managed under the MSFCMA and one (1) that is proposed that could be within the project action area. These are 29 Fathom, Alderice Bank, Bouma Bank, East and West Flower Garden Banks, Geyer Bank, Jakkula Bank, MacNeil, McGrail Bank, Rankin Bright Bank, Rezak Sidner Bank, Stetson, Sonnier Bank and Florida Middle Grounds. In addition, the project area of transit and sampling is designated as a HAPC for bluefin tuna. Flower Garden Banks National Marine Sanctuary (FGBNMS) is also an EFH area where conventional fishing with only hook and line gear are allowed. Fishing within FGBNMS by any other method (including net, spear, long line, or trawling) is prohibited. FGBNMS would be avoided as part of this project, no activities would be conducted within the sanctuary.

### *3.2.2.3 Cultural Resources*

Section 106 of the National Historic Preservation Act (NHPA) (54 U.S.C. § 306108) requires Federal agencies to consult regarding their actions if they (the agencies) determine that historic sites, artifacts, or other historic, archeological, or cultural resources may be affected. However, if the agency determines that the action has no potential to affect historic properties, the agency has no further Section 106 obligations.

### *3.2.2.4 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. § 1434(d)). The Flower Garden Banks and the Florida Keys National Marine Sanctuaries are within the project action area (Figure 1).

The Flower Gardens Banks NMS are situated 70 to 115 miles off the coasts of Texas and Louisiana. It includes underwater communities that rise from the depths of the Gulf of Mexico atop underwater mountains called salt domes. The sanctuary protects three separate areas: East Flower Garden Bank, West Flower Garden Bank, and Stetson Bank. These banks are separated from each other by miles of open ocean ranging from 200 to 400 feet (61-122 m) deep, and each bank has its own set of boundaries.

Florida Keys National Marine Sanctuary protects 3,840 mi<sup>2</sup> of waters surrounding the Florida Keys, from south of Miami westward to encompass the Dry Tortugas, excluding Dry Tortugas National Park. The shoreward boundary of the sanctuary is the mean high-water mark, essentially meaning that once you set foot in Keys waters, you have entered the sanctuary. Within the boundaries of the sanctuary lie spectacular, unique, and nationally significant marine resources, from the world’s third largest barrier reef, extensive seagrass beds, mangrove-fringed islands, and more than 6,000 species of marine life. The sanctuary also protects pieces of our nation’s history such as shipwrecks and other archeological resources

## *3.3 Biological Environment*

### 3.3.1 Marine Mammals

There are twenty-four species of marine mammals which could potentially occur within the project action area (Table 1). Six marine mammal species are endangered or proposed endangered, such as the Blue, Fin, Sei, Sperm and Bryde’s whales (proposed endangered) and the West Indian manatee. According to the NMFS OPR 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. There is no critical habitat designated for whales within the research action area. All marine mammal stocks are considered depleted by the MMPA.

Florida manatees occur throughout the southeastern U.S., which is at the northern limit of their range (Lefebvre et al. 2001). They occur in freshwater, brackish, and marine environments that typically include coastal tidal rivers and streams, mangrove swamps, salt marshes, freshwater springs, and vegetated bottoms (FWC 2005). Manatees use different habitats at different times of the year. During cold winter temperatures, they concentrate along peninsular Florida and many rely on warm water from natural springs, passive thermal basins, and power plant outfalls (Laist et al. 2013, USFWS 2001). During summer, they expand their range; manatees are occasionally seen as far north as Rhode Island on the Atlantic coast and as far west as Texas on the Gulf of Mexico coast (USFWS 2001). There is critical habitat designated for manatees but it is located within the shallow bays and lagoons of southwest and eastern Florida and does not overlap with the project action area.

Table 2. Marine mammal species that regularly occur in the Gulf of Mexico region.

Species Common Name	Scientific Name	ESA status
<b>Cetaceans</b>		
Blue Whale	<i>Balaenoptera musculus</i>	<a href="#">E – 35 FR 18319</a>
Fin Whale	<i>Balaenoptera physalus</i>	<a href="#">E – 35 FR 18319</a>
Sei Whale	<i>Balaenoptera borealis</i>	<a href="#">E – 35 FR 18319</a>
Sperm Whale	<i>Physeter macrocephalus</i>	<a href="#">E – 35 FR 18319</a>
Bryde’s Whale	<i>Balaenoptera edeni</i>	<a href="#">PE - 81 FR 88639</a>
<i>Minke whale</i>	<i>Balaenoptera acutorostrata</i>	-- --
Pygmy or dwarf sperm whale	<i>Kogia breviceps</i> or <i>K. sima</i>	-- --
Killer whale	<i>Orcinus orca</i>	-- --
Pygmy killer whale	<i>Feresa attenuata</i>	-- --
False killer whale	<i>Pseudorca crassidens</i>	-- --
Cuvier’s beaked whale	<i>Ziphius cavirostris</i>	-- --
Mesoplodont beaked whales	<i>Mesoplodon spp.</i>	-- --
Melon-headed whale	<i>Peponocephala electra</i>	-- --
Risso’s dolphin	<i>Grampus griseus</i>	-- --
Short-finned pilot whale	<i>Globicephala macrorhynchus</i>	-- --
Atlantic spotted dolphin	<i>Stenella frontalis</i>	-- --

Pantropical spotted dolphin	<i>Stenella attenuata</i>	-- --
Striped dolphin	<i>Stenella coeruleoalba</i>	-- --
Fraser's dolphin	<i>Lagenodelphis hosei</i>	-- --
Rough-toothed dolphin	<i>Steno bredanensis</i>	-- --
Clymene dolphin	<i>Stenella clymene</i>	-- --
Spinner dolphin	<i>Stenella longirostris</i>	-- --
Bottlenose dolphin	<i>Tursiops truncatus</i>	varies <sup>1</sup>
<b>Sirenians</b>		
West Indian manatee	<i>Trichechus manatus</i>	<a href="#">T -82 FR 16668</a>

<sup>1</sup>There are 36 stocks of Bottlenose dolphins in the project action area

### 3.3.2 Fishes

There are thousands of finfish species that occur within the project action area. Here we provide information on the five (5) ESA-listed fish species that may occur in the project action area, prohibited species and highly migratory species.

