**UNITED STATES DEPARTMENT OF COMMERCE**
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
http://sero.nmfs.noaa.gov

June 5, 2015

MEMORANDUM FOR: Leslie Craig
Southeast Region Supervisor, NOAA Restoration Center

FROM: Virginia M. Fay
Assistant Regional Administrator, Habitat Conservation Division

SUBJECT: Essential fish habitat review of the Shell Belt and Coden Belt Roads Living Shoreline Project in Alabama

In response to the Deepwater Horizon oil spill, NOAA and the other Trustee agencies propose to fund the construction of living shoreline breakwaters within Mississippi Sound between Bayou La Batre and Bayou Coden in Mobile County, Alabama using Phase IV Early Restoration funds. The project activities described in the EFH assessment would result in temporary short and long term minor impacts to estuarine water bottoms and water column categorized as essential fish habitat (EFH) under provisions of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

As specified in the Magnuson-Stevens Act, EFH consultation is required for federal actions which may adversely affect EFH. The NOAA's Restoration Center prepared an EFH assessment for this project and provided the document for our review by electronic mail dated May 27, 2015. The Southeast Region's Habitat Conservation Division (SER HCD) has reviewed the EFH assessment and finds the document adequately evaluates potential project impacts to EFH supportive of a number of federally managed fishery species. While project implementation would directly impact two acres of estuarine soft bottom EFH and convert this area to hard substrate habitat, this new substrate will also benefit some species managed under the Magnuson-Stevens Act by providing more diverse foraging habitat. Estuarine marsh planted in the protected area behind the breakwaters will also enhance EFH. Best management practices to minimize short term impacts during project construction have been developed and were included in the EFH assessment. The SERO HCD concurs with the statements in the EFH assessment that adverse impacts of project implementation are expected to be minor, and the proposed project should have an overall net beneficial cumulative impact on EFH resources. Therefore, SER HCD has no EFH conservation recommendations to provide pursuant to Section 305(b)(2) of the Magnuson-Stevens Act at this time. Further consultation on this matter is not necessary unless future modifications are proposed and such actions may result in adverse impacts to EFH.

cc:
F/HC2 - Jennings, Schubert
F/SER - Giordano
F/SER4 - Dale
F/SER46 - Young

# Essential Fish Habitat Assessment

## for the proposed Shell Belt and Coden Belt Roads Living Shoreline Project

### *Introduction*

The EFH provisions of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. §§ 1801 et seq.) (Magnuson-Stevens Act) support one of the nation's overall marine resource management goals – maintaining sustainable fisheries. Critical to achieving this goal is the conservation and enhancement of the quality and quantity of suitable marine and estuarine fishery habitats. One of the most important provisions of the Magnuson-Stevens Act for conserving fish habitat is that which requires federal agencies to consult with NMFS when any activity proposed to be permitted, funded, or undertaken by a federal agency may have adverse effects on designated Essential Fish Habitat (EFH). The consultation requirements in the Magnuson-Stevens Act direct federal agencies to consult with NMFS when any of their activities may have an adverse effect on EFH. The EFH rules define an adverse effect as "any impact which reduces quality and/or quantity of EFH...[and] may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat wide impacts, including individual, cumulative, or synergistic consequences of actions."

The purpose of this document is to present the findings of the EFH assessment conducted for the proposed Point aux Pins Living Shoreline Restoration Project, (proposed project) as required by the Magnuson-Stevens Act.. The objectives of this EFH assessment are to describe how the actions proposed for the Point aux Pins Living Shoreline Project would affect EFH designated by the National Marine Fisheries Service (NMFS) and the Gulf of Mexico Fisheries Management Council (GMFMC), for the area of influence of the project. According to the GMFMC, EFH within the Gulf of Mexico (Gulf) includes all estuarine and marine waters and substrates from the shoreline to the seaward limit of the Exclusive Economic Zone (EEZ). This assessment includes a description of the proposed action; a summary of EFH occurring within the vicinity of the proposed project; a description of each Fishery Management Plan; an analysis of the direct, indirect and cumulative effects of the proposed project on EFH for the managed fish species and their major food sources; and proposed mitigation measures selected to avoid or minimize potential negative effects of the proposed project.

### *Project Description*

The proposed Shell Belt and Coden Belt Roads Living Shoreline project is intended to provide ecological restoration and recovery of natural resource services lost as a result of the *Deepwater Horizon* (DWH) oil spill by employing living shoreline techniques that utilize natural and/or artificial breakwater materials and marsh planting to create and enhance habitat along an area in Portersville Bay in the Mississippi Sound in Mobile County, Alabama. As the lead implementing Trustee, the Alabama Department of Conservation and Natural Resources (ADCNR) would create breakwaters to dampen wave energy while also providing habitat and increasing benthic secondary productivity.

Construction activities would include placement of breakwater materials along the shoreline. The specific breakwater elevations, construction techniques and design would be developed to maximize project success and meet regulatory requirements. Over time, the breakwaters are expected to provide habitat that supports benthic secondary productivity, including, but not limited to, bivalve mollusks,

annelid worms, shrimp, crabs, and small forage fishes. Marsh vegetation is expected to become established. This is expected to further enhancing both primary and secondary productivity adjacent to the breakwaters.

The breakwaters would be constructed with a target crest height of approximately +0.5 to +1.0 ft. Mean Lower Low Water (MLLW). The breakwaters would likely have 10 ft. crest widths, based on desired wave reduction, and would be designed with a height that falls within the mean high and low water lines (intertidal). The specific breakwater elevations and technique designs would be selected to maximize project success and meet federal and state regulatory requirements.

## Project Location

The proposed Shell Belt and Coden Belt Roads Living Shoreline Project area is located along the stretch of shoreline between Bayou la Batre and Bayou Coden in Mississippi Sound, Alabama. Mississippi Sound is an estuarine system separated from the Gulf of Mexico by barrier islands in Alabama and Mississippi. Habitats in and around Mississippi sound include tidal wetlands and swamps, salt marshes, aquatic grass beds, oyster reefs, maritime and palustrine upland forests, and estuarine soft-bottom habitat.

**Figure 1. Proposed Shell Belt and Coden Belt Roads Living Shoreline Restoration Project Location**

Figure 2. Proposed Project Layout Shell Belt Road, Coden, Alabama.

