

RECORD OF DECISION

APPENDIX A: PROGRAMMATIC MITIGATION MEASURES

Consistent with NEPA’s implementing regulations, Appendix A lists those mitigation measures (i.e., Best Management Practices and Conservation Measures) that will be considered for implementation on site-specific projects (40 C.F.R. § 1505.2). For future projects, Trustees will review these mitigation measures and identify applicable measures that will be implemented in order to avoid, reduce, or minimize impacts to one or more resources. In addition, Trustees and consulting resource agencies will identify any additional mitigation measures appropriate for future Early Restoration projects. Trustees are required to fulfill all federal, state and local compliance consultation requirements prior to project implementation, and are required to ensure that all project-specific mitigation measures are implemented.

The potential environmental consequences described in Phase III ERP/PEIS were presented largely without factoring in the types of specific project actions and requirements that could avoid or minimize potential adverse effects. An exception was the analysis of impacts to protected biological resources and their habitats. For these resources, project types were specifically analyzed with the incorporation of mitigation measures that would be typically required by consulting resource agencies, as these project types would generally not be able to move forward through agency review without incorporation of mitigation measures. Best management practices have been identified for protected species including certain birds, beach mice, marine mammals, tortoises and turtles, other reptiles, fish, plants; invasive species; and general construction measures.

The list of mitigation measures is organized by resource and includes a section on general construction measures. Three tables are included in a later portion to provide information on the natural resources and the human environment that could be protected by these mitigation measures. Several of the mitigation measures are described in larger documents and only the titles are included here. As regulatory agencies periodically update their guidance documents, future restoration proponents and practitioners are expected to be familiar with such updated guidance and BMPs and apply as required or as agreed to by the Trustees. Appropriate websites should be checked during project planning to see if updated guidance is available.

Applicable mitigation measures for the specific 44 projects for the Phase III Early Restoration Plan are discussed in further detail in Section 10—Phase III Early Restoration Plan Mitigation and Monitoring. Future projects tiered from the Phase III ERP/PEIS will consider the mitigation measures below. If changes to the mitigation measures below are warranted for specific future projects, those changes would be analyzed in the future NEPA/OPA documentation.

The general organization of this list of mitigation measures is as follows:

Birds

- Bald Eagle
- Migratory Birds
- Piping Plover and Red Knot
- Red-cockaded woodpecker

Mammals

- Beach Mice
- Manatee
- Bottlenose Dolphin
- Marine Mammals

Reptiles

- Reticulated flatwoods salamander
- Eastern Indigo Snake

Tortoises/Turtles

- Gopher tortoise
- Sea turtles – in water
- Sea turtles – nesting beaches

Fish

- Gulf sturgeon

Plants

- Protected Plants

Invasive Species

General Construction Measures

Birds

Bald Eagles

If bald eagle breeding or nesting behaviors are observed or a nest is discovered or known, have all activities avoid the nest by a minimum of 660 feet. If the nest is protected by a vegetated buffer where there is *no* line of sight to the nest, then the minimum avoidance distance is 330 feet. Maintain this avoidance distance from the onset of breeding/courtship behaviors until any eggs have hatched and eaglets have fledged (approximately 6 months).

If a similar activity (like driving on a roadway) is closer than 660 feet to a nest, maintain a distance buffer as close to the nest as the existing tolerated activity. If a vegetated buffer is present and there is no line of sight to the nest and a similar activity is closer than 330 feet to a nest, then maintain a distance buffer as close to the nest as the existing tolerated activity.

In some instances activities conducted within 660 feet of a nest may result in disturbance, particularly for the eagles occupying the Mississippi barrier islands. If an activity appears to cause initial

disturbance, stop the activity and move all individuals and equipment away until the eagles are no longer displaying disturbance behaviors. Contact the U.S. Fish and Wildlife Service's (USFWS) Migratory Bird Permit Office to determine how to avoid impacts or if a permit may be needed.

Migratory Birds

Use care to avoid birds when operating machinery or vehicles near birds.

During the project design phase, coordinate with the U.S. Fish and Wildlife Service and the State trust resource agency to site and design projects to avoid or minimize impacts to migratory bird nesting habitats or important feeding/loafing areas.

Avoid working in migratory bird nesting habitats during breeding, nesting, and fledging (approximately Mid February to late August). If project activities must occur during this timeframe and breeding, nesting, or fledging birds are present, contact the State trust resource agency to obtain the most recent guidance to protect nesting birds or rookeries and their recommendations will be implemented.

Conservation areas may already be marked to protect bird nesting areas. Stay out of existing marked areas.

If vegetation clearing is necessary, clear vegetation outside of migratory bird nesting season (approximately Mid February to late August) or have a qualified biologist inspect for active nests. If no active nests are found, vegetation may be removed. If active nests are found, vegetation can be removed after the nest successfully fledges.

Avoid driving over the wrack line or areas of dense seaweed, as these habitats may contain hatchlings and chicks that are difficult to see.

Install pointy, white, piling caps on exposed pilings to prevent bird roosting on piers, docks, and marinas.

Piping Plover and Red Knot

Provide all individuals working on a project with information in support of general awareness of piping plover or red knot presence and means to avoid birds and their critical or otherwise important habitats.

Avoid working in designated critical habitat when piping plover are present (approximately late July through mid-May) or important wintering sites for red knots when they are present (contact U.S. Fish and Wildlife Service for red knot time frames and habitats) to the maximum extent practicable. If work must be conducted when individuals are present, avoid working near concentrations of individuals or post avoidance areas to minimize disturbance.

For projects that result in large scale habitat changes, coordinate early with the U.S. Fish and Wildlife Service to enhance or protect habitat features preferred by the species (inlet shoals, lagoons, washover fans, ephemeral pools, baysides and mud flats). Do not remove sand from intertidal, sand, or mud flats.

Use dredged material to enhance adjacent emerged and submerged shoals and bayside habitats within and adjacent to project areas.

Minimize vegetation planting in preferred habitats and avoid removal of natural organic material ("wrack") year-around along the shoreline.

During recreational use, enforce leash or “no pet” policies in critical or important habitats.

Red-cockaded woodpecker

Avoid working within active red-cockaded woodpecker clusters (minimum convex polygon containing the aggregation of cavity trees used by a group of red-cockaded woodpeckers and a 200-foot wide buffer surrounding the polygon).

If avoidance is not possible or management activities in red-cockaded woodpecker suitable habitat are desired, conduct standard surveys to determine if the habitat is supporting any individuals or presence can be assumed. If red-cockaded woodpeckers are present (or assumed to be), avoid cavity trees and use mechanized equipment during the non-nesting season (approximately April 1 – July 31).

If tree removal is necessary, survey pine trees approximately 60 or more years old for active cavities within one year of the proposed removal. Extend surveys from the project site out to no less than ½ mile. Replace any cavities affected by the project via drilled cavity construction.

If impacts to suitable foraging habitat (pines approximately 30 or more years old and within ½ mile of an active cavity tree) are proposed, conduct a foraging habitat analysis. Foraging habitat may need to be replanted post-project.

Design projects within red-cockaded woodpecker suitable habitat such that prescribed fire needs are not impeded.

Mammals

Beach Mice

Avoid using vehicles and mechanical equipment within the dune system, including primary, secondary, and tertiary dunes.

Avoid storing or staging equipment, vehicles, and project debris in a manner or location where it could be colonized by mice.

