

**DRAFT DAMAGE ASSESSMENT AND
RESTORATION PLAN AND
ENVIRONMENTAL ASSESSMENT
FOR THE
M/V FORTUNE EPOCH OIL SPILL
SAVANNAH, GEORGIA**

May 2nd, 2018

Prepared by:

The U. S. Fish and Wildlife Service
on behalf of the
U.S. Department of the Interior

and

The Georgia Department of Natural Resources

EXECUTIVE SUMMARY

An accidental discharge of oil from the Motor Vessel FORTUNE EPOCH in the vicinity of Savannah, Georgia occurred in November 2004 (Spill). The United States Fish and Wildlife Service and the Georgia Department of Natural Resources, acting as natural resource trustees (Trustees), determined that natural resources were injured as a result of the Spill. A damage assessment for natural resource injuries was conducted by the Trustees with participation from the Responsible Party (RP), the Fukunaga Kaiun Co. Ltd.

Based on the results of the natural resource damage assessment, a settlement agreement among the Trustees and the RP was reached and became effective on February 26th, 2018. From this agreement, \$620,894.64 was recovered to implement restoration actions to restore natural resources injured by the Spill.

The Trustees have developed a Draft Damage Assessment and Restoration Plan and Environmental Assessment (Draft DARP/EA) for the Spill. The Draft DARP/EA summarizes the Trustees' assessment of the natural resource injuries caused by the Spill and evaluates several potential restoration alternatives for the restoration of injured natural resources.

A proposed restoration alternative is identified in the Draft DARP/EA and involves the restoration of tidal exchange at several locations on Ossabaw Island, Georgia through the replacement of undersized culverts with adequately-sized bridges. In addition to evaluating the potential for the proposed restoration alternative to restore injured natural resources, the EA portion of the Draft DARP/EA is intended to satisfy the Federal Trustee's requirement to evaluate impacts to the human environment from the proposed restoration alternative identified in the document under the National Environmental Policy Act. The information presented in this Draft DARP/EA is available for public review and comment.

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1.0 INTRODUCTION

An accidental discharge of oil from the Motor Vessel (M/V) FORTUNE EPOCH in the vicinity of Savannah, Georgia occurred in November 2004 (Spill). A settlement agreement among the United States on behalf of the United States Fish and Wildlife Service (USFWS), acting as a natural resource trustee for the United States Department of Interior (DOI), the State of Georgia on behalf of the Georgia Department of Natural Resources (GADNR), and Fukunaga Kaiun Co. Ltd, the operator of the M/V FORTUNE EPOCH, regarding natural resource damages resulting from the Spill became effective on February 26th, 2018. From this agreement, \$620,894.64 was recovered to implement restoration actions to restore natural resources injured by the Spill.

This Draft Damage Assessment and Restoration Plan and Environmental Assessment (Draft DARP/EA) has been developed by USFWS and GADNR, acting as the natural resource trustees (Trustees) in a natural resource damage assessment (NRDA) for the Spill. This document summarizes the Trustees' assessment of the natural resource injuries caused by the Spill and evaluates several restoration alternatives for their potential to restore injured natural resources.

In developing this plan, the Trustees have acted in accordance with the NRDA regulations applicable to oil spills issued under the Oil Pollution Act of 1990 (OPA), 33 U.S.C. § 2701 *et seq.* set forth at 15 C.F.R. Part 990. Lastly, this document is intended to satisfy the Federal Trustee's requirement to evaluate impacts to the human environment from the proposed restoration alternative identified in the document under the National Environmental Policy Act (NEPA), 42 U.S.C. § 4321 *et seq.* and its implementing regulations, 40 C.F.R. Parts 1500-1508.

1.1 Authority

The Federal and State designated Trustees, under their respective authority and responsibilities for the natural resources injured as a result of the discharge of oil during the Spill under the Federal Water Pollution Control Act, 33 U.S.C. § 1251 *et seq.*, OPA, 33 U.S.C. § 2701 *et seq.*, and other applicable federal laws, including Subpart G of the National Oil and Hazardous Substances Pollution Contingency Plan, 40 C.F.R. 300.600 *et seq.* prepared this Draft DARP/EA. As a designated Trustee, each agency is authorized to act on behalf of the public to assess injuries to natural resources, recover damages, and plan and implement actions to restore natural resources and their associated services injured or lost as the result of a discharge of oil.

Section 1002(a) of OPA provides that each party responsible for a vessel or facility from which oil is discharged, or which poses a substantial threat of a discharge of oil, into or upon the navigable waters of the United States or adjoining shorelines, is liable for natural resource damages resulting from such actual or threatened discharges of oil (33 U.S.C. § 2702(a)). OPA Section 1006(d)(1) defines the measure of natural resource damages as the cost of restoring, rehabilitating, replacing or acquiring the equivalent of the injured natural resources, compensation for the diminution in value of those natural resources pending restoration, and the reasonable costs of assessing such damages (33 U.S.C. § 2706(d)(1)). Damages recovered, aside from those to reimburse assessment costs, are required to be spent to restore, rehabilitate, replace or acquire the equivalent of the injured resources in accordance with a restoration plan developed by the Trustees (33 U.S.C. § 2706(f)).

1.2 Trustee Determinations Supporting Development of this Restoration Plan

The Trustees' decision to conduct a NRDA for this Spill is based on and supported by certain determinations made by the Trustees pursuant to the NRDA regulations, i.e., the Determination of Jurisdiction to Pursue Restoration pursuant to 15 C.F.R. § 990.41 and the Determination to Conduct Restoration Planning pursuant to 15 C.F.R. 990.42. These determinations were set forth and described in a Notice of Intent to Conduct Restoration Planning (NOI) published on February 25, 2009 in *The Savannah Morning News*, a newspaper of large general circulation in and around Savannah, Georgia.

1.3 Coordination with Responsible Party

Under OPA, the responsible party (RP) for a vessel or facility from which oil is discharged is liable for the injuries to natural resources that result from the discharge. The OPA regulations require the Trustees to invite the RP to participate in the damage assessment process. Although the RP may participate, authority to make determinations regarding injury and restoration rests solely with the Trustees.

Fukunaga Kaiun Co. Ltd (a/k/a FSK Line, SA), the owner of the M/V FORTUNE EPOCH, was officially designated as the RP for the Spill. The Trustees invited the RP to cooperatively participate in the NRDA process in a December 2008 letter. Input from the RP was considered by the Trustees in assessing the natural resource injuries and service losses caused by this Spill. This coordination and cooperation between the Trustees and the RP helped avoid duplication of effort, allowed increased information sharing, and has made the process more cost-effective.

1.4 Public Participation

Section 1006(c)(5) of OPA requires the Trustees to involve the public in the restoration planning process (33 U.S.C. § 2706(c)(5)). The Trustees are providing the public with the opportunity to comment on this Draft DARP/EA. Any public comments received will be considered prior to adopting a Final DARP/EA. Affording opportunity for public comment is also consistent with NEPA and its implementing regulations at 40 C.F.R. Parts 1500-1508.

The NOI published in *The Savannah Morning News* on February 25, 2009, provided an early opportunity for the public to submit restoration ideas or alternatives for consideration by the Trustees in the development of the Draft DARP/EA. The NOI described the spill event, identified the Trustees involved, provided general information on the likely natural resource injuries, and invited input from the public regarding restoration alternatives that should be considered.

This Draft DARP/EA has been prepared by the Trustees to further inform members of the public about the nature and extent of natural resource injuries resulting from the Spill and to solicit comments directly from the public regarding a proposed restoration alternative.

This Draft DARP/EA is being made available for 30 days for public review. The Trustees will consider comments received during the public comment period prior to adopting a Final DARP/EA. A summary of the comments received and the Trustees' responses will be included in the Final DARP/EA. An additional opportunity for public review will be provided if public

comments on this Draft DARP/EA result in significant changes to the restoration alternative proposed herein.

The deadline for submitting written comments on this Draft DARP/EA is June 20th, 2018. Written comments may be submitted by mail or email to:

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Townsend, GA 31331
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1.5 NEPA Compliance

Actions undertaken by Trustees to restore natural resources or services under OPA and other federal laws are subject to the NEPA regulations at 40 C.F.R. Part 1500. Federal agencies contemplating implementation of a major federal action must produce an environmental impact statement (EIS) if the action is expected to have significant impacts on the quality of the human environment. When it is uncertain whether a contemplated action is likely to have significant impacts, federal agencies prepare an environmental assessment (EA) to evaluate the need for an EIS. If the EA demonstrates that the proposed action will not significantly impact the quality of the human environment, the agency issues a Finding of No Significant Impact (FONSI), which satisfies the requirements of NEPA, and no EIS is required. For a proposed restoration plan, if a FONSI determination is made, the Trustees may then issue a final restoration plan describing the selected restoration action(s).

2.0 PURPOSE AND NEED FOR RESTORATION

The purpose and need for restoration derives from the natural resource injuries and service losses that resulted from the discharge of oil from the M/V FORTUNE EPOCH in the vicinity of Savannah, Georgia. Under OPA, the RP is liable for these resource injuries. Restoration actions to compensate the public should restore, replace, rehabilitate, or acquire the equivalent resources or services.