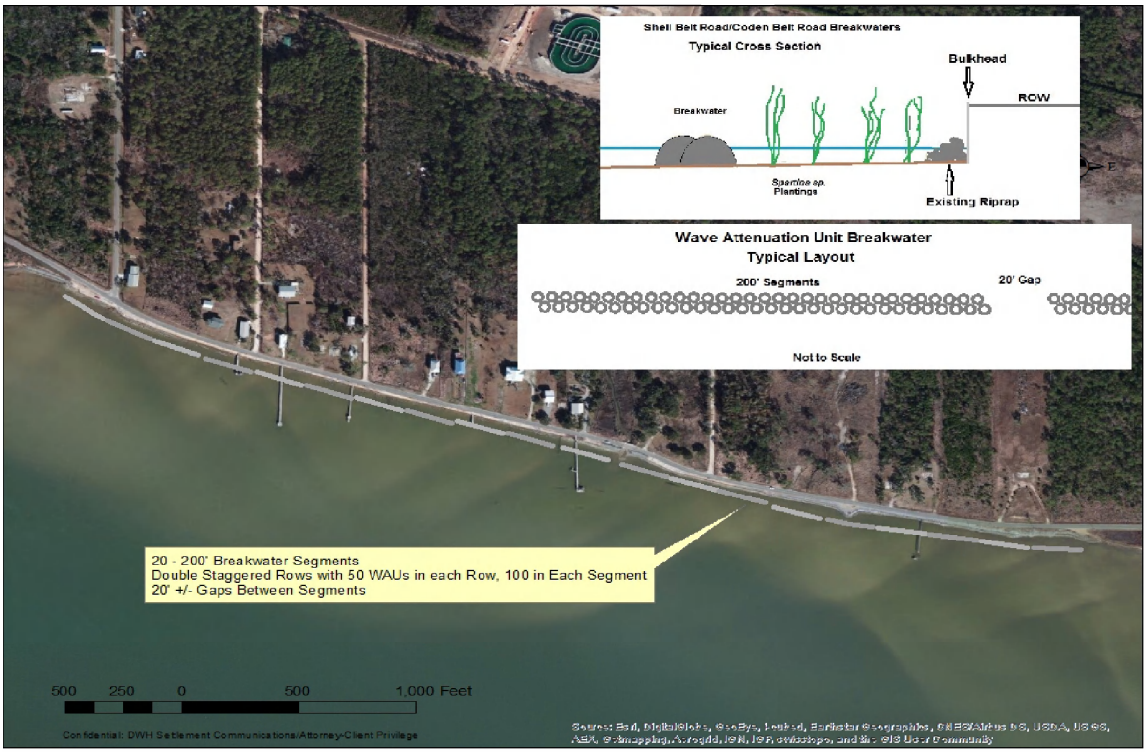
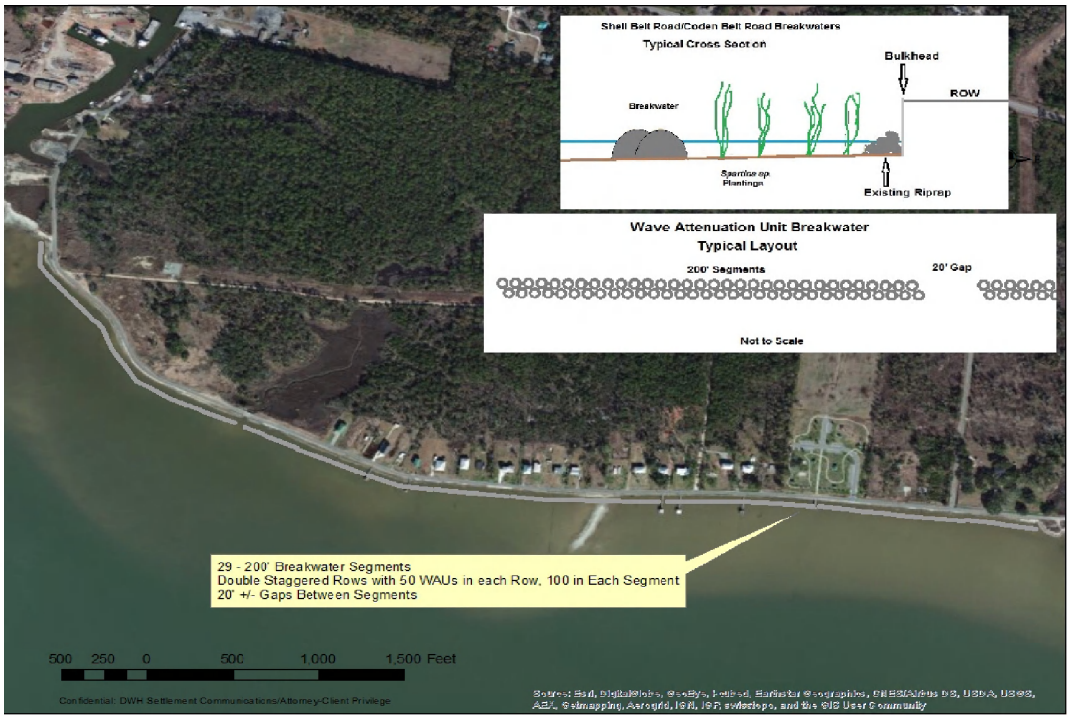


**Figure 3. Proposed Project Layout – Coden Belt Road Living Shoreline**




## Construction and Installation

The implementation of the Shell Belt and Coden Belt Roads Living Shoreline project is estimated to take approximately 9 months and would include the following activities:

- Planning, site investigations, and design - approximately 6 months, concurrently it would take approximately 3-4 months for permitting and consultation.
- Construction – Approximately 2 months.

Upon completion of planning, design and permitting, a request for construction bids would be issued and a contract for construction issued in accordance with Alabama bid and procurement laws and regulations. It is anticipated that construction of the breakwaters would take place from the shoreline road right of way using a small track hoe or other similar equipment and that no dredging would be required from project access. After planning and design are complete, if it is more feasible, the construction of the breakwaters could take place using shallow draft barges and tugs to transport the breakwater units. A small track-hoe or other similar equipment located on the barge would then be utilized to place the breakwater units in the appropriate configuration. However, actual equipment and construction techniques would be determined by the selected contractor and conducted in compliance with all permit conditions and best management practices. The following assumptions about vehicle and barge operation for the implementation of the proposed project are based on previous similar construction operations conducted by ADCNR. It is anticipated that the above described equipment would be on site approximately 2 months. A work day would range from between 8 and 14 hours.