If work must occur within the dune system, have a qualified, permitted, biologist survey the project site before work commences and flag potential burrows and tracks so that they can be avoided.

Where possible replace footpaths or low-lying dune walkovers with improved walkovers that do not fragment the dune system. For dune walkover construction in Florida and Alabama, *follow the Conservation Measures for Dune Walkover Construction* (USFWS 2013).

Avoid vegetation removal, including scrub vegetation. If vegetation is damaged or removed during project implementation, plant appropriate native plants in the same location to minimize erosion and provide a food source for beach mice. If forage plants are reduced or limited in the project area, supplemental beach mouse food sources may be necessary.

Manatee

In Florida, follow the most current version of the *Standard Manatee Conditions for In-water Work* and the *Additional Conditions for Project In-water Activities in Manatee Habitat* (USFWS, 2011).

For in-water work in Alabama, Mississippi, and Texas where manatees could be present, follow conditions a, b, c, and d of the Standard Manatee Conditions for In-water Work. Report any collisions to the U.S. Fish and Wildlife Service or State trust resource agency. Temporary signs, if necessary, can be modified from the Florida Fish and Wildlife Conservation Commission's template to reflect local conditions. In Louisiana, follow the most recent version of the *Standard Conditions for In-Water Work in the Presence of Manatees* (USFWS n.d.a).

Bottlenose Dolphin

Follow the most current version of the Measures for Reducing Entrapment Risk to Protected Species, Revised: May 22, 2012

Marine Mammals

Follow the most current version of the Vessel Strike Avoidance Measures and Reporting for Mariners NOAA Fisheries Service, Southeast Region, Revised February 2008.

Reptiles

Reticulated flatwoods salamander

Avoid suitable habitat during all construction activities and do not permanently alter hydrology of the area. Avoid eliminating connectivity between suitable ponds.

Use silt fencing to prevent sedimentation or erosion of the project site into ponds.

If suitable habitat (including the approximately 1,500 buffer zone around breeding ponds) may be impacted, perform pre-project surveys within 2 miles of known breeding sites or assume the presence of reticulated flatwoods salamanders. Schedule work during the non-breeding season (summer) and maintain the natural contour of the ponds.

Eastern Indigo Snake

If suitable habitat or other evidence of Eastern indigo snake is discovered within the project area during site surveys, implement the most recent version of the U.S. Fish and Wildlife Service's *Standard Protection Measures for the Eastern Indigo Snake*.

Tortoises/Turtles

Gopher tortoise

If suitable habitat is present, have a qualified biologist conduct surveys to identify any gopher tortoise burrows. If burrows are within the project area and cannot be avoided through establishing a protective buffer (size determined by U.S. Fish and Wildlife Service and the State trust resource agency), implement standard procedures to relocate the tortoise within the project site but away from the areas of construction or restoration or consider conservation banks. A Candidate Conservation Agreement with Assurances may be appropriate for project sites within the non-listed range of the species.

Sea turtles – in water

Implement the following guidelines: Sea Turtle and Smalltooth Sawfish Construction Conditions, Revised: March 23, 2006; Measures for Reducing Entrapment Risk to Protected Species, Revised: May

22, 2012; and Vessel Strike Avoidance Measures and Reporting for Mariners NOAA Fisheries Service, Southeast Region, Revised February 2008.

Sea turtles – nesting beaches

If a sea turtle (either adult or hatchling) is observed, maintain at least 200 feet between the turtle and personnel, equipment, or machinery and notify the sea turtle monitoring program. Allow the turtle to leave the area of its own volition.

During nourishment activities, use beach quality sand that is suitable for successful sea turtle nesting and hatchling emergence. Emulate the natural shoreline slope and dune system (including configuration and shape) to the maximum extent practicable.

In Florida and Alabama, avoid the use of vehicles and heavy machinery on nesting beaches during sea turtle nesting and hatching season (Approximately May through October).

- If work must occur on nesting beaches during sea turtle nesting season (May through August), begin work with vehicles or machinery after 9:00 am local time to allow the sea turtle monitoring program to detect and mark new nests and assess the need to relocate sea turtle nests that could be affected by the project construction. Avoid marked nests by at least 10 feet.
- If beach topography is altered, restore all areas to the natural beach profile by 8:00 pm local time each day during nesting and hatching season. Restore beach topography by raking tire ruts and filling pits or holes.
- Avoid driving over the wrack line or areas of dense seaweed, as these habitats may contain sea turtle hatchlings that are difficult to see.

In Texas, all observed sea turtle nests will be excavated and the eggs relocated for incubation, in coordination with the National Park Service's Sea Turtle Recovery Project. Construction in Texas should be scheduled to avoid Kemps nesting season, which extends from April 1 until October 1.

Fish

Gulf sturgeon

Avoid work in riverine critical habitats when Gulf sturgeon are likely to be present (April to October). Do not dredge in spawning areas when Gulf sturgeon are likely to be present.

During project implementation, maintain riparian buffers of at least 100 feet around critical habitat. Install silt fencing to prevent sedimentation or erosion into streams and rivers.

Operate dredge equipment in a manner to avoid risks to Gulf sturgeon (e.g., disengage pumps when the cutter head is not in the substrate; avoid pumping water from the bottom of the water column).

Implement the Sea Turtle and Smalltooth Construction Conditions, Revised: March 23, 2006 (NOAA, 2006) and Measures for Reducing Entrapment Risk to Protected Species, Revised: May 22, 2012 as they are protective of Gulf sturgeon as well.

Plants

Protected Plants

Perform surveys to determine if protected plants (or suitable habitat) are on or adjacent to the project site. Have a qualified individual perform the surveys and follow suitable survey protocols. Conduct plant surveys during appropriate survey periods (usually flowering season).

Design projects to avoid known locations and associated habitat to the extent possible. Use "temporary" removal of plants and soil profile plugs (which include the A and B horizons) with the intent to replace to original location post construction as a last resort. Consider transplanting and seed banking only after all other options are exhausted.

Enhance and protect plants on-site and adjacent habitats to the maximum extent possible.

Use only native plants for post project restoration efforts.

Invasive Species

Develop and implement a Hazard Analysis and Critical Control Points (HACCP) plan to prevent and control invasive species. Use (ASTM E2590 - 08) or other version of HACCP or other similar planning tool.

Implement an Integrated Pest Management (IPM) approach to facility design, sanitation, and maintenance to prevent and control invasive and pest species.

Inspect sites, staging, and buffer areas for common invasive species prior to the onset of work. Map any invasive species detected and note qualitative or quantitative measures regarding abundance.

Implement a control plan, if necessary, to ensure these species do not increase in distribution or abundance at a site due to project implementation. Inspect sites periodically to identify and control new colonies/individuals of an invasive species not previously observed prior to construction.

Prior to bringing any equipment (including personal gear, machinery, vehicles or vessels) to the work site, inspect each item for mud or soil, seeds, and vegetation. If present, clean the equipment, vehicles, or personal gear until they are free from mud, soil, seeds, and vegetation. Inspect the equipment, vehicles, and personal gear each time they are being prepared to go to a site or prior to transferring between sites to avoid spreading exotic, nuisance species.

Place and maintain predator-proof waste receptacles in strategic locations during project implementation to prevent an increase in predator abundance. For projects designed to enhance or increase visitor use, maintain predator-proof waste receptacles for the life of the project.