ESA-listed fishes such as Gulf sturgeon, Nassau grouper, smalltooth sawfish, and the proposed oceanic whitetip shark and giant manta ray may occur within the action area (Table 3). Gulf sturgeon associate with the benthos, and can be found in the Gulf of Mexico and in rivers in Alabama, Mississippi, and the Florida panhandle. Gulf sturgeon spend most of the year in rivers, and are typically found in shallow Gulf waters (two to four meters) during winter (Fox et al. 2002). The Nassau grouper occupies shallow water throughout the Caribbean, south Florida, Bermuda, and the Bahamas (NMFS 2013). In the United States, smalltooth sawfish are found in shallow coastal waters around the peninsula of Florida (NMFS 2010). Giant manta rays, proposed for listing in January 2017, are commonly found offshore in oceanic waters, but are sometimes found feeding in shallow waters (less than 10 meters) (Miller and Klimovich 2016). Giant manta rays can grow to be as large as seven meters; fully developed pups are about 1.4 meters. The oceanic whitetip shark, proposed for listing in December 2016, is distributed worldwide in tropical and subtropical waters, usually found in open ocean and near the outer continental shelf (Young 2016).

Critical habitat for gulf sturgeon has been designated in rivers in Louisiana, Mississippi, Alabama, and the Florida panhandle, outside of the action area of the neritic and oceanic Gulf of Mexico. There is no critical habitat designated for the other listed species.

Table 3. ESA-listed fish species within the Gulf of Mexico



Fishes	ESA status	Critical habitat
Gulf sturgeon ( <i>Acipenser oxyrinchus desotoi</i> )	<a href="#">T – 56 FR 49653</a>	<a href="#">68 FR 13370</a>
Smalltooth Sawfish ( <i>Pristis pectinata</i> ) – U.S. portion of range DPS	<a href="#">E – 68 FR 15674</a>	<a href="#">74 FR 45353</a>
Nassau grouper ( <i>Epinephelus striatus</i> )	<a href="#">T – 81 FR 42268</a>	-- --
Oceanic whitetip shark ( <i>Carcharhinus longimanus</i> )	<a href="#">T -- 81 FR 96304 (Proposed)</a>	-- --
Giant manta ray ( <i>Manta birostris</i> )	<a href="#">T -- 82 FR 3694 (Proposed)</a>	-- --

Prohibited fish species are those species caught as bycatch in commercial or recreational fisheries that cannot be retained under provisions of one or more FMPs, unless authorized by another applicable law. Prohibited highly migratory shark species include Atlantic angel, basking, bigeye sand tiger, bigeye sixgill, bigeye thresher, bignose, Caribbean reef, Caribbean sharpnose, dusky, Galapagos, longfin mako, narrowtooth, night, sand tiger, sevengill, silky, sixgill, smalltail, whale, and white. Other prohibited species include goliath grouper, nassau grouper, and red drum.

Highly migratory species (Table 1) are those fish species which migrate variable distances across oceans for feeding or reproduction, and have wide geographic distributions. These species are pelagic and are typically found both within the 200-mile EEZ and in open oceans, although some life history stages may occur in nearshore waters. HMS managed under the Consolidated Atlantic Highly Migratory Species FMP (NMFS 2006) include: billfish (blue marlin, white marlin, sailfish, swordfish, longbill spearfish), sharks (basking, cow, hammerhead, mackerel, nurse, requiem, sandbar, sand tiger, thresher, whale), and tunas (Atlantic bigeye, Atlantic yellowfin, Atlantic albacore, Atlantic skipjack).

### 3.3.3 Corals

There are seven ESA-listed coral species which may occur in the action area: lobed star coral, boulder star coral, mountainous star coral, pillar coral, rough cactus coral, elkhorn coral, and staghorn coral (Table 4) Lobed star, boulder star, and mountainous star coral species are found in the Caribbean. Elkhorn and staghorn coral can be found in the Florida Keys; pillar coral and rough cactus coral can be found in southeastern Florida. There is no critical habitat designated within the project action area.

Table 4. ESA listed coral species potentially found within the project action area.

<b>Corals</b>	<b>ESA Status</b>	<b>Critical Habitat</b>
Elkhorn Coral ( <i>Acropora palmata</i> )	<a href="#">T – 71 FR 26852</a>	<a href="#">73 FR 72210</a>
Staghorn Coral ( <i>Acropora cervicornis</i> )	<a href="#">T – 71 FR 26852</a>	<a href="#">73 FR 72210</a>
Rough Cactus Coral ( <i>Mycetophyllia ferox</i> )	<a href="#">T – 79 FR 54122</a>	-- --
Pillar Coral ( <i>Dendrogyra cylindrus</i> )	<a href="#">T – 79 FR 54122</a>	-- --
Mountainous Star Coral ( <i>Orbicella faveolata</i> )	<a href="#">T – 79 FR 54122</a>	-- --
Boulder Star Coral ( <i>Orbicella franksi</i> )	<a href="#">T – 79 FR 54122</a>	-- --
Lobed Star Coral ( <i>Orbicella annularis</i> )	<a href="#">T – 79 FR 54122</a>	-- --

### 3.3.4 Sea Turtles

Five species of sea turtles can be found within the project action area; green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricate*), Kemp’s ridley (*Lepidochelys kempii*), leatherback (*Dermochelys coriacea*), and loggerhead (*Carretta carretta*). All life history phases and associated size classes for these particular species may occur.

The green sea turtle is globally distributed and commonly inhabits nearshore and inshore waters. The North Atlantic DPS green turtle is found in the north Atlantic Ocean and Gulf of Mexico. The green sea turtle is the largest of the hardshell marine turtles, growing to a weight of 350 pounds (159 kilograms) and a straight carapace length of greater than 3.3 feet (1 meter). Here we incorporate by reference the description of the status, life history, population dynamics, and recovery goals for the species from the NMFS Sargassum BiOp (Section 8.1, Pp. 18-20). No critical habitat is within the project action area.

The hawksbill turtle has a circumglobal distribution throughout tropical and, to a lesser extent, subtropical oceans. The hawksbill sea turtle has a sharp, curved, beak-like mouth and a “tortoiseshell” pattern on its carapace, with radiating streaks of brown, black, and amber. Here we incorporate by reference the description of their status, life history, population dynamics, and

recovery goals for the species from the NMFS Sargassum BiOp (Section 8.2, Pp. 20-24). No critical habitat is within the project action area.

The Kemp’s ridley turtle is considered to be the most endangered sea turtle, internationally. Its range extends from the Gulf of Mexico to the Atlantic coast, with nesting beaches limited to a few sites in Mexico and Texas. We incorporate by reference the description of their status, life history, population dynamics, and recovery goals for the species from the NMFS Sargassum BiOp (Section 8.3, Pp. 24-27). No critical habitat has been designated.