No maintenance activities for the wave attenuation units would be required. Signs marking the breakwater segments could be replaced as needed.

**Project Monitoring**

ADCNR will oversee the proposed monitoring for this restoration project as outlined below. This proposed monitoring plan is organized by project objective, with one or more monitoring parameters for each objective. For each of the identified monitoring parameters, information is provided on the monitoring methods, timing and frequency, sample size, and sites. In addition, performance criteria for each parameter are identified (if applicable), including corrective actions that may be taken if the performance criteria are not met.

<u>Objective #1: Construction of breakwaters that meet project design criteria and that are sustained for the expected lifespan of the project to support benthic secondary productivity.</u>

- Did the project achieve its design criteria?

  Parameter #1: Structural integrity of breakwater structure

  a) Method: Conduct visual inspections and take pictures of the project site from the boat or shoreline.
  b) Timing and Frequency: Post-construction (Annually from Years 1-5 for observational purposes only. Additional visual inspections are recommended to be conducted after major storm events).
  c) Sample Size: Observations along entire length of breakwater structure
  d) Performance Criteria:
     a. Year 0: Did the contractor construction breakwater segments as specified?
     b. Years 1-5: Are the breakwater segments present?

<u>Objective #2: Support habitat utilization of the breakwater segments invertebrate infauna and epifauna to increase secondary benthic productivity at the project site</u>

- Are invertebrate infauna and epifauna colonizing and being maintained on the breakwater structures?
- What is the density of invertebrate infauna and epifauna on the breakwater structures?

Parameter #1 : Invertebrate infauna and epifauna species composition and abundance.

a) Method: Identify and count invertebrate infaunal and epifaunal organisms within a defined area on WAUs. Utilize methods that report density on a square meter basis (e.g., quadrat sampling).
b) Timing and Frequency: Post-construction Year 1-5 (1 times per year- late summer).
c) Sample Size: 0.25 $m^2$ quadrats on five (5) randomly selected breakwater units within each breakwater segment for a total of 55 - 0.25$m^2$ quadrats sampled.
   a) Performance Criterion: At year 5, 90% of breakwater units have infaunal and epifaunal organisms present..

<u>Objective #3: Restoration of salt marsh habitat through the planting of *Spartina alterniflora*.</u>

- Is the planted marsh surviving?

Parameter #1: Marsh Planting Survival

a. Method: Visual counts of presence or absence of live plantings behind each breakwater segment.
b. Timing and Frequency: Post-construction (Year 1). The timing of the post-implementation surveys may be adjusted based on the actual date of the completion of plantings. Typically end of growing season in late summer/early fall. Additional surveys may be conducted after major storms.
c. Sample Size: Presence/absence of all plantings
d. Performance Criteria: At year 1: 75% survival of marsh plantings.
e. Corrective Action: Contractual requirement to replace plugs to reach 75% survival.

Parameter #2: Marsh Vegetation Cover

a. Method: Conduct cover estimates in 1 meter square plots located randomly behind each breakwater (number of plots TBD).
b. Timing and Frequency: Post-construction (Years 1-5). The timing of the post-implementation surveys may be adjusted based on the actual date of the completion of plantings. Years 1-5, once per year. Additional surveys may be conducted after major storms.
c. Sample Size: 1 meter square plots (number of plots TBD).
d. Performance Criterion: None. This is a supporting monitoring parameter.

## Monitoring Schedule

The schedule for the project monitoring is shown in the table below separated by monitoring activity. Baseline monitoring will occur before project implementation. Implementation monitoring will occur immediately following project implementation (Year 0). Performance monitoring will occur in the years following project implementation (Years 1–5).

**Monitoring schedule for the Shell Belt and Coden Belt Roads Living Shoreline Project**

| | Implementation Monitoring | Year 0 | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|---|---|
| Breakwater Segment Construction Observations | X | X | x | x | x | x | x |
| Biological monitoring | | | X | X | X | X | X |
| Marsh Plantings Survival | | X | | | | | |
| Marsh Cover | | | X | X | X | X | X |

***Essential Fish Habitat:***

The 1996 amendments to the Magnuson-Stevens Act set forth a mandate for NMFS, regional Fishery Management Councils (FMC), and other Federal agencies to identify and protect EFH of economically important marine and estuarine fisheries. To achieve this goal, suitable fishery habitats need to be maintained and restored. A provision of the Magnuson-Stevens Act requires that FMCs identify and protect EFH for every species managed by a Fishery Management Plan (FMP) (U.S.C. 1853(a)(7)). There are FMPs in the Gulf region for shrimp, red drum, reef fishes, coastal migratory pelagics, and highly migratory species (e.g., sharks).

The Gulf of Mexico Fishery Management Council (Gulf Council) manages over 40 species, plus corals, in the Gulf of Mexico under multiple FMPs. EFH for each fishery managed by the Gulf Council under the Red Drum, Reef Fish, Coastal Migratory Pelagic, and Shrimp FMPs is described below:

- ☐ **Red Drum**: EFH for red drum consists of all Gulf of Mexico estuaries; waters and substrates extending from Vermilion Bay, Louisiana, to the eastern edge of Mobile Bay, Alabama, out to depths of 25 fathoms; Crystal River, Florida, to Naples, Florida, between depths of 5 and 10 fathoms; and Cape Sable, Florida, to the boundary between the areas covered by the GMFMC and the South Atlantic Fishery Management Council (SAFMC) between depths of 5 and 10 fathoms.

- ☐ **Reef Fish and Coastal Migratory Pelagics**: EFH for reef fish and coastal migratory pelagics includes all Gulf of Mexico estuaries; the US/Mexico border to the boundary between the areas covered by the GMFMC and the SAFMC from estuarine waters out to depths of 100 fathoms.

- ☐ **Shrimp**: EFH for shrimp consists of Gulf of Mexico waters and substrates extending from the US/Mexico border to Fort Walton Beach, Florida, from estuarine waters out to depths of 100 fathoms; Grand Isle, Louisiana, to Pensacola Bay, Florida, between depths of 100 and 325 fathoms; Pensacola Bay, Florida, to the boundary between the areas covered by the GMFMC and the SAFMC out to depths of 35 fathoms, with the exception of waters extending from Crystal River, Florida, to Naples, Florida, between depths of 10 and 25 fathoms and in Florida Bay between depths of 5 and 10 fathoms.