2.1 Overview of the Incident

In the early morning of November 17, 2004, the M/V FORTUNE EPOCH was traveling outbound on the Savannah River when it lost power and drifted outside the safe navigation channel at Tybee Roads. Once power was restored, the M/V FORTUNE EPOCH proceeded to a safe anchorage approximately 16 kilometers (km) east of Tybee Island, Georgia. While anchored, the representative of the vessel's owner notified the U.S. Coast Guard National Response Center that fuel oil was leaking from the vessel's port side. On November 18th, divers surveyed the vessel and found cracks in the hull. Temporary patchwork to the damaged #2 port fuel tank and #4 port ballast water tank began the following day.

The vessel was estimated to be carrying 37,000 gallons of fuel oil, of which an estimated 6,800 gallons of Intermediate Fuel Oil (IFO-180) were released into mainly open waters over a period of five hours. A small amount of oil came ashore near the mouth of the Savannah River while the remaining visible oil moved south along the coast (Figure 1). The prevailing wind current

during that time was approximately five knots from a northeastern direction. Response activities included conducting survey flights, booming the vessel, lightering off the remaining fuel, skimming free-floating oil, shoreline assessment and clean-up, and oiled wildlife surveys and recovery. Response workers recovered approximately 75 gallons of liquid oil, 14 bags of oiled debris and oil patties from the water, and 26 bags of oiled debris from the shore.

Wildlife recovery efforts included aerial surveillance and on-shore and off-shore surveys via vehicles, on-foot, or by boats. By November 19th, response personnel had received reports of oiled birds. The organization Tri-State Bird Rescue and Research, Inc. was called to assist with the rehabilitation of injured wildlife. Field crews were instructed to retrieve all carcasses to ensure that wildlife impacts could be properly documented.

2.2 Natural Resources Present

Natural resources that were present, or might have been present, at the time of the Spill include both biotic and abiotic resources. Abiotic resources include mainly the nearshore marine waters off the Georgia coast (within 15 km from Tybee Island shoreline), but also the surface waters of the Savannah River estuary as well as the shorelines of Tybee and Wassaw Islands. Biological resources includes a wide variety of fish, shellfish, saltmarsh vegetation, birds and other organisms, including federally threatened and endangered species.

Several types of marine fish, shellfish, mammals and seabirds utilize the waters off the coast of Georgia. In the month of November (the month in which the Spill occurred), wintering and year-round resident gull species would be present in nearshore coastal waters along with other coastal bird species such as the black skimmer, brown pelican, double-crested cormorant, northern gannet and various terns. Pelagic bird species occur offshore much of the time, but can be seen from shore or near shore after several days of strong easterly winds. Also, wintering sea ducks utilize Georgia's marine coastal waters including black scoters, lesser scaup, surf scoters, horned grebes, canvasback, ruddy ducks, red-breasted mergansers, and common and red-throated loons. Marine mammals utilizing waters off of Georgia's barrier islands include striped and bottlenose dolphins while larger marine mammals such as the federally endangered North Atlantic right whale and the humpback whale, which has both federally threatened and endangered distinct population segments, generally move in marine waters further offshore. In the vicinity of the Spill location, there may be various fish species (or their supporting habitat) present that are managed under the Magnuson-Stevens Act. Shark species may use waters in the vicinity of the Spill location during various life stages. Also, live hard bottom habitat, managed under the Magnuson-Stevens Act as Essential Fish Habitat (EFH), may be present in the nearshore waters. These limestone outcrops serve as reef habitat for marine life such as coralline algae, sponges, hydroids, and various species of other invertebrates and coral (South Atlantic Fisheries Management Council 1998). The flora and fauna of these habitats attract other species managed under the Magnuson-Stevens Act such as coastal pelagic species (e.g., Spanish and king mackerel, cobia, and dolphinfish) and fishes of the snapper-grouper complex. A vast number of other marine fish and shellfish use the surrounding pelagic habitat during all or some of their life history. For example, white and brown shrimp release eggs into offshore waters where they hatch and develop into planktonic larvae.

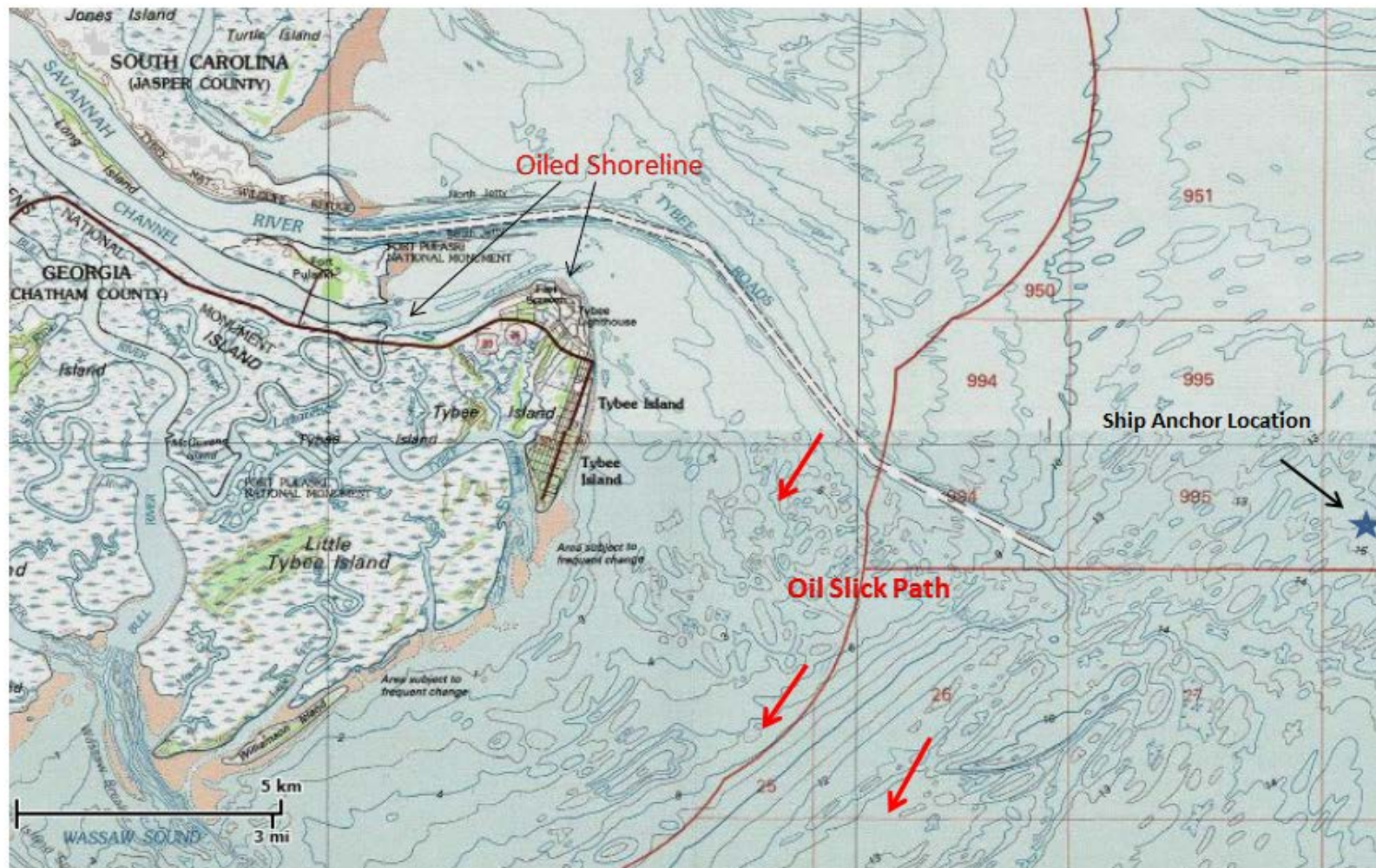


Figure 1. M/V Fortune Epoch Oil Spill Location

Closer to the mouth of the Savannah River, anadromous fish species such as American shad, hickory shad, blueback herring, and striped bass may be present by late fall, heading into open waters. Bay anchovy, Atlantic menhaden, Atlantic croaker, and spot are abundant fish species in the Savannah River estuary. The smooth cordgrass marsh lining the estuary also provides shelter and food for a wide variety of coastal fauna. Mummichogs are abundant within the marsh, as well as invertebrates such as the periwinkle, saltmarsh snail, and fiddler crab. Clapper rails, various egrets and herons, saltmarsh sparrows, raccoons, and mink forage on these lower trophic level species. The diamondback terrapin and the federally threatened West Indian manatee are also found within saltmarsh waters.

Georgia's coastal beaches and dunes provide important habitat for sea turtles and shorebirds. At the time of the Spill, the intertidal sand beaches would be providing foraging and roosting habitat for a great number of wintering shorebirds. Shorebirds such as the American oystercatcher and sanderling would be prevalent, feeding on a variety of invertebrate fauna. Other beach-roosting species that winter in Georgia include the ruddy turnstone, purple sandpiper, western sandpiper, short-billed dowitcher, and various plovers (piping, semipalmated, and black-bellied). The piping plover is a federally threatened species and sections of Georgia's barrier island beaches are designated as critical habitat for this species.

2.3 Natural Resources of Concern

The natural resources of primary concern related to the Spill are migratory birds. Although some oil came ashore on Tybee Island and proximate areas, causing light-to-moderate staining, shoreline clean-up and assessment teams were able to readily identify impacted areas and notify the clean-up strike teams. Shoreline collection efforts were downsized five days after the incident due to no further impact, although continuous monitoring and recovery efforts were maintained in conjunction with wildlife recovery. While some degree of offshore water column injury would have occurred from the release of the oil there were no documented injuries to marine fishes or mammals.

