United States Department of the Interior
FISH AND WILDLIFE SERVICE

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December 22, 2011

Colonel Christopher Sallese
U.S. Army Corps of Engineers
Galveston District
Attn: Regulatory Branch, Steven Walls
P.O. Box 1229
Galveston, Texas 77553-1229

Consultation No. 21430-2011-F-0281

Dear Colonel Sallese:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (BO) for the U.S. Army Corps of Engineers' (Corps) proposal to permit (SWG-2009-00833) the fill and closure of Rollover Pass on Bolivar Peninsula, Galveston County, Texas, and its effects on the endangered Kemp's ridley sea turtle *Lepidochelys kempii*, the threatened loggerhead sea turtle *Caretta caretta*, the threatened piping plover *Charadrius melodus*, and piping plover designated critical habitat unit TX-37 in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

The Corps has determined that the proposed project is not likely to adversely affect the endangered Atlantic hawksbill sea turtle *Eretmochelys imbricata*, the endangered green sea turtle *Chelonia mydas*, and the endangered leatherback sea turtle *Dermochelys coriacea*. The Service concurred with that determination in a September 1, 2011 letter to the Corps.

This BO is based on information provided in Corps Biological Assessment entitled *Biological Evaluation of Potential Impacts to Threatened and Endangered Species*; consultation documents, meetings, telephone conversations, and e-mails with project proponents; field investigations; and other sources of information. A complete administrative record of this consultation is on file at the Clear Lake Ecological Services Field Office (CLESFO) in Houston, Texas.

BIOLOGICAL OPINION

CONSULTATION HISTORY

January 2009	The Service received preliminary information about the Texas General Land Office's (TxGLO) plans to close Rollover Pass at a Joint Evaluation Meeting at the Galveston District Corps of Engineers Building.
March 11, 2010	The Corps issued Public Notice (PN) SWG-2009-00833 for the closure of Rollover Pass.
April 6, 2010	The Service received a copy of the Draft Environmental Assessment for the Rollover Pass Closure Project from Taylor Engineering, Inc. on behalf of the TxGLO.
April 12, 2010	The Service sent a letter to the Corps in response to the PN and recommended that they assess the project for impacts to federally listed sea turtles and piping plovers.
February 8, 2011	The Service received a letter and biological evaluation (BE) from the Corps regarding Section 7 consultation for PN SWG-2009-00833. They requested our concurrence with a likely to adversely affect determination for federally listed sea turtles and piping plovers.
March 3, 2011	The Service sent an e-mail to the Corps providing them with Section 7 guidance and requested clarification of their effect determination.
March 10, 2011	The Service received a revised letter and BE from the Corps regarding PN SWG-2009-00833. Again, they requested our concurrence with a likely to adversely affect determination for sea turtles and piping plovers.
March 15, 2011	The Service participated in a site visit of Rollover Pass with the Corps and TxGLO.
April 15, 2011	The Service sent a letter to the Corps requesting additional information, clarification, and revision of the BE.
May 25, 2011	The Service received an e-mail from the Corps with supplemental BE information and a request for review.
June 30, 2011	The Service sent an e-mail to the TxGLO stating that the comments within the letter we submitted to the Corps on April 15, 2011 had not been completely addressed.
July 1, 2011	The Service met with the Corps to discuss section 7 procedures and the

	effect determinations they made in their letter, dated March 10, 2011.
July 8, 2011	The Service received a letter from the Corps requesting initiation of formal consultation for PN SWG-2009-00833.
July 28, 2011	The Service called TxGLO to discuss the additional information requested in our letter dated April 15, 2011.
August 31, 2011	The Service called the Corps to inform them of our remaining concerns with the project. We recommended that in order to address these concerns and move forward a monitoring plan should be developed for inclusion within the BO. They agreed.
September 1, 2011	The Service sent a letter to the Corps acknowledging receipt of all required information to initiate formal consultation and concurring that the proposed project is not likely to adversely affect the Atlantic hawksbill sea turtle, green sea turtle and the leatherback sea turtle.
September 7, 2011	The Service sent an e-mail to the TxGLO requesting additional information on pass dimensions, construction details, and native beach sediment characters.
September 30, 2011	The Service sent draft monitoring plan recommendations to the Corps and the TxGLO and requested a conference call to discuss these recommendations.
October 6, 2011	The Service received an e-mail from the TxGLO with information on pass dimensions, construction details, and native beach sediment characters.
October 28, 2011	The Service had a conference call with the Corps and TxGLO to discuss monitoring plan recommendations. The TxGLO indicated that the recommendations were feasible. The Service agreed to provide piping plover and benthic invertebrate survey recommendations to assist the TxGLO.
November 22, 2011	The Service provided the TxGLO with recommendations for conducting piping plover and benthic macroinvertebrate surveys.
December 6, 2011	The Service provided the Corps with a draft BO via e-mail.
December 15, 2011	The Corps and TxGLO provided the Service with their comments on the draft BO via e-mail.
December 22, 2011	The Service transmits the final BO to the Corps via e-mail and regular mail.

DESCRIPTION OF PROPOSED ACTION

Section 404 of the Clean Water Act (CWA) authorizes the Corps to issue permits for the discharge of fill material into waters of the United States. Under this authority, the Corps proposes to issue Department of the Army Permit SWG-2009-00833 to the TxGLO for the discharge of fill material to close Rollover Pass at Gilchrist, Texas in Galveston County. The TxGLO intends to close Rollover Pass to reduce beach erosion rates, nourishment activities, and maintenance dredging that are caused by the inflow of sediment through the pass.

Rollover Pass is approximately 200 feet (ft) wide and extends approximately 1,450 ft from the Gulf of Mexico to Rollover Bay (Appendix A). The majority of the pass is 6-8 ft deep with the area underneath and immediately north of the Highway 87 bridge 17-23 ft deep (Ray Newby, TxGLO, personal communication 201, Taylor Engineering 2010). The contractor will commence construction in the fall of 2011or winter of 2012 and will complete construction within 8 months of the start date. The contractor may work 24 hours per day, seven days per week if cost effective. However, nighttime construction will not occur on the beach portion of the project.

The contractor will stage heavy equipment (cranes, bulldozers, backhoes, excavators, etc.) around Rollover Pass within the boundaries of the Gulf Coast Rod, Reel, and Gun Club property (Appendix A). To fill Rollover Pass the contractor will use tugboats or motorized barges to transport equipment necessary to install fill stabilization structures. Barges or tugboats will approach Rollover Pass from the Gulf or through the GIWW and pass channel. The contractors will likely use 20-30-ft workboats to shuttle workers between the shore and the equipment.

Once the equipment is in place, construction will start with installation of a fill stabilization structure (i.e., concrete armor units 5 ft. long by 4 ft. wide and 2.5 ft. thick) 400 ft landward of the Gulf end of Rollover Pass and another fill stabilization structure 300 ft from landward from Rollover Bay end of the pass to stop tidal exchange and reduce lateral pressure on the bridge pilings during construction. In lieu of the outermost geotube, the contractor will construct buried erosion control barriers using concrete armor units. Concrete armor units will be installed landward of the exiting dune line so as to not become exposed.

The contractor will haul all upland sand sources to the project site with dump trucks. Sandy fill material will come from one of four locations on Bolivar Peninsula: Kahla's Sand Pit, Green Fields Real Properties Ltd., Dredge Material Placement Area 42, and Galveston County stockpiles. All beach quality sand will come specifically from Kahla's Sand Pit and will be tested in accordance with ASTM D422 (standard test method for particle size analysis). Beach quality sand will have an average mean grain size greater than or equal to .10 mm and less than 1.0 mm, a silt content passing #200 sieve (0.074 mm) of less than 10 per cent, and a final composite gradation curve that fits within the gradation range shown in Appendix B. All sand placed Gulf-ward of the southern-most geotube and on the top three feet of fill between the geotube and the steel sheet-pile wall south of highway 87 will be of beach quality (i.e., Kahla's

Sand Pit). The top three feet of fill between the sheetpile wall and Rollover Bay will be comprised of the otherwise best available quality sand (i.e., Green Fields Real Properties Ltd., Dredge Material Placement Area 42, and Galveston County stockpiles). The contractor will be responsible for the collection and testing of samples taken at the material delivery site (barge, truck, etc.) to ensure that it is free of contaminants.

After Rollover Pass has been filled, the contractor will use vibratory rollers and sheeps-foot compactors to grade and compact the sediment. Before filling Rollover Pass to final grade, the contractor will remove the remaining metal lining to fill elevation and will bury the remaining lining under several feet of fill. Lastly, the contractor will fill and grade Rollover Pass to match surrounding grades.

Please be advised that any changes, additions or modifications to this project, or any work conducted by the applicant or others in addition to the activities described above, are not covered by this BO.

Conservation Measures

The Corps and TxGLO have pledged the following conservation measures during the construction, maintenance, and operational phases of the project:

1. All crew members (contractors, workers, etc.) will attend training sessions prior to the initiation of, or their participation in, project work activities. Training will be conducted by qualified personnel and the scope of training will include 1) recognition of sea turtles and piping plovers, their habitats, and tracks 2) impact avoidance measures 3) reporting criteria 4) contact information for different rescue agencies in the area.

2. Project equipment and materials will not be staged or stock-piled on the Gulf beach or flats within Rollover Bay.

3. Project equipment and vehicles transiting between the staging area and project site will be kept to a minimum and will use designated routes. Vehicle access shall be confined to the immediate needs of the project.

4. The contractor will coordinate and sequence the work to minimize the frequency and density of vehicular traffic on the beach to the greatest extent practicable. During the beach fill phase of the project the contractor will minimize the number of vehicles on the beach during vehicle ingress and egress and will avoid “stacking” vehicles on the beach waiting to unload fill material or waiting to leave the beach.

5. Beach driving shall be reduced to the maximum extent practicable.

6. The use of construction lighting at night shall be minimized, directed toward the construction activity area, and shielded from view outside of the project area to the maximum extent practicable.

7. Only sand that meets the specifications of the local beach quality (e.g., grain size, color, and mineralogy) will be used for fill and maintenance activities. Beach quality sand will be tested in accordance with ASTM D422. Beach quality sand will have an average mean grain size greater than or equal to .10 mm and less than 1.0 mm, a silt content passing #200 sieve (0.074 mm) of less than 10 per cent, and a final composite gradation curve that fits within the gradation range shown in Appendix B.

8. Siltation barriers shall be made of material in which a sea turtle cannot become entangled and shall be regularly monitored to avoid sea turtle entanglement.

9. All marine vessels associated with the construction project shall operate at "no wake/idle" speed at all times while in the construction area and while in water depths where the draft of the vessel provides less than a 4-ft of clearance from the bottom. All vessels will follow deep-water routes to the maximum extent practicable.

10. A designated sea turtle and piping plover monitor(s) will be identified who will act as the single point of contact responsible for communicating and reporting endangered species issues throughout construction of the project.