The leatherback sea turtle is unique among sea turtles for its large size, wide distribution (due to thermoregulatory systems and behavior), and lack of a hard, bony carapace. It ranges from tropical to subpolar latitudes, worldwide. Leatherbacks are the largest living turtle, reaching lengths of six feet long, and weighing up to one ton. Leatherback sea turtles have a distinct black leathery skin covering their carapace with pinkish white skin on their belly. Here we incorporate by reference the description of their status, life history, population dynamics, and recovery goals for the species from the NMFS Sargassum BiOp (Section 8.4, Pp. 27-30). No critical habitat is within the project action area.

Table 5. Sea Turtles that may occur in the Gulf of Mexico project action area.

Sea Turtles	ESA Status	Critical Habitat	Recovery Plan
Green Turtle, ( <i>Chelonia mydas</i> ) – North Atlantic DPS	<a href="#">T – 81 FR 20057</a>	<a href="#">63 FR 46693</a>	<a href="#">63 FR 28359</a>
Hawksbill Turtle ( <i>Eretmochelys imbricata</i> )	<a href="#">E – 35 FR 8491</a>	<a href="#">63 FR 46693</a>	<a href="#">57 FR 38818</a>
Kemp’s Ridley Turtle ( <i>Lepidochelys kempii</i> )	<a href="#">E – 35 FR 18319</a>	-- --	<a href="#">75 FR 12496</a>
Leatherback Turtle ( <i>Dermochelys coriacea</i> )	<a href="#">E – 35 FR 8491</a>	<a href="#">44 FR 17710</a> and <a href="#">77 FR 4170</a>	<a href="#">63 FR 28359</a>
Loggerhead Turtle, ( <i>Caretta caretta</i> ) – Northwest Atlantic Ocean DPS	<a href="#">T – 76 FR 58868</a>	<a href="#">79 FR 39856</a>	<a href="#">63 FR 28359</a> <a href="#">74 FR 2995</a>

Loggerhead sea turtles are circumglobal, and are found in the temperate and tropical regions of the Indian, Pacific and Atlantic Oceans. Northwest Atlantic Ocean DPS loggerheads are found along eastern North America, Central America, and northern South America. The loggerhead sea turtle is distinguished from other turtles by its reddish-brown carapace, large

head and powerful jaws. Here we incorporate by reference the description of their status, life history, population dynamics, and recovery goals for the species from the NMFS Sargassum BiOp (Section 8.5, Pp. 30-34).

Sargassum has been designated as [critical habitat](#) for loggerhead sea turtles because of its importance in support of reproduction, development, and foraging activities in juveniles (Table 6). Specifically the Sargassum critical habitat designated as [LOGGS-02](#) overlaps with the proposed project area.

*Table 6. Essential features of loggerhead sea turtle Northwest Atlantic Ocean distinct population segment (DPS) designated critical habitat.*

<b>Loggerhead Critical Habitat Unit</b>	<b>Essential Features</b>
Nearshore Reproductive Habitat	<ul style="list-style-type: none"> <li>• Waters off of the highest density nesting beaches;</li> <li>• Waters sufficiently free of obstructions or artificial lighting;</li> <li>• Waters with minimal manmade structures.</li> </ul>
Constricted Migratory Habitat	<ul style="list-style-type: none"> <li>• Constricted continental shelf area relative to nearby continental shelf waters; and</li> <li>• Passage conditions to allow for migration to and from nesting, breeding, and foraging areas.</li> </ul>
Breeding Habitat	<ul style="list-style-type: none"> <li>• High densities of reproductive males and females;</li> <li>• Proximity to primary Florida migratory corridor; and Proximity to Florida nesting grounds.</li> </ul>
Winter Habitat	<ul style="list-style-type: none"> <li>• Water temperatures above 10°C from November to April;</li> <li>• Continental shelf waters in proximity to the western boundary of the Gulf Stream; and</li> <li>• Water depths between 20 and 100 m.</li> </ul>
Foraging Habitat	<ul style="list-style-type: none"> <li>• Sufficient prey availability and quality, such as benthic invertebrates; and</li> <li>• Water temperatures to support loggerhead inhabitation, generally above 10°C.</li> </ul>

## 4.0 Environmental Consequences

### 4.1 Proposed Action (preferred alternative)

The proposed action includes research activities awarding NOAA RESTORE Act Science Program funds to support University of Southern Mississippi and sub-awardees research of *Sargassum* and larval fish communities. This would involve the use of sampling equipment such as neuston nets, Methot frame trawl, plankton purse seine, light-traps, and opportunistic hook-and-line sampling with Sabiki rigs as described in Section 2.1.

#### 4.1.1 Physical Environment

##### 4.1.1.1 Gulf of Mexico Large Marine Ecosystem

No adverse impacts to the water column or the benthic environment are anticipated during the collection of fish and *Sargassum* as a result of research activities.

##### 4.1.1.2 Special Resources Areas and Essential Fish Habitat

###### 4.1.1.2.1 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)).

There is overlap between the EFH of many HMS and the project action area for sampling. Potential impacts are described in (Table 7)

Table 7. Potential impacts to highly migratory species essential fish habitat.

EFH	Species Impacted	Potential for Impact
Tuna EFH Maps in <a href="#">Figures 5.15.13</a>	Albacore, Bigeye, Bluefin, Skipjack, and Yellowfin Tuna	The juvenile stage of each tuna species uses <i>Sargassum</i> habitats for nursing and foraging. Planned sampling locations are included within the EFH of each species. It is likely that these species will be encountered during sampling. Researchers would catalogue encounters of these species to generate a <i>Sargassum</i> -fish association data to include in their <i>Sargassum</i> index.