Over the course of a week and a half after the Spill, 41 oiled birds were recovered live and taken to an on-site rehabilitation center set up by Tri-State Bird Rescue and Research, Inc. Reconnaissance teams brought in birds from as far north as Hilton Head Island, South Carolina and as far south as Hird Island, Georgia. Of those recovered, 38 were common loons, two were northern gannets, and one was a brown pelican. Of that total, only three common loons were successfully rehabilitated and released. An attempted release of the brown pelican was unsuccessful. Twenty-four additional bird carcasses were recovered from the incident and sent to the National Fish and Wildlife Forensics Laboratory for necropsy. Of those, seven common loons and one northern gannet had evidence of oiled feathers. The carcasses of four oiled loons also had signs of predation and one oiled loon carcass had been extensively scavenged such that a cause of death could not be determined.

General species information on the three bird species known to be affected by the Spill is provided below.

2.3.1 Common Loon – General Information

Common loons are duck-like diving birds that have long pointed bills. They breed in freshwater habitats of Alaska and northern Canada, east to Iceland, and south to central Massachusetts, Montana, and California. Breeding territories are established on islands or large, deep lakes (generally larger than 24 hectares (ha)) in coniferous forest or on deeper tundra lakes (Evers et al. 2010). In winter, individual birds or loose flocks migrate to sea coasts (both Atlantic and Pacific) and some large inland lakes as far south as Northern Mexico. Within these coastal areas, birds prefer shallow inshore waters with protected bays and inlets. Their diet consists mainly of fish but they may supplement their diet with other items such as crustaceans, aquatic insects, leeches, and plant matter (Barr 1996, Ford and Gieg 1995, Gingras and Paszkowski 2006). The common loon is considered a suitable indicator species of aquatic integrity because of certain biological or behavioral aspects (e.g., high trophic-level feeder, relatively slow replacement rate, foraging preference for locations with high water clarity) and because it is highly observable and audible to humans (Evers et al. 2010).

The common loon is not a federally listed species, but it is protected by the Migratory Bird Treaty Act (MBTA). The loon's conservation status is considered of "Potential Concern" according to a recent American Bird Conservancy (ABC) study (ABC 2012). The "Potential Concern" category indicates that the species is currently safe, but may need more careful monitoring than those species that have no immediate major threats. Threats to this species include exposure to contaminants (particularly heavy metals such as lead and mercury), effects of acid rain at breeding ground habitats, entanglement in monofilament commercial fishing nets, coastal oil spills, human disturbance on breeding grounds, and disease (e.g., avian botulism, aspergillosis) (Evers et al. 2010).

2.3.2 Brown Pelican – General Information

The brown pelican is a coastal seabird that is large in size (weight range of approximately 2-5 kg) and has a long flat bill and an expansive throat pouch. Breeding range includes coastal areas along the Pacific coast (from southern California south to Ecuador), the Gulf of Mexico, and the Atlantic coast (from Maryland to Florida, through the West Indies to Venezuela). In nonbreeding periods, the range expands further north into central California on the Pacific coast and to New Jersey or Delaware on the Atlantic coast (Shields 2002). Nest sites are generally built on the ground on top of sand, shell, or vegetation, but in some locations they nest on cliffs or will build nesting platforms in trees (Shields 2002). This species forages by plunge-diving in shallow inshore waters, estuaries, and bays, and its diet is comprised mostly of fish (e.g., menhaden or mullet) (Shields 2002).

The brown pelican is not a federally listed species, but it is protected by the MBTA and is listed as a State Species of Concern in Georgia. It has been given a Georgia state ranking of 'S2' or 'Imperiled' because there are generally few available nesting sites in any given year. Also, for those birds that are successful in establishing nesting sites, nesting success is diminished by factors such as storms, overwash, predation, and brood parasitism from other colonial nesters. According to the ABC study, the brown pelican's conservation status is of "Potential Concern" (ABC 2012). Current threats to this species include oil spills, human disturbance or intentional acts of harm to birds or eggs at nesting and roosting sites, degradation of habitat, and entanglement in fishing gear (Shields 2002).

2.3.3 Northern Gannet – General Information

Northern gannets are large (approximately 2-3 kg) seabirds with long necks and long, pointed bills. This species spends the majority of time at sea over continental shelves on both sides of the Atlantic Ocean and west along the Gulf Coast. It primarily breeds in large colonies on cliffs and offshore islands. In North America, three breeding colonies occur in the Gulf of St. Lawrence and three occur on the Atlantic coast of Newfoundland. Its diet is comprised mainly of large-bodied, surface schooling fish such as mackerel and herring (Mowbray 2002).

The northern gannet is not a federally listed species, but it is protected by the MBTA and according to the ABC study, its conservation status is of “Potential Concern” (ABC 2012). Current threats to this species include intentional acts of harm by humans, environmental pollution, entanglement in fishing line, and degradation of habitat (Mowbray 2002).

3.0 ASSESSMENT STRATEGY

3.1 Injury Assessment Overview

The goal of injury assessment under OPA is to determine the nature and extent of injuries to natural resources and the services they provide. Such assessment provides a technical basis for evaluating the need for, type of, and scale of restoration actions. Injury is defined by OPA regulations as an observable or measurable adverse change in a natural resource or impairment of a natural resource service (15 C.F.R. Part 990.30). Once there is a determination that a resource is injured, the injury must be quantified. The injury quantification process determines the magnitude and temporal extent of injury.

3.2 Injury Determination and Quantification

The Trustees determined that there were injuries to migratory birds due to the Spill. As stated in Section 2.3 above, oiled birds were collected during the spill event. Oiling of a bird’s feathers can cause loss of insulating and water-repellent properties, resulting in death by hypothermia, starvation, or drowning. Also, birds may attempt to remove the oil from feathers by engaging in preening behavior, which leads to oil ingestion. Ingestion of oil can cause a variety of sub-lethal effects including anemia, intestinal irritation, liver and kidney damage, altered blood chemistry, altered hormone levels, impaired osmoregulation, and decreased production and viability of eggs (Crocker et al. 1974, Miller et al. 1978, Ohlendorf et al. 1978, Stickel and Dieter 1979, Peakall et al 1981, Clark 1984, and Fry and Lowenstine 1985).

Impacts to three bird species were documented. The majority of documented individual birds that were impacted were common loons. Therefore, the Trustees decided to use this species as the focal species for injury quantification. For estimation of bird mortalities, the Trustees and the RP agreed to use a multiplier of six to account for an estimated number of birds that were presumed to have been injured as a result of the Spill but which could not be located and accounted for due to various reasons (e.g., scavenged by predators, movement away from shore with tidal current, low searcher efficiency, sinking of oiled carcasses). As a result, 240 birds were estimated to have been injured as a result of the Spill.

To quantify the loss of these birds, and the future generations that would have been produced had the Spill not occurred, the Trustees used a Resource Equivalency Analysis (REA) model

(adapted from Unsworth and Bishop 1994). A REA model is comprised of two steps: 1) the quantification of natural resource service losses and 2) the quantification of the natural resource services provided by potential compensatory restoration projects. For this incident, natural resource services are represented in bird-years (see Sperduto et al. 2003 for a similar REA model). The Trustees obtained data from scientific literature for the biological inputs for the REA model (e.g., number of reproductive years for an adult female loon, number of loon chicks typically produced, and survivability of fledglings). The REA model results indicated that direct bird losses (bird mortality directly resulting from the Spill) equaled 1,565.45 bird-years and indirect bird losses (loss of fledgling production resulting from direct bird mortality) equaled 505.32 bird-years, for a total of 2,070.77 lost bird-years (Peacock 2009).

4.0 RESTORATION ALTERNATIVES

4.1 Restoration Strategy Overview

The Trustees' primary goal is to implement restoration that compensates for natural resource injury that resulted from the Spill. Acceptable restoration actions include any of the actions authorized under OPA, meaning any action, or combination of actions, to restore, rehabilitate, replace, or acquire the equivalent of injured natural resources and services (15 C.F.R. 990.41). Trustees are required to consider a reasonable number of possible restoration alternatives. Restoration alternatives were evaluated based on multiple factors including:

- 1) The cost to carry out the alternative;
- 2) The extent to which each alternative is expected to meet the Trustees' goal of compensating for natural resource service losses;
- 3) The likelihood of success of each alternative;
- 4) The extent to which each alternative will avoid further natural resource injury;
- 5) The extent to which each alternative benefits more than one natural resource and/or service; and
- 6) The effect of each alternative on public health and safety.

Restoration actions under OPA are termed primary or compensatory. Primary restoration is any action taken to enhance the return of injured natural resources and services to their baseline condition, while compensatory restoration is any action taken to compensate for interim losses of natural resources and services pending recovery.

The Trustees expect that affected migratory birds have or will return to baseline conditions through the natural reproductive process in a reasonable amount of time. Therefore, the Trustees believe natural recovery will achieve primary restoration. The Spill however, caused a certain amount of interim losses, which are losses incurred between the incident and a return to baseline, that are not compensated by natural recovery. Compensatory restoration is necessary to address these interim losses.

The restoration alternatives considered by the Trustees are described below.

4.2 Restoration Alternatives

4.2.1 Alternative 1: No Action

NEPA requires the Trustees to consider a no action alternative, and the OPA regulations require consideration of a roughly equivalent natural recovery alternative. Under this alternative, the Trustees would take no direct action to restore injured natural resources or to compensate for lost services. The interim losses resulting from the Spill would not be compensated through the no action alternative. For this reason, this alternative is not proposed.