Have the appropriate state agency inspect any equipment or construction materials for invasive species prior to use.

Inspect and certify propagated or transplanted vegetation as pest and disease free prior to planting in restoration project areas.

General Construction Measures

Guidelines:

Dock Construction Guidelines in Florida for Docks or Other Minor Structures Constructed in or over Submerged Aquatic Vegetation (SAV), Marsh or Mangrove Habitat. U.S. Army Corps of Engineers/National Marine Fisheries Service August 2001

Key for Construction Conditions for Docks or Other Minor Structures Constructed in or Over Johnson's Seagrass (*Halophila johnsonii*). National Marine Fisheries Service/U.S. Army Corps of Engineers October 2002

National Artificial Reef Plan (as Amended): Guidelines for siting, construction, development, and assessment of artificial reefs, Revised February 2007

Guidelines for Marine Artificial Reef Materials 1997 GSMFC Number 121

Bubble Curtain Specifications for Pile Driving

Assessment and Mitigation of Marine Explosives: Guidance for Protected Species in the Southeast U.S.

Piling Installation

Push pilings into soft, bottom substrate to reduce noise from installation; do not drive and hammer pilings into bottom substrate unless necessary for proper construction.

Protected species

Provide all individuals working on a project with information in support of general awareness of and means to avoid impacts to protected species and their habitats present at the specific project site.

Survey for other at-risk or imperilled species. If found on site, contact the U.S. Fish and Wildlife Service and State trust resource agency to determine if avoidance or minimization measures or a Candidate Conservation Agreement with Assurances may be appropriate.

Site maintenance and conduct

Use the nearest, existing staging, access and egress areas, travel corridors, pathways, and roadways (including those provided by the State, local governments, land managers, trustee, or private property owner, with proper permissions) and do not create new staging areas, access (except dune walk overs) or egress, or travel corridors through dune habitats.

Limit driving on the beach for construction to the minimum necessary within the designated travel corridor—established just above or just below the primary “wrack” line. Avoid driving on the upper beach whenever possible, and never drive over any dunes or beach vegetation. Check with the U.S. Fish

and Wildlife Service and State trust resource agency for additional specific beach driving recommendations in Florida and Alabama.

Minimize construction noise to the maximum extent practicable when working near protected species and their habitats.

Maintain or improve all lighting regimes. Methods include: working during daylight hours only, prohibiting lighting on dune walkovers, and using wildlife-friendly lighting where lighting is necessary for human safety.

Post signs at kiosks, ramps, and piers to provide visitors with information to avoid and minimize impacts to protected species and their habitats while recreating. Develop signs in coordination with National Marine Fisheries Service, U.S. Fish and Wildlife Service and the local State trust resource agency.

Supply and maintain containers for waste fishing gear to avoid fish and wildlife entanglement.

Land and vegetation protection

Develop and implement an erosion control plan to minimize erosion during and after construction and where possible: use vegetative buffers (100 feet or greater), revegetate with native species or annual grasses, and conduct work during dry seasons.

Develop and implement a spill prevention and response plan, including: conducting daily inspections of all construction and related equipment to assure there are no leaks of antifreeze, hydraulic fluid, or other substances and cleaning and sealing all equipment that would be used in the water to rid it of chemical residue. Develop a contract stipulation to disallow use of any leaking equipment or vehicles.

Prohibit use of hazardous materials, such as: lead paint, creosote, pentachlorophenol, and other wood preservatives during construction in, over or adjacent to, sensitive sites during construction and routine maintenance.

Where landscaping is necessary or desired, use native plants from local sources. If non-native species must be used, ensure they are non-invasive and use them in container plantings.

Wetland and aquatic resource protection

Complete an engineering design and post-construction inspection for projects where geomorphic elevations would be restored in wetlands, marshes, and shallow water habitats to ensure the success of the restoration project. Manage elevation of fill material to ensure projected consolidation rates were accomplished and that habitat suitable for wetland and marsh vegetation is developed.

Perform an engineering design and post-construction inspection for projects where geomorphic elevations are restored within wetlands, marshes, and shallow water habitats to ensure the success of the restoration project.

Avoid and minimize, to the maximum extent practicable, placement of dredged or fill material in wetlands and other aquatic resources.

Design construction equipment corridors to avoid and minimize impacts to wetlands and other aquatic resources to the maximum extent practicable.

To the maximum extent possible, implement the placement of sediment to minimize impacts to existing vegetation or burrowing organisms.

Place protective warning signs and buoys around at-risk habitats for infrastructure projects that could increase recreational uses in SAV or oyster areas.

Apply herbicide in accordance with the direction and guidance provided on the appropriate Environmental Protection Agency (EPA) labels and State statutes during land-based activities.

Only use suitable borrow sites (that do not contain *Sargassum*, SAV, or oysters) as dredging sites for sediment. Obtain sediments by beneficially using dredged material from navigation channels or by accessing material from approved offshore borrow areas. Sediments must closely match the chemical and physical characteristics of sediment at the restoration site. Additionally, use target borrow areas within reasonable proximity to suitable sites for sediment placement.

When local conditions indicate the likely presence of contaminated soils and sediments, test soil samples for contaminant levels, and take precautions to avoid disturbance of -or to provide for proper disposal of - contaminated soils and sediments. Evaluate methods prior to dredging to reduce the potential for impacts from turbidity or tarballs.

Perform maintenance of generators, cranes, and any other stationary equipment operated within 150 feet of any natural or wetland area, as necessary, to prevent leaks and spills from entering the water.

Designate a vehicle staging area removed from any natural surface water resource or wetland to perform fueling, maintenance, and storage of construction vehicles and equipment. Inspect vehicles and equipment daily prior to leaving the storage area to ensure that no petroleum or oil products are leaking.

Upon completion of construction activities, restore all disturbed areas as necessary to allow habitat functions to return. Create and manage public access developments to enhance recreational experience and educational awareness to minimize effects to habitat within wetland and shallow water areas and to the long-term health of related biological communities.

Incorporate containment levees for fill cells for projects using marsh creation or other barrier island restoration. Remove these containment levees after construction to allow for the restoration of nature tidal exchange.

Use silt fencing where appropriate to reduce increased turbidity and siltation in the project vicinity. This would apply to both on land and in water work.

Continue oyster and clam shell recycling programs to provide natural material for creating additional oyster reefs.

Ensure shells to be introduced for reef creation are subjected to depuration in a secure open air area for a period of not less than 6 months.

Make all efforts to reduce the peak sound level and exposure levels of fish to reduce the potential impact of sound on fish present in the project areas.

Use a vibratory hammer whenever possible to reduce peak sound pressure levels in the aquatic environment.

Use sound attenuation devices where practicable for pulse-noise (impact hammers) to reduce peak sound pressure levels in the aquatic environment.

Stipulate the timing of activities to avoid impacts to spawning fish and eggs/larvae.

Use BMPs to reduce turbidity, such as turbidity blankets, to reduce the potential impact of turbidity on finfish.

Screen water withdrawal pipes to minimize potential entrainment of fish from the withdrawal area. Have project proponents coordinate with NMFS to create an intake screen that would minimize potential impingement of fish.

Aquaculture facilities

Treat effluent from aquaculture facilities to avoid dispersal of potential pathogens into receiving waters.