Swordfish EFH Maps in <a href="#">Figures 5.145.16</a>	Swordfish ( <i>Xiphias gladius</i> )	Swordfish use the GOM as spawning grounds and juveniles at various stages have been observed. Larger swordfish prefer deeper waters that are likely outside the planned sampling area; however, they are co-located with Sargassum habitats and could be encountered.
Billfish EFH Maps in <a href="#">Figures 5.175.25</a>	Blue Marlin ( <i>Makaira nigricans</i> ), Longbill Spearfish ( <i>Tetrapturus pfluegeri</i> ), Roundscale Spearfish, Sailfish ( <i>Istiophorus platypterus</i> ), and White Marlin ( <i>Tetrapturus albidus</i> )	Billfish species spawn in the Atlantic and utilize the GOM for larval development, juvenile/subadult, and adult stages. Each species is typically seen in the central GOM from southern Texas to the Florida panhandle. These fish are oceanic and epipelagic, so it is likely that they utilize Sargassum habitats at some point in their lifecycle.
Sharks EFH Maps in <a href="#">Figures 5.275.83</a>	Angel, Bigeye Thresher, Bull, Common Thresher, Dusky, Great Hammerhead, Longfin Mako, Night, Nurse, Oceanic Whitetip, Porbeagle, Sandbar, Scalloped Hammerhead, Shortfin Mako, Silky, Smooth Dogfish, Spinner, Tiger, Whale, and White Sharks	These large coastal sharks are located in the GOM. Most of the sharks occur during juvenile/subadult and adult life stages only, while some occur during neonate stages. Their location close to the coasts indicate that they may encounter Sargassum habitats.

NCCOS initiated an informal EFH consultation with NMFS Southeast Regional Office (SERO) on May 2, 2017 requesting concurrence with our determination that project activities would not adversely affect EFH within the project action area. On May 11, 2017, NCCOS received an LOC from the NMFS Office of Habitat Conservation (OHC), Southeast Regional Office (SERO) concurring with the NCCOS determination of no adverse effects to EFH (Encl 4). However, the LOC requested that the project PI request a Letter of Acknowledgement to collect MSFCMA species. This process is described further in Section 4.1.2.2 below. Finally, on December 19, 2017, NCCOS informed NMFS of a proposed new gear type, the “Methot frame Trawl” and NMFS responded via email that no further consultation is required (Encl 5)

#### 4.1.1.2.2 Habitat Areas of Particular Concern

Project activities would have no adverse effects on any of the HAPCs, managed under the MSFCMA. NMFS concurred with 'no adverse effects' determination in an LOC received on May 11, 2017 (Encl 4).

#### 4.1.1.2.3 Cultural Resources

To determine if this project action may affect cultural resources and require a Section 106 consultation under the NHPA, NCCOS reviewed the cultural resources data layer from the [National Park Service website](#) and found no historic resources within the project action area. Therefore no adverse impacts to cultural resources are expected as a result of this project action and NCCOS will not request a Section 106 consultation.

In addition, according to NOAA nautical charts #11006, 1117A, 1116A, and 411, there are shipwrecks within the project action area. Given the depth of the shipwrecks, they would not be affected by vessel or sampling operations which are primarily occurring near surface waters. Further, shipwrecks in shallower areas would be avoided as hazards to navigation at all times.

#### 4.1.1.2.4 National Marine Sanctuaries

No vessel or sampling operations are proposed to occur within the FGBNMS or the FKNMS therefore no sanctuary resources could be injured as a result. No consultations will be sought.

### 4.1.2 Biological Environment

#### *4.1.2.1 Marine Mammals*

There are five (5) species of endangered and proposed endangered whales whose potential ranges overlap with the project action area (Table 2). ESA-listed species may be exposed to stressors associated with the proposed action. These stressors include vessel activity (strike, noise, visual disturbance, transit, discharges, and introduction of aquatic nuisance species), and the inwater research activities (sampling).

When a vessel transits to and from the survey areas, potential effects on the marine mammals include vessel strike, noise generated by the vessel, and visual disturbance from the vessel itself. There will be no multi-beam echosounders or sub-bottom profilers in use for this proposed action, meaning that the only vessel noise generated will be from the operation of the vessel itself. Combined vessel noise and presence could cause slight response or behavioral interruptions, but they would be minor and temporary as the vessel moves away from any whales. The distance between the vessel and observed whales, per avoidance protocols, would also minimize the potential for acoustic disturbance from engine noise. Therefore, effects to ESA-listed whales from noise or presence associated with vessel transit would be insignificant.

Because the vessel would move at a very slow speed during the survey, a vessel striking an ESA listed or proposed whale would be improbable and extremely unlikely. Further, adherence to reduced vessel speeds, use of protected species observers, and avoidance procedures are also expected to avoid vessel strikes. Therefore, effects from vessel strikes during the survey would be discountable.

The potential for fuel or oil leakages is extremely unlikely. An oil or fuel leak would likely pose a significant risk to the vessel and its crew and actions to correct a leak should occur immediately to the extent possible. In the event that a leak should occur, the amount of fuel and oil onboard the research vessel is unlikely to cause widespread, high dose contamination (excluding the remote possibility of severe damage to the vessel) that would impact marine mammals directly or pose hazards to their food sources. Because the potential for fuel or oil leakage is extremely unlikely to occur, we find that the risk from this potential stressor to any ESA-listed or proposed whale is discountable.

The inwater research activities would include the use of plankton purse seines, neuston nets, Sabiki hook and line rigs, and light traps. This equipment is designed to capture larval fish and Sargassum. Due to the small size of the inwater research equipment, we conclude that there will be no effect to ESA-listed or proposed whales.

*In the NMFS Sargassum BiOp received on July 20, 2017(Encl 1) and the LOC received Feb. 16, 2018 (Encl 3), NMFS agreed with the NCCOS determination of no-effect to ESA-listed marine mammals as result of project activities.*

The West Indian manatee also may be exposed to similar stressors as described for the ESA-listed whales including vessel activity (strike, noise, visual disturbance, transit, discharges, and introduction of aquatic nuisance species), and the in-water research activities. It is extremely unlikely to encounter a manatee in the area where the project action will occur. Therefore NCCOS determines that there would be no adverse affects to manatees, thus no consultation with USFWS will be sought.

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). The potential stressors and the impacts to the eighteen (18) species of marine mammals (Table 2. Non ESA-listed) within the Gulf of Mexico are similar to those previously described for listed whales. Therefore, NCCOS determines that the likelihood of adverse effects are either discountable or insignificant. The MMPA allows that action proponents (NCCOS in this case) may determine without concurrence that the action does not have a reasonable likelihood of resulting in the incidental take of marine mammals.