11. During the sea turtle nesting season of March 15 to October 1:

    a. The TxGLO in coordination with the Corps and other project proponents will ensure that a qualified monitor(s) is onsite during work and maintenance activities and provide the Service with the names and qualifications of the monitor(s). Monitors will:
        i. Survey the project areas (i.e., immediate project area and 100-ft buffer zone outside the project area) and vehicle access routes for turtles and turtle nests before beginning work activities each day, after work has concluded each day, once a day on non-construction days, and other such times as deemed necessary by monitors.
        ii. Escort large vehicles when necessary to ensure that sea turtles and nests are protected.
        iii. Determine when beach is clear for work.
        iv. Ensure that tire ruts and other disturbed areas on the beach are smoothed out and sand loosened upon the completion of each work day.

    b. If a sea turtle or nest is located in or adjacent to work areas, work activities will immediately cease within 100 ft of the nest or turtle, and the monitor will call 1-866-TURTLE-5 and notify the CLESFO (281-286-8282). Work activities will not resume within 100 ft of the nest site or turtle until authorization from the

monitor is received to do so. Information regarding the qualification of the independent qualified monitor will be submitted to the Corps prior to starting work in the permitted area.

12. During the piping plover wintering season of July 15 to May 15:

    a. The TxGLO in coordination with the Corps and other project proponents will ensure that a qualified monitor(s) surveys the work areas and looks under equipment and vehicles for piping plovers prior to morning construction activities. A monitor will be onsite to ensure that loafing or resting piping plovers are not in the project area during project activities. Please note that piping plovers are especially vulnerable during periods of cold temperatures and when they are roosting at night, and extra care should be taken at these times.

    b. If a piping plover is found in an active construction area, work will be stopped within an area specified by the monitor until the bird(s) leave the construction site. If the bird does not relocate (e.g., injured bird) the Service will be contacted to solicit additional guidance.

Action Area

Bolivar Peninsula, Rollover Pass, and Rollover Bay
The action area is Bolivar Peninsula, which is located along the upper Texas coast in the Western Gulf of Mexico (Figure 1). Bolivar Peninsula began to form about 2,000 years ago as lonshore currents (waves that approach the shore at an angle) transported sand in a southwest direction along the coast. The peninsula (a land mass surrounded on three sides by water) is currently 25 miles long, varies in width from ¼ to 3 miles, and separates East Bay from the Gulf of Mexico (Prather and Sorensen 1972, Anderson 2007). Rollover Pass is an artificial inlet that was mechanically cut by the Texas Game and Fish Commission (now the Texas Parks and Wildlife Department) at the town of Gilchrist, Texas on Bolivar Peninsula in 1955 (Figure1; Appendix A).

Rollover Bay is a small and shallow (1-3 ft over most of its area) embayment of East Bay that adjoins Rollover Pass. Several studies indicate that sediments traveling southwest along Bolivar Peninsula, within the longshore transport system, flow into Rollover Pass and settle in Rollover Bay to create sand and mud flats (i.e., flood tidal delta shoals). Oyster reefs are also present in the bay but are not a dominant substrate component (Taylor Engineering 2010). Water inflows from the Gulf of Mexico also influence the tidal characters and benthic invertebrate community of the bay (Prather and Sorensen 1972, Bales and Holley 1985, White 1985, Morton 1997, Watson 1999). The GIWW crosses Rollover Bay about one mile from the Gulf shoreline and studies have found that a large amount of sediment is deposited in the GIWW via the pass channel that runs through the bay (Parchure et al. 2000).

STATUS OF THE SPECIES AND CRITICAL HABITAT

Five species of sea turtles are found in U.S. waters and nest on U.S. beaches: leatherback, hawksbill, loggerhead, green and Kemp's ridley. Only the Kemp's ridley and loggerhead are known to nest on Bolivar Peninsula.

Kemp's Ridley Sea Turtle

Species Description

Kemp's ridleys are the smallest of the sea turtles, reaching about 2-feet in length and weighing up to 100 pounds. Adults have a triangular-shaped head and a moderately hooked beak with large crushing surfaces. Their carapace (upper shell) is olive-gray and almost as wide as it is long and their plastron (lower shell) is a light yellowish color. The carapace is broad, heart-shaped, and keeled and has five pairs of costal scutes (shell plates) along the sides. The plastron has four infra-marginal scutes perforated by a pore. Juveniles have a dark-charcoal colored shell that changes to olive-green or gray with age (Seaturtle.org 2005).

Critical Habitat

Critical habitat has not been designated for this species.

Distribution

Kemp's ridley sea turtles occur throughout the Gulf of Mexico and along the Atlantic coast of the U.S. Their primary nesting locations are concentrated along the northeastern coast of Mexico at Rancho Nuevo, Tamaulipas and secondarily along the Texas coast (Service and National Marine Fisheries Service (NMFS) 1992).

Habitat

Kemp's ridley sea turtles inhabit terrestrial (i.e., beach), nearshore coastal waters and bays, and offshore oceanic waters throughout their life cycle. Upon emerging from nest chambers, hatchlings immediately crawl into the surf and swim offshore where they become passive migrants in oceanic currents. In offshore waters, hatchlings presumably feed among floating algal communities (e.g., *Sargassum*) (Carr 1982, Shaver 1991, Wyneken and Salmon 1992, NMFS et al. 2010).

Turtles move back into the nearshore coastal waters as juveniles and occupy these waters throughout adulthood (NMFS et al. 2010). In these nearshore areas, juveniles and adults forage primarily on benthic species such as crabs, which make up the bulk of their diet (Ogren 1989, Shaver 1991, Burke et al. 1993, Seney and Musick 2005, NMFS et al. 2010). Important coastal foraging sites include seagrass beds, oyster reefs, and sandy bottoms, mud bottoms, and live bottoms (i.e., sessile invertebrates attached to substrate) (NMFS et al. 2010).

Adult Kemp's ridleys nest on beaches that vary in character, morphology, and quality (Marquez 1994, NMFS et a. 2010) despite the influence of beach characteristics (i.e., grain size, distribution, mineralogy, water potential, etc.) have on sea turtle nesting capabilities (e.g., nest

excavation), the nest chamber environment, and hatching success (Ackerman et al. 1985, Mortimer 1990).

Life History
Kemp's ridley nesting season usually ranges from March 15 to October 1. Female Kemp's ridleys can nest annually or biannually and up to three times (average 2.5) in a single season. Females come ashore individually or in large groups of hundreds to thousands of turtles (arribadas) and clutch sizes can average between 100-110 eggs. Preferred nesting conditions are characterized by strong winds and daylight hours (Service and NMFS 1992, NMFS et al. 2010). In general, Kemp's ridleys follow the breeding chronology outlined below: (Service and NMFS 1992, NMFS and Service 2007, NMFS et al. 2010, Wyneken and Salmon 1992):

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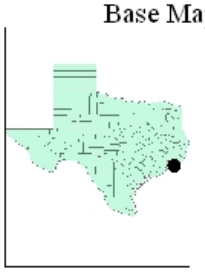
Figure 1. Action Area: Bolivar Peninsula, TX

Base Map: ESRI USA Base Map, Action Area Bolivar Peninsula, Galveston County, TX



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- Sea turtle hatchlings emerge after approximately 50 days of incubation, crawl into the surf, and swim offshore where they become passive migrants on oceanic currents (Carr 1982).
- After approximately 2 years, juvenile sea turtles migrate back into nearshore coastal waters.
- Kemp's ridleys reach sexual maturity between 10 and 17 years of age. Adult Kemp's ridleys primarily occupy nearshore waters of 120 ft or less, where they migrate to and from nesting and foraging areas in the Gulf of Mexico and occasionally along the U.S. Atlantic coast.

Population Dynamics
A historical report indicates that more than 40,000 Kemp's ridley females nested in a single arribaba in northeastern Mexico in 1947 (Hildebrand 1963). However, by 1982 female numbers declined to about 300 and nest numbers declined to about 702. Due to recovery and conservation efforts that were initiated in the early 1960s (see proceeding section entitles *Recovery Efforts* for details), the number of sea turtle nests began to steadily increase during the 1980s. Today, recovery efforts continue and the total number of nests recorded annually in Rancho Nuevo, Mexico and adjacent beaches exceeds 20,000 and the population is exponentially increasing, which may indicate a similar increase in the population as a whole (NMFS et al. 2010, Service and NMFS 1992, NMFS et al. 2010).

Reasons for Listing and Threats to Survival
The Department of Interior listed the Kemp's ridley sea turtle as endangered throughout its entire range on December 2, 1970 (35 FR 18319-18322). At the time of listing, two threats had contributed primarily to the decline of the Kemp's ridley: over-utilization of ridley eggs and turtle parts and entrainment in trawls of commercial and recreational fishing operations. Hildebrand (1963) reported that eggs were taken from the sea turtle nesting beaches at Rancho Nuevo, Mexico in mule trains, by truck, and by horseback prior to protection of these nesting beaches. Furthermore, by the 1950s an intensive trawl fishing industry had developed in the Gulf of Mexico. The trawl fishing industry, primarily shrimp trawling, generated the largest source of adult and juvenile sea turtle mortality (between 500 and 5,000 turtles killed annually) (Service and NMFS 1992). These threats have been reduced or eliminated throughout the majority of the species range.

Additional threats to the recovery of the species that have emerged since the Kemp's ridleys listing include coastal development, marine pollution and debris, and other commercial and recreational fishing activities. Human population growth in coastal areas of the U.S. is expected to increase by approximately 25 percent or by 18 million people within the next 25 years (Field 2000). Development activities that displace beach habitats or that undermine natural coastal

processes can adversely affect Kemp's ridley sea turtle nesting environments. The Gulf of Mexico is an area of high-density offshore oil extraction and many oil-extraction activities are in close proximity to the primary feeding grounds and nesting beaches of the Kemp's ridley sea turtle (e.g., Deep Water Horizon). Depending on the degree of contact, contaminants may cause lethal and sub-lethal effects to sea turtles and eggs (Fritts and McGehee 1981, Milton et al. 2003, NMFS et al. 2010), alter food availability, and disrupt life cycles of coastal wildlife (NOAA 2010). A vast amount of floating debris also exists in the Gulf of Mexico and ingestion and entanglement in such debris can cause injury and death to sea turtles (Plotkin and Amos 1990). Aside from trawling, sea turtles can be injured or harmed by other fishing gears and industries as well. Kemp's ridley sea turtles have been taken by pound nets, gill nets, hook and line, crab traps, and longlines (Service and NMFS 1992). Recently, the effects of global warming on sex ratios have also been identified as a potential threat to the Kemp's ridley population (NMFS and Service 2007). These threats continue to persist throughout the species' range.

Recovery Efforts

Since the Kemp's ridley sea turtle was listed under the Act, several important conservation milestones have been achieved that have removed and reduced significant threats to the species. Efforts to protect nesting Kemp's ridleys and nesting beaches in Mexico have been ongoing since the 1960s. In 1966, Mexico established a sea turtle camp for the study and protection of nesting Kemp's ridleys at Barra Calabaza and Barra Coma, Rancho Nuevo, Mexico. In 1977, the U.S. (Service, National Park Service, NMFS, and Texas Parks and Wildlife Department) joined these efforts and by 1988, the program had expanded these camps to other primary nesting beaches along northeastern Mexico. A secondary nesting beach at the National Park Service's Padre Island National Seashore (PAIS) was also established through bi-national efforts. At PAIS, hatchlings were released onto the beach, allowed to enter the water, and then immediately recaptured and raised in "head start" facilities in Galveston, Texas for approximately 9 to11 months before being released into the Gulf of Mexico (NMFS et al. 2010).

In 1986, the National Park Service initiated a program to detect, monitor, and protect sea turtle nests at PAIS. Patrol efforts involving multiple federal, state, local, university and non-governmental agencies are now conducted on most Texas beaches from April 1 to July 15 each year. These protections have resulted in increased hatching success rates.