Make sure that all aquaculture facilities and fish raised in those facilities meet fish health standards and are screened for pathogens prior to release into receiving waters.

Implement a genetics management plan that ensures maintenance of genetic diversity of native stocks of finfish in the Gulf of Mexico.

Develop and implement a stocking management plan prior to the release of hatchery-reared finfish.

BMPs and Mitigation Measures – Benefits to Resources and the Human Environment

Potential BMPs and Mitigation Measures, including those described above, as well as additional measures have been organized into three tables to provide information on the potential benefits to natural resources and the human environment associated with implementing the measures:

1. Table A-1: *Potential Site-Specific and Construction Mitigation Measures and BMPs: Benefits to Natural Resources*. This table presents the benefits to natural resources associated with implementation of a broad range of standard BMPs and Mitigation Measures;
2. Table A-2: *Potential Site-Specific and Construction Mitigation Measures and BMPs. Benefits to the Human Environment*: This table presents the benefits to the human environment associated with implementation of a broad range of standard BMPs and Mitigation Measures; and
3. Table A-3: *Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs*. This table presents BMPs and Mitigation Measures that may be implemented on case-by-case basis when sensitive habitats or protected species may be present. These measures would not preclude implementation of BMPs or Mitigation Measures listed in Table A-1 or A-2, but

may be implemented in addition to those deemed appropriate in Table A-1 or A-2 to further reduce potential for adverse effects to natural resources.

Table A-1. Potential Site-Specific and Construction Mitigation Measures and BMPs: Benefits to Natural Resources

Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats					Living Coastal and Marine Resources											
	Upland Geology and Substrates	Nearshore Geology and Substrates	Freshwater Environments		Saltwater Environment Fish Resources		Wetlands	Barrier Islands	Beaches	Submerged Aquatic Vegetation (SAV)	Terrestrial, Coastal, and Riparian Habitat	Nearshore Benthic Communities	Oysters	Pelagic Microfaunal Communities	Sargassum	Finfish			Sea Turtles	Marine Mammals	Birds	Terrestrial Wildlife	
			Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment										Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish					
Tilling of compacted soil areas to reduce hardening.	X	X					X	X		X								X				X	
Use of existing access ways whenever possible. Temporary access roads would not be built in locations that would suggest a likelihood of excessive erosion (e.g., large slopes, erosive soils, proximity to water body). All temporary access roads would be restored when the action is completed, the soil would be stabilized, and the site would be re-vegetated. Temporary roads in wet or flooded areas would be restored shortly after the work period was complete.	X	X		X	X		X	X	X	X		X	X			X	X	X	X	X	X	X	X
Selection and operation of heavy equipment to minimize adverse effects to the environment (e.g., minimally-sized, low-pressure tires, minimal hard turn paths for tracked vehicles, temporary mats or plates within wet areas or sensitive soils).	X	X		X	X		X	X	X	X					X	X	X	X	X	X	X	X	X
To the extent feasible, heavy equipment would work from the top of the bank, unless work from another location would result in less habitat disturbance.	X	X		X	X		X	X	X	X			X		X	X	X	X	X	X	X	X	X
Temporary stabilization of areas of upland soil disturbance by sediment and erosion control practices during construction and re-vegetation with appropriate native species following construction.	X			X			X	X	X	X		X	X		X	X	X	X		X	X	X	X
When local conditions indicate the presence of contaminated soils/sediments is likely, soil samples would be tested for contaminant levels, and precautions would be taken to avoid disturbance of or provide for proper disposal of contaminated soils/sediments.	X	X	X	X	X		X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X
Prior to dredging, methods will be evaluated to reduce the potential for impacts from turbidity.				X	X		X	X	X	X	X	X	X		X	X	X	X	X				
Seasonal rainfall will be factored into the construction timeline to reduce ground disturbance during raining or flood seasons.	X	X		X	X		X	X	X	X		X	X		X	X	X	X	X	X	X	X	X
Employment of standard BMPs for construction to reduce erosion, stormwater	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X

Table A-1. Potential Site-Specific and Construction Mitigation Measures and BMPs: Benefits to Natural Resources

Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats					Living Coastal and Marine Resources												
	Upland Geology and Substrates	Nearshore Geology and Substrates	Freshwater Environments		Saltwater Environment Fish Resources		Wetlands	Barrier Islands	Beaches	Submerged Aquatic Vegetation (SAV)	Terrestrial, Coastal, and Riparian Habitat	Nearshore Benthic Communities	Oysters	Pelagic Microfaunal Communities	Sargassum	Finfish			Sea Turtles	Marine Mammals	Birds	Terrestrial Wildlife		
			Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment										Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish						
runoff, transport of soil into receiving waters, or disturbance of sediment.																								
Employment of temporary erosion controls prior to any land clearing or land disturbance on the project site, which would be monitored during construction to ensure proper function. Turbidity curtains, hay bales, and erosion mats would be used where appropriate.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Confinement of vegetation removal and soil disturbance would be to the minimum area and the minimum length of time necessary to complete the action.	X	X	X	X	X	X	X	X	X	X	X			X		X	X	X	X	X	X	X	X	X
Site work stoppage under high flows or seasonal conditions that threaten to damage erosion and sediment control measures, except where efforts are aimed at avoiding or minimizing resource damage.	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X
Maintenance of generators, cranes, and any other stationary equipment operated within 150 feet of any natural or wetland area as necessary to prevent leaks and spills from entering the water.			X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X
Development and implementation of spill prevention and control plans to minimize the risk of releasing petroleum and oil products to receiving waters.			X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X
Management of hazardous material generated, used, or stored onsite in accordance with Federal and State regulations, including notification of proper authorities.	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X
Application of herbicide during land-based activities would be in accordance with the direction and guidance provided on the appropriate Environmental Protection Agency (EPA) labels.			X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X
Cleaning of construction equipment before moving between sites to prevent spread of invasive species							X	X	X	X	X	X		X					X	X	X	X	X	X
Identification of mooring locations for restoration-related barges and other boats to best avoid EFH and minimize damage to existing healthy reefs or							X	X	X	X	X		X	X		X	X	X	X	X				

Table A-1. Potential Site-Specific and Construction Mitigation Measures and BMPs: Benefits to Natural Resources

Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats					Living Coastal and Marine Resources												
	Upland Geology and Substrates	Nearshore Geology and Substrates	Freshwater Environments		Saltwater Environment Fish Resources		Wetlands	Barrier Islands	Beaches	Submerged Aquatic Vegetation (SAV)	Terrestrial, Coastal, and Riparian Habitat	Nearshore Benthic Communities	Oysters	Pelagic Microfaunal Communities	Sargassum	Finfish			Sea Turtles	Marine Mammals	Birds	Terrestrial Wildlife		
			Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment										Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish						
adjacent SAV beds.																								
Creation, as feasible, of a stockpile of topsoil; native channel material; and large, mature native trees and shrubs for reuse in the restoration process.	X	X						X	X		X								X		X	X		
Upon completion of construction activities, all disturbed areas would be restored as necessary to allow habitat functions to return.	X	X	X	X	X		X	X	X	X	X	X		X		X	X	X	X	X	X	X	X	X
Temporal (e.g., time-of-year, seasonal) restrictions for construction activities applicable to protection of Federally listed threatened and endangered species, EFH, diadromous fish species, SAV, or other natural resources could be employed to avoid impacts.							X	X	X	X	X		X			X	X	X	X	X	X	X	X	X
Fueling, maintenance, and storage of construction vehicles and equipment within a designated vehicle staging area removed from any natural surface water resource or wetland. Vehicles and equipment would be inspected daily prior to leaving the storage area to ensure that no petroleum or oil products are leaking.			X	X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X
Conducting preconstruction surveys for the presence of sensitive natural and cultural resources.							X	X	X	X	X				X	X	X	X	X	X	X	X	X	X
Installation of protective buffers around sensitive wetlands, surface waters, and wildlife habitat. At a minimum, flagging or fencing sensitive resource areas adjacent to the action area would be employed to avoid accidental impacts.				X	X		X	X	X	X	X			X		X	X	X	X	X	X	X	X	X
The use of an appropriate assemblage of species native to the action area or region, including trees, shrubs, and herbaceous species, would be used in the re-vegetation and restoration processes.							X	X	X	X	X					X	X	X	X	X	X	X	X	X
During all phases of the project, keeping equipment and vehicles within the limits of the initially disturbed areas. In addition, use existing roads to the maximum extent feasible to avoid additional surface disturbance.							X			X						X	X	X						

Table A-2. Potential Site-Specific and Construction Mitigation Measures and BMPs: Benefits to the Human Environment.

Potential Mitigation Measures	Socio-economics		Cultural Resources	Infrastructure	Land and Marine Management	Tourism and Recreation Use						Fisheries		Marine Transportation	Aesthetics and Visual	Public Health and Safety	Noise	Air Quality and Greenhouse Gases
	Demographics	Regional Economy				Wildlife Observation	Hunting	Beach and Waterfront	Boating	Recreational Fishing and Stock Enhancement	Tourism	Commercial Fisheries, Processing, and Sales	Aquaculture, Processing, and Sales (and Shellfish Leases)					
Tilling of compacted soil areas to reduce hardening.																		
Use of existing access ways whenever possible. Temporary access roads would not be built in locations that would suggest a likelihood of excessive erosion (e.g., large slopes, erosive soils, proximity to water body). All temporary access roads would be restored when the action is completed, the soil would be stabilized, and the site would be re-vegetated. Temporary roads in wet or flooded areas would be restored shortly after the work period was complete.			X											X	X			X
Selection and operation of heavy equipment to minimize adverse effects to the environment (e.g., minimally-sized, low-pressure tires, minimal hard turn paths for tracked vehicles, temporary mats or plates within wet areas or sensitive soils).														X				X
To the extent feasible, heavy equipment would work from the top of the bank, unless work from another location would result in less habitat disturbance.						X	X	X										
Temporary stabilization of areas of upland soil disturbance by sediment and erosion control practices during construction, and re-vegetation with appropriate native species following construction.						X	X	X						X	X			X
When local conditions indicate the presence of contaminated soils/sediments is likely, soil samples would be tested for contaminant levels, and precautions would be taken to avoid disturbance of or provide for proper disposal of contaminated soils/sediments.	X															X		
Prior to dredging, methods will be evaluated to reduce the potential for impacts from turbidity.	X									X		X	X					
Seasonal rainfall will be factored into the construction timeline to reduce ground disturbance during raining or flood seasons.	X									X		X	X			X		
Employment of standard BMPs for construction to reduce erosion, stormwater runoff, transport of soil into receiving waters, or disturbance of sediment.	X		X			X	X	X		X		X	X	X	X	X		
Employment of temporary erosion controls prior to any land clearing or land disturbance on the project site, which would be monitored during construction to ensure proper function. Turbidity curtains, hay bales, and erosion mats would be	X		X			X	X	X		X		X	X	X	X	X		

Table A-2. Potential Site-Specific and Construction Mitigation Measures and BMPs: Benefits to the Human Environment.

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used where appropriate.																		
Confinement of vegetation removal and soil disturbance would be to the minimum area and the minimum length of time necessary to complete the action.			X	X		X	X	X						X	X			
Site work stoppage under high flows or seasonal conditions that threaten to damage erosion and sediment control measures, except where efforts are aimed at avoiding or minimizing resource damage.				X		X	X	X						X	X			
Maintenance of generators, cranes, and any other stationary equipment operated within 150 feet of any natural or wetland area as necessary to prevent leaks and spills from entering the water.						X	X	X			X	X		X	X			X
Development and implementation of spill prevention and control plans to minimize the risk of releasing petroleum and oil products to receiving waters.						X	X	X		X	X			X	X			
Management of hazardous material generated, used, or stored onsite in accordance with Federal and State regulations, including notification of proper authorities.															X			X
Application of herbicide during land-based activities would be in accordance with the direction and guidance provided on the appropriate Environmental Protection Agency (EPA) labels.															X			
Cleaning of construction equipment before moving between sites to prevent spread of invasive species						X	X	X						X				
Identification of mooring locations for restoration-related barges and other boats to best avoid EFH and minimize damage to existing healthy reefs or adjacent SAV beds.						X	X	X		X	X							
Creation, as feasible, of a stockpile of topsoil; native channel material; and large, mature native trees and shrubs for reuse in the restoration process.																		
Upon completion of construction activities, all disturbed areas would be restored as necessary to allow habitat functions to return.						X	X	X						X	X			
Temporal (e.g., time-of-year, seasonal) restrictions for construction activities applicable to protection of Federally listed threatened and endangered species, EFH, diadromous fish species, SAV, or other natural resources could be employed to avoid impacts.						X	X	X		X	X							

Table A-2. Potential Site-Specific and Construction Mitigation Measures and BMPs: Benefits to the Human Environment.

Potential Mitigation Measures	Socio-economics		Cultural Resources	Infrastructure	Land and Marine Management	Tourism and Recreation Use						Fisheries		Marine Transportation	Aesthetics and Visual	Public Health and Safety	Noise	Air Quality and Greenhouse Gases
	Demographics	Regional Economy				Wildlife Observation	Hunting	Beach and Waterfront	Boating	Recreational Fishing and Stock Enhancement	Tourism	Commercial Fisheries, Processing, and Sales	Aquaculture, Processing, and Sales (and Shellfish Leases)					
Fueling, maintenance, and storage of construction vehicles and equipment within a designated vehicle staging area removed from any natural surface water resource or wetland. Vehicles and equipment would be inspected daily prior to leaving the storage area to ensure that no petroleum or oil products are leaking.															X			
Conducting preconstruction surveys for the presence of sensitive natural and cultural resources.			X			X								X				
Installation of protective buffers around sensitive wetlands, surface waters, and wildlife habitat. At a minimum, flagging or fencing sensitive resource areas adjacent to the action area would be employed to avoid accidental impacts.						X	X	X		X		X			X			
The use of an appropriate assemblage of species native to the action area or region, including trees, shrubs, and herbaceous species, would be used in the re-vegetation and restoration processes.						X	X							X				
Cultural resource monitoring of construction in the vicinity of the development			X												X	X	X	
Conducting records searches to determine the presence of known archaeological sites and historic structures within the area of potential effect. Identify the need for an archaeological and/or architectural survey. Conduct a survey, if needed.			X	X														
During all phases of the project, keeping equipment and vehicles within the limits of the initially disturbed areas. In addition, use existing roads to the maximum extent feasible to avoid additional surface disturbance.			X			X	X	X						X	X			
Restoration activities could utilize the Secretary of the Interior’s Standards for the Treatment of Historic Properties. Archeological deposits should be avoided or excavated, analyzed, and curated with the proper State or Federal repository.			X															
Construction workers and volunteers employed in the projects associated with restoration techniques would be adequately trained to ensure that impacts are minimized. Training may include but may not be limited to: understanding impacts to transportation and energy infrastructure.			X	X	X	X	X	X		X		X	X		X	X	X	
Local companies should try to work with project leads to establish construction work times that overlap with off season tourism schedules.		X								X								

Table A-2. Potential Site-Specific and Construction Mitigation Measures and BMPs: Benefits to the Human Environment.