4.2.2 Alternative 2: Fund Efforts to Rehabilitate Loons or Other Seabirds

This alternative would provide funds to existing bird rehabilitation centers for the care and medical needs of loons (or other seabirds) suffering from various diseases and injuries such as gunshot wounds and entanglement in fishing gear (but generally not oil-spill related effects as that is already a legal requirement of responsible parties). It would be predicted to result in some level of improvement in the number of individual birds rehabilitated and released each year.

Diving birds (such as loons), however, have a unique physiology that poses several challenges when attempting to keep them in captivity under treatment for long periods. According to Russell et al. (2003), diving birds have difficulty standing for long periods of time because their legs are located more to the posterior end of their bodies. As a result, birds will tend to sit. In this posture, the majority of their weight gets placed on either their keels, resulting in keel sores, or on their hocks, resulting in hock swelling. Diving birds can also suffer from foot lesions (from the drying and cracking of sensitive webbed feet). While new devices have been designed to improve the resting condition and posture of birds that cannot be placed immediately back into the water (Russell et al. 2003), birds that require long-term treatment will still suffer from some degree of bruising.

As described above, the rehabilitation of diving birds is challenging and the likelihood of success and the magnitude of potential benefits are uncertain. For these reasons, this alternative is not proposed.

4.2.3 Alternative 3: Fund Research for Seabird Bycatch Reduction Techniques

This alternative would provide funds for the continuation of research into finding effective techniques that would reduce incidental capture and mortality (bycatch) of loons and other seabirds. Commercial fishing gear, such as longlines and gillnets, are significant sources of incidental mortalities for different types of marine vertebrates, including seabirds (National Marine Fisheries Service 2011). From 1996 to 2007, yearly estimates of gillnet bycatch off the mid-Atlantic coast for common loons ranged from 107 to 1294 individuals per year, and for red-throated loons, the estimates ranged from 135 to 1567 individuals per year (Warden 2010). The North American Waterbird Conservation Plan (Kushlan et al. 2002) suggests that “bycatch reduction should be achieved through development and deployment of multifaceted mitigating measures, and outreach, education, and training programs within the affected fisheries and consumer groups.” Werner et al. (2006) and Cox et al. (2007) listed several experimental studies for seabird bycatch reduction techniques and provided examples of successful achievement in reducing numbers of incidental take. However, which type(s) of bycatch reduction measures would be most effective for protecting seabirds is still unclear, as efficacy is likely dependent on the target species. Few studies in the past have examined reduction methods specifically for

loons. For trap nets used in freshwater lakes in upper mid-western states, loon excluder nets (ones that have a larger ceiling mesh size so that loons trapped at the water surface can escape) can reduce catch and mortality (Christiansen and Robinson 1997). However, in coastal waters gillnets pose a different logistical challenge. A recent study by Warden (2010) addresses this issue and provides some ideas for potential engineering solutions. Warden (2010) used gillnet fisheries observer data off the Atlantic coast (1996 to 2007) to predict common and red-throated loon bycatch rates and investigate gear characteristics associated with high bycatch rates. Her data analyses indicated that gill nets deployed in a way that allows for space between nets (thereby allowing birds to pass through the net string) may lower bycatch, although haul and soak durations may also be equally important factors. This study is valuable in providing a direction for future work in developing bycatch engineering solutions for loons, but it is clear that additional data collection and research needs to be conducted.

Identification of fisheries techniques or gear adjustments that could significantly reduce bycatch would be clearly beneficial for seabird populations. However, because there are still large data gaps that need to be addressed through scientific study, it is difficult to predict 1) when there might be actual benefits to future seabird populations and 2) how to quantify those benefits. Also, since gill netting (which has been shown to have high loon bycatch) is limited off the coast of Georgia, project gains would likely not benefit loon populations that typically winter in areas proximate to the Spill location. Lastly, Trustee oversight and monitoring costs would be large due to the fact that the project would not be implemented in Georgia. For these reasons, this alternative is not proposed.

4.2.4 Alternative 4: Reducing Bird Mortality from Lead Tackle

This alternative would fund outreach efforts aimed at educating anglers about the impact of lead fishing tackle on loons and other wildlife. The goal is to reduce lead-related wildlife mortalities by persuading the angler community to abandon the use of lead tackle and switch to alternative types of lead-free tackle.

Species assessments for the common loon have identified lead poisoning as a current threat (Evers 2007). For loons, lead ingestion is a common hazard since they forage for digestive aids such as small grit and pebbles at the bottom of lakes where lost tackle gets deposited. Loons may also ingest lead by swallowing fish with fishing gear still attached. Lead poisoning negatively affects the loon's physiology and disrupts nerve impulse transmission within the nervous system, resulting in abnormal behaviors such as head-shaking, open-mouth breathing, wing and eye droop, disorientation, and lethargy (Sidor et al. 2003). Ingestion of even a small amount of lead (one or two pieces of lead fishing tackle, such as a 0.5 - 15 g sinker or jig) is enough to kill an adult loon (Twiss and Thomas 1998). In a study conducted in New England, necropsy results indicated that confirmed and suspected lead toxicosis accounted for nearly half of the mortality observed in breeding common loons between 1987 and 2000 (Sidor et al. 2003). In Wisconsin between 2006 and 2008, 26 common loons were submitted for necropsy and approximately 30% were determined to have died from lead poisoning (Strom et al. 2009). In Canada, 27% of dead adult loons (out of a total of 185) were determined to have died due to lead toxicosis during an approximate period between 1983 and 1998 (Twiss and Thomas 1998).

The success of outreach efforts to alter angler behavior is unknown and the expected benefits per unit cost and/or effort are also unknown. Also, this type of outreach would be less effective in

benefiting loons in Georgia's coastal areas as loons are generally only found wintering at off-shore locations. To have a significant impact, outreach funds would have to be spent at inland lakes where these birds nest and forage during the spring/summer periods, i.e. Canada or upper mid-western states such as Wisconsin and Minnesota (Kenow et al. 2002). Implementation, oversight, and monitoring of this alternative by the Trustees at out-of-state locations would be labor-intensive and costly. For these reasons, this alternative is not proposed.

4.2.5 Alternative 5: Purchasing or Protecting Seabird Nesting Habitat

This alternative would involve purchasing or protecting breeding ground habitat for seabirds. The goal of this alternative would be to promote successful fledging of chicks, thereby increasing overall loon populations to replace birds injured by the Spill. Since the majority of birds injured in the Spill were common loons, the target habitat for protection would be shorelines along inland lakes in Canada or in upper mid-western states since loons wintering off the south Atlantic coast have been documented as migrating from those areas (Kenow et al. 2002).

Protecting breeding habitat from development would assist in fulfilling the need for improved breeding habitat quality that has been mentioned in several conservation plans for the common loon (Evers 2007, Tischler 2011). Shoreline development in breeding ground areas may lead to an increased human presence and an increase in predator densities, shoreline erosion, loss of supporting vegetation for nesting and cover, and impacts to water quality which may result in changes in prey and plant communities (Evers 2007, Tischler 2011). Meyer (2006) showed that loon pair presence and reproductive success was negatively impacted when shoreline building densities exceed 25 buildings per km of shoreline. Also, Titus and VanDruff (1981) reported reproductive losses for loons resulting from disturbance by human-related recreational activities. When birds are repeatedly flushed off their nests, eggs are often subject to abandonment and/or predation, or are accidentally rolled into the water by the flushing movements of the nesting bird (Titus and VanDruff 1981).

Considering the relatively large size of a loon nesting territory, protecting a sufficient amount of lakeshore breeding habitat to produce benefits would be a costly alternative. The size of a loon nesting territory varies due to several factors (e.g., food source availability, the presence of predators), but part of the reason for large territories may be because as loon densities increase, there tends to be increases in divorce rates and declines in reproductive success (Evers 2007). In Wisconsin, Strong and Baker (2000) found that the mean number of loons per lake ranged from one-half on 4 to 19 ha lakes to close to three loons on lakes greater than or equal to 202 ha. The Trustees for the 1996 North Cape Oil Spill estimated a protection requirement of 1,911 m linear shoreline per nest in their 1999 Restoration Plan and Environmental Assessment (NOAA, RI DEM, USDOJ, and USFWS 1999). At that time, the average cost for sites in New England were at an estimated \$158,000 per nest site. However, Meyer (2006) reported that vacant land on some lakes in Wisconsin was selling as high as \$1,500 - \$2,000 per linear foot of lake frontage and up to \$250,000 for vacant parcels on some lakes. In Minnesota, mean lakeshore property sales prices in 1996-2001 averaged between \$434 and \$959 per frontage foot (Krysel et al. 2003). It is reasonable to assume that current costs are significantly higher than these outdated estimates.

This project could produce direct benefits by supporting loon reproduction. However, this project may be more costly relative to other alternatives due to high costs for land acquisition. Also,

since this project would have to be implemented in out-of-state locations, Trustee oversight and monitoring of this alternative would be more costly and more difficult than for projects that could be implemented in-state. While this alternative would likely supplement the adult loon population that eventually migrates to the southeastern region for the winter, this alternative does not address threats to survival for wintering adult loon populations off the southeastern Atlantic coast. For these reasons, this alternative is not proposed.