Mexico and the U.S. have also implemented several protection measures for turtles in the marine environment. In 1992, the U.S. required Turtle Excluding Device (TED) use in both inshore and offshore shrimp fisheries during all times of the year and Mexico mandated the use of TEDs in the Gulf of Mexico and Caribbean in 1993. Both countries have also implemented seasonal and area closures of shrimp (long lining, gillnetting, etc.) in waters inhabited by turtles. These protections have reduced juvenile and adult mortality rates (NMFS et al. 2010).

Other important conservation efforts include the passage of the Marine Pollution Act, which restricts the discharge of plastics and sets standards for other solid waste dumping into the marine environment and the development of long-term, comprehensive education programs in Texas and Mexico (NMFS et al. 2010).

Loggerhead Sea Turtle

Species Description
Loggerhead sea turtles can grow to an average weight of about 200 pounds. Loggerheads have a large head with blunt, powerful jaws. Their carapace and flippers are a reddish-brown color with five pairs of costal scutes (plates) and their plastron is yellow to orange. Hatchlings lack the reddish -brown coloration of adults and have a carapace that varies from light to dark brown; their plastron and other ventral surfaces are a dull, yellowish tan. Furthermore, both pairs of hatchling flippers are dark brown above and have distinct white margins (Seaturtle.org 2005).

Critical Habitat
Critical habitat has not been designated for this species.

Distribution and Abundance
Loggerheads can be found inland and hundreds of miles offshore throughout temperate and tropical waters. For example, loggerhead sea turtles are known to occur in waters off of Alabama, American Samoa, California, Connecticut, Delaware, Florida, Georgia, Guam, Hawaii, Louisiana, Massachusetts, Maryland, Northern Mariana Islands, Mississippi, North Carolina, New Jersey, New York, Oregon, Puerto Rico, Rhode Island, South Carolina, Texas, Virginia, Virgin Islands, and Palau.

Loggerheads nest in the continental U.S. from Texas to Virginia; however, their major nesting concentrations are found in Florida, Georgia, South Carolina and North Carolina.
Total estimated loggerhead nesting in the southeastern U.S. is approximately 50,000 to 70,000 nests per year (NMFS and Service 1991). From a global perspective, the southeastern U.S. nesting aggregation of loggerhead sea turtles is important to the survival of the species and is second in size to nesting in Oman, in the Arabian Sea (Ehrhart 1989; NMFS and Service 1991). The loggerhead nesting aggregations in Oman, the southeastern U.S., and Australia account for about 88 percent of nesting worldwide (NMFS and Service 1991).

Habitat
Loggerhead sea turtles inhabit estuaries, bays, lagoons, salt marshes, ship channels and the mouths of large rivers in nearshore coastal waters along the Atlantic, Pacific, and Indian oceans.

Loggerheads are omnivorous and their diet includes a variety of marine invertebrates (e.g., sponges, jellyfish, etc.) and plants; however, they primarily feed on mollusks (e.g., scallops, shellfish and conch), crustaceans (e.g., crabs and shrimp), and *Sargassum* plants (NMFS and Service 1991, Ernst et. al. 1994).

Life History
Loggerhead sea turtle nesting season extends from about May through August in the continental U.S. Female loggerheads are known to nest from one to seven times within a nesting season (average 4.1) at intervals of approximately 14 days and mean clutch sizes can vary from about

100 to 125 eggs. Female loggerheads can nest every 1 to 7 years, but nesting intervals of 2 to 3 years are the most common. Loggerheads are predominantly nocturnal nesters. In general, loggerhead sea turtles follow the breeding chronology outlined below (NMFS and Service 1991):

- Loggerhead hatchlings emerge at night after approximately 50-60 days of incubation, crawl into the surf, and swim offshore where they are believed to become passive migrants on oceanic currents of the North Atlantic Ocean.
- After about 10 to 12 years or once they reach a certain size, juvenile loggerheads move to coastal areas in the western Atlantic.
- Juveniles occupy coastal feeding grounds for a decade or more before maturing and making their first reproductive migration.
- Age at sexual maturity is believed to be between 25 to 30 years.

Population Dynamics
The population of loggerhead sea turtles experienced drastic declines prior to 1980s and new information suggests that the population may again be in decline (Witherington et al. 2009).

Reasons for Listing and Threats to Survival
The loggerhead sea turtle was listed as threatened throughout its entire range on July 28, 1978 (43 FR 32800). Threats to loggerhead populations include loss or degradation of nesting habitat from coastal development and beach armoring, beach nourishment, disorientation of hatchlings by beachfront lighting, excessive nest predation by native and non-native predators, degradation of foraging habitat, marine pollution and debris, watercraft strikes, disease, and incidental take from channel dredging, commercial trawling, longline, and gill net fisheries (NMFS and Service 1991). There is particular concern regarding incidental take of juvenile loggerheads in the eastern Atlantic by longline fishing vessels from several countries, some of which lack regulations regarding impacts towards the species.

Recovery Efforts
Conservation efforts to lessen threats include protection of major nesting beaches; improvements to TEDs; regulations for incidental take among fisheries; and management of favorable coastal and marine habitat (NMFS and Service 1991).

Piping Plover

Species Description
The piping plover is a small shorebird approximately 7 inches in length with a wingspan of about 15 in (Palmer 1967, Service 2009). Plumage and descriptive characteristics include a pale back, nape, and crown, white under parts, a stubby bill, and orange legs. During the breeding season, the legs and bill are bright orange, the bill has a black tip, and a single black breast band and forehead bar are present. In winter, its legs become pale orange, its bill turns black, and the darker bands and bars are lost (Wilcox 1959, Service 2009).

Distribution and Abundance
The historic range of the piping plover has traditionally been divided into a breeding and wintering range. The breeding range encompasses the northern Great Plains and Prairies, the Great Lakes, and the North Atlantic ecoregions of the United States and Canada while the wintering range extends along coastal areas of the U.S. from North Carolina to Texas and portions of Mexico and the Caribbean (Service 2009). The species current range remains similar to its historic range except that piping plovers have been extirpated from several Great Lakes breeding areas (Service 2003).

Recently, Gratto-Trevor et al. (2009) found differences among the wintering distributions of the piping plovers from the four breeding populations. For example, the majority of Prairie Canada individuals appear to winter in Texas, while individuals from the U.S. Great Plains are more widely distributed on the Gulf Coast from Florida to Texas. Information in Gratto-Trevor et al. (2009) also indicates that piping plovers display inter- and intra-annual fidelity to migration and wintering regions (Gratto-Trevor et al. 2009, Service 1996, Service 2003).

Habitat
On their migration and wintering range, piping plovers forage and roost among a mosaic of beach and bay habitats and move locally (within a home range) among these habitats in response to a variety of factors including tidal stage, weather conditions, human disturbance, and prey abundance (Drake 2001, Cohen et al. 2008, Noel and Chandler 2008). Foraging habitats include bayside flats and islands, the intertidal zone of ocean beaches, wrack microhabitats, washover passes (channel cuts created by storm driven water), and shorelines of ephemeral ponds, lagoons, and salt marshes. Roosting habitats include back-beach areas, dunes, wrack microhabitats, inlets, and river mouths as roosting habitats (Arvin 2009, Service 2009). For the purposes of this BO, the back-beach is defined as the backshore area between the foreshore (i.e., surf and strand zone) and dunes, where halophytic communities of plants become increasingly dominant (Britton and Morton 1989).

Piping plovers primarily feed on polychaete worms, amphipods, and insects of benthic and surface invertebrate communities and their diet reflects the relative availability of these prey items at different beach and bayside foraging sites (Service 1988, Zonick 2000).

Life History
Piping plovers spend approximately 3-4 months on their breeding grounds and up to 10 months on their migration and wintering grounds. In general, piping plovers follow this breeding chronology (Service 1988, Haig and Oring 1985, Haig and Oring 1988, Haig and Oring 1988b, Wilcox 1959):

- Piping plovers arrive on their breeding grounds between mid-April and mid-May.
- Egg laying commences the second or third week of May.
- Incubation lasts for 21-35 days.
- Eggs begin to hatch from late May to mid-June.

- Fledging time varies from 21-35 days.
- Breeding adults depart their breeding grounds between mid-July and mid-August and juveniles usually depart a few weeks later.
- Birds migrate to wintering grounds where they spend up to 10 months of the year before returning to breeding grounds.

Critical Habitat

Critical habitat is defined as the specific areas within the geographic area occupied by a species on which are found those physical or biological features that are essential to the conservation of the species (i.e., areas that provide essential life-cycle needs otherwise known as primary constituent elements (PCEs) as defined at 50 CFR 424.12(b)) and that may require special management considerations or protections. Such requirements include, but are not limited to, space for individual growth, and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; and habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species (66 FR 36038).

Critical habitat was designated for all wintering piping plovers on July 10, 2001 (66 FR 36038) to provide sufficient wintering habitat to support the piping plover at the population level and geographic distribution necessary for recovery of the species. This designation included 142 conservation units along the coasts of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas. A total of approximately 165,211 acres or 1,798 miles were designated. There were 37 critical habitat units (approximately 62,454 acres, 797 miles) designated in Texas. These areas were believed to contain the essential physical and biological elements for the conservation of wintering piping plovers, and the physical features necessary for maintaining the natural processes that provide appropriate foraging, roosting, and sheltering habitat components.

The PCEs essential for the conservation of wintering piping plovers are those habitat components that support foraging, roosting, and sheltering and the physical features necessary for maintaining the natural processes that support these habitat components. These PCEs are found in geologically dynamic coastal areas that contain intertidal beaches and flats (between annual low tide and annual high tide) and associated dune systems and flats above annual high tide (66 FR 36038).

On March 20, 2006, the TxGLO challenged the designation of 19 units of critical habitat along the Texas coast. On July 26, 2006, the United States District Court, Victoria County, Texas ruled the Service must vacate, re-evaluate, and reconsider the designation of these units. The Service revised the designation of critical habitat for wintering piping plovers in Texas in 18 specific units on June 18, 2009 (50 CFR 23476). All areas designated as critical habitat in Texas are currently occupied and contain sufficient PCEs to support at least one life history function.

Population Dynamics

Experts generally recognize three separate breeding populations of piping plovers: the Atlantic Coast, Great Lakes, and the Northern Great Plains populations. Historical references from the 1800s suggest that piping plovers were common residents of beaches along the Atlantic coast. However, by the early 1900s unregulated shooting had caused piping plover numbers to decline and birds to become extirpated from some areas of the Atlantic coast. In 1918, Congress enacted the Migratory Bird Treaty Act (MBTA) to promulgate the 1916 convention between the U.S. and Great Britain (i.e., Canada) for the protection of internationally migrating species such as the piping plover. With the federal protection afforded by the MBTA, piping plover numbers recovered by the 1920s (50 FR 50725, Gratto-Trevor and Abbot 2011).

In the early to mid-1940s, piping plover numbers again began to experience decline due to habitat loss and disturbance. Declines were most severe throughout the Great Lakes breeding range where numbers declined to 28 adults by the mid 1980s and where no breeding was reported in Canada between 1978 and 2007 (Gratto-Trevor and Abbot 2011). Intensive management and conservation efforts increased the Great Lakes population size to over 100 individuals in 2006 and annual counts of breeding pairs from 2002 to 2008 suggest that the population experienced an overall increase despite yearly fluctuations in fledgling and survival rates (Gratto-Trevor and Abbot 2011, Service 2009, Service 1988). Similar conservation and management efforts have increased piping plover numbers in other sub-populations.