Potential Mitigation Measures	Socio-economics		Cultural Resources	Infrastructure	Land and Marine Management	Tourism and Recreation Use						Fisheries		Marine Transportation	Aesthetics and Visual	Public Health and Safety	Noise	Air Quality and Greenhouse Gases
	Demographics	Regional Economy				Wildlife Observation	Hunting	Beach and Waterfront	Boating	Recreational Fishing and Stock Enhancement	Tourism	Commercial Fisheries, Processing, and Sales	Aquaculture, Processing, and Sales (and Shellfish Leases)					
Local companies and workforces should be used for construction or implementation the project if possible to support local economic benefits.		X																
Vocational training for out-of-work fisheries workers.		X									X	X						
Performing exploratory trenching			X															

Table A-3: Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs

Category	Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats				Living Coastal and Marine Resources											
		Upland Geology and Substrates	Nearshore Geology and Substrates	Freshwater Environments		Saltwater Environment Fish Resources		Wetlands	Barrier Islands	Beaches	Submerged Aquatic Vegetation (SAV)	Terrestrial, Coastal, and Riparian Habitat	Nearshore Benthic Communities	Oysters	Pelagic Microfaunal Communities	Sargassum	Finfish			Sea Turtles	Marine Mammals	Birds	Terrestrial Wildlife
				Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment										Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish				
BIRDS																							
Bald Eagle	If bald eagle breeding or nesting behaviors are observed or a nest is discovered or known, have all activities avoid the nest by a minimum of 660 feet. If the nest is protected by a vegetated buffer where there is <i>no</i> line of sight to the nest, then the minimum avoidance distance is 330 feet. Maintain this avoidance distance from the onset of breeding/courtship behaviors until any eggs have hatched and eaglets have fledged (approximately 6 months).																					X	
	If a similar activity (like driving on a roadway) is closer than 660 feet to a nest, maintain a distance buffer as close to the nest as the existing tolerated activity. If a vegetated buffer is present and there is no line of sight to the nest and a similar activity is closer than 330 feet to a nest, then maintain a distance buffer as close to the nest as the existing tolerated activity.																						X
	In some instances activities conducted within 660 feet of a nest may result in disturbance, particularly for the eagles occupying the Mississippi barrier islands. If an activity appears to cause initial disturbance, stop the activity and move all individuals and equipment away until the eagles are no longer displaying disturbance behaviors. Contact the USFWS's Migratory Bird Permit Office to determine how to avoid impacts or if a permit may be needed.																						X
Migratory Birds	Use care to avoid birds when operating machinery or vehicles near birds.																					X	
	During the project design phase, coordinate with the U.S. Fish and Wildlife and the State trust resource agency to site and design projects to avoid or minimize impacts to migratory bird nesting habitats or important feeding/loafing areas.																					X	
	Avoid working in migratory bird nesting habitats during breeding, nesting, and fledging (approximately Mid February to late August). If project activities must occur during this timeframe and breeding, nesting, or fledging birds are present, contact the State trust resource agency to obtain the most recent guidance to protect nesting birds or rookeries and their recommendations will be implemented.																						X
	Conservation areas may already be marked to protect bird nesting areas. Stay out of existing marked																						X

Table A-3: Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs

Category	Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats				Living Coastal and Marine Resources												
		Upland Geology and Substrates	Nearshore Geology and Substrates	Freshwater Environments		Saltwater Environment Fish Resources		Wetlands	Barrier Islands	Beaches	Submerged Aquatic Vegetation (SAV)	Terrestrial, Coastal, and Riparian Habitat	Nearshore Benthic Communities	Oysters	Pelagic Microfaunal Communities	Sargassum	Finfish			Sea Turtles	Marine Mammals	Birds	Terrestrial Wildlife	
				Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment										Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish					
	areas.																							
	If vegetation clearing is necessary, clear vegetation outside of migratory bird nesting season (approximately Mid February to late August) or have a qualified biologist inspect for active nests. If no active nests are found, vegetation may be removed. If active nests are found, vegetation can be removed after the nest successfully fledges.																							X
	Avoid driving over the wrack line or areas of dense seaweed, as these habitats may contain hatchlings and chicks that are difficult to see.																							X
	Install pointy, white, piling caps on exposed pilings to prevent bird roosting on piers, docks, and marinas.																							X
Piping Plover and Red Knot	Provide all individuals working on a project with information in support of general awareness of piping plover or red knot presence and means to avoid birds and their critical or otherwise important habitats.																							X
	Avoid working in designated critical habitat when piping plover are present (approximately late July through mid-May) or important wintering sites for red knots when they are present (contact U.S. Fish and Wildlife Service for red knot time frames and habitats) to the maximum extent practicable. If work must be conducted when individuals are present, avoid working near concentrations of individuals or post avoidance areas to minimize disturbance.																							X
	For projects that result in large scale habitat changes, coordinate early with the U.S. Fish and Wildlife Service to enhance or protect habitat features preferred by the species (inlet shoals, lagoons, washover fans, ephemeral pools, baysides and mud flats). Do not remove sand from intertidal, sand, or mud flats. Use dredged material to enhance adjacent emerged and submerged shoals and bayside habitats within and adjacent to project areas.																							X
	Minimize vegetation planting in preferred habitats and avoid removal of natural organic material ("wrack") year-around along the shoreline.																							X

Table A-3: Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs

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				Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment										Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish					
	Where possible replace footpaths or low-lying dune walkovers with improved walkovers that do not fragment the dune system. For dune walkover construction in Florida and Alabama, <i>follow the Conservation Measures for Dune Walkover Construction</i> (USFWS 2013).																							X
	Avoid vegetation removal, including scrub vegetation. If vegetation is damaged or removed during project implementation, plant appropriate native plants in the same location to minimize erosion and provide a food source for beach mice. If forage plants are reduced or limited in the project area, supplemental beach mouse food sources may be necessary.																							X
Manatee	In Florida, follow the most current version of the <i>Standard Manatee Conditions for In-water Work</i> available and the <i>Additional Conditions for Project In-water Activities in Manatee Habitat</i> (USFWS, 2011).																					X		
	For in-water work in other states (Alabama, Mississippi, Louisiana, and Texas) where manatees could be present, follow conditions b, c, and d of the <i>Standard Manatee Conditions for In-water Work</i> . Report any collisions to the U.S. Fish and Wildlife Service or State trust resource agency. Temporary signs, if necessary, can be modified from the Florida Fish and Wildlife Conservation Commission's template to reflect local conditions.																						X	
Bottleneck Dolphin	Follow the most current version of the <i>Measures for Reducing Entrapment Risk to Protected Species, Revised: May 22, 2012</i>																						X	
Marine Mammals	Follow the most current version of the <i>Vessel Strike Avoidance Measures and Reporting for Mariners NOAA Fisheries Service, Southeast Region, Revised February 2008</i> .																						X	
REPTILES																								
Reticulated Flatwoods Salamander	Avoid suitable habitat during all construction activities and do not permanently alter hydrology of the area. Avoid eliminating connectivity between suitable ponds.																							X
	Use silt fencing to prevent sedimentation or erosion of the project site into ponds.																							X
	If suitable habitat (including the approximately 1,500 buffer zone around breeding ponds) may be																							X