#### *4.1.2.2 Fish*

ESA-listed fishes such as Gulf sturgeon, Nassau grouper, smalltooth sawfish, and the proposed oceanic whitetip shark and giant manta ray could occur within the action area. The proposed action would take place in the Gulf of Mexico, involving vessel activity and sampling at the waters surface. Since the action will not involve sampling methods that could capture Gulf sturgeon, in an area where they typically do not occur, we expect there to be no effect from the proposed action to Gulf sturgeon, and will not consider it further. The Nassau Grouper and smalltooth sawfish are found in shallow waters which do not overlap with the action area. The range of giant manta rays includes the Gulf of Mexico, and could coincide with the action area. The proposed action involves in-water sampling, but due to the small size of the purse seines and



neuston nets, the sampling methods are not likely to result in capture of the Giant Manta Ray. Although oceanic whitetip sharks could occur in the deeper oceanic waters of the action area, the proposed in-water sampling activities are unlikely to result in capture due to the size of the equipment being used.

Critical habitat for gulf sturgeon has been designated in rivers in Louisiana, Mississippi, Alabama, and the Florida panhandle, outside of the action area of the neritic and oceanic Gulf of Mexico. Since the proposed action will not occur in designated Gulf sturgeon critical habitat, we conclude that there will be no effect, and it will not be considered further.

Although oceanic whitetip sharks could occur in the deeper oceanic waters of the action area, the proposed in-water sampling activities are unlikely to result in capture due to the size of the equipment being used. Therefore NCCOS determines that project activities would not adversely affect any of these listed fish species or adversely modify or destroy their critical habitat.

*In the NMFS Sargassum BiOp (Encl 1) received on July 20, 2017, and the LOC received Feb. 16, 2018 (Encl 3), NMFS agreed with the NCCOS determination of no-effect to ESA-listed fishes as result of project activities.*

There are Prohibited Species that cannot be retained under the provisions of one or more FMPs and also HMS managed by the MSFMCA that may be collected during the proposed sampling activities. As a result NMFS/OHC/SERO required the project PI to obtain a Letter of Acknowledgment (LOA) for the collection of fishes managed under the MSFCMA and a scientific research permit (SRP) for the collection of HMS. LOAs and SRPs are issued by NMFS under the authority of the MSFCMA for situations where research activities would normally be in violation of federal fishing regulations.

NMFS issued an LOA to the project PI on June 19, 2017 (Encl 7) that recognizes the project activities described in Section 2.1 of this EA as scientific research in accordance with the definitions and guidance at 50 C.F.R. §600.10. As such, the proposed activities are not subject to fishing regulations at 50 C.F.R. part 622 in accordance with the MSFCMA. Managed species likely to be collected include *Rachycentron canadum* (cobia), *Seriola dumerili* (greater amberjack), *S. fasciata* (lesser 15 amberjack), *S. zonata* (banded rudderfish), Lutjanidae species (snappers), Scombridae species (mackerels), and *Balistes caprisiscus* (gray triggerfish). Further, NMFS issued the project PI an SRP authorizing the collection of highly migratory species (HMS) (Encl 8, 9). NMFS did not require any further consultation based on the proposed gear type “Methot frame Trawl” (Encl 3).

#### *4.1.2.3 Corals*

There are seven (7) species of ESA-listed corals and their critical habitat (two species) are potentially found within the project action area. Elkhorn and staghorn coral can be found in the Florida Keys; pillar coral and rough cactus coral can be found in southeastern Florida. However, research will involve vessel activity and in water sampling that will not impact the substrate or any locations where corals are known. The vessel operators will use mapping data to avoid anchoring on sensitive bottom types and coral reefs.

*In the NMFS Sargassum BiOp received on July 20, 2017, and the LOC received Feb. 16, 2018 (Encl 3), NMFS agreed with the NCCOS determination of no-effect to ESA-listed corals as result of project activities*

#### *4.1.2.4 Sea Turtles*

There are five (5) ESA-listed turtle species which may occur in the action area: Green turtle, Hawksbill turtle, Kemp's Ridley turtle, Leatherback turtle, and Loggerhead turtle (Table 5). On May 23, 2017, NCCOS initiated formal consultation with NMFS after NMFS and NCCOS determined that the proposed project 'may affect' sea turtles. This resulted in the NMFS Sargassum BiOp (Encl 1) which we incorporated by reference within this section. Further, NCCOS reinitiated consultation on Nov 28, 2017, with a not likely to adversely affect determination, relative to a proposed gear type not previously analyzed in the Sargassum BiOp. On Feb 16, 2018 NCCOS received an LOC agreeing with NCCOS determination.

The potential stressors on ESA listed turtle species from the proposed action are:

- *Vessel activity*: includes vessel strike, noise, visual disturbance (e.g., presence), vessel transit, discharge of fuel or oil leakages, and introduction of aquatic nuisance species.
- *In-water research activities*: includes sampling using Plankton purse seine, neuston net, Methot frame trawl, Sabiki rigs, and light traps.

#### *Vessel Activity Effects*

When a vessel transits to and from the survey areas, potential effects on the ESA-listed sea turtles include vessel strike, noise generated by the vessel, and visual disturbance from the vessel itself. There will be no multi-beam echosounders or sub-bottom profilers in use for this proposed action, meaning that the only vessel noise generated will be from the operation of the vessel itself. Combined vessel noise and presence could cause slight sea turtle response or behavioral interruptions, but they would be minor and temporary as the vessel moves away from any marine mammals or sea turtles. The distance between the vessel and observed sea turtles, per avoidance protocols, would also minimize the potential for acoustic disturbance from engine noise. Therefore, effects from noise or presence associated with vessel transit would be insignificant. Because the vessel would move at a very slow speed during the survey, a vessel striking a sea turtles would be improbable and extremely unlikely. Further, adherence to reduced vessel speeds, use of protected species observers, and avoidance procedures are also expected to avoid vessel strikes. Therefore, effects from vessel strikes during the survey would be discountable.

Similar to the analysis described in previous sections, the potential for fuel or oil leakages is extremely unlikely. An oil or fuel leak would likely pose a significant risk to the vessel and its crew and actions to correct a leak should occur immediately to the extent possible. In the event that a leak should occur, the amount of fuel and oil onboard the research vessel is unlikely to cause widespread, high dose contamination (excluding the remote possibility of severe damage to the vessel) that would impact listed species directly or pose hazards to their food sources.

Because the potential for fuel or oil leakage is extremely unlikely to occur, we find that the risk from this potential stressor to ESA-listed sea turtles is discountable.

To minimize the risk of aquatic nuisance species introduction, personnel would: avoid discharge of ballast water in designated critical habitat; use anti-fouling coatings; clean the hull regularly to remove aquatic nuisance species (but avoid doing so in critical habitat), and rinse the anchor with a high-powered hose after retrieval. These protective measures go beyond the requirements of the Vessel and Small Vessel General Permits, as described in the mitigation measures (Appendix A). Furthermore, the vessels would not transit outside of the United States; therefore, they would not introduce foreign aquatic nuisance species. Given the protective measures, it is highly unlikely that the vessels would transfer aquatic nuisance species to ESA-listed sea turtles during the proposed action.