Since 1991, an international piping plover census (IPPC) has been conducted throughout the breeding and wintering ranges at six-year intervals to establish an index of population size and identify trends in bird numbers. The IPPC attempts to count all birds observed during a two week period and spans thousands of miles of habitat. Based on the results of the IPPCs, Gratto-Trevor and Abbot (2011) estimate that the global population of piping plovers has increased from around 5,500 adults in 1991 to over 8,000 adults in 2006. Furthermore, they illustrate that while the U.S. Atlantic and Northern Great Plains sub-populations are comprised of thousands of individuals, the Great Lakes population is comprised of only a few hundred. Despite these recent increases, Great Lakes and Northern Great Plains piping plover sub-populations remain below breeding pair recovery goals (Service 1988, Service 2003, Service 2009).

Reasons for Listing and Threats to Survival

The Service listed the piping plover as endangered throughout the Great Lakes and threatened throughout the remainder of its range (Northern Great Plains, Atlantic Coast, and wintering grounds) on January, 10 1986 (50 FR 50725). At the time of listing, coastal development and stabilization, dam construction, fresh water withdrawal, and channelization had caused extensive habitat loss and continued to threaten sandy beach and other littoral nesting habitats throughout the breeding range. Increasing human use of beach habitats inhabited by piping plovers had also caused extensive disturbance to nesting activities and mortality of adult and immature piping plovers. Based on these findings, the Service determined the species to be eligible for endangered and threatened status due to a substantial decline in the species and its habitat, shrinkage of its breeding range, and continued threats to the species, its habitat, and its range. These threats continue to persist throughout all breeding ranges.

Since the piping plover's listing under the Act, habitat loss, degradation, and human disturbance on the birds' wintering grounds have emerged as serious threats to the survival of the species. Wintering habitat is threatened by coastal development, shoreline stabilization (revetments, seawalls, berms, nourishment, etc.), and beach management (raking, dune construction, etc.), while the primary mechanisms of human disturbance are foot and vehicular traffic, and domesticated animals (Service 1988, Service 1996, Service 2003). Accelerating sea-level rise and climate change (International Panel on Climate Change 2007) have also been identified as serious threats that may affect the coastal habitats (Scavia 2002) and the survival of the species in the future through loss of habitat (Service 2009). Other threats that have been identified as having a reduced or minor influence on the survival of the species on the wintering grounds include predation, disease, military actions, contaminants, and pesticides (Service 2009). Population viability analyses conducted for piping plovers have also consistently found that the population's extinction risk is sensitive to small declines in adult or juvenile survival rates (Plissner and Haig 2000, Service 2009).

Recovery Efforts

While the majority of piping plover recovery efforts (e.g., productivity monitoring, predator exclosure, captive rearing, etc.) have been focused on enhancing the productivity of birds within the breeding ranges, recent studies have suggested that population growth gained through productivity enhancement can quickly be negated by decreases in survival rates of adult and immature birds on their migration and wintering range (Plissner and Haig 2000, Service 2009, Gratto-Trevor and Abbot 2011). As a result, habitat loss, habitat degradation, and human disturbance on the wintering grounds have emerged as serious threats to the survival of piping plovers. Accelerated efforts to stop, or reduce, loss and degradation to coastal migration and wintering habitat are needed to avoid adverse effects on survival rates and is of a high priority for recovery of all three breeding populations (Service 2009).

High priority actions identified in piping plover recovery plans and five-year-reviews that address habitat loss, degradation, and disturbance within the migration and wintering range are:

1. Protect and manage wintering habitat (Service 1988).

2. Develop a comprehensive conservation plan for piping plovers in the U.S. portion of their migration and wintering range (Service 2009).

    a. Conduct a systematic review of recreational policies and beach management. Develop recommendations to improve management and enforcement of piping plover protections where warranted.

3. Develop, in coordination with land managers, management plans for critical habitat sites or other sites that support or could support non-breeding piping plovers (Service 2009).

a. Develop and implement a conservation plan Taylored to the site's conditions. A range of management measures may include, as appropriate, leash laws and dog free zones, off-road vehicle management, and symbolic fencing of key habitats during periods of high plover use.

b. Develop a recommended piping plover monitoring protocol for each site.

c. Monitor the effectiveness of management measures.

4. Improve consistency in the approach used and recommendations generated for piping plover conservation in section 7 consultations and Coastal Barrier Resources Act reviews across all Service field offices throughout the species U.S. coastal migration and wintering range (Service 2009).

a. Emphasize importance of maintaining natural coastal processes to perpetuate high quality piping plover migrating and wintering habitat.

b. Discourage projects that will degrade or interfere with formation or maintenance of high quality piping plover habitat.

c. Encourage project features to minimize adverse effects on piping plovers and their habitat, including creation and enhancement of habitat in the vicinity of existing stabilization projects.

d. Develop a comprehensive monitoring and management plan template for shoreline stabilization projects on the wintering and migration grounds.

e. Consider effects of climate change when determining long-term impacts.

The survival and recovery of piping plovers is dependent not only the continuation of recovery actions on their breeding grounds but also on the conservation and availability of sufficient habitat within their migration and wintering range.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all federal, state, or private actions in the action area; the anticipated impacts of all proposed federal actions in the action area that have undergone formal or early section 7 consultation; and the impact of state and private actions that are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

Status of the Species within the Action Area

Kemp's Ridley Sea Turtle
Since 1980, approximately 1,185 nests have been documented along the Texas coast (Dr. D. Shaver, National Park Service, personal communication 2011). In 2002, Kemp's ridley nests were first documented along the upper Texas coast and continue to be documented in every subsequent year. Approximately 22 Kemp's ridley nests have been documented this year (as of August 8, 2011) along the upper Texas coast.

On Bolivar Peninsula, 14 Kemp's ridley nests have been documented since 2002 and some of these nests have occurred along the beach adjacent to Rollover Pass. Based on this information, the entire beach adjacent to Rollover Pass should be considered suitable habitat for nesting Kemp's ridley sea turtles. Please note that documented sea turtle nests are based on turtle patrol and public sightings and do not take into account additional nests that have gone undetected or unseen and may represent an underestimate of the true number of nests.

Loggerhead Sea Turtle
In the U.S., the majority of nesting loggerhead sea turtles are found in Florida. However, loggerheads occasionally nest on the Texas coast. Of the 921 sea turtle nests found on the Texas coast between 1979 and 2009, 46 were loggerhead nests, 33 of which were found at PAIS, and only two of which were found on the upper Texas coast (Dr. D. Shaver, National Park Service, personal communication 2009). Although loggerhead sea turtles do not regularly nest along the Texas coast, there is a potential for this species to nest near the project area.

Historical records indicate that there has been one confirmed loggerhead nest found on Bolivar Peninsula. Therefore, while it is possible that a loggerhead could nest in the action area, the probability of a loggerhead nesting within the project area is low. However, suitable nesting habitat appears to be present.

Piping Plover
The Texas coast is a major wintering area for piping plovers. In general, piping plovers begin to arrive along the Texas coast from their respective breeding grounds in July and migrate back to breeding areas in late February. By late May, the majority of piping plovers have left the Texas coast for their breeding grounds (Haig and Oring 1985, Haig and Elliott-Smith 2004).

Since 1991, four international piping plover winter censuses (IPPWC) have been conducted throughout the piping plover wintering range to establish an index of population size and to identify population trends. These censuses counted 1,904 piping plovers in 1991, 1,333 in 1996, 1,042 in 2001, and 2,090 individuals in 2006 along the Texas coast (Haig and Plissner 1993, Plissner and Haig 2000, Haig et. al. 2005, Elliott-Smith et. al. 2009). Along the upper Texas coast, IPPWCs counted 120 piping plovers in 2001 and 551 piping plovers in 2006 (Plissner and Haig 2000, Haig et. al. 2005, Elliott-Smith et. al. 2009). It is important to note that the inter-annual variability among piping plover numbers may reflect the quantity and quality of local habitats available during the time of the survey, unequal survey coverage, or even growths and

declines in the breeding populations that concentrate their wintering distribution in Texas. Furthermore, any singular IPPWC event may underestimate the abundance of piping plovers using a site or region during other months (Maddock et al. 2009, Service 2009).

Piping Plover Critical Habitat Unit TX-37
Piping plover critical habitat unit TX-37 is located on the bayside of Bolivar Peninsula (i.e., Rollover Bay) and is bounded by the towns of Gilchrist to the east and the Gulf beach of the Bolivar Peninsula to the south (Appendix C). The landward boundary is the line indicating the beginning of dense vegetation, and the bayside boundary is the mean lower low water (MLLW). This unit includes flats on the State-owned land managed by the TxGLO known as wind tidal flats and captures the intertidal complex of the bay. Maddock (2010) surveyed this area in 2009 and confirmed piping plover use of this critical habitat unit.

The PCEs of intertidal flats include sand and mud flats with no or very sparse emergent vegetation. In some cases, these flats may be covered or partially covered by a mat of blue-green algae. Adjacent unvegetated or sparsely vegetated sand, mud, or algal flats above high tide are also important, especially for roosting piping plovers. Such sites may have debris, detritus, or microtopographic relief offering a refuge from high winds and cold weather. These habitat components are a result of dynamic geological processes that are controlled by erosion, accretion, succession, and sea level change. The integrity of the components depends upon daily tidal events and regular sediment transport processes, as well as episodic, high magnitude storm events; these processes are associated with the formation and movement of coastal landforms (66 FR 36038).

Factors Affecting Species Environment within the Action Area

Rollover Bay and Rollover Pass
Several studies indicate that sediments traveling within the longshore transport system flow into Rollover Pass and settle in the bay to create sand and mud flats (i.e., flood tidal delta shoals). Studies of historical shoreline change along the Gulf-facing beach also suggest that the natural rate of shoreline retreat on Bolivar Peninsula was about 5-ft per year (Bales and Holley 1985). The inflow of sediment into Rollover Pass has caused this rate to increase to anywhere from 6 to 13.5 ft per year west of the pass (Mason 1981, Bales and Holley 1985, Watson 1999). Beaches closer to the pass appear to be eroding at higher rates and estimates of the length of shoreline that is experiencing increased erosion range from 3/4 of a mile to 6 miles west of the pass. Furthermore, estimates of the amount of sediment transported through the pass vary considerably and range from 18,000 cubic yards per year to 290,000 cubic yards per year (Watson 1999). Natural rates of shoreline retreat have also been altered by the construction of the Bolivar Jetties at the Galveston entrance channel.

On the northeastern end of Bolivar Peninsula, the Gulf-facing beach is narrow, steep, and covered by fine sands with patches of estuarine shells. Erosional rates dissipate along a gradient to the southwest of the pass where the beaches generally become broader, sandier, and backed by dunes. The construction of the Bolivar Jetties at the southwestern tip of the peninsula has caused

millions of cubic yards of sediment to accumulate on the updrift end of the north jetty and accretion on the beaches to the east of the jetties (Morton 1997, Anderson 2007, Heilman 2008).

Development

Bolivar Peninsula is moderately developed (relative to Galveston Island) along the beach, beachfront, and uplands. Where the beach or beachfront has been developed, it is likely that sea turtle and piping plover beach habitats have been displaced or degraded. Development on the beach (back-beach, dunes, etc.) can cause immediate and permanent displacement of habitat and can disrupt natural shore zone processes that are essential to the formation and maintenance of the beach. For example, beachfront housing can restrict the natural landward migration of dunes, which coincide with the migration of the beach (Anderson 2007).