During the process of analyzing, identifying, and describing EFH for each managed species, the Gulf Council refined their designations by establishing five "eco-regions". Within each eco-region, EFH was further defined as occurring either in estuarine (inside barrier islands and estuaries), nearshore (waters less than 18-meters/60-feet deep) or offshore waters (greater than 18-meters/60-feet deep). The proposed project is within Eco-region 3, which extends from Pensacola Bay, Florida, to the Mississippi River Delta. The restoration activities would be located within estuarine waters of Mississippi Sound.

EFH within estuaries is defined as, "all estuarine waters and substrates (mud, sand, shell, rock and associated biological communities), including the sub-tidal vegetation (grasses and algae) and adjacent inter-tidal vegetation (marshes and mangroves)," (*Generic Amendment Number 3 for Addressing Essential Fish Habitat Requirements, Habitat Areas of Particular Concern, and Adverse Effects of Fishing in the following Fishery Management Plans of the Gulf of Mexico, Gulf of Mexico Fishery Management*

*Council*, *March 2005*). Estuarine habitats such as shallow waters, submerged aquatic vegetation, emergent marshes, mangroves, oyster reefs, and unvegetated soft bottom substrates all provide EFH for multiple fish species managed by the Gulf Council that inhabit the estuary for part of their life cycle. Table 1 summarizes EFH categories for estuarine waters within Eco-region 3 within the vicinity of the proposed project.

**Figure 3. Essential Fish Habitat in the Gulf of Mexico**

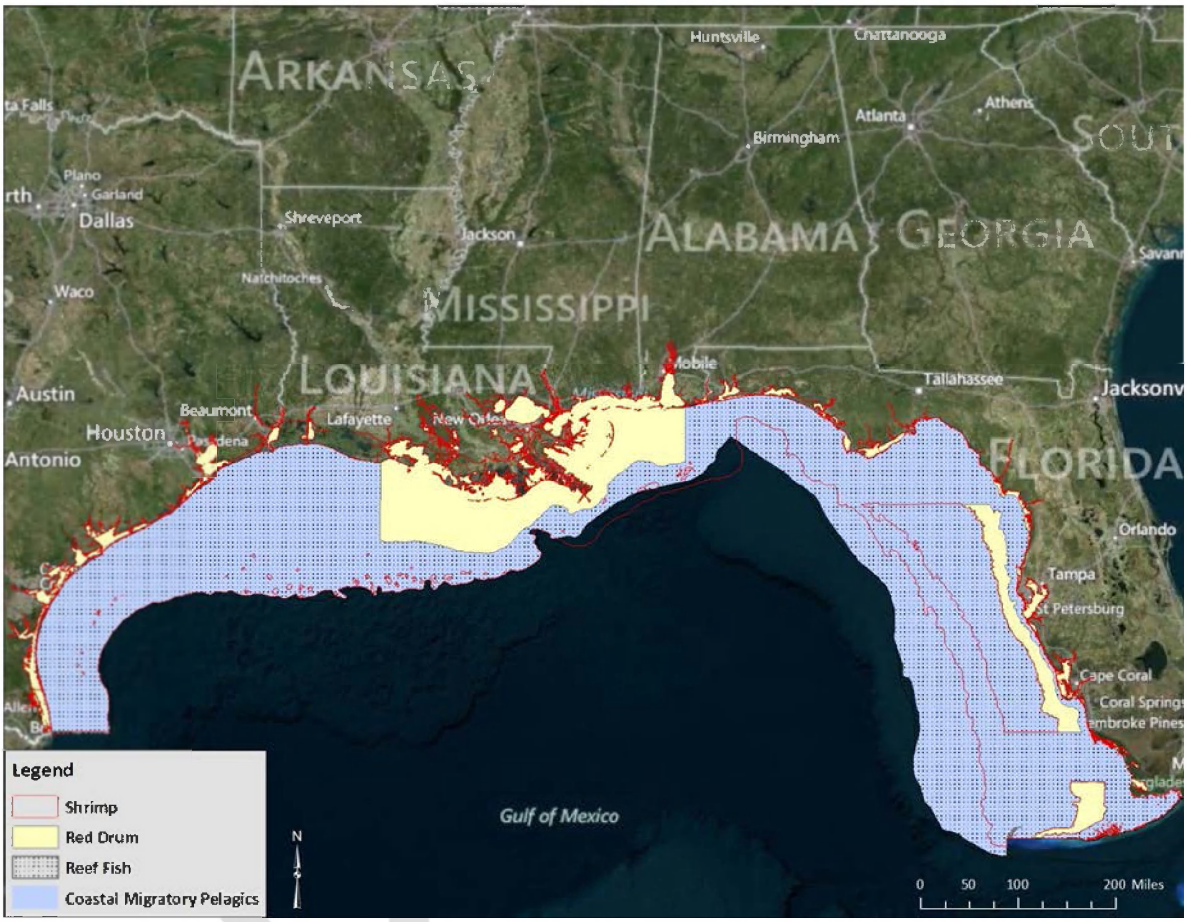



**Table 1. Estuarine Habitats for Gulf Council Managed Species Within Eco-Region 3 Present Near the Project Site**
(● indicates habitat type designated as EFH for species' life stage)