### ***In-Water research activities***

Five (5) types of sampling gear would be used in the proposed action. Due to differences in the gear types, how they will be used and relative frequency each will be used, each gear type carries with it a different likelihood of interacting with sea turtles.

Neuston nets would be the primary gear type used in the proposed action. Researchers would use very short tow times (30 seconds or less), and the net would fill up with Sargassum very quickly. The short tow times would limit the amount of Sargassum sampled, and reduce the likelihood of capture of sea turtles. Plankton purse seines (ten by three meters) would encircle a Sargassum mat, and its contents would be brought on board for sorting and sampling. This gear would collect a greater amount of Sargassum over a larger area than the neuston nets, creating an increased likelihood of capturing a sea turtle. The Methot frame trawl would only be used in open-water habitats, within 1-2 meters of the surface with tow times of 10 to 20 minutes.

In the proposed action, light traps would be used at dusk or at night, for one-hour soak times. Artificial light can pose problems for sea turtle hatchlings, which can be disoriented by artificial light on beaches after hatching, preventing them from reaching the ocean. Light traps are used to capture larval fishes and marine crustaceans. The openings are sized to capture these species. In a broad review of the literature on the use of light traps in the marine environment, McLeod and Costello (2017) reported that light traps collected 12 phyla of benthic and planktonic animals, and 13 orders of crustaceans. Because of the size of the openings designed to capture larval fishes, and no reported capture of sea turtles, we determine that the effects to sea turtles from light traps are discountable, and sea turtles are not likely to be adversely affected. Sabiki rigs will be used opportunistically to capture larger mobile juvenile fishes. The fact that this gear type will be used infrequently (relative to other gear) reduces the likelihood that it will interact with sea turtles. Incidental capture in commercial longline fisheries poses a significant threat to sea turtle populations worldwide, and efforts to reduce bycatch have included requiring the use of circle hooks. However, the Sabiki rigs used in the proposed action are much smaller, and will be used infrequently leading us to conclude that effects to sea turtles from Sabiki rigs are extremely unlikely to occur. ***The effects are discountable, and sea turtles are not likely to be adversely affected.***

To summarize, we expect that neuston nets and plankton purse seines could potentially capture sea turtles, but not the Methot frame trawl which would only be used in the open water environment away from *Sargassum* where turtles are found. Further, we do not expect that juveniles and adult sea turtles in the neritic environment will be exposed to the proposed action because this is not where these sea turtle lifestages are found. In addition, because of their size, the size of the sampling gear, and the use of protected species observers, we do not expect adult sea turtles in the oceanic environment to be exposed to the proposed action. ***However, because they are smaller and inhabit the Sargassum mats which are targeted for sampling in the proposed action, we do expect juvenile and post hatchling sea turtles to be exposed in the oceanic environment.*** NMFS concurred with NCCOS in the Sargassum BiOp (Encl 1) and the LOC received Feb. 16, 2016 (Encl 3).

NMFS describes within the Sargassum BiOp (Section 10.3.5, Pg. 55) the amount of sea turtles expected to be exposed to the proposed action as being calculated by using the available density information (McDonald et al., 2017) and the amount of effort expected to be put forth by the researchers. We incorporate by reference this description of their methodology (Section 10.3.5, Pg. 55-46). As a result NMFS determined that for the entire action (four cruises, 1 is completed), we predict that four sea turtles of each species will be exposed.

Finally NMFS concluded that:

*“after reviewing of the current status of the ESA-listed species, the environmental baseline within the action area, the effects of the proposed action, any effects of interrelated and interdependent actions, and cumulative effects, it is NMFS’ biological opinion that the proposed action is not likely to jeopardize the continued existence of North Atlantic green, Northwest Atlantic Ocean loggerhead, hawksbill, or Kemp’s ridley sea turtles or to destroy or adversely modify Northwest Atlantic Ocean loggerhead designated critical habitat. NCCOS concurs with NMFS’ biological opinion and will employ BMPs. (Appendix A, Sea turtle and Sargassum section)*

Critical Habitat - The proposed action(vessel activities and in-water research activities) would not affect the essential features of the designated [LOGG-S-02 \(Sargassum\)](#) critical habitat, because the activities would not affect oceanographic conditions, water depth or temperature, prey availability, passage conditions, densities of reproductive loggerheads, or any other identified essential features for loggerhead critical habitat. The amount of Sargassum collected would be insignificant as most would be returned to the water. In the NMFS Sargassum BiOp (Section 10.6, pg.60), NMFS concurs with this determination of no affect to Sargassum critical habitat.

#### 4.1.2.4.1 Incidental Take Statement

The NMFS Sargassum BiOp, (Section 14.1, pg 61 - 62), contains the following Incidental Take Statement (ITS):

*“Section 7(b)(4) of the ESA and implementing regulations require NMFS to specify the impact, i.e. identify the amount or extent, of any incidental take of endangered or threatened species, to*

*include reasonable and prudent measures to minimize the impact of the take, and to provide terms and conditions to implement those reasonable and prudent measures. Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. “Take” is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by regulation to include significant habitat modification or degradation that results in death or injury to ESA-listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. ESA section 7(o)(2) provides that any take that is incidental to an otherwise lawful agency action is not considered to be prohibited under the ESA, if the agency action is performed in compliance with the terms and conditions identified below of this incidental take statement.”*

#### *4.1.2.4.1.1 Amount or Extent of Take*

The NMFS Sargassum BiOp (Section 14.1, pg. 62), sets the following limits on sea turtle take:

*“Based on the calculated exposure estimates, we expect that up to one Northwest Atlantic DPS loggerhead, one North Atlantic DPS green, one hawksbill, and one Kemp’s ridley sea turtle may be captured during each cruise in the proposed action. We anticipate that all sea turtles expected to be incidentally captured over the life of the permit will undergo short term harassment and/or minimal injury from being released from nets.”*

#### *4.1.2.4.1.2 Effects of Take*

In the NMFS Sargassum BiOp (Section 14.2, pg. 62), NMFS determines that:

*“ the amount or extent of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.”*