Beachfront developments also increase the presence of humans, pets, and vehicles on nearby beaches which can disturb the normal nesting, foraging, or roosting behaviors of sea turtles and piping plovers that also use those beach habitats (Arvin 2009, NMFS et al. 2010, Service 2009). In addition, artificial lighting associated with development can disorient sea turtle hatchlings that emerge at night and cause them to meander along the beach and prolong their exposure to predators, or mistakenly enter nearby roadways and be crushed (Hosier et al. 1981, NMFS et al. 2010).

Roadways located on or near beaches can act as hazards to sea turtles and hatchlings and roadside ditches or other topographic modifications can also trap nesting turtles or hatchlings and potentially result in the death of individuals.

Beach Use

The authority of the Texas Open Beaches Act grants the public free and unrestricted access to state-owned beaches. Typical beach use activities include, but are not limited to, walking, jogging, walking pets, fishing, camping, recreating, and vehicular driving.

Seasonal increases in human presence and beach use during summer months coincide with the sea turtle nesting season and can negatively affect sea turtles and their reproductive success in numerous ways. Pedestrian and vehicular traffic can crush sea turtle nests or hatchlings and can compact beach sands which can hinder the ability of hatchlings to emerge from nests (Mann 1977, Ernest 1998, NMFS et al. 2010). Furthermore, sediments surrounding sea turtle egg chambers (nests) greatly influence the incubation environment (e.g., temperature, moisture content, and gas exchange) within the nest (Ackerman et al. 1985). Alteration of the character (grain size, mineralogy, substrate distribution, etc.) of the sand above nests through compaction or manipulation can influence this environment and affect hatching and emerging success (NMFS et al. 2010). Mortimer (1990) has shown that the physical characteristics of beach sediments can affect the nesting behavior of female sea turtles and their ability to excavate nests. Vehicular traffic that changes the character of beach sands can therefore also affect the nesting capabilities of sea turtles. Similar to roadside ditches, ruts and ridges created by vehicles can also hinder or trap nesting turtles and hatchlings. Trapped turtles are susceptible to injury or

death from predation, dehydration, and crushing by other vehicles (Hosier et al 1981, NMFS et al. 2010).

Human and vehicular presence can also disturb nesting sea turtles and foraging or roosting piping plovers and deter their use of suitable beach habitats. Such disturbances can interfere with the foraging and roosting activities of piping plovers and hinder their ability to accumulate the necessary energy reserves required to survive the migration back to breeding grounds (Goss-Custard et al. 1996, Burger 1994, Thomas et al. 2002, Service 2009). Increases in the densities of domesticated animals on the beach are also associated with human presence and can disturb sea turtles and piping plovers (Arianoutsou 1988, NMFS et al. 2010).

Dune and Beach Management

The Texas Open Beaches Act requires each county that contains a public beach within its boundary to adopt a plan for preserving and enhancing the beach. Our review of the Texas Administrative Code (31 TAC § 15.1-15.36) and the Galveston County Dune Protection and Beach Access Plan (Galveston County 2006) indicates that typical beach and dune management and construction activities employed or authorized by the county include, but are not limited to, the removal of debris from the beach by hand-picking, raking, or by mechanical means and dune construction with heavy machinery. Based on our experience and field observations, dune and beach management activities occur most often along the beach fronting development and after storm events and are employed or authorized at various schedules (i.e., daily, weekly, monthly).

Beach wrack (material deposited onto beaches by wave and swash action) serves as an important foraging and roosting microhabitat for piping plovers (Lott et al. 2009); furthermore, beach wrack traps windblown sand and helps to stabilize the beach (Nordstrom 2011, Service 2009). Beach cleaning activities that remove wrack can remove important piping plover habitats and destabilize the beach. Debris raking can also remove the upper layer of sand over turtle nests causing overheating (NMFS et al. 2010).

The use of heavy machinery on the beach can also injure or kill sea turtles by crushing nests and compacting sand above nests thereby hindering the emergence of hatchlings. Heavy machinery can also create ruts and ridges in the sand, which may hinder or trap nesting turtles or emerging hatchlings. The disposal of debris on top of nests could prevent the emergence of hatchlings or alter the sensitive environment of the incubation chamber (Hosier et al. 1981, Mann1977, NMFS et al. 2010).

Bolivar Roads Jetties

The Bolivar Jetties were constructed in the late-1800s. Overtime, millions of cubic yards of sediment have accumulated on the updrift end of the north jetty and estimates suggest that the shoreline accretes at a rate of 12 to possibly more than 17 ft per year for some distance to the east of this jetty (Bureau of Economic Geology 2005, Anderson 2007, Port Bolivar 2011, Watson 1999).

This accumulation of sediment has created a large expanse of tidal flats known as Bolivar Flats. Bolivar Flats is formally recognized as a bird area of international importance by the Western Hemisphere Shorebird Reserve Network (WHSRN) and is estimated to host at least 100,000

birds annually (WHSRN 2011, Skagen et al. 1999, Withers 2002). Piping plover surveys along the upper Texas coast have also consistently documented moderate to high piping plover use of this habitat (i.e., approximately 80-100 individuals counted during various surveys) (Anderson 2009, Maddock 2010, Service 1996) and the Service designated this area as wintering piping plover critical habitat (Unit TX-37) in 2001 (66 FR 36038).

Beach nourishment

Beach nourishment involves the importation of sand onto an eroding beach to ameliorate erosion and increase width. The beaches adjacent to Rollover Pass have been nourished multiple times since the mid-1950s to ameliorate the increased erosion rates caused by the pass. The earliest records of beach nourishment date back to 1957 when the Game and Fish Commission placed approximately 6,000 cubic yards of fill along the Gulf shore west of the pass (Taylor Engineering 2010). The latest records indicate that in 2000, the Corps issued Department of Army (DA) permit 21755 (SWG-2007-00391) authorizing Galveston County to dredge up to 300,000 cubic yards of sand (or 35 acres) from Rollover Bay and the GIWW. Galveston County has nourished the beaches adjacent to Rollover Pass almost annually between 2000 and 2008 (Taylor Engineering 2010). We also note that the Texas Department of Transportation nourished the beach between High Island and Rollover Pass during the summer of 2011.

Increasing beach width through nourishment can benefit nesting sea turtles and piping plovers by increasing the amount of nesting, foraging, and roosting habitat. However, increasing beach width can also restore (or enhance) the recreational capacity of the beach and induce beach management practices which can harm or harass sea turtles and piping plovers.

Use of sand sources that differ in grain size and mineralogy (e.g., silt, clay, sand) from native sands can alter the character of the beach. Such changes can affect the reproduction of sea turtles by altering the normal incubation environment within the nests as well as the nesting capabilities of female sea turtles (Ackerman et al. 1985, Mortimer 1990, NMFS et al. 2010).

Several studies have shown that the placement of large volumes of sand onto a beach can cause a temporary decline in infaunal abundance and potentially degrade the foraging habitat value for shorebirds (Atlantic States Marine Fisheries Commission 2002). Infaunal organisms (organisms that live within the substrates) of beaches and bay flats are an important food source for piping plovers.

Geotextile Tubes

After hurricane Frances in 1996, Galveston County obtained Federal disaster funds to reconstruct the dune line along Gilchrist, TX with geotextile tube cores (geotubes) to protect upland development and infrastructure. The county installed geotubes along a 27,000-ft stretch of shoreline to the east and west of Rollover Pass. The geotubes had a circumference of 9-m and were placed at a contour of approximately +1.5 NAVD (North American Vertical Datum of 1988); the geotubes were filled with and encased in sand to reconstruct dune topography (Heilman et al. 2008).

In general, the placement of shore-parallel structures (i.e., revetments, seawalls, geotubes, etc.) on the beach can result in the displacement of beach habitat along the length of the structure. Indirect loss of beach can also occur overtime due to interactions between the shore-parallel structure and natural shore zone processes. For example, passive erosion occurs when a shoreline undergoing net-long term erosion is fixed by a shore-parallel structure that establishes a position in the sand against which the beach narrows rather than retreats (Tait and Griggs 1990, Hall and Pikey 1991, Griggs 2005).

Hurricane Ike
Hurricane Ike made landfall on the upper Texas coast on September 13, 2008. The most severely affected areas were the point of landfall on the eastern end of Galveston Island and the coastal area northeastward to the Sabine River. Pre- and post-storm coastal change analyses indicate that the storm caused substantial shoreline and dune erosion, beach volume losses, and inland sand deposition on Bolivar Peninsula. Dune elevations were reduced up to 3 m at Crystal Beach, Texas and the shoreline was eroded up to 150 m at Gilchrist, Texas (Doran et al. 2009). Post-storm cleanup, reconstruction, and shoreline stabilization activities continue on Bolivar Peninsula and are likely to continue throughout the duration of the project.

Deepwater Horizon Oil Spill
On April 20, 2010, an explosion on the Deepwater Horizon MC252 drilling platform in the Gulf of Mexico caused oil to begin spilling into Gulf waters. Contaminants may cause lethal and sub-lethal effects (e.g., physiological, behavioral and reproduction impairment) to birds and sea turtles and can result in a decline of benthic infauna, and the foraging quality of beach habitats to shorebirds and piping plovers (Service and NMFS 1992, Chapman 1984, Service 2009). Compared to other locations along the Gulf of Mexico, a relatively minor amount of oil was documented along the beaches of Bolivar Peninsula during the summer of 2010.

Federal Actions with Permitted Piping Plover and Sea Turtle Take
In 2010, the Federal Emergency Management Agency (FEMA) proposed to fund Galveston County for the reconstruction of five county roads adjacent to or directly on the beaches of Bolivar Peninsula. Through consultation with the Service, FEMA determined that the project was likely to adversely affect piping plovers and sea turtles due to the adverse effects posed by roadway construction activities and the displacement of habitat, and requested that the Service initiate formal consultation under the ESA. Under Section 7 of the ESA, the Service permitted the harm of an unquantifiable number of undiscovered nests, eggs, or hatchlings, the harassment of 2 Kemp's ridley turtles and unquantifiable number of piping plovers, and the take of 4.056 acres of Kemp's ridley sea turtle and piping plover nesting and roosting habitat, respectively (Service 2010). A complete administrative record of this consultation is on file at the Clear Lake Ecological Services Field Office in Houston, Texas.

In 2011, the Corps permitted Samson Lone Star, LLC. for three dimensional seismic survey activities throughout a 494-square mile area that includes uplands, wetlands, and open water habitats within and adjacent to the Gulf Intracoastal Waterway, Galveston Bay, East Bay, Trinity Bay, nearshore waters of the Gulf of Mexico, Bolivar Peninsula and Galveston Island in Chambers, Jefferson, and Galveston Counties , TX. The applicant will detonate explosive

charges at depths of 110-ft and use air gun releases to conduct seismic surveys throughout the project area. Through consultation with the Service, the Corps determined that these seismic activities were likely to adversely affect piping plovers and sea turtles within the project area and requested that the Service initiate formal consultation under the ESA. Under Section 7 of the ESA, the Service permitted the take (through harm or harassment) of 1 Kemps ridley sea turtle, 1 Loggerhead sea turtle, 1 Kemp's ridley sea turtle nest, 1 Loggerhead sea turtle nest and an unknown number of piping plovers (Service 2011). A complete administrative record of this consultation is on file at the Clear Lake Ecological Services Field Office in Houston, Texas.