| **Estuarine Emergent Marsh** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Species Common Name | Eggs | Larvae | Post Larvae | Early Juvenile | Late Juvenile | Adult | Spawning Adult |
| Red Drum | | | ● | ● | | ● | |
| Gray Snapper | | | | | | ● | |
| Brown Shrimp | | | | ● | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| White Shrimp | | | | ● | | | |
| **Estuarine Submerged Aquatic Vegetation** | | | | | | | |
| Species Common Name | Eggs | Larvae | Post Larvae | Early Juvenile | Late Juvenile | Adult | Spawning Adult |
| Red Drum | | ● | ● | | ● | ● | |
| Lane Snapper | | | ● | ● | ● | | |
| Brown Shrimp | | | | ● | | | |
| Pink Shrimp | | | | ● | | | |
| **Estuarine Pelagic** | | | | | | | |
| Species Common Name | Eggs | Larvae | Post Larvae | Early Juvenile | Late Juvenile | Adult | Spawning Adult |
| Spanish Mackerel | | | | ● | ● | ● | |
| **Estuarine Oyster Reef** | | | | | | | |
| Species Common Name | Eggs | Larvae | Post Larvae | Early Juvenile | Late Juvenile | Adult | Spawning Adult |
| Brown Shrimp | | | | ● | | | |
| **Estuarine Sand and Shell Bottom** | | | | | | | |
| Species Common Name | Eggs | Larvae | Post Larvae | Early Juvenile | Late Juvenile | Adult | Spawning Adult |
| Red Drum | | | ● | | | ● | |
| Gray Snapper | | | | | | ● | |
| Lane Snapper | | | | ● | ● | | |
| Brown Shrimp | | | | ● | | | |
| **Estuarine Mud/Soft Bottom** | | | | | | | |
| Species Common Name | Eggs | Larvae | Post Larvae | Early Juvenile | Late Juvenile | Adult | Spawning Adult |
| Red Drum | | ● | ● | ● | | ● | |
| Gray Snapper | | | | | | ● | |
| Lane Snapper | | | | ● | ● | | |
| Brown Shrimp | | | | ● | | | |
| White Shrimp | | | | ● | | | |

The NMFS manages the highly migratory species (HMS), such as tunas, billfish, and sharks, within EEZ and state territorial waters and provides the EFH designations for HMS. The EFH designations for HMS are primarily based on limited available species distribution data, which led NMFS to identify geographic areas as EFH rather than specific habitat types typically identified in the Gulf Council designations.

- ☐ **Highly Migratory Species**: HMS may be found in large expanses of the world's oceans, straddling jurisdictional boundaries. Although many of the species frequent other oceans of the world, the Magnuson Stevens Act only authorizes the description and identification of EFH in federal, state, or territorial waters, including areas of the U.S. Caribbean, the Gulf of Mexico and the Atlantic coast of the United States, to the seaward limit of the U.S. Exclusive Economic Zone (waters 3 to 200 miles offshore). These areas are connected by currents and water patterns that influence

the occurrence of HMS at particular times of the year. Due to habitat specific requirements of each species, EFH for each HMS potentially occurring in the vicinity of the proposed project site is described below (EFH information from NMFS 2009):

*Scalloped Hammerhead Shark*:

- ☐ Neonate/YOY (≤60 cm TL): Coastal areas in the Gulf of Mexico from Texas to the southern west coast of Florida; Atlantic coast from the mid-east coast of Florida to southern North Carolina.
- ☐ Juveniles (61 to 179 cm TL): Coastal areas in the Gulf of Mexico from the southern to mid-coast of Texas, eastern Louisiana to the southern west coast of Florida, and the Florida Keys; offshore from the mid-coast of Texas to eastern Louisiana; Atlantic coast of Florida through New Jersey.
- ☐ Adults (≥180 cm TL): Coastal areas in the Gulf of Mexico along the southern Texas coast and eastern Louisiana through the Florida Keys; offshore from southern Texas to eastern Louisiana; Atlantic coast of Florida to Long Island, New York.

*Greater Hammerhead Shark:*

- ☐ Neonate/YOY, Juveniles, and Adults: EFH designation for all life stages have been combined and are considered the same. Coastal areas throughout the west coast of Florida and scattered in the Gulf of Mexico from Alabama to Texas. Atlantic east coast from the Florida Keys to New Jersey. Eastern Puerto Rico.

*Bonnethead Shark*:

- ☐ Neonate/YOY (≤55 cm TL): Coastal areas in the Gulf of Mexico along Texas, and from eastern Mississippi through the Florida Keys; Atlantic coast from the midcoast of Florida to South Carolina.
- ☐ Juveniles (56 to 81 cm TL): Coastal areas in the Gulf of Mexico along Texas, and from eastern Mississippi through the Florida Keys; Atlantic coast from the mid-coast of Florida to South Carolina.
- ☐ Adults (≥82 cm TL): Coastal areas in the Gulf of Mexico along Texas, and from eastern Mississippi through the Florida Keys; Atlantic east coast from the mid-coast of Florida to Cape Lookout, North Carolina.

*Blacktip Shark*:

- ☐ Neonate/YOY (≤75 cm TL): Coastal areas in the Gulf of Mexico from Texas through the Florida Keys; Atlantic coastal areas from northern Florida through Georgia and the mid-coast of South Carolina.
- ☐ Juvenile (76 to 136 cm TL): Coastal areas in the Gulf of Mexico from Texas through the Florida Keys; Atlantic coastal areas localized off of the southeast Florida coast and from West Palm Beach, Florida to Cape Hatteras, North Carolina.
- ☐ Adult (≥137 cm TL): Coastal areas in the Gulf of Mexico from Texas through the Florida Keys. In Atlantic coastal areas southeast Florida to Cape Hatteras.

*Bull Shark*:

- ☐ Neonate/YOY (≤95 cm TL): Gulf of Mexico coastal areas along Texas, and localized areas off of Mississippi, the Florida Panhandle, and west coast of Florida; as well as the Atlantic mid-east coast of Florida.

- ☐ Juveniles (96 to 219 cm TL): Gulf of Mexico coastal areas along the Texas coast, eastern Louisiana to the Florida Panhandle, and the west coast of Florida through the Florida Keys; Atlantic coastal areas localized from the mid-east coast of Florida to South Carolina.
- ☐ Adults (≥220 cm TL): Gulf of Mexico along the southern and mid-coast of Texas to western Louisiana, eastern Louisiana to the Florida Keys; Atlantic coast from Florida to South Carolina.

*Spinner Shark*:

- ☐ Neonate/YOY (≤70 cm TL): Localized coastal areas in the Gulf of Mexico along Texas, eastern Louisiana, the Florida Panhandle, Florida west coast, and the Florida Keys; Atlantic coast of Florida to southern North Carolina.
- ☐ Juveniles (71 to 179 cm TL): Gulf of Mexico coastal areas from Texas to the Florida Panhandle and the mid-west coast of Florida to the Florida Keys; Atlantic coast of Florida through North Carolina.
- ☐ Adults (≥180 cm TL): Localized areas in the Gulf of Mexico off of southern Texas, Louisiana through the Florida Panhandle, and from the mid-coast of Florida through the Florida Keys; Atlantic coast throughout Florida and localized areas from South Carolina to Virginia.