Table A-3: Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs

Category	Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats				Living Coastal and Marine Resources												
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				Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment										Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish					
	impacted, perform pre-project surveys within 2 miles of known breeding sites or assume the presence of reticulated flatwoods salamanders. Schedule work during the non-breeding season (summer) and maintain the natural contour of the ponds.																							
Eastern Indigo Snake	If suitable habitat or other evidence of Eastern indigo snake is discovered within the project area during site surveys, implement the most recent version of the U.S. Fish and Wildlife Service's <i>Standard Protection Measures for the Eastern Indigo Snake</i> .																							X
TORTOISES/TURTLES																								
Gopher tortoise	If suitable habitat is present, have a qualified biologist conduct surveys to identify any gopher tortoise burrows. If burrows are within the project area and cannot be avoided through establishing a protective buffer (size determined by U.S. Fish and Wildlife Service and the State trust resource agency), implement standard procedures to relocate the tortoise within the project site but away from the areas of construction or restoration or consider conservation banks. A Candidate Conservation Agreement with Assurances may be appropriate for project sites within the non-listed range of the species.																							X
Sea turtles – in water	Implement the following guidelines: <i>Sea Turtle and Smalltooth Sawfish Construction Conditions, Revised: March 23, 2006</i> and <i>Measures for Reducing Entrapment Risk to Protected Species, Revised: May 22, 2012</i> and <i>Vessel Strike Avoidance Measures and Reporting for Mariners NOAA Fisheries Service, Southeast Region, Revised February 2008</i> .																							X
Sea turtles – nesting beaches	In Florida and Alabama, avoid the use of vehicles and heavy machinery on nesting beaches during sea turtle nesting and hatching season (Approximately May through October).																							X
	If work must occur on nesting beaches during sea turtle nesting season (May through August), begin work with vehicles or machinery after 9:00 am local time to allow the sea turtle monitoring program to detect and mark new nests and assess the need to relocate sea turtle nests that could be affected by the project construction. Avoid marked nests by at least 10 feet.																							X
	If a sea turtle (either adult or hatchling) is observed, maintain at least 200 feet between the turtle																							X

Table A-3: Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs

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				Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment										Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish						
	“temporary” removal of plants and soil profile plugs (which include the A and B horizons) with the intent to replace to original location post construction as a last resort. Consider transplanting and seed banking only after all other options are exhausted.																								
	Enhance and protect plants on-site and adjacent habitats to the maximum extent possible.					X		X	X	X	X														
	Use only native plants for post project restoration efforts.					X		X	X	X	X														
Invasive species	Develop and implement a HACCP plan to prevent and control invasive species. Use (ASTM E2590 - 08) or other version of HACCP or other similar planning tool.					X	X	X	X	X	X														
	Implement an Integrated Pest Management (IPM) approach to facility design, sanitation, and maintenance to prevent and control invasive and pest species.					X	?	X	X	X	X														
	Inspect sites, staging, and buffer areas for common invasive species prior to the onset of work. Map any invasive species detected and note qualitative or quantitative measures regarding abundance. Implement a control plan, if necessary, to ensure these species do not increase in distribution or abundance at a site due to project implementation. Inspect sites periodically to identify and control new colonies/individuals of an invasive species not previously observed prior to construction.						X	X	X	X	X	X													
	Prior to bringing any equipment (including personal gear, machinery, vehicles or vessels) to the work site, inspect each item for mud or soil, seeds, and vegetation. If present, clean the equipment, vehicles, or personal gear until they are free from mud, soil, seeds, and vegetation. Inspect the equipment, vehicles, and personal gear each time they are being prepared to go to a site or prior to transferring between sites to avoid spreading exotic, nuisance species.						X	X	X	X	X	X													
	Place and maintain predator-proof waste receptacles in strategic locations during project implementation to prevent an increase in predator abundance. For projects designed to enhance or increase visitor use, maintain predator-proof waste receptacles for the life of the project.						X	X	X	X	X	X													
	Have the appropriate state agency inspect any equipment or construction materials for invasive species prior to use.						X	X	X	X	X	X													

Table A-3: Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs

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				Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment										Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish					
	Inspect and certify propagated or transplanted vegetation as pest and disease free prior to planting in restoration project areas.					X		X	X	X	X	X												
GENERAL CONSTRUCTION MEASURES																								
	<p>Guidelines:</p> <ul style="list-style-type: none"> - <i>Construction Guidelines in Florida for Minor Piling-Supported Structures Constructed in or over Submerged Aquatic Vegetation (SAV), Marsh or Mangrove Habitat.</i> U.S. Army Corps of Engineers/National Marine Fisheries Service August 2001 - <i>Key for Construction Conditions for Docks or Other Minor Structures Constructed in or Over Johnson's Seagrass (Halophila johnsonii).</i> National Marine Fisheries Service/U.S. Army Corps of Engineers October 2002 - <i>National Artificial Reef Plan (as Amended): Guidelines for siting, construction, development, and assessment of artificial reefs,</i> Revised February 2007 - <i>Guidelines for Marine Artificial Reef Materials</i> 1997 GSMFC Number 121 - <i>Bubble Curtain Specifications for Pile Driving</i> - <i>Assessment and Mitigation of Marine Explosives: Guidance for Protected Species in the Southeast U.S.</i> 					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Piling installation	Push pilings into soft, bottom substrate to reduce noise from installation; do not drive and hammer pilings into bottom substrate unless necessary for proper construction.																	X	X	X	X	X	X	
Protected species	Provide all individuals working on a project with information in support of general awareness of and means to avoid impacts to protected species and their habitats present at the specific project site.																		X	X	X	X	X	
	Survey for other at-risk or imperilled species. If found on site, contact the U.S. Fish and Wildlife Service and State trust resource agency to determine if avoidance or minimization measures or a Candidate Conservation Agreement with Assurances may be appropriate.					X	X	X	X	X	X													
Site maintenanc	Use the nearest, existing staging, access and egress areas, travel corridors, pathways, and roadways (including those provided by the State, local governments, land managers, trustee, or private					X	X	X	X	X	X										X		X	X