EFFECTS OF THE ACTION

The Service has sole jurisdiction over sea turtles when on land and all consultations under section 7 of the Act involving sea turtle nesting beaches shall be the responsibility of the Service (see http://www. nmfs.noaa.gov/pr/pdfs/species/turtle_mou.pdf). Therefore, we have only evaluated those proposed actions that take place on land for effects to sea turtles and piping plovers.

Factors to be Considered

Project activities will occur on Bolivar Peninsula at Rollover Pass. We expect the duration of the construction activities to coincide with at least one sea turtle nesting season and one to two piping plover migration and wintering seasons.

Nature of the effect

Sea Turtles

The work activities associated with the closure of Rollover Pass could cause direct harm to adult sea turtles, hatchlings, or eggs through crushing, injuring, or killing. We expect these activities to cause direct harassment of adult sea turtles and hatchlings through the following mechanisms: disturbance of normal adult nesting behaviors, disturbance of normal hatchling behaviors.

Alternatively, the beach quality sand placed south of Highway 87 could benefit sea turtles by creating additional beach habitat. The closure of Rollover Pass could also benefit sea turtles by reducing shoreline erosion rates along the beach habitats to the east and west of Rollover Pass.

Piping Plovers

We anticipate the closure of Rollover Pass to alter sediment, tidal, and water quality characters within Rollover Bay; thereby potentially altering the habitat components and PCEs that support piping plover foraging, roosting, and sheltering behaviors and the physical features necessary for maintaining the natural processes that support these habitats. Alteration of these critical habitat components can also result in the direct harm of piping plovers through the impairment or preclusion of normal feeding and sheltering behaviors necessary to support survival during the wintering, migration, and/or breeding period.

We also anticipate that project activities (e.g., human and vehicle presence on the beach, noise, vibration, etc.) will disturb piping plover feeding and sheltering behaviors. Such effects can harm piping plovers through the loss of foraging and resting opportunities and impair or preclude normal feeding and sheltering behaviors necessary for survival of the wintering, migration, and breeding period.

Alternatively, the beach quality sand that project proponents propose to fill Rollover Pass with can benefit piping plovers by creating additional beach habitat. The closure of Rollover Pass could also benefit piping plovers by reducing shoreline erosion rates along beach to the east and west of Rollover Pass to natural levels.

Duration
The closure of Rollover Pass will alter various physical and chemical characters of Rollover Bay and Critical Habitat Unit TX-37 permanently. The closure of Rollover Pass is a one-time occurrence and we expect the direct effects of the activities associated with this action (i.e., noise, vibrations, vehicles and construction workers on the beach) to be short-term in nature.

Disturbance frequency, intensity, and severity
The closure of Rollover Pass could alter the tidal and water quality characters and sediment dynamics within Rollover Bay or Critical Habitat Unit TX-37 permanently. Alteration of water quality (e.g., salinity) characters is expected to affect the entirety of Rollover Bay while the extent to which tidal and sediment dynamics will be modified are unknown. The disturbance effects caused directly by work activities will be temporary.

Analyses for effects of the action

<u>Kemp's Ridley and Loggerhead Sea Turtles</u>

Beneficial Effects
Beneficial effects are those effects that are wholly positive without any adverse effect to listed species or designated critical habitat. We do not expect any wholly positive effects to occur from this project.

Direct Effects
Direct effects are those direct or immediate effects of a project on the species or its habitat. The use of heavy machinery to close Rollover Pass and to grade fill to match surrounding beach grades can injure or kill sea turtles and hatchlings through crushing as mechanized equipment traverses suitable sea turtle nesting habitat on adjacent beaches. Externally applied surface pressure from construction equipment can also crush eggs and compact the sand above nests, making it difficult or impossible for hatchlings to emerge (Mann 1977, NMFS et al. 2010).

Construction practices that create trenches, ruts, and ridges on or near the beach may impede or trap nesting turtles and hatchlings from traversing an area to reach suitable habitat. Trapped

turtles are susceptible to injury or death from predation, dehydration, and crushing by vehicles (Hosier et al. 1981, NMFS et al. 2010).

Even when turtle monitors are employed to locate nests, Schroeder (1994) found that monitors can misidentify about seven percent of nesting attempts as false crawls (when a female turtle comes ashore to nest but returns to the water without nesting).

Piping Plover

Beneficial Effects
We expect the closure of Rollover Pass to restore the longshore transport of sand to the southwestern portion of Bolivar Peninsula and to reduce beach erosion rates to the west and east of the pass. We do not expect any wholly positive effects to occur from this project.

Direct Effects
Construction activities within or near critical habitat unit TX-37 (i.e., Rollover Bay) and the Gulf facing beach can disturb piping plovers and displace birds onto other feeding or roosting areas. Shorebirds that are repeatedly flushed in response to disturbance expend energy on costly shore flights (Nudds and Bryant 2000). Disturbance can also result in less time roosting and foraging for energy (i.e., calories) acquisition by causing piping plovers to spend more time in alert postures or fleeing from disturbance (Burger 1994, Lafferty 2001, Thomas et al. 2002). In addition, disturbance can be comparable to habitat loss if birds cannot habituate to the disturbance and move to other habitats permanently. Such displacement can lead to an increase in bird density (and competition) in other habitats, roost abandonment, and local population declines (Goss-Custard 1995, Burton et al. 1996, West 2002). Ultimately, the effects of disturbance can deplete acquired energy and hinder the acquisition of energy reserves necessary to maintain body condition and survive winter and/or migration (Nudds and Bryant 2000,Maillett and Weber 2006, Service 2009).

Indirect Effects
The closure or Rollover Pass has the potential to result in the loss and/or degradation of piping plover foraging and roosting habitat in Rollover Bay (See *Critical Habitat Analysis* below). Habitat loss can result in a reduction of the overall amount of foraging and/or roosting habitat on Bolivar Peninsula. Habitat loss can displace birds onto other feeding and sheltering areas leading to an increase in bird density (and competition) in these habitats (Goss-Custard 1995, West 2002). Habitat degradation can also reduce the quality of the habitat components that support piping plover foraging, roosting, and sheltering within Rollover Bay (See *Critical Habitat Analysis* below). A reduction in these components can reduce or limit the birds' acquisition of energy and hinder them from accumulating the energy reserves to maintain body condition and survive winter and/or migration and may lead to reduced reproductive success on the breeding grounds (Nudds and Bryant 2000, Maillett and Weber 2006, Service 2009).

Alternatively, we expect the closure of Rollover Pass to restore the longshore transport of sand to the southwestern portion of Bolivar Peninsula and to reduce beach erosion rates to the west and

east of the pass. A reduction in beach erosion rates can reduce the loss of sea turtle nesting habitat. Moreover, a reduction in erosion rates can reduce the frequency of nourishment activities that are necessary to maintain beach width and thereby reduce the likelihood that such activities might harass or harm sea turtles. A reduction in erosion rate should also reduce the loss of piping plover foraging and roosting habitat. Moreover, a reduction in erosion rates should reduce the frequency of beach nourishment activities and dredging activities that are necessary to maintain navigable depths in the GIWW. A reduction in the frequency of these activities should reduce the likelihood that such activities might harass piping plovers or degrade piping plover habitat (see *Beach nourishment* discussion above).

Critical Habitat Analysis

This biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat.

Piping plover critical habitat unit TX-37 (i.e., Rollover Bay) adjoins Rollover Pass on the bayside of Bolivar Peninsula. The landward boundary is the line indicating the beginning of dense vegetation, and the bayside boundary is the MLLW. This unit includes flats on State-owned land managed by the TxGLO that are occupied by piping plovers (Maddock 2010).

Several studies indicate that sediments within the longshore transport system flow into Rollover Pass and settle in Rollover Bay to create sand and mud flats (i.e., flood tidal delta shoals) (Prather and Sorensen 1972, Bales and Holley 1985, Morton 1997, Watson 1999). Studies also show that inflows from the Gulf of Mexico, via Rollover Pass, influence the tidal characters and benthic invertebrate community of the bay (Mason 1981, White 1985). Based on this information, the closure of Rollover Pass has the potential to alter several habitat components of critical habitat unit TX-37 that support foraging, roosting, and sheltering of piping plovers and the physical features necessary for maintaining the natural processes that support these habitat components.

The characteristics of bay sediments (e.g., distribution, grain size, etc.) are influenced by several factors such as the nearness of inlets, local wave, wind, and current conditions (i.e., energy), and water depth (Britton and Morton 1989). The closure of Rollover Pass will eliminate flood and ebb tidal delta characters including the inflow of sand and outflow of suspended material. Elimination of flood tidal characters will reduce tidal velocities (and energy) and water inflows from the Gulf of Mexico (Taylor Engineering 2010). As shores become more protected, they have the potential to become finer grained and accumulate more organic matter (Nybakken 2001); in the absence of tidal inflows, East Bay is also expected to become the primary determinant of water quality within Rollover Bay (Taylor Engineering 2010). A lower energy environment might also encourage the growth of marsh habitat from the landward boundary of the critical habitat unit (Taylor Engineering 2010). Furthermore, Parchure (2000) collected suspended sediment samples from the water column in Rollover Bay and noted that total suspended sediment concentrations are higher on the ebb cycle than on the flood cycle. Suspended materials include clay, silt, sand, and organic substances that can settle in the bay and

potentially contribute to the productivity of critical habitat unit TX-37. With the elimination of sandy inflows, erosional forces from GIWW barge traffic and sloughing (CLESFLO personnel observations, Parchure et al. 2000) can result in the loss of tidal flat habitat. These changes have the potential to affect the sediment characteristics and water quality within critical habitat unit TX-37. They also have the potential to result in the loss of habitat through erosion or encroachment of vegetation.

Mason (1981) compared tidal data from Rollover Bay from pre- and post-inlet periods and found that the construction of Rollover Pass reduced tidal lag and increased tidal range (i.e., daily higher high water minus lower low water). Likewise, we expect the closure of Rollover Pass to alter the tidal regime within Rollover Bay. Wind is also known to augment the tidal regime in Rollover Bay because of its shallow depths. For example, a wind to the north brings sea water inside the bay, piling water to abnormally high levels, and wind blowing southward empties the bay and exposes shallower areas (Parchure et al. 2000). Based on this information, we expect the closure of Rollover Pass to alter the tidal regime within Rollover Bay and to affect the physical (e.g., amount of habitat exposed, duration of habitat exposed, etc.) characteristics of critical habitat unit TX-37.

Tidal flat benthic invertebrate communities are strongly influenced by the sediment characteristics, tidal regime, exposure (e.g. high energy vs. low energy), and the water quality (e.g. salinity,) of these habitats (Britton and Morton 1989). The grain size of sediments can influence the abundance of deposit verses suspension feeders in tidal flats (Nybakken 2001). Tidal regime and inundation can influence distribution of invertebrates (Sears and Muller 1989). Due to a connection with offshore environment, inlets are also characterized by waters of high salinity and energy and offshore organisms can find a home in inlet sediments (Britton and Morton 1989). As indicated above, the closure of Rollover Pass is likely to alter the sediment characters, tidal regime, and exposure of Rollover Bay; pass closure is also expected to reduce salinity (Tyler Engineering 2010). These changes have the potential to affect and to alter the invertebrate community (e.g. abundance, distribution, makeup, etc.) within critical habitat unit TX-37.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area considered in this BO. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Galveston County has published a development plan for Bolivar Peninsula, entitled the *Bolivar Blueprint* (Galveston County 2009). This document establishes goals and objectives for the enhancement of the housing and tourism industries on Bolivar Peninsula. Local and private actions proposed on Bolivar Peninsula include the development of a major (about 250 homes) beach front housing project, two-mile long beach districts for entertainment ventures and private

commercial development, transportation and infrastructure improvements, and comprehensive erosion control, beach restoration, and dune restoration plans (Galveston County 2009).