*Atlantic Sharpnose Shark*:

- ☐ Neonate/YOY (≤60 cm TL): Gulf of Mexico coastal areas from Texas through the Florida Keys; Atlantic from the mid-coast of Florida to Cape Hatteras, North Carolina.
- ☐ Juveniles (61 to 71 cm TL): Gulf of Mexico coastal areas from Texas through the Florida Keys; Atlantic from the mid-coast of Florida to Cape Hatteras, North Carolina, and a localized area off of Delaware.
- ☐ Adults (≥72 cm TL): Gulf of Mexico from Texas through the Florida Keys out to a depth of 200 meters; Atlantic from the mid-coast of Florida to Maryland.

*Tiger shark:*

- ☐ Neonate/early juveniles (120cm TL): From shallow coastal areas to the 200 m isobath from Cape Canaveral, FL north to offshore Montauk, Long Island, NY (south of Rhode Island); and from offshore southwest of Cedar Key, FL north to the Florida/Alabama border from shallow coastal areas to the 50 m isobath.

- ☐ Late juveniles/subadults (121 to 289cm TL): Shallow coastal areas from Mississippi Sound (just west of Mississippi/Alabama border) to the 100 m isobath south to the Florida Keys; around the peninsula of Florida to the 100 m isobath to the Florida/Georgia border; north to Cape Lookout, NC from the 25 to100 m isobath; from Cape Lookout north to just south of the Chesapeake Bay, MD from inshore to the 100 m isobath; north of the mouth of Chesapeake Bay to offshore Montauk, Long Island, NY (to south of Rhode Island between the 25 and 100 m isobaths; south and southwest coasts of Puerto Rico from inshore to the 2,000 m isobath.

HMS managed by NMFS with EFH located within Eco-region 3 in Mississippi Sound within the vicinity of the proposed project are included in Table 2 below.

Table 2. Highly Migratory Species EFH Designations – State Waters of Eco-Region 3 within the Project Area

| **Species Common Name** | **Life Stage Within Estuarine Waters** |
|---|---|
| Hammerhead Shark | Neonate, Juvenile & Adult |
| Scalloped Hammerhead Shark | Neonate, Juvenile & Adult |
| Blacktip Shark | Neonate, Juvenile & Adult |
| Bull Shark | Neonate, Juvenile & Adult |
| Spinner Shark | Juvenile |
| Tiger Shark | Juvenile |
| Bonnethead Shark | Neonate, Juvenile & Adult |
| Atlantic Sharpnose Shark | Neonate, Juvenile & Adult |
| Finetooth Shark | Neonate, Juvenile & Adult |

***Ecological Notes and Potential Impacts to EFH Fisheries and Species***

**Red Drum**

The red drum is very common in the northern Gulf of Mexico and utilizes the estuarine zone during larval, postlarval, juvenile, and adult life stages. Within estuaries of Eco-region 3 they utilize the water column, SAV (submerged aquatic vegetation), and sand, shell, and soft mud bottoms. Larvae, juveniles, and young adults spend the majority of their time in estuarine habitats and prey on a large array of species including blue crab eggs and numerous juvenile fishes (ADCNR 2011). Soft mud bottom shallow water habitat utilized by red drum would be impacted by the breakwaters and permanently converted to hard bottom substrate. Soft bottom benthic invertebrates under the footprint of the breakwater would be covered with hard substrate. Small icthyofauna and adult fish may temporarily avoid the immediate project area during construction due to disturbance. However, these impacts will be minor. The creation of additional hard substrate habitat for crabs, shrimp, small forage fishes, and other prey items will result in increased foraging opportunities for red drum and will provide overall long term net positive benefits through the protection of emergent saltmarsh and SAV habitat from erosion.

**Highly Migratory Species**

Estuarine waters like those found at the proposed project site provide EFH resources for various life stages of HMS. Sharks enter the shallow estuarine bay waters to forage and feed (Bathea et al. 2007).

**Shrimp**

Shrimp use a variety of estuarine and marine habitats in the Gulf of Mexico. Brown shrimp are found within the estuaries to offshore depths of 110 meters (m) throughout the Gulf of Mexico; white shrimp inhabit estuaries and to depths of about 40 m offshore in the coastal area extending from Florida's Big Bend area through Texas; pink shrimp inhabit the Gulf coastal area from estuaries to depths of about 65 m offshore and is the dominant species off southern Florida. Brown and white shrimp are generally more abundant in the central and western Gulf, whereas pink shrimp are generally more abundant in the eastern Gulf. Royal red shrimp are not estuarine-dependent and spend their lives in depths of 100 to 300 fathoms (GMFMC 2005).

**Brown Shrimp**

Brown shrimp range in the Gulf of Mexico from Florida to the northwestern coast of Yucatan. The range is not continuous but is marked by an apparent absence of brown shrimp along Florida's west coast between the Sanibel and the Apalachicola shrimping grounds. In the U.S. Gulf of Mexico, catches are high along the Texas, Louisiana, and Mississippi coasts. Postlarval, early juvenile, and late juvenile brown shrimp use estuarine habitat for survival. Early juvenile brown shrimp are common in oyster reef, marsh, SAV, and shallow sand, shell, and mud bottom habitats in Eco-region 3. Impacts to habitat for this species that would occur as a result of this project include temporary potential migratory disruption and the permanent conversion of soft mud bottom benthic habitat to hard substrate habitat. Brown shrimp emigrate to estuaries as post-larvae from February-April on high tides at night and typically leave as sub-adults during full and new moons at night during different parts of the year. While the project will covert soft bottom habitat to hard bottom habitat, brown shrimp are also known to utilize oyster reef habitat so they may also benefit from the new hard substrate placement if it is colonized with oysters. Restoration will also provide longterm benefits to brown shrimp by protecting the adjacent marsh and seagrass beds from erosion. Placement of living shorelines structure would produce additional habitat that the species can utilize for cover and feeding.