4.2.6 Alternative 6 (Proposed Alternative): Saltmarsh Restoration on Ossabaw Island to Enhance Production of Seabird Wintering Prey Base

This alternative would restore saltmarsh areas that are hydrologically-restricted, thereby providing better quality habitat for the production and transport of seabird prey items. This project would enhance the tidal exchange into saltmarsh habitat that is currently restricted by undersized culverts. Specific culverts would be removed and replaced with adequately-sized bridges. The bridges will have greater capacity to allow tidal exchange to occur. Also, the scouring effects observed adjacent to the culverts would decrease with the installation of the bridges. Restoring saltmarsh areas by enhancing the hydrology and tidal flow would benefit loons, and other seabirds, by 1) improving the habitat conditions of saltmarsh areas that serve as the nursery grounds for prey items (e.g., fish, crustaceans, other invertebrates) and 2) widening and reshaping the hydraulic channel currently restricted by the culverts, thereby improving the transport of those prey items from the saltmarsh to seabird foraging locations along Georgia's coast.

This restoration alternative would compensate for natural resource injuries resulting from the Spill by benefiting adult loon populations and other seabirds that migrate to the Southeast Atlantic coast to survive winter months. Enhancing the production and transport of food resources to wintering loons and other seabirds will support their survival and long-term stability. This restoration alternative should also aid in lessening the impacts of emaciation syndrome, a term used to describe large loon die-offs where the common condition is emaciation, but which may originate from several, synergistic abiotic and biotic stress-causing factors (Forrester et al. 1997, Evers et al. 2010). Wintering loons may be particularly vulnerable to this syndrome due to depletion of energy reserves after migration and molting of flight feathers. During the molting process, loons will also undergo periods of flightlessness thereby restricting foraging capabilities. Habitat stability with adequate food resources, therefore, is particularly critical for survival during this period (Spitzer 1995). Marsh production of forage fish such as Atlantic menhaden is also of significance because emaciation syndrome has been partially attributed to an increase in salt-intake and higher parasite loads from dietary switches to crustaceans when fish are less abundant (Forrester et al. 1997). This project would provide greater transport of forage food for loons during periods when foraging mobility is restricted and energy reserves are low.

Priority saltmarsh restoration sites have been identified on Ossabaw Island. Ossabaw Island (Figure 2) is one of Georgia's thirteen barrier islands and is located within Chatham County. It was purchased by the State of Georgia in May 1978 and was declared as Georgia's first Heritage Preserve with an agreement that Ossabaw Island would "only be used for natural, scientific and cultural study, research and education, and environmentally sound preservation, conservation and management of the Island's ecosystem." Although it is cooperatively managed by three entities (the GADNR -Wildlife Resources Division (WRD), the Ossabaw Island Foundation, and the West Life Estate), WRD has the responsibility for the management and educational use of Ossabaw's natural, cultural, historic and archaeological resources. The island has just over 4,269

ha of upland and over 5,989 ha of tidally influenced saltmarsh¹. The natural environment is comprised of three distinct ecosystem communities: beaches and dunes, maritime forest, and saltmarsh/estuarine. The island holds a diversity of wildlife species, including several federally listed species (described in section 5.1.2.3). Two mixed-species wading bird rookeries exist on the island and several species of coastal shorebirds utilize Ossabaw Island's beaches.

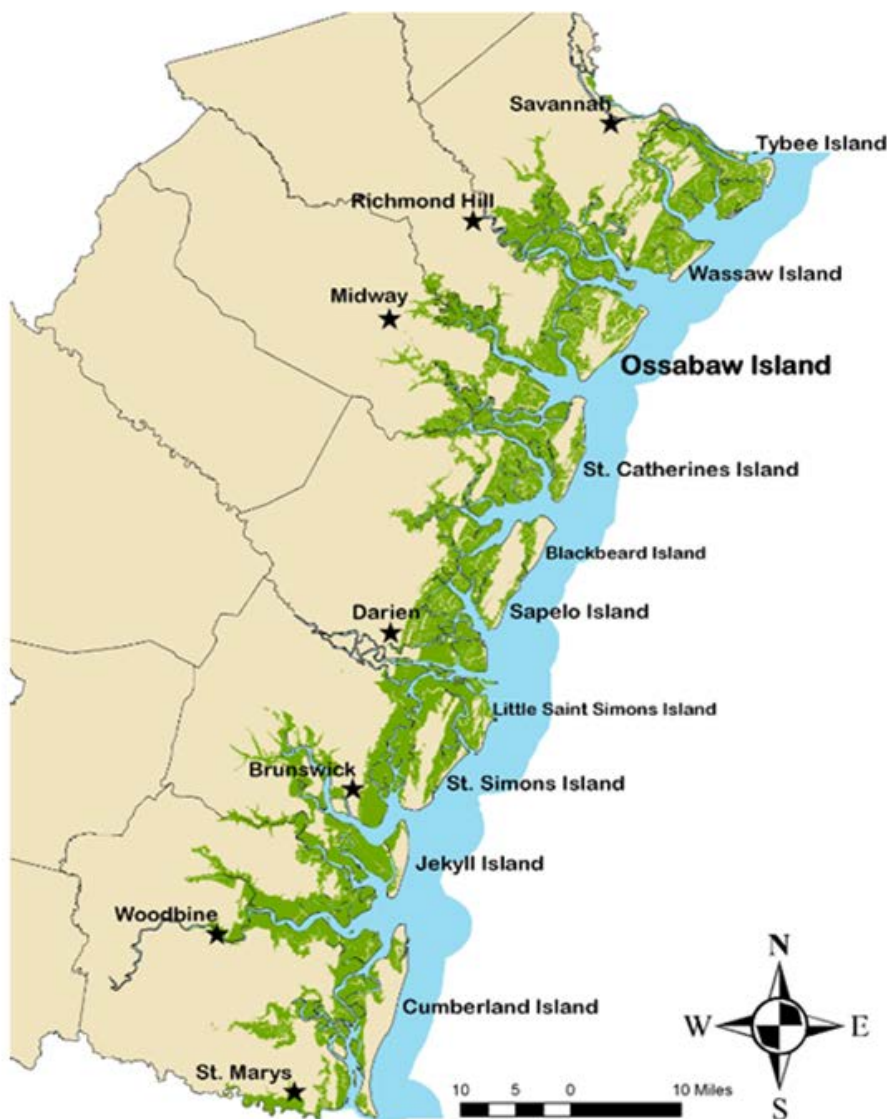


Figure 2. Location of Ossabaw Island Along Georgia's Coast

Three sites on Ossabaw Island have been identified for saltmarsh restoration through an increase in tidal exchange by replacing undersized culverts with adequately-sized bridges. Site 1

¹ Area estimates were determined from a digitized vegetation community habitat map created by GADNR in 2010.

(31.76202N, 81.14149W) is just southeast of the island's hunt camp on the mid-west side of the island, Site 2 (31.75507N, 81.12827W) is just over 1 km southeast from site 1 (Figure 3), and Site 3 (31.77689N, 81.10485W) is north of Sites 1 and 2, and is located at the mid-center of the island (Figure 4). The estimated area of the saltmarsh habitat that will be restored for each of the three sites is 10, 6, and 64 ha, respectively².



Figure 3. Proposed Restoration Sites 1 and 2 on Ossabaw Island

² Restored area estimates were calculated by GADNR using geographic information system software to compare 2006 aerial imagery to 1942 imagery, and then calculated the anticipated vegetation response to reestablished natural tidal flow for the areas currently restricted by undersized culverts.



Figure 4. Proposed Restoration Site 3 on Ossabaw Island

Construction activities at the sites include removing the existing plastic culverts and timbers under the roadway, the excavation of a small section of the causeway, and the construction of timber bridges as replacements. The replacement bridges will be designed to support the crossing of excavators and dump trucks. Preliminary bridge designs indicate that bridges will be approximately 4 m in width. Bridge length may vary at each site but is approximated to be 12 m, 15 m and 20 m at Sites 1, 2, and 3, respectively. Supporting timber piles (approximately 3 m high) will be located every 3 m and there will be 1.5m wing walls on either side. Overall, the construction footprint in the saltmarsh varies depending on bridge length but is estimated to approximately 92 m², 116 m², and 154 m² for bridge Sites 1, 2, and 3, respectively. Once the bridges are installed, it is expected that there will be an increased tidal flow to approximately 6, 10 and 64 ha of saltmarsh at Sites 1, 2, and 3, respectively. Restoration monitoring will be conducted pre- and post-construction. Monitoring may include an evaluation of plant community changes, water quality, and hydrologic changes.

The proposed alternative is consistent with restoration needs listed in environmental

management plans such as the 2001 Ossabaw Island Comprehensive Management Plan (GADNR 2001) and GADNR's 2005 Comprehensive Wildlife Conservation Strategy (GADNR 2005). Specifically, in the Ossabaw Island Comprehensive Management Plan, the Ecology and Natural History Subcommittee made the following recommendation regarding wetlands (p. 28):

“Roads over culverts restricting water flow into estuarine areas should be evaluated for importance.....Bridges or multiple culverts should be considered to replace the more restrictive culvert design on heavily used roads. This recommendation was also supported by the Management subcommittee.”