#### *4.1.2.4.1.3 Reasonable and Prudent Measures*

The NMFS Sargassum BiOp (Section 14.3, pg. 62) sets the following reasonable and prudent measures *“as necessary and appropriate, to minimize the impacts of incidental take on threatened and endangered species:*

- 1. The National Centers for Coastal Ocean Science will, at the conclusion of each research cruise, assess the actual level of incidental take in comparison with the anticipated incidental take specified in this biological opinion.*
- 2. The National Centers for Coastal Ocean Science will detect and report on when the level of anticipated incidental take is exceeded.*
- 3. In addition to the reporting requirements that are part of the proposed action, the National Centers for Coastal Ocean Science will instruct the researchers to provide photographs of any incidentally captured sea turtles, if feasible. These photographs are to be included in the reports. “*

#### *4.1.2.4.1.4 Terms and Conditions*

Further the NMFS Sargassum BiOp (Section 14.4, Pp. 62-63) states:

*“To be exempt from the prohibitions of sections 9 and 4(d) of the ESA, the National Centers for Coastal Ocean Science must comply with the following terms and conditions, which implement the Reasonable and Prudent Measures described above.*

- 1. The National Centers for Coastal Ocean Science will require that the researcher observe the nets for sea turtles, and return to the water, to the maximum extent practicable and with vigilant consideration of safety, any live sea turtles that are found in nets during research.*
- 2. The National Centers for Coastal Ocean Science will require the researcher to report any sea turtle interactions to NMFS within 14 days of the incident. This report must contain the description of the take, species of sea turtle, a description of the sea turtle (e.g., size, markings), a photograph of the sea turtle, and release condition.*
- 3. These reports must be forwarded to the ESA Interagency Cooperation Division of the Office of Protected Resources, National Marine Fisheries Service 1315 East-West Highway, Silver Spring, Maryland, 20910.”*

#### *4.1.2.4.1.5 Reinitiation Notice*

According to the NMFS *Sargassum* BiOp (Section 16, Pg. 63) NCCOS is required to reinitiate consultation if the following situations occur:

- 1. The amount or extent of taking specified in the incidental take statement is exceeded.*
- 2. New information reveals effects of the agency action that may affect ESA-listed species or critical habitat in a manner or to an extent not previously considered.*
- 3. The identified action is subsequently modified in a manner that causes an effect to ESA listed species or designated critical habitat that was not considered in this opinion.*
- 4. A new species is listed or critical habitat designated under the ESA that may be affected by the action.*

## *4.2 No-Action Alternative*

Under the no action alternative, no cruise activities would be conducted in 2018 or 2019 as proposed. Therefore, there would be no adverse effects to the physical, biological, or cultural environment. Other alternatives considered but eliminated from analysis include surveying *Sargassum* extent solely with remote sensing data. NOAA RESTORE Act Science Program did not consider alternative locations because another location would not satisfy the purpose and need for NOAA RESTORE Act Science Program mission to carry out research which supports the long-term sustainability of the ecosystem, fish stocks, fish habitat, and the recreational, commercial, and charter-fishing industry in the Gulf of Mexico.

## *4.3 Comparison of Environmental Consequences for Alternatives*

Comparison Matrix of Environmental Effects to resources for both alternatives (preferred and no-action) are summarized in Table 8.

Table 8. 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.	No impacts
	Land	Same as No Action	No impacts
	Air	Same as No Action	No impacts
	Essential fish Habitat	Same as No-action, quantity or quality would not be impacted and therefore effects are discountable.	No impacts
Biological Resources	Marine Mammals	Not likely to adversely affect marine mammals due to small size of in-water research equipment including neuston nets, purse seines, light traps and Sabiki Rigs. Minimization measures to be employed to reduce risk of vessel strike.	No impacts
	Endangered species and critical habitat	Risk of vessel strike during transit is insignificant. Practices will be employed to minimize risk further. Risk of capture of Sea Turtles in Neuston nets and purse seines is possible. Best management practices will be employed to minimize risk of incidental take. Quality or quantity of critical habitat would not be impacted	No impacts
	Prohibited fish species and MSFCMA species	Collections of these species would be minimal and permitted as part of research activities by Special Research Permits and Letter of Acknowledgement from NMFS/OHC/SERO.	No impacts
Cultural resources		Same as No-action	No impacts
National Marine Sanctuaries		Same as No-Action	No impacts

## 5.0 Cumulative Effects

Cumulative effects is defined as:

*“the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 C.F.R. § 1508.7)”*

Biological resources such as sea turtles, marine mammals, fish and corals and exposed to a wide variety of past and present state, Federal or private actions and other human activities that have already occurred or continue to occur in the action area. For the purposes of this cumulative effects analysis, we consider the past and present actions (i.e. environmental baseline) as those that are also reasonably foreseeable.

Habitat degradation in the form of underwater noise (sound) from in-water construction activities such as pile driving, dredging and industrial activity associated with the oil and gas extraction occur in both inland, coastal and oceanic waters in the project action area. We incorporate by reference from the description of sound emitted from these sources from the NMFS Sargassum BiOp (Section 9.1, pg 34). Marine debris is a significant concern for marine species, animals can ingest the debris and it can be lodged in their digestive tract. Marine debris accumulates in gyres in all oceans. We incorporate by reference the description on marine debris impacts to turtles (Section 9.1 Pp. 35 - 36). Entrapment and entanglement in fishing gear is also a large source of incidental capture and death of sea turtles and marine mammals within the project action area. We incorporate by reference the description of these impacts from the NMFS Sargassum BiOp (Section 9.2, Pg. 36). In addition to noise production dredging activities can entrain marine organisms such as fish and sea turtles. Marine dredging vessels are common in coastal environments. We incorporate by reference from the NMFS Sargassum BiOp (Section 9.3, Pg 36). US Navy training and testing activities have the potential to harm and harass sea-turtles and marine mammals. These activities include vessel and aircraft transects, munitions detonations and sonar use. We incorporate by reference the description of anticipated impacts from the NMFS Sargassum BiOp (Section 9.4, Pg 36-37). The Gulf of Mexico is a sink for high levels of pollutants from marine and terrestrial sources. There are annual ‘hypoxic’ zones that occur each summer in the northern Gulf of Mexico just south of the Mississippi. We incorporate by description of pollution sources and impacts from the NMFS Sargassum BiOp (Section 9.5, Pp. 37-38). There are risks to all marine life from the exposure to oil (hydrocarbons) from accidental and non-accidental spills within the project action area. Apart from major oil spills like Deep-water in 2010, routine discharges of oil can amount to over 100,000 barrels of oil per year (see NMFS Sargassum BiOp Section 9.6, Pp. 38-41 for complete description of impacts). Cold stunning is a natural threat to sea-turtles, but not considered a major source of mortality (See NMFS Sargassum BiOp, Pp 43). Although not well understood, vessel strikes from recreational and commercial vessels can be a source of mortality to sea turtles and marine mammals. Recreational and Commercial vessel operations in extensive (See NMFS Sargassum BiOp, Pp. 44).