Table A-3: Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs

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		Upland Geology and Substrates	Nearshore Geology and Substrates	Freshwater Environments		Saltwater Environment Fish Resources		Wetlands	Barrier Islands	Beaches	Submerged Aquatic Vegetation (SAV)	Terrestrial, Coastal, and Riparian Habitat	Nearshore Benthic Communities	Oysters	Pelagic Microfaunal Communities	Sargassum	Finfish			Sea Turtles	Marine Mammals	Birds	Terrestrial Wildlife	
				Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment										Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish					
e and conduct	property owner, with proper permissions) and do not create new staging areas, access (except dune walk overs) or egress, or travel corridors through dune habitats.																							
	Limit driving on the beach for construction to the minimum necessary within the designated travel corridor—established just above or just below the primary “wrack” line. Avoid driving on the upper beach whenever possible, and never drive over any dunes or beach vegetation. Check with the U.S. Fish and Wildlife Service and State trust resource agency for additional specific beach driving recommendations in Florida and Alabama.					X			X	X											X		X	X
	Minimize construction noise to the maximum extent practicable when working near protected species and their habitats.																			X	X	X	X	
	Maintain or improve all lighting regimes. Methods include: working during daylight hours only, prohibiting lighting on dune walkovers, and using wildlife-friendly lighting where lighting is necessary for human safety.					X			X	X		X								X	X	X	X	
	Post signs at kiosks, ramps, and piers to provide visitors with information to avoid and minimize impacts to protected species and their habitats while recreating. Develop signs in coordination with National Marine Fisheries Service, U.S. Fish and Wildlife Service and the local State trust resource agency.					X		X	X	X	X								X	X	X	X	X	X
	Supply and maintain containers for waste fishing gear to avoid fish and wildlife entanglement.																X	X	X	X	X	X	X	X
Land and vegetation protection	Develop and implement an erosion control plan to minimize erosion during and after construction and where possible: use vegetative buffers (100 feet or greater), revegetate with native species or annual grasses, and conduct work during dry seasons.				X	X		X	X	X	X													
	Develop and implement a spill prevention and response plan, including: conducting daily inspections of all construction and related equipment to assure there are no leaks of antifreeze, hydraulic fluid, or other substances and cleaning and sealing all equipment that would be used in the water to rid it of chemical residue. Develop a contract stipulation to disallow use of any leaking equipment or vehicles.			X	X	X	X	X	X	X	X													

Table A-3: Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs

Category	Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats					Living Coastal and Marine Resources											
		Upland Geology and Substrates	Nearshore Geology and Substrates	Freshwater Environments		Saltwater Environment Fish Resources		Wetlands	Barrier Islands	Beaches	Submerged Aquatic Vegetation (SAV)	Terrestrial, Coastal, and Riparian Habitat	Nearshore Benthic Communities	Oysters	Pelagic Microfaunal Communities	Sargassum	Finfish			Sea Turtles	Marine Mammals	Birds	Terrestrial Wildlife	
				Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment										Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish					
	Prohibit use of hazardous materials, such as: lead paint, creosote, pentachlorophenol, and other wood preservatives during construction in, over, or adjacent to, sensitive sites during construction and routine maintenance.			X	X	X	X	X	X	X	X													
	Where landscaping is necessary or desired, use native plants from local sources. If non-native species must be used, ensure they are non-invasive and use them in container plantings.					X		X	X	X	X													
Wetland and aquatic protection	Complete an engineering design and post-construction inspection for projects where geomorphic elevations would be restored in wetlands, marshes, and shallow water habitats to ensure the success of the restoration project. Manage elevation of fill material to ensure projected consolidation rates were accomplished and that habitat suitable for wetland and marsh vegetation is developed.		X			X		X																
	Perform an engineering design and post-construction inspection for projects where geomorphic elevations are restored within wetlands, marshes, and shallow water habitats to ensure the success of the restoration project.		X			X		X																
	Avoid and minimize, to the maximum extent practicable, placement of dredged or fill material in wetlands.							X																
	Design construction equipment corridors to avoid and minimize impacts to wetlands to the maximum extent practicable.							X																
	To the maximum extent possible, implement the placement of sediment to minimize impacts to existing vegetation or burrowing organisms.					X		X				X												
	Place protective warning signs and buoys around at-risk habitats for infrastructure projects that could increase recreational uses in SAV or oyster areas.					X				X			X											
	Apply herbicide in accordance with the direction and guidance provided on the appropriate Environmental Protection Agency (EPA) labels and State statutes during land-based activities.				X	X		X	X	X	X													
	Only use suitable borrow sites (that do not contain <i>Sargassum</i> , SAV, or oysters) as dredging sites for sediment. Obtain sediments by beneficially using dredged material from navigation channels or by					X	X	X	X		X	X	X		X				X		X	X	X	X

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					Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment										Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish				
	accessing material from approved offshore borrow areas. Sediments must closely match the chemical and physical characteristics of sediment at the restoration site. Additionally, use target borrow areas within reasonable proximity to suitable sites for sediment placement.																							
	When local conditions indicate the likely presence of contaminated soils and sediments, test soil samples for contaminant levels, and take precautions to avoid disturbance of -or to provide for proper disposal of - contaminated soils and sediments. Evaluate methods prior to dredging to reduce the potential for impacts from turbidity or tarballs.					X	X	X	X	X	X													
	Perform maintenance of generators, cranes, and any other stationary equipment operated within 150 feet of any natural or wetland area, as necessary, to prevent leaks and spills from entering the water.					X	X		X	X	X													
	Designate a vehicle staging area removed from any natural surface water resource or wetland to perform fueling, maintenance, and storage of construction vehicles and equipment. Inspect vehicles and equipment daily prior to leaving the storage area to ensure that no petroleum or oil products are leaking.					X	X		X	X														
	Upon completion of construction activities, restore all disturbed areas as necessary to allow habitat functions to return. Create and manage public access developments to enhance recreational experience and educational awareness to minimize effects to habitat within wetland and shallow water areas and to the long-term health of related biological communities.					X	X		X	X		X												
	Incorporate containment levees for fill cells for projects using marsh creation or other barrier island restoration. Remove these containment levees after construction to allow for the restoration of nature tidal exchange.					X	X		X	X														
	Use silt fencing where appropriate to reduce increased turbidity and siltation in the project vicinity. This would apply to both on land and in water work.					X	X		X	X	X	X												
	Continue oyster and clam shell recycling programs to provide natural material for creating additional oyster reefs.						X						X											

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	Ensure shells to be introduced for reef creation are subjected to depuration in a secure open air area for a period of not less than 6 months.					X							X											
	Make all efforts to reduce the peak sound level and exposure levels of fish to reduce the potential impact of sound on fish present in the project areas.															X	X	X						
	Implement monitoring of restored oyster beds to evaluate success.					X							X											
	Use a vibratory hammer whenever possible to reduce peak sound pressure levels in the aquatic environment.														X	X	X	X	X					
	Use sound attenuation devices where practicable for pulse-noise (impact hammers) to reduce peak sound pressure levels in the aquatic environment.														X	X	X	X	X					
	Stipulate the timing of activities to avoid impacts to spawning fish and eggs/larvae.														X	X	X							
	Use BMPs to reduce turbidity, such as turbidity blankets, to reduce the potential impact of turbidity on finfish.				X	X	X								X	X	X							
	Screen water withdrawal pipes to minimize potential entrainment of fish from the withdrawal area. Have project proponents coordinate with NMFS to create an intake screen that would minimize potential impingement of fish.														X	X	X							
Aquaculture facilities	Treat effluent from aquaculture facilities to avoid dispersal of potential pathogens into receiving waters.				X	X																		
	Make sure that all aquaculture facilities and fish raised in those facilities meet fish health standards and are screened for pathogens prior to release into receiving waters.														X	X	X	X	X	X				
	Implement a genetics management plan that ensures maintenance of genetic diversity of native stocks of finfish in the Gulf of Mexico.														X	X	X							
	Develop and implement a stocking management plan prior to the release of hatchery-reared finfish.														X	X	X							