In GADNR's 2005 Comprehensive Wildlife Conservation Strategy, Ossabaw Island is listed as a 'High Priority Site' for the Southern Coastal Plain Ecoregion. Also, 'Estuarine and Inshore Marine Waters' are listed as high priority habitats because they serve as nursery grounds for many species of fish and shellfish and are considered habitat for marine mammals such as the federally threatened West Indian manatee. Under "Conservation Goals" for this ecoregion, it is stated (p. 157):

“Encourage restoration of important wildlife habitats through reintroduction of prescribed fire, hydrologic restoration, and revegetation efforts.”

The natural resource service gains from the proposed alternative were evaluated using the REA model described in Section 3.2. The expected benefits of the restoration actions to loons and other seabirds would be the production and transport of prey necessary to support the survival of adult wintering seabirds. The model quantified the natural resource services that would be gained by conducting the proposed restoration actions. The Trustees used data from scientific literature for model inputs such as annual secondary production for local saltmarshes (Kneib 2003, Dr. Dennis Allen, University of South Carolina, personal communication 2010) and common loon consumption rates (Barr 1996, Fournier et al. 2002, Fournier et al. 2007). The Trustee-calculated bird-year gain from restoration of the three Ossabaw Island sites is 1,650.94 bird-years. Although this estimated bird-year gain is less than the total Trustee-estimated 2,070.77 bird-years lost as a result of the Spill, the proposed restoration alternative does offset the Trustee-calculated 1,565.45 bird-years lost from direct mortality and the Trustees and RP agreed that the proposed saltmarsh restoration projects on Ossabaw Island are a suitable alternative to address natural resource injury from the Spill and that funds from the settlement agreement described in Section 1.0 should be used to implement the proposed restoration alternative.

5.0 ENVIRONMENTAL ASSESSMENT

5.1 NEPA Evaluation

As noted in subsection 1.5, NEPA requires federal agencies to produce an environmental impact statement (EIS) if they are contemplating implementation of a major federal action expected to have significant impacts on the quality of the human environment. NEPA defines the human environment comprehensively to include the “natural and physical environment and the relationship of people with that environment” (40 C.F.R. § 1508.14). All reasonably foreseeable direct and indirect effects of implementing a project, including beneficial effects, must be evaluated (40 C.F.R. § 1508.8). Federal agencies prepare an environmental assessment (EA) to

consider these effects and evaluate the need for an EIS. If the EA demonstrates that the proposed action will not significantly impact the quality of the human environment, the agency issues a Finding of No Significant Impact (FONSI), which satisfies the requirements of NEPA, and no EIS is required.

In accordance with NEPA, an EA is integrated into this Draft DARP/EA. The EA details an evaluation of the expected effects of the proposed alternative on the quality of the human environment. This section of the Draft DARP/EA evaluates the potential impacts of both Alternative 1 – No Action Alternative, and the proposed alternative, Alternative 6 – Saltmarsh Restoration on Ossabaw Island to Enhance Production of Seabird Wintering Prey Base.

5.1.1 Physical Environment Impacts

5.1.1.1 Air Quality Impacts

5.1.1.1.1 No Action Alternative

The No Action Alternative would not result in any air quality impacts since no restoration actions would be undertaken.

5.1.1.1.2 Saltmarsh Restoration on Ossabaw Island

The restoration of saltmarsh habitat on Ossabaw Island through the replacement of undersized culverts to allow greater tidal flow and inundation should not have a significant impact on air quality. Increased emissions from construction-related machinery would be expected, but these emissions would be short-term and minor and should not have an impact on the human environment outside of the restoration site.

5.1.1.2 Hydrological Impacts

5.1.1.2.1 No Action Alternative

The No Action Alternative would not result in any hydrological impacts since no restoration actions would be undertaken.

5.1.1.2.2 Saltmarsh Restoration on Ossabaw Island

The restoration of saltmarsh habitat on Ossabaw Island would have a significant impact on tidal hydrology at the site. Increasing tidal flow into the saltmarsh through the removal of culverts that are currently restricting flow is the primary objective of this alternative. The effects of this altered hydrology are expected to be long-term and beneficial, as it will support increased biological productivity within the restored saltmarsh habitat. The expected changes in hydrology should not have an impact on the human environment outside of the restoration site.

5.1.1.3 Water Quality Impacts

5.1.1.3.1 No Action Alternative

The No Action Alternative would not result in any water quality impacts since no restoration actions would be undertaken.

5.1.1.3.2 Saltmarsh Restoration on Ossabaw Island

The restoration of saltmarsh habitat on Ossabaw Island is expected to impact water quality in the restored saltmarsh habitat. Currently, the restricted tidal exchange in the areas to be restored

limits the flushing of nutrients from the existing marsh. Increasing tidal exchange in the habitat to be restored through the replacement of the undersized culverts is expected to produce long-term and beneficial impacts by allowing greater nutrient flushing to occur. Some adverse impacts to water quality may be observed through increased turbidity and/or suspended sediment as a result of the construction activities related to the restoration actions. Such adverse impacts are expected to be temporary and minor. The expected eventual improvement in water quality in the marsh would have beneficial impacts on the human environment by better supporting fish and wildlife resources that would be available for active (fishing) or passive (observing) recreation for the public.

5.1.1.4 Sediment Quality Impacts

5.1.1.4.1 No Action Alternative

The No Action Alternative would not result in any sediment quality impacts since no restoration actions would be undertaken.

5.1.1.4.2 Saltmarsh Restoration on Ossabaw Island

The restoration of saltmarsh habitat on Ossabaw Island is expected to have an impact on sediment quality in the restored saltmarsh habitat. Adverse impacts to sediments through disturbance are expected during construction activities. These adverse impacts are expected to be short-term and moderate. Increasing tidal exchange will allow for a more natural cycle of sediment movement and deposition, which is considered beneficial. Additionally, the scouring effects currently observed on sediments adjacent to the undersized culverts would be alleviated by replacing the culverts with adequate-sized bridges. Beneficial impacts to sediment quality are expected to be long-term. The expected improvement in sediment quality in the marsh would have beneficial impacts on the human environment by better supporting fish and wildlife resources that would be available for active (fishing) or passive (observing) recreation for the public.

5.1.1.5 Prime Agricultural Lands

There are no known prime agricultural lands in the vicinity of the restoration sites on Ossabaw Island.

5.1.2 Biological Impacts

5.1.2.1 Vegetation

5.1.2.1.1 No Action Alternative

The No Action Alternative would not result in any impacts to vegetation since no restoration actions would be undertaken.

5.1.2.1.2 Saltmarsh Restoration on Ossabaw Island

The restoration of saltmarsh habitat on Ossabaw Island is expected to impact vegetation. As the undersized culverts are replaced with adequately-sized bridges tidal exchange will increase in the marsh leading to greater inundation for longer periods of time. This altered hydrologic cycle is expected to elicit changes in the plant community structure. There are no rare, threatened, or endangered plant species at the restoration site that will be adversely impacted by the restoration actions. Changes to the plant community will be long-term and beneficial as the saltmarsh is fully restored. Changes in the vegetative community in the restored saltmarsh will not impact the

human environment outside of the restoration sites.

5.1.2.2 Fish and Wildlife Resources

5.1.2.2.1 No Action Alternative

The No Action Alternative would not result in any impacts to fish and wildlife resources since no restoration actions would be undertaken.

5.1.2.2.2 Saltmarsh Restoration on Ossabaw Island

Aquatic Biota

The restoration of saltmarsh habitat on Ossabaw Island is expected to impact aquatic biota including fish and benthic invertebrates. Increased turbidity and/or suspended sediments as a result of construction activities may impact fish gills. Being mobile, fish would be expected to vacate areas of impact during construction activities, which would limit the scale of impacts. Benthic species with limited mobility may be crushed by construction activities. Best management practices will be implemented during construction activities to limit both suspended sediment releases and the disturbance to benthic habitat. The expected adverse impacts to aquatic biota from construction activities would be short-term and minor. Additional habitat will be available for both fish and benthic species as a more natural hydrologic cycle is restored to areas of the saltmarsh. The creation of such additional habitat is expected to be long-term and beneficial.

Mammals

The restoration of saltmarsh habitat on Ossabaw Island may impact mammals in and around the restoration sites. Construction activities may temporarily displace mammals, and may even cause mortality during the use of heavy machinery. Being mobile, mammals are expected to vacate areas of impact, which will limit adverse impacts. Adverse impacts to mammals are expected to be short-term and minor. The restoration of the saltmarsh sites may ultimately be beneficial to mammals that forage in the saltmarsh as prey abundance may increase.

Birds

The restoration of saltmarsh habitat on Ossabaw Island may impact birds in and around the restoration sites. Construction activities may disturb birds through noise and general human presence. Birds are expected to vacate construction areas to avoid any direct injury or mortality. The restoration of the saltmarsh sites may ultimately be beneficial to birds that forage in the saltmarsh as prey abundance may increase.

5.1.2.3 Rare, Threatened, or Endangered Species

5.1.2.3.1 No Action Alternative

The No Action Alternative would not result in any impacts to rare, threatened, or endangered species since no restoration actions would be undertaken.