**White Shrimp**

White shrimp utilize both offshore and estuarine habitats, and are pelagic or demersal depending on their life stage. The eggs are demersal and larval stages are planktonic, and both occur in nearshore marine waters. Postlarval white shrimp arrive in the area of the proposed Point aux Pins Living Shoreline site from May-September. Offshore, postlarval white shrimp are found in the upper 2 meters of the water column, but become benthic upon reaching the nursery areas of estuaries, seeking shallow water with muddy-sand bottoms that are high in organic detritus (GMFMC 2004). Juveniles move from estuarine areas to coastal waters as they mature. Adult white shrimp are demersal and generally inhabit nearshore Gulf waters in depths less than 100 ft. on soft mud or silty bottoms (GMFMC 2006). White shrimp in the vicinity of the proposed project will be affected in the same way as brown shrimp by the conversion of soft mud substrate to hard reef-like substrate. Like brown shrimp, white shrimp will benefit as a result of living shoreline placement from the erosion protection of marsh and seagrass habitats, which they utilize for foraging and refuge.

**Pink Shrimp**

Juvenile pink shrimp inhabit most estuaries in the Gulf of Mexico, but are most abundant in Florida. Juveniles are commonly found in estuarine areas where SAV is present. Postlarval, juvenile, and subadult pink shrimp may prefer coarse sand/shell/mud mixtures. Adults inhabit offshore marine waters, with the highest concentrations in depths of 30 to 144 feet (GMFMC 2006). Pink shrimp have been reported to use areas of Mobile Bay as nursery habitat. Juveniles may be present year round but are most abundant during the summer and spring (NOS 1998). Avoidance of SAV near the proposed project site would minimize impacts on pink shrimp relative to brown and white shrimp, but similar precautions would be taken during project implementation to ensure minimal impacts. The proposed project will provide longterm benefits to pink shrimp by protecting marsh and seagrass beds from erosion.

**Coastal Migratory Pelagics**

The only managed coastal migratory pelagic species with EFH at the project site is Spanish mackerel. Spanish mackerel are jointly managed between the GMFMC and the SAFMC. Spanish mackerel migrate south during the winter months and return north to their spawning grounds in the spring (GMFMC & SAFMC 1983). Mackerel tend to feed exclusively on other fishes. Estuarine pelagic waters provide EFH in the Mississippi Sound for juvenile and adult Spanish mackerel which use the area for feeding, foraging, and resting during summer months. Habitat use for all life stages is primarily water column, so habitat impacts from restoration activities would occur as a result of conversion of the water column within the project footprint itself to hard substrate. There may also be some short-term decreased water quality from temporary turbidity during project construction. Adults typically only use these shallow areas in the pursuit of prey and typically prefer higher salinity waters (GMFMC 2004). Adverse impacts to this species would be minor, and Spanish mackerel may benefit due to increased benthic habitat diversity, which increases the abundance of prey items.

Reef Fish

The reef fish fishery in the Gulf includes numerous species that are present in the estuarine zone during one or more life stages. Most are transitory species that use inshore environments only part of the year. However only lane and gray snapper have EFH defined within the estuaries of Eco-region 3 and use the estuarine zone as adults for feeding. Adult gray snapper and juvenile lane snapper utilize estuarine sand, shell, and mud bottom habitats. Soft bottom habitats within the breakwater footprint would be

converted to hard substrate thus causing a minor impact. However, since the restoration project would protect shoreline habitats from erosion, gray snapper and lane snapper may also benefit from the project. Juvenile lane snapper typically use SAV beds in estuarine environments for food and cover (GMFMC 2004). Adult gray snapper utilize estuarine emergent marsh for feeding and growth to maturity.

***Environmental Consequences of the Proposed Action***

**Direct**

Construction activities and equipment noise associated with construction may temporarily reduce habitat utilization by EFH species in the immediate area. These effects would be short term, localized, and minor. Because the proposed project footprint itself is located in unvegetated open water soft bottom habitat, there would be no adverse impacts to wetlands, seagrasses, or oyster reef habitats. Minor spatially limited adverse effects to EFH will occur within the direct footprint of the breakwater due to the conversion of 2.0 acres of estuarine soft bottom habitat to hard substrate habitat. However, hard substrate habitat and oyster reef habitat created by the breakwater will also directly provide estuarine benthic habitat diversity and EFH benefits to federally managed species such as brown shrimp, red drum, gray and red snapper which utilize shell bottom and oyster reef habitats.

**Indirect**

Indirect adverse impacts are not expected in the short or longer term. Once the proposed project is complete, beneficial indirect effects on water quality are expected as a result of increased filtration capacity from the newly established bivalves (Coen et al. 2007). Oysters and other bivalves can also indirectly enhance EFH by offsetting the effects of coastal nutrient loading (Dalrymple 2013), potentially reducing the frequency and magnitude of hypoxia and fish kills. Additionally, oyster and other bivalves have been shown to indirectly promote SAV colonization, which may further enhance EFH, due to sediment stabilization and increased water clarity (Meyer et al. 1997).

***Proposed Mitigative Measures and Guidelines for EFH Protection***

ADCNR, in consultation with the contractors, will take all practicable precautions to avoid and minimize negative impacts to EFH.

1. **Use of Best Management Practices (BMP)**
   BMPs are measures to minimize and avoid potential adverse impacts to EFH during project construction and monitoring. This project requires the use of BMPs during construction to reduce impacts from project implementation. Contractors will access the site with shallow draft vessels during tide levels which are sufficient to avoid prop washing. Contractors will be notified of the location of seagrasses inland of the proposed project footprint and will be instructed not to enter seagrass beds during construction.

2. **Follow Manatee and Sea Turtle Standard FWS conditions**
   The contractor will follow the FWS' standard manatee construction conditions and standard sea turtle and smalltooth sawfish conditions, as required under Endangered Species Section 7 consultations (Appendix A). The construction procedures outlined in these documents require boats to operate at idle speed and ensure that contractors visually assess the construction area for manatees and sea turtles. Following these guidelines will also help minimize potential prop dredging, and subsequent bottom disturbance, and will help minimize impacts to individual fish species.

3. **Monitor & Adaptively Manage Structure**
   Monitoring will be conducted before, during, and after project implementation to ensure compliance with project design. If immediate post-construction monitoring reveals that unavoidable impacts to EFH have occurred, appropriate coordination with regional EFH personnel will take place to determine appropriate response measures, possibly including mitigation.