CONCLUSION

After reviewing the current status of the Kemp's ridley sea turtle, the loggerhead sea turtle, and the piping plover; the environmental baseline for the action area; the effects of the proposed action; the cumulative effects; and the conservation and reasonable and prudent measures associated with this project, it is the Service's BO that the action, as proposed, is not likely to jeopardize the continued existence of the Kemp's ridley sea turtle, the loggerhead sea turtle, and the piping plover.

Kemp's Ridley Sea Turtle
The Service finds that the proposed action is not likely to jeopardize the Kemp's ridley sea turtle for the following reasons:

1. The Kemp's ridley sea turtle nesting population is exponentially increasing, which may indicate a similar increase in the population as a whole (NMFS et al. 2010).

2. Fourteen Kemp's ridley sea turtle nests have been confirmed along the beaches of Bolivar Peninsula to date. This number is much lower than the number of nests found annually in Mexico (approximately 22,000 in 2011) where the majority of Kemp's ridley sea turtles continue to nest.

3. The conservation measures proposed by the Corps and the TxGLO will reduce the likelihood that nesting Kemp's ridleys, their eggs, or hatchlings will be harmed by the project.

Loggerhead Sea Turtle
The Service finds that the proposed action is not likely to jeopardize the loggerhead sea turtle for the following reasons:

1. Between 1994 and 2010, only 1 loggerhead sea turtle nest has been confirmed on Bolivar Peninsula.

2. The conservation measures proposed by the Corps and the TxGLO will reduce the likelihood that nesting loggerheads, their eggs, or hatchlings will be harmed by the project.

Piping Plover
Piping plover surveys in Rollover Bay indicate that several birds use this critical habitat unit during the overwintering period (Maddock 2010). Consequently, the realization of the full magnitude of effects posed by the project can result in the incidental take of several piping

plovers through loss of survivability. However, we find that the proposed action is not likely to jeopardize the piping plover for the following reasons:

1. The piping plover population appears to be stable (Gratto-Trevor and Abbott 2011, Service 2009).

2. On-going management and recovery efforts within the breeding range will continue to sustain and possibly enhance reproductive success.

3. The conservation measures proposed by the Corps and the TxGLO will reduce the likelihood that piping plovers will be harmed and/or harassed by project activities.

4. The reasonable and prudent measures that will be carried out by the Corps and the TxGLO include measures to monitor piping plovers and potential changes to critical habitat unit TX-37 and to mitigate adverse effects that are caused by the closure of Rollover Pass.

Piping Plover Critical Habitat
The Service finds that the proposed action is not likely to result in the destruction or adverse modification of designated critical habitat for the following reasons:

1. Approximately 1,797 miles of shoreline along the southeastern Atlantic and Gulf of Mexico coasts are designated as critical habitat for the wintering population of piping plovers (Service 2001) and the reasonable and prudent measures that will be carried out by the Corps and TxGLO include measures to monitor potential changes to critical habitat unit TX-37 and to mitigate adverse effects that are caused by the closure of Rollover Pass.

Please be advised that the conclusions of this BO are based on full implementation of the project as described in the "Description of the Proposed Action" section of this document, including any Conservation Measures that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take

that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be undertaken by the Corps and TxGLO so that they become binding conditions of any grant or permit issued to the project proponents, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require the TxGLO and other project proponents to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps and project proponents must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE ANTICIPATED

Sea Turtles
A review of our files indicates that a total of 14 Kemp's ridley nests have been confirmed along the beaches of Bolivar Peninsula since 2004. While project proponents have committed to conservation measures and monitoring, take may still occur because monitors can misidentify about seven percent of nesting attempts as false crawls (Schroeder 1994).

Based on the information within our files and within the BA (including the conservation measures proposed by project proponents), the Service anticipates that 1 adult Kemp's ridley sea turtle and eggs or hatchlings from1 sea turtle nest will be taken directly as a result of this action. Specifically, incidental take resulting from this project is expected to be in the form of harm and/or harassment from:

1. Disruption of breeding activities from noise, vibrations, heavy machinery and human presence on the beach.

2. Entrapment of adults and hatchlings in trenches and vehicle ruts and trenches.

3. Crushing, collision, and burial of sea turtles and/or nests and compaction of sand over nest with heavy equipment.

The Service anticipates that the incidentals take of sea turtle hatchlings and/or eggs from these effects will be difficult to detect for the following reason(s):

1. Turtle nests are difficult to find, natural factors, such as rainfall, wind, and tides and human-caused factors, such as pedestrian traffic, may obscure crawls, resulting in nests being destroyed because they were missed during monitoring surveys.

2. The total number of hatchlings and eggs per undiscovered nest is unknown.

3. The reduction in percent hatching and emerging success per nest over an undisturbed nest site is unknown.

4. An unknown number of females may avoid the project beaches and be forced to nest in less optimal areas.

Piping Plover
Recent surveys show that piping plovers occupy the tidal flats of critical habitat unit TX-37 (i.e., Rollover Bay) (Maddock 2010). Based on this information as well as the information within the BA and associated consultation documents, the Service anticipates that an unquantifiable number of piping plovers will be taken directly as a result of this proposed action. In addition, the Service anticipates that an unquantifiable amount of piping plovers and critical habitat could be taken as a result of the indirect effects of this proposed action. Incidental take associated with this project is expected to be in the form of harm and/or harassment from:

1. Disruption of feeding and sheltering behaviors resulting from noise, vibrations, heavy machinery and human presence on the beach and back bay mudflats.

2. Reduction in feeding and sheltering opportunities or capabilities due to the loss and/or degradation of foraging and roosting habitat.

3. Temporary or permanent reduction in survivability of wintering piping plovers resulting from the lost and/or degradation of foraging and roosting habitat.

The Service anticipates that the incidental take of piping plovers from these effects will be difficult to detect for the following reason(s):

1. Finding dead or impaired specimens is unlikely because the effects of disturbance or loss of habitat (e.g., poor body condition, death, etc.) may not have immediate and conspicuous effects and may be realized later in time during the wintering, migration, or breeding periods.

However, take of this species can be anticipated by the loss of critical habitat because:

1. Surveys show that piping plovers occupy the tidal flats of critical habitat unit TX-37 (i.e., Rollover Bay) during their wintering period.

2. Habitat loss and habitat degradation can reduce the quantity and quality of habitat components that support piping plover foraging, roosting, and sheltering. A reduction in these components can reduce or limit the bird's acquisition of energy and hinder them from accumulating the energy reserves to maintain body condition and survive winter and/or migration.

Please be advised that incidental take only covers take of the species within the action area.

EFFECT OF THE TAKE

In the accompanying BO, the Service has determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

Pursuant to section 7(b)(4) of the Act, the Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize the amount of incidental take of nesting sea turtles, hatchlings, sea turtle eggs, piping plovers, and piping plover critical habitat.

1. Implement all conservation measures in the project plans.

2. Ensure that all parties involved in the project (i.e., project proponents, contractors, work crew, monitors, etc.) fully understand the endangered species protection measures detailed in the incidental take statement and conservation measures.

3. Establish and implement a protocol to notify the CLESFO immediately of direct take of sea turtles, hatchlings, sea turtle eggs, or nests.

4. Notify CLESFO in writing upon the initiation and completion of work activities.

5. Develop and implement a plan to monitor changes to critical habitat unit TX-37 and/or piping plover use of critical habitat unit TX-37 so that potential adverse affects that are caused by the closure of Rollover Pass can be identified and mitigated accordingly. See the Service Mitigation Policy (46 FR 7656) for further details.

6. Modify DA Permit 21755 (SWG-2007-00391) to preclude dredging activities within Rollover Bay.

7. Post public education signs at the project site that informs the public about piping plovers and their habitat.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Corps and the TxGLO shall comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline reporting or monitoring requirements. These terms and conditions are non-discretionary.

1. As detailed in the project description the Corps and TxGLO will implement measures to avoid and minimize direct impacts to sea turtles and piping plovers.

2. The TxGLO in coordination with the Corps shall insure that contractors, work crews, and the sea turtle and piping plover monitors shall be properly trained to identify sea turtles and piping plovers prior to the commencement of work each time work is to be conducted.

3. In the event that activities result in the direct take (killing, harming, or maiming) of a sea turtle, hatchlings, or eggs, the person(s) responsible for monitoring sea turtles shall notify CLESFO (281/286-8282) and Dr. Donna Shaver (National Park Service/PAIS), and the Texas Sea Turtle Stranding Coordinator (361/949-8173, ext. 226). The Corps and other project proponents will develop a standard methodology for notifying the aforementioned contacts. The handling of dead or stranded sea turtles found during the monitoring program will be established by the Sea Turtle Coordinator and the Service. This methodology shall be directed at determining the cause of death and ensuring that all data is recorded. The finder has the responsibility to ensure that evidence intrinsic to the specimen is not disturbed.

4. Notify CLESFLO in writing of the initiation of work activities. Upon completion of the project, a report describing any deviations from the description of the proposed action (see description of proposed action section above), conservation measures implemented during project activities, the success of such measures, any incidents that may have occurred, and any recommendations on improvements to those measures shall be submitted to CLESFO. Reports should be sent to: U.S. Fish and Wildlife Service, Clear Lake Ecological Services Field Office, ATTN: Field Supervisor, 17629 El Camino Real Suite 211, Houston, Texas 77058.

5. Piping plover and critical habitat unit TX-37monitoring requirements:

    a) Conduct piping plover surveys at Rollover Bay within the migration and wintering season prior to, throughout, and after closure of Rollover Pass for five consecutive years after the closure of Rollover Pass. See document entitled *Rollover Pass Piping Plover Survey Recommendations* in Appendix D for more details.

b) Collect high-resolution aerial photographs prior to and after the closure of Rollover Pass annually for five consecutive years.

c) Collect high-resolution LIDAR data prior to and after the closure of Rollover Pass at two-year intervals for five consecutive years (i.e., three collection events: one event prior to closure, another event during year three, and the last event during year five). Use LIDAR data to identify changes in tidal flat habitat and mean lower low water level.

d) Determine through survey the mean lower low water level prior to and after the closure of Rollover Pass at two-year intervals for five consecutive years (i.e., three collection events: one event prior to closure, another event during year three, and the last event during year five).

e) Use tidal gauges to assess pre- and post-closure tidal characters in Rollover Bay.

f) Conduct benthic invertebrate surveys at Rollover Bay within the piping plover migration and wintering season prior to, throughout, and after closure of the pass for five consecutive years. See document entitled *Rollover Pass Benthic Invertebrate Survey Recommendations* in Appendix E for more details.

g) Monitoring reporting requirements:

   a. Incorporate all data collected into an appropriate database, preferably one for piping plovers and one for benthic prey species.

   b. Provide annual reports to the CLESFLO Annual reports should include data sheets, maps, a copy of the database, and the progress and initial findings of piping plover and benthic community surveys.

   c. If the TxGLO or Corps foresees any problematic issues that would require a change in the recommended survey schedule due to work conditions or project delays, the TxGLO and Corps should immediately notify the CLESFLO so that we can resolve/correct any such issues.

   d. A final comprehensive report that includes an analysis of all data results from the piping plover and benthic community surveys should be provided to the CLESFLO following the fifth year of surveys.

i) Work with the CLESFLO to mitigate adverse effects to critical habitat unit TX-37 and/or piping plovers should the results of the monitoring plan indicate that adverse effects are occurring as a result of the closure of Rollover Pass. See the Service Mitigation Policy (46 FR 7656) for further details.