5.1.2.3.2 Saltmarsh Restoration on Ossabaw Island

The USFWS' Information for Planning and Consultation (IPAC) database lists twelve federally threatened or endangered species that occur in Chatham County, Georgia. These species include the threatened West Indian manatee (*Trichechus manatus*), the threatened piping plover (*Charadrius melodus*), the threatened red knot (*Calidris canutus rufa*), the threatened wood stork

(*Mycteria americana*), the threatened eastern indigo snake (*Drymarchon corais couperi*), the threatened green sea turtle (*Chelonia mydas*), the threatened loggerhead sea turtle (*Caretta caretta*), the threatened frosted flatwoods salamander (*Ambystoma cingulatum*), the endangered red-cockaded woodpecker (*Picoides borealis*), the endangered Kemp's ridley sea turtle (*Lepidochelys kempii*), the endangered leatherback sea turtle (*Dermochelys coriacea*), and the endangered pondberry (*Lindera melissifolia*). The gopher tortoise (*Gopherus polyphemus*) and the striped newt (*Notophthalmus perstriatus*) also occur in Chatham County, both of whom are candidates for listing under the Endangered Species Act. There is designated critical habitat for the loggerhead sea turtle and the piping plover along the oceanfront beaches of Ossabaw Island.

While these species all occur in Chatham County, the majority are not found in saltmarsh habitat, the predominant habitat at the proposed restoration sites. Such species should not be impacted at all by the proposed restoration actions. Although critical habitat for the loggerhead sea turtle and the piping plover is found on Ossabaw Island, the proposed restoration actions at the inshore saltmarsh sites are expected to have no impact on the critical habitat units along the oceanfront beaches of Ossabaw Island.

Two federally listed species, the wood stork and the West Indian manatee, may be present at the proposed restoration sites. Potential impacts to both of these species are described below.

Wood Stork

The wood stork utilizes both freshwater and estuarine wetland habitats for nesting, roosting, and foraging. They nest in large rookeries in trees located on islands, marsh hammocks, or along the edges of the marsh where the surrounding water serves as a protective barrier against nest predators. Their diet consists mainly of small fish (supplemented with amphibians and aquatic invertebrates) found in brackish and freshwater wetlands. Suitable foraging habitat for the wood stork exists at all three of the proposed restoration sites. There are active wood stork rookeries on Ossabaw Island, but a review of the rookeries' locations indicates that the nearest rookery is greater than 3 km from any of the proposed restoration sites.

The proposed restoration projects are expected to increase tidal exchange at the project sites. The long-term impacts to the wood stork are likely to be beneficial in that there will be an enhancement to foraging habitat as previously dried or stagnant tidal creeks or pools will be reopened and may hold additional prey. During the construction period, there may be short-term, minor impacts to wood storks in the form of disturbance due to an increased human presence, increases in noise levels, and heavy machinery traffic. Wood stork foraging may also be temporarily limited in the vicinity of the restoration sites. Prior to implementing any restoration actions, the Trustees will consult with the USFWS' Georgia Ecological Services Office for potential impacts to the wood stork under Section 7 of the Endangered Species Act and will implement any recommended wood stork protection conditions.

West Indian Manatee

West Indian manatees in Georgia can be found in nearshore ocean waters, tidal creeks, estuaries, and the lower reaches of large rivers, preferring slow-moving and shallow waters. Because manatees are thermally stressed at low water temperatures, manatees are typically found in Georgia during the warmer months of the year. As water temperature drops, they may congregate

at warm water sources such as warm springs or industrial outfalls. The West Indian manatee is herbivorous and eats aquatic plants such as sea grasses, marine algae, water hyacinth, and hydrilla. In Georgia, manatees may eat marsh grass. Critical habitat for the West Indian manatee has been designated, but there is no designated critical habitat within the state of Georgia. Manatees may inhabit the estuary in and around the proposed restoration sites, particularly during warmer months of the year.

Prior to implementing any restoration actions, the Trustees will consult with the USFWS' Georgia Ecological Services Office for potential impacts to the West Indian manatee under Section 7 of the Endangered Species Act and will implement any recommended manatee protection conditions.

5.1.3 Socio-Economic Impacts

5.1.3.1 Aesthetics Impacts

5.1.3.1.1 No Action Alternative

The No Action Alternative would not result in any impacts to aesthetic or scenic qualities as no restoration actions would be undertaken.

5.1.3.1.2 Saltmarsh Restoration on Ossabaw Island

The restoration of saltmarsh habitat on Ossabaw Island is expected to have short-term and minor adverse impacts to aesthetic or scenic qualities at the restoration sites. During construction activities, the scenic quality of the sites will be impacted due to the presence of construction equipment and construction activities. Once construction is completed, the aesthetic qualities of the sites will return to their pre-construction status, and may even improve as the saltmarsh is fully restored through greater tidal exchange.

5.1.3.2 Noise Impacts

5.1.3.2.1 No Action Alternative

The No Action Alternative would not result in any noise impacts as no restoration actions would be undertaken.

5.1.3.2.2 Saltmarsh Restoration on Ossabaw Island

The restoration of saltmarsh habitat on Ossabaw Island is expected to have short-term and minor noise impacts while construction activities are being conducted. As there are no private residences in the vicinity of the restoration sites, local citizens should not be impacted by the construction-related noise. Wildlife resources may be temporarily disturbed by noise, but this disturbance would be short-term and minor and would cease once construction activities are completed.

5.1.3.3 Recreational Impacts

5.1.3.3.1 No Action Alternative

The No Action Alternative would not result in any recreational impacts as no restoration actions would be undertaken.

5.1.3.3.2 Saltmarsh Restoration on Ossabaw Island

The restoration of saltmarsh habitat on Ossabaw Island may have short-term and minor impacts on recreation. The roads where the undersized culverts are to be replaced with bridges provide access to various parts of Ossabaw Island. In order to access parts of the island where recreational activities, such as bird watching, may occur, alternate, possibly longer routes may need to be taken. Also, scheduled hunting events periodically occur on Ossabaw Island. Such events will be considered when the project construction schedules are developed in order to limit impacts to the scheduled hunting events.

5.1.3.4 Transportation Impacts

5.1.3.4.1 No Action Alternative

The No Action Alternative would not result in any impacts to transportation as no restoration actions would be undertaken.

5.1.3.4.2 Saltmarsh Restoration on Ossabaw Island

The restoration of saltmarsh habitat on Ossabaw Island will have short-term impacts on transportation. The roads where the undersized culverts are to be replaced with bridges provide access to various parts of Ossabaw Island. Transportation will be restricted at each site as construction work is conducted and alternate, possibly longer, routes will be used. The roads where construction will occur are not major thoroughfares and do not function as regular commuting roads for the public, therefore the impacts to transportation will be minor. The timing of construction activities will be coordinated to limit transportation impacts.

5.1.3.5 Public Health and Safety

5.1.3.5.1 No Action Alternative

The No Action Alternative would not result in any impacts to public health and safety as no restoration actions would be undertaken.

5.1.3.5.2 Saltmarsh Restoration on Ossabaw Island

The restoration of saltmarsh habitat on Ossabaw Island would involve short term risks to workers from the operation and transportation of construction equipment and machinery. To minimize such risk, all activities would be conducted in accordance with applicable occupational safety regulations. Public access to restoration sites would be restricted during construction activities to limit risks to the public. Once completed, the final restoration projects should pose no risk to public health and safety at neither the restoration sites nor within the local community.

5.1.3.6 Economic Impacts

5.1.3.6.1 No Action Alternative

The No Action Alternative would not result in any economic impacts as no restoration actions would be undertaken.

5.1.3.6.2 Saltmarsh Restoration on Ossabaw Island

The restoration of saltmarsh habitat on Ossabaw Island will create temporary employment opportunities while the construction activities are conducted and may benefit the local economy to a minor degree. No adverse economic impacts are expected. The proposed restoration sites are not suitable for commercial or residential development; therefore the restoration actions will not

impact the potential for the sites to generate future economic benefits. Successful restoration of the saltmarsh sites may enhance local fish and wildlife resources which could produce minor economic benefits to the local community through an increase in eco-tourism and/or recreational fishing.

5.1.3.7 Historic and Cultural Impacts

5.1.3.7.1 No Action Alternative

The No Action Alternative would not result in any impacts to historic or cultural resources as no restoration actions would be undertaken.

5.1.3.7.2 Saltmarsh Restoration on Ossabaw Island

The restoration of saltmarsh habitat on Ossabaw Island is not expected to impact any historic or cultural resources. Prior to project implementation, restoration actions will be reviewed under Section 106 of the National Historic Preservation Act of 1966 (NHPA) and O.C.G.A. § 12-3-50.1(c)(6) & (7) to ensure that impacts to historic or cultural resources are avoided.

5.1.4 Cumulative Impacts

To evaluate cumulative impacts the proposed restoration actions along with other past, present, and reasonably foreseeable future actions must be considered. Previous actions relevant to this analysis on Ossabaw Island include the construction of the current roads and their associated culverts. These previous actions caused adverse impacts to the adjacent saltmarsh habitat by restricting tidal exchange. The proposed restoration actions under consideration would require construction activities to be conducted in the same location as the original culvert installation, but the ultimate impacts should be beneficial and should mitigate some of the initial adverse impacts of the culverts by improving tidal exchange into the saltmarsh habitat of interest.

The adverse impacts to the environment from the proposed restoration actions will be short-term and minor. As Ossabaw Island is managed for conversation and educational use by GADNR, no foreseeable future actions that would contribute additional adverse impacts to those already expected from the proposed action are predicted.