Finally, climate change is also a threat that is common to all species. Data presented in the 2014 Assessment Synthesis Report from the Working Groups on the Intergovernmental Panel on Climate Change (IPCC 2014) indicate the oceans have warmed and that sea level has risen. Additional effects include ocean stratification, decreased sea-ice extent, changes in ocean circulation, decreased ocean oxygen (Doney et al. 2012) and increased ocean acidity (IPCC 2014). Implications of climate change may include shifts in species geographic distribution, migration patterns, seasonal activities, species abundance and diversity. We incorporate by reference from the NMFS Sargassum BiOp (Section 9.12, Pg. 44-46).

There are three (3) proposed nine (9) day cruise proposed for this project action. The amount of emissions emitted during that time frame would have a de-minimis effect on the trajectory of global carbon emissions and thus climate change and is therefore considered insignificant.

The magnitude and significance of these current, and past threats are anticipated into the reasonably foreseeable future. No others are considered in this analysis. Therefore based on the best scientifically available information NCCOS determines that the potential for significant cumulative impacts when the proposed action is combined with the past, present and reasonably foreseeable future actions are insignificant. 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.

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## 7.0 List of Preparers and Contacts

Paula Whitfield  
Environmental Compliance Coordinator  
National Centers for Coastal Ocean Science  
National Ocean Service  
1305 East West Hwy 240-533-  
0304 [paula.whitfield@noaa.gov](mailto:paula.whitfield@noaa.gov)

Caitlin Young  
Program Specialist  
NOAA RESTORE Act Science Program  
1021 Balch Blvd  
Stennis Space Center, MS  
631-415-7095  
[caitlin.young@noaa.gov](mailto:caitlin.young@noaa.gov)

## 8.0 List of Agencies Consulted and Contacts

### ESA

Colette Cairns

Fishery Biologist  
ESA Interagency Cooperation Division  
Office of Protected Resources  
National Marine Fisheries Service  
1315 East West Hwy  
Silver Spring MD 20910  
301-427-8414  
[colette.cairns@noaa.gov](mailto:colette.cairns@noaa.gov)

Cathy Tortorici  
Division Chief  
ESA Interagency Cooperation Division  
Office of Protected Resources  
National Marine Fisheries Service  
1315 East West Hwy  
Silver Spring MD 20910  
301-602-2193  
[cathy.tortorici@noaa.gov](mailto:cathy.tortorici@noaa.gov)

Kris Petersen  
Deputy Division Chief  
ESA Interagency Cooperation Division  
Office of Protected Resources  
National Marine Fisheries Service  
1315 East West Hwy  
Silver Spring MD 20910  
301-427-8453  
[kristine.petersen@noaa.gov](mailto:kristine.petersen@noaa.gov)

EFH

David Dale  
Habitat Protection Division  
Office of Habitat Conservation  
National Marine Fisheries Service  
263 13th Avenue South  
St Petersburg Fl 3701  
727-551-5736  
[david.dale@noaa.gov](mailto:david.dale@noaa.gov)

Lauren Waters  
Sustainable Fisheries Division  
Southeast Region Office  
National Marine Fisheries Service  
National Marine Fisheries Service  
263 13th Avenue South

St Petersburg Fl 3701  
727-209-5991  
[lauren.waters@noaa.gov](mailto:lauren.waters@noaa.gov)

## Appendix A: Protective Measures and Best Management Practices

Protected species observers would be on watch for ESA-listed species and other protected resources, providing 100 percent coverage during the survey. All 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.

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

In the event of incidental take above the amount identified in the Incidental Take Statement, the project PI would suspend all activities causing incidental take and immediately contact NMFS, Colette Cairns at [colette.cairns@noaa.gov](mailto:colette.cairns@noaa.gov), 301-427-8414 to request reinitiation in the event of exceedance of the amount of take, systematic noncompliance with the minimization measures, unanticipated adverse effects, or modification of the action.

Additional measures, identified in an August 22, 2014, memo from Deputy Under Secretary for Operations Vice Admiral Michael Devany, the Office of Coast Survey have been incorporated to include habitat impact precautions and to mitigate concerns regarding entanglement.

- Minimize vessel disturbance and ship strike potential
  - Reduced speeds (less than 13 knots) when transiting through ranges of ESA-listed cetaceans (unless otherwise required, e.g., NOAA Sanctuaries).
  - Reduced speeds (less than 13 knots) while transiting through designated critical habitat (unless slower speeds are required, e.g., less than 10 knots in Right Whale critical habitat and management areas).
  - Trained observers aboard all vessels; 100 percent observer coverage.
  - Species identification keys (for marine mammals, reptiles, fishes, and invertebrates – as applicable) will be available on all vessels.
- Minimize noise
  - Reduced speed (see above).
- Minimize vessel discharges (including aquatic nuisance species)
  - Meet all Coast Guard requirements.
  - Clean hull regularly to remove aquatic nuisance species.
  - Avoid cleaning of hull in critical habitat.
  - Avoid cleaners with nonylphenols.
- 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.
- Sea Turtles, Manatees, and Dolphins
  - Avoid approaching within 50 yards.
- Sea Turtles and Sargassum
  - During transit, Protected Species observers will be on watch for patches of Sargassum and will also search for sea turtles.
  - Vessel speed upon approaching Sargassum will be reduced (1 knot or less).
  - Multiple observers, including protected species observers, will scan any proposed patch of Sargassum to be sampled for 10 minutes prior to deploying any net gear. If sea turtles are observed during the 10 minute observation period, that particular patch will not be sampled.
  - If a sea turtle is observed in the sampling path of a plankton net at any point during deployment, the net tow or plankton purse seine event will be halted.
- Cetaceans
  - Avoid approaching within 200 yards (182.9 meters), 500 yards for right whales.
  - Avoid critical habitat, when possible.
- Entanglement Protective Measures
  - Small nets (1 x 2 meter neuston and 10 x 3 meter plankton purse seine) utilized.
  - Net tow times should be minimized as much as possible.