***Cumulative EFH Impacts and Conclusion:***
Adverse impacts due to project implementation are likely to be minor. The proposed project will have a net beneficial cumulative impact on EFH resources in and around the Shell Belt and Coden Belt Roads Living Shoreline Project. The potential long-term benefits to EFH, especially for shrimp, red drum, gray and lane snapper will include increased foraging habitat, prey abundance, and cover for juveniles through the protection of existing marsh and seagrass beds from erosion, improved water quality from the establishment of new reef habitat, and the potential for conditions favorable to establish additional submerged aquatic vegetation colonization behind the breakwater due to decreased wave energy and turbidity. Increased bivalve abundance resulting from the project is likely to have longterm beneficial impacts on water quality and clarity.

## *References*

Alabama Department of Conservation and Natural Resources. 2011. Red Drum. <http://www.outdooralabama.com/fishing/freshwater/fish/drum/red/>. Accessed October 3, 2013.

Bethea, D.M., L. Hale, J.K. Carlson, E. Cortés, C. A. Manire, and J. Gelsleichter. 2007. Geographic and ontogenetic variation in the diet and daily ration of the bonnethead shark, *Sphyrna tiburo*, from the eastern Gulf of Mexico. Mar. Biol. 152:1009-1020.

Coen, L.D., Brumbaugh, R.D., Bushek, D., Grizzle, R., Luckenbach, M.W., Posey, M.H., Powers, S.P., Tolley, S. 2007. Ecosystem services related to oyster restoration. Marine Ecology Progress Series, 341, 303-307.

Collette, B.B., and J.L. Russo. 1979. An introduction to the Spanish mackerels, genus Scomberomorus. In: Nakamura and Bullis (eds.), Proceedings: Colloquium on the Spanish and king mackerel resources of the Gulf of Mexico. Gulf States Marine Fisheries Commission, No. 4. p. 3-16.

Dalrymple, D.J. 2013. Effects of ontogeny on nitrogen sequestration and removal capacity of oysters. M.S. Thesis. University of South Alabama, Department of Marine Sciences. Mobile, Alabama.

Ditty, J.G. and R.F. Shaw. 1995. Seasonal occurrence, distribution, and abundance of larval bluefish, *Pomatomus saltatrix* (family: Pomatomidae) in the northern Gulf of Mexico. Bull. Mar. Sci. 56:592-601.

Ditty J.G., R.F. Shaw, C.B. Grimes, and J.S. Cope. 1994. Larval development, distribution, and abundance of common dolphin, *Coryphaena hippurus*, and pompano dolphin, *C. equiselis* (family: Coryphaenidae), in the northern Gulf of Mexico. Fish. Bull. 92:275-291.

Gregalis, K.C., Johnson, M.W., and Powers, S.P. 2009. Restored Oyster Reef Location and Design Affect Responses of Resident and Transient Fish, Crab, and Shellfish Species in Mobile Bay, Alabama. Transactions of the American Fisheries Society 138:314-327.

Gulf of Mexico Fishery Management Council. 1998. Generic Amendment for Addressing Essential Fish Habitat Requirements in the following Fishery Management Plans of the Gulf of Mexico: Shrimp Fishery of the Gulf of Mexico, United States Waters, Red Drum Fishery of the Gulf of Mexico, Reef Fish Fishery of the Gulf of Mexico, coastal Migratory Pelagic Resources (Mackerels) in the Gulf of Mexico and South Atlantic, Stone Crab Fishery of the Gulf of Mexico, Spiny Lobster in the Gulf of Mexico and South Atlantic, Coral and Coral Reefs of the Gulf of Mexico. GMFMC, Tampa, Florida.

Gulf of Mexico Fishery Management Council. 2004. Final Environmental Impact Statement for the Generic Essential Fish Habitat Amendment to the following fishery management plans of the Gulf of Mexico (GOM): Shrimp Fishery of the Gulf of Mexico, Red Drum Fishery of the Gulf of Mexico, Reef Fish Fishery of the Gulf of Mexico, Stone Crab Fishery of the Gulf of Mexico, Coral and Coral Reef fishery of the Gulf of Mexico, Spiny Lobster

Fishery of the Gulf of Mexico and South Atlantic, Coastal Migratory Pelagic Resources of the Gulf of Mexico and South Atlantic. GMFMC, Tampa, Florida. 118 pp.

Gulf of Mexico Fishery Management Council. 2005. Final Amendment Number 13 to the Fishery Management Plan for the Shrimp Fishery of the Gulf of Mexico, U.S. Waters with Environmental Assessment Regulatory Impact Review, and Regulatory Flexibility Act Analysis. GMFMC, Tampa, Florida. 273 pp.

Gulf of Mexico Fishery Management Council and South Atlantic Fishery Management Council. 1983. Fishery Management Plan, Final Environmental Impact Statement Regulatory Impact Review, Final Regulations for the Coastal Migratory Pelagic Resources in Gulf of Mexico and South Atlantic Regions. GMFMC, Tampa, Florida & SAFMC, Charleston, South Carolina.

Meyer DL, Townsend EC, Thayer GW. 1997. Stabilization and erosion control value of oyster cultch for intertidalmarsh. Restor. Ecol. 5:93–99.

National Marine Fisheries Service. 2009. Final Amendment 1 to the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan, Essential Fish Habitat. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Sustainable Fisheries, Highly Migratory Species Management Division, Silver Spring, MD. Public Document. 395 pp.

National Marine Fisheries Service. 2013. Making Sense of Mackerel. <http://sero.nmfs.noaa.gov /sustainable_fisheries/gulf_sa/cmp/documents/pdfs/making_sense_of_mackerel_081213 .pdf>. Accessed October 7, 2013.

National Ocean Service. 1998. Gulf of Mexico Essential Fish Habitat, LA/MS/AL. Center for Coastal Monitoring and Assessment. <http://ccma.nos.noaa.gov/products/ biogeography/gom-efh/lma.aspx>. Accessed September 9, 2013.

Stout J.P. and M.G. Lelong, 1981. Wetland Habitats of the Alabama Coastal Area. Alabama Coastal Area
Board Technical Publication, CAB-81-01. 27p.

Vittor & Associates, Inc., 2004. Mapping of Submerged Aquatic Vegetation in Mobile Bay and Adjacent Waters of Coastal Alabama in 2002. Prepared for the Mobile Bay National Estuary Program, Mobile, AL. 27 pp + appendices.

Vittor & Associates, Inc., 2009. Mapping of Submerged Aquatic Vegetation in Mobile Bay and Adjacent Waters of Coastal Alabama in 2008 and 2009. Prepared for the Mobile Bay National Estuary Program, Mobile, AL. 16 pp + appendices.