6.0 COMPLIANCE WITH OTHER KEY STATUTES, REGULATIONS AND POLICIES

6.1 Federal Laws, Regulations, and Policies

Federal Water Pollution Control Act

The Federal Water Pollution Control Act, commonly known as the Clean Water Act (CWA), 33 U.S.C. § 1251, *et seq.*, was established to restore and maintain the chemical, physical and biological integrity of the United States' waters. The CWA sets a long-term goal of eliminating the discharge of pollutants into navigable waters, and an interim goal of attaining water quality that provides for the protection and propagation of fish, shellfish, and wildlife, as well as opportunities for water recreation. The CWA and its amendments comprise a complex set of programs and regulations including, among other things, permit programs for discharges from facilities and other point sources, specific discharge limitations for certain identified pollutants or

categories of pollutants, provisions for qualitative and quantitative water quality standards to be set by states for their water bodies, and regulation of dredge and fill operations.

Section 404 of the CWA authorizes the U.S. Army Corps of Engineers (Corps) to issue permits, after notice and opportunity for public hearings, for the discharge of dredged or fill material into the waters of the United States. Section 401 of the CWA provides that any applicant for a federal permit or license to conduct any activity which may result in any discharge into navigable waters must obtain certification of compliance with state water quality standards.

The Trustees anticipate that the selected restoration project will trigger CWA permitting requirements. The Trustees, or their implementing entity, will obtain the appropriate permits prior to project implementation.

Endangered Species Act

The purpose of the Endangered Species Act (ESA), 16 U.S.C. § 1531 *et seq.*, is to protect and recover imperiled species and the ecosystems upon which such species depend. All projects funded by federal agencies are required to insure that those activities are not likely to jeopardize the continued existence of any federally threatened or endangered species, or result in the destruction or adverse modification of habitat designated as critical for such species. Section 7 of the ESA requires federal agencies to consult with the Department of Commerce (through the National Oceanic and Atmospheric Administration (NOAA)) and/or DOI (through USFWS), depending on which agency has jurisdiction over a species of interest, when a federal action may impact a federally listed species. . As discussed in Section 5.1.2.3, the Trustees will consult with USFWS regarding potential impacts to federally listed species, in particular the wood stork and West Indian manatee, prior to any restoration activities being conducted.

Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA), 16 U.S.C. § 1361 *et seq.*, is the principal federal legislation for the protection of marine mammals. The MMPA prohibits, with few exceptions, the taking or importing into the United States of marine mammals or their products. . The West Indian manatee is the marine mammal of most concern with regard to the proposed restoration alternative. . Appropriate project construction conditions resulting from consultation with USFWS under the ESA should provide adequate protection for the manatee. Other marine mammals, such as dolphins, may be present in the vicinity of the restoration sites, but would be expected to vacate construction areas without being harmed.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act, 16 U.S.C. § 661 *et seq.*, requires that agencies receiving federal funds consult with the USFWS, the National Marine Fisheries Service, and state wildlife agencies for activities that result in the impoundment, diversion, channel deepening, or control or modification of any stream or water body, to minimize and mitigate any adverse effects on fish and wildlife resources and habitats. This consultation is generally incorporated into the process of complying with Section 404 of the CWA and other federal permit, license, or review requirements.

The Trustees, or implementing entity, will consult with the necessary agencies on any of the selected restoration projects that involve activities that affect, control, or modify water bodies.

Fish and Wildlife Conservation Act

The Fish and Wildlife Conservation Act (FWCA), 16 U.S.C § 2901 *et seq.*, encourages all agencies receiving federal funds to use their statutory and administrative authorities to the maximum extent practicable and consistent with the agency's statutory responsibilities, to conserve and to promote the conservation of nongame fish and wildlife species and their habitats.

The proposed restoration alternative should benefit nongame fish and wildlife species and habitat and is expected to fully comply with the FWCA

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Act, as amended, 16 U.S.C. § 1801, *et seq.* and reauthorized by the Sustainable Fisheries Act of 1996, provides for the conservation and management of the Nation's fishery resources within the Exclusive Economic Zone (from the seaward boundary of every state to 200 miles from that baseline). The resource management goal is to achieve and maintain the optimum yield from U.S. marine fisheries. It also establishes a program to promote the protection of essential fish habitat (EFH) in the review of projects conducted under federal permits, licenses, or other authorities that affect or have the potential to affect such habitat. After EFH has been described and identified in fishery management plans by the regional fishery management councils, federal agencies are obligated to consult with the Secretary of Commerce with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any EFH.

The Trustees do not believe that the proposed restoration actions will have an adverse impact on EFH, but will consult with NOAA's National Marine Fisheries Service for a final determination.

Coastal Zone Management Act

The goal of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1451, *et seq.* is to encourage and assist states to preserve, protect, develop and, where possible, restore and enhance valuable natural coastal resources. Participation by states is voluntary. Section 1456 of the CZMA requires that any federal action inside or outside of the coastal zone that affects any land or water use or natural resources of the coastal zone be consistent to the maximum extent practicable with the enforceable policies of approved state management programs.

The Trustees believe that the proposed restoration alternative is consistent with the policies of the CZMA and will be submitting this consistency determination to the Georgia Coastal Management Program for review and concurrence.

Rivers and Harbors Appropriation Act

The Rivers and Harbors Act of 1899, 33 U.S.C. § 401 *et seq.*, regulates the development and use of the nation's navigable waterways. Section 10 of the Act prohibits unauthorized obstruction or alteration of navigable waters and vests the US Army Corps of Engineers with authority to regulate discharges of fill and other materials into such waters.

The Trustees do not believe that the proposed restoration alternative will negatively impact navigable waters. The permitting process with the Corps required for compliance with the CWA will include compliance with the requirements of the Rivers and Harbors Act.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918, 16 U.S.C. § 703 *et seq.*, provides for the protection of migratory birds.

Implementation of the proposed restoration alternative is not expected to have an adverse impact on migratory birds.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act of 1940 (BGEPA) as amended, 16 U.S.C. § 668 *et seq.*, provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds.

The National Bald Eagle Management Guidelines (USFWS 2007) recommend that construction projects, which cannot be conducted outside of the breeding season, maintain a distance over 201 m from nests in situations in which the construction site activity is visible to the nest. Prior to implementing any construction activities, the Trustees will determine if bald eagle nests are present within the recommended buffer.

National Historic Preservation Act

Section 106 of the National Historic Preservation Act of 1966 (NHPA) as amended, 16 U.S.C. § 470 *et seq.*, mandates federal agencies undergo a review process for all federally-funded and permitted projects that will impact sites listed on, or eligible for listing on, the National Register of Historic Places.

The Trustee will verify compliance with the NHPA during the permitting process.

Information Quality Guidelines Issued Pursuant to Public Law 106-554

Information disseminated by federal agencies to the public after October 1, 2002, is subject to information quality guidelines developed by each agency pursuant to Section 515 of Public Law 106-554 that are intended to ensure and maximize the quality of such information (i.e., the objectivity, utility and integrity of such information).

This Draft DARP/EA is an information product covered by information quality guidelines established by USFWS and DOI for this purpose. The quality of the information contained herein is consistent with the applicable guidelines.

Executive Order 12898 (59 Fed. Reg. 7629) -Environmental Justice

Executive Order 12898 (February 11th, 1994) requires each federal agency to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. As described in the analyses above, the proposed restoration actions are not expected to have long-term and/or major impacts on any physical, biological, or socio-economic factors. Minority and low-income populations will not be disproportionately affected by the short-term, minor impacts that are expected.

Executive Order Number 11514 (35 Fed. Reg. 8,693) – Protection and Enhancement of Environmental Quality

A Draft EA is integrated within this Draft DARP/EA and environmental analyses and coordination are taking place as required by NEPA.

Executive Order Number 11990 (42 Fed. Reg. 26,961) -Protection of Wetlands

Issued in 1977, Executive Order 11990 instructs each Federal agency to avoid, to the extent possible, the long- and short-term adverse effects associated with the destruction or modification of wetlands.

It is not anticipated that the proposed restoration alternative will adversely affect wetlands but rather will provide for the enhancement of wetlands and wetland services. However, appropriate regulatory permits will be obtained by the Trustees or the implementing entity before construction begins.

Executive Order Number 12962 (60 Fed. Reg. 30,769) -Recreational Fisheries

The proposed restoration actions will not result in adverse effects on recreational fisheries but will contribute to the enhancement of, and help support, such fisheries.

Executive Order 13112 - Invasive Species

The purpose of Executive Order 13112 is to prevent the introduction of invasive species and provide for their control, and to minimize the economic, ecological, and human health impacts that invasive species cause. "

The Trustees do not believe that the proposed restoration alternative would promote the introduction or spread of invasive species.

Occupational Safety and Health Act

The Occupational Safety and Health Act (OSHA) of 1970, as amended, 29 USC § 651 *et seq.*, governs the health and safety of employees from exposure to recognized hazards, such as toxic chemicals, excessive noise, mechanical dangers, and unsanitary conditions.

The Trustees expect that all work conducted will comply with OSHA requirements.

6.2 State Laws, Regulations, and Policies

Coastal Marshlands Protection Act

The State of Georgia established the Coastal Marshlands Protection Act (CMPA), O.C.G.A. 12-5-280, *et seq.*, to protect the marsh and estuarine areas, and to regulate the activities within these public trust lands that are held for the citizens of Georgia. It requires that any entity seeking to remove, fill, dredge, drain, or otherwise alter any marshlands, or construct or locate any structure on or over marshlands within the estuarine area, must first obtain a permit from the Coastal Marshlands Protection Committee or, in the case of minor alteration of marshlands, the Commissioner of Natural Resources. The appropriate permits will be obtained prior to project implementation.

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