6. Modify DA Permit 21755 (SWG-2007-00391) to preclude dredging activities within Rollover Bay.

7. In order to raise public awareness on sea turtles and piping plovers, the Corps and TxGLO shall work with the Service to develop educational signs. The signs should contain information about the biology, status, and laws protecting piping plovers. Increasing public awareness can facilitate the adoption of attitudes and conduct that will benefit environmental conservation and the recovery of this species (NMFS et al. 2010). Signs should also alert drivers and pedestrians attempting to access Rollover Bay to the potential presence of piping plovers. All signs should receive periodic maintenance in perpetuity to ensure their sitting and readability remains intact.

These reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Corps must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in your request for formal consultation. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by

the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The Service appreciates the Corps and the TxGLO's efforts to identify and minimize effects to listed species from this project. For further information please contact staff biologist A. J. Vale or myself at 281/286-8282. Please refer to the consultation number 21430-2011-F-0281 in future correspondence concerning this project.

Sincerely,

For

Edith Erfling
Field Supervisor

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APPENDIX A

Rollover Pass, Bolivar Peninsula, TX
& Gulf Coast Rod, Reel, and Gun Club Properties at Rollover Pass

Basemap: ESRI 2009 DOQQ Aerial Photographs, Rollover Pass

Gulf Coast Rod, Reel, and Gun Club Properties at Rollover Pass

APPENDIX B

Required Gradation for Beach Fill Material

2.1.3.1. Table 2-1: Required Gradation for Beach Fill Material

Sieve Designation U.S. Standard Square Mesh	Percentage by Weight Passing
3/8 inch	100
No. 4	94 – 100
No. 8	84 – 100
No. 16	60 – 100
No. 30	45 – 100
No. 50	17 – 65
No. 70	5 – 27
No. 100	3 – 15
No. 140	0 – 10
No. 200	0 – 10

APPENDIX C

Piping Plover Critical Habitat Units TX-35-37

Some locations have been slightly enlarged for display purposes only.

APPENDIX D

Rollover Pass Piping Plover Survey Recommendations

The purpose of this document is to provide recommendations to the Texas General Land Office so that they can conduct piping plover surveys prior to, throughout, and after the closure of Rollover Pass for five consecutive years. These recommendations are specific to this project and are not intended as general use piping plover survey guidelines. The Service reserves the authority to modify these recommendations for future projects, as needed, based on new information.

1. Surveys should be conducted three times per month throughout the piping plover wintering period (November – February) and a minimum of five surveys should be conducted during the spring (March - May 15) and fall (July 15-October) migration periods (i.e., ten total surveys during the migration period).

2. Both the East and West sides of Rollover Bay tidal flat areas should be surveyed. Surveys should be conducted during daylight hours in an east to west direction so that the surveyor's field of vision is illuminated and not obstructed by the glare of the sun.

3. Qualified professionals with shorebird survey experience should conduct the survey work. Aptitude for surveying shorebirds includes keen powers of observation, familiarity with avian taxonomy and behavior, experience observing birds or other wildlife, tolerance for adverse weather, experience in data collection, and patience.

4. In most cases, surveys will be conducted by foot. Birds on exposed flats that may be inaccessible by foot or that may be roosting should be counted with a spotting scope to avoid disturbance. Each survey crew should use their best professional judgment on the most efficient way to conduct these surveys.

5. Binoculars, a Global Positioning System unit, a 10-60 x spotting scope with a tripod, and the Service datasheet (attached) should be used to conduct surveys.

6. Negative (i.e., no plovers seen) and positive survey data shall be recorded and reported.

7. Sightings should be recorded within the general location where a piping plover is found with a GPS (set to record in decimal degrees in the WGS datum). If several birds are observed together then one GPS location should be recorded. If birds are observed at a distance with a spotting scope, estimate the location of the plover sighting from the spotting scope GPS location.

8. Habitat, landscape, and substrate features used and behavior (e.g., foraging, roosting, preening, bathing, flying, aggression, walking) of piping plovers shall be documented on the Service data sheet below.

9. Color-bands seen on piping plovers shall also be documented and reported at: Piping.plover@usace.army.milhttp://www.fishwild.vt.edu/piping_plover/Protocols_final_draft.pdf, http://www.waterbirds.umn.edu/Piping_Plovers/piping2.htm, and http://www.fws.gov/northeast/pipingplover/pdf/BahamasBandReporting2010.pdf.

10. Observers should work in teams of two to four people.

11. Although piping plovers are the target species, any additional observations of other species (i.e., red knots, snowy plovers, other banded birds, etc.) would help the Service to identify shorebird concentration areas and management needs.

Piping Plover Survey Form

Date:_____ Time_____

Tide stage(s): ___Low ___Mid ___High (___Rising / ___Falling)
Weather: temp:____wind dir:____wind speed:_____cloud cover:____per cent ___precip___
Approximate temperature: _____Celsius / Fahrenheit (circle one)
Beach conditions: _____
Surveyor(s): _____

Disturbance (#): Pedestrians__Boats___Bicycles___ATVs___ORVs___Dogs On___Off___

Numbers, and GPS location(s) of piping plovers observed (mark on map if possible). See example data table below.

Obs. #	GPS Wpt	Species	#Banded	# Birds	Image #	Notes
1	PIPL1	PIPL	1	2		1 out of 2 were banded (see other side), Roosting
2	PIPL2	REKN	0	5	1305	Feeding
3	PIPL3	PIPL	0	1		Feeding
4	PIPL4	PIPL	0	1		Feeding, missing left foot
5	PIPL5	PIPL	0	1		Roosting
6	PIPL6	PIPL	0	1		Flushed south was not able to record band
7	PIPL7	PIPL	0	1		Man fishing near roost site
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Reverse side of data sheet should be used to record banded bird information and additional comments or notes. A good resource for PIPL banding is:

Example: Red Flag Upper Left, Red over Green lower Left, Metal band Upper Right, Yellow over Black Lower right.)

Observation 1	Flag-R	M
	R/G	Y/K

APPENDIX E

Rollover Pass Benthic Invertebrate Survey Recommendations

The purpose of this document is to provide recommendations to the Texas General Land Office so that they can conduct benthic invertebrate surveys prior to, throughout, and after the closure of Rollover Pass for five consecutive years. These recommendations are specific to this project and are not intended as general use benthic survey guideline. The Services reserves the authority to modify these recommendations for future projects, as needed, based on new information.

1. Macroinvertebrate sampling should be conducted a total of 3 times per year for five consecutive years during the piping plover wintering season (i.e., one time per month in December, January, and February).

2. Sampling should be coordinated with piping plover surveys and the likely elevation range of piping plover habitat use should be used to establish a shore-parallel permanent sampling transect within the range of piping plover habitat use (Figure 1).

3. On each sampling day, transects should be established perpendicular to the shore-parallel transect and extend from the high water mark to the water's edge. Sample stations should occur along each shore-perpendicular transect from the high-water mark to the waters edge (Figure 1).

4. A sediment core should be taken at each sample station and be processed to determine the broad taxonomic composition, abundance, and density of the invertebrate prey community.

5. A qualitative measure of sediment characteristics (sand, shell, mud) should also be recorded.

6. See references for additional details on survey methods.

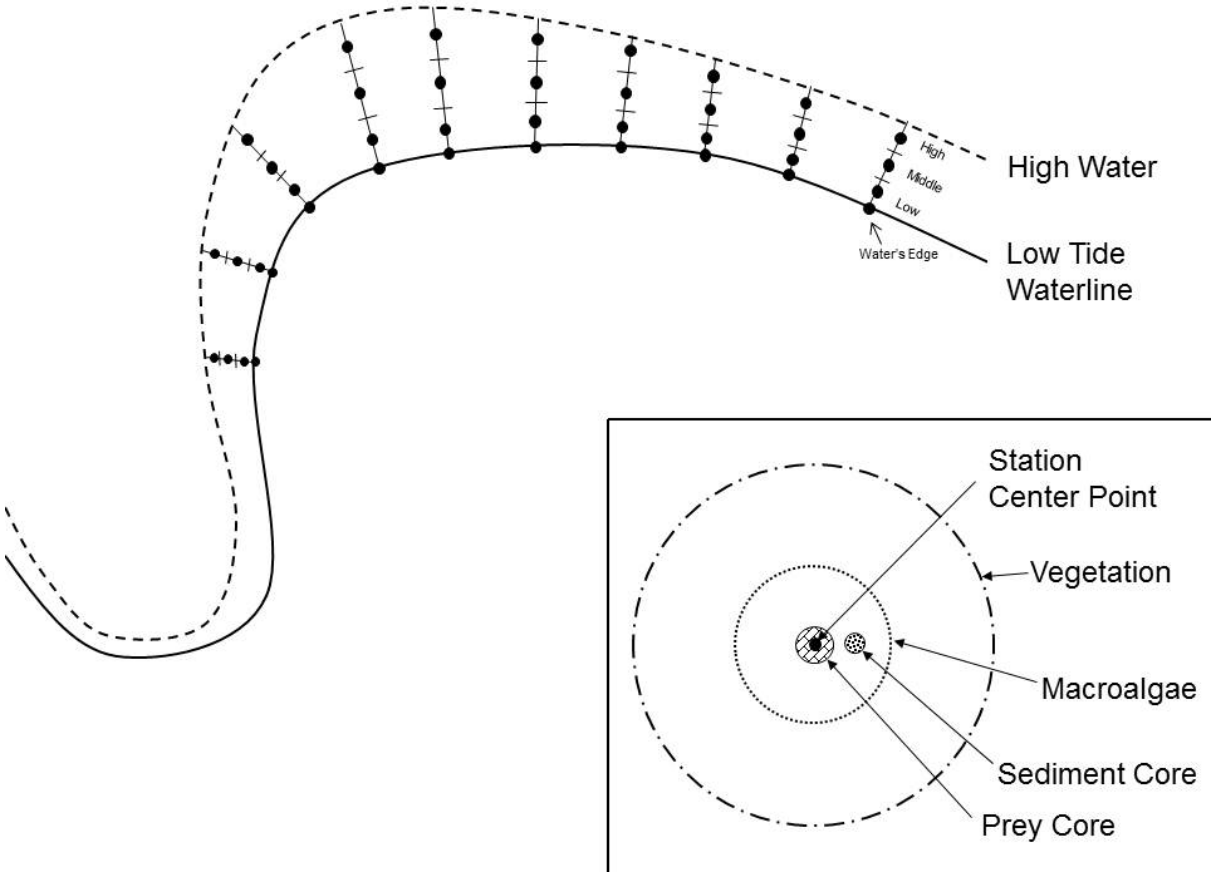

Figure 1. Example macroinvertebrate Sampling Scheme (figure from Bimbi and Bergquist 2010).

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