Pensacola Beach Nourishment
Gulf of Mexico
Escambia County, Florida
Public Notice 200105838 (IP-CP)

Biological Opinion
June 3, 2002

Prepared by:
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Figures and Tables

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June 3, 2002

Colonel James. G. May
U.S. Army Corps of Engineers
Jacksonville District Office
Pensacola Regulatory Office
41 North Jefferson Street, Suite 104
Pensacola, Florida 32501

Attn: Clif Payne

Re: FWS No. 4-P-02-056
Public Notice 200105838 (IP-CP)
Dated December 14, 2001
Pensacola Beach Nourishment Project
Gulf of Mexico, Escambia County, Florida

Dear Colonel May:

The U.S. Fish and Wildlife Service (Service) has evaluated the permit application 200105838(IP-CP) for the Pensacola Beach offshore dredging and beach nourishment along the Gulf of Mexico in Escambia County, Florida. The public notice for the project dated December 14, 2001, included the request for formal consultation. We received the public notice on December 17, 2001. This document represents the Service's biological opinion on the effects of that action on loggerhead, green, leatherback, and Kemp's ridley sea turtles. We concur with your determination that the proposed action would not likely adversely affect the piping plover, the Perdido Key beach mouse or the Florida manatee, and would not adversely modify designated critical habitat for the piping plover. The consultation is provided in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended, (16 U.S.C. 1531 et seq.). We have assigned log number FWS 4-P-02-056 to this consultation.

This biological opinion is based on information provided in the Public Notice, and by your agency, the applicant's consultant, Olsen Associates, Inc., Gulf Islands National Seashore (GINS), the Florida Fish and Wildlife Conservation Commission (FWC), and Riley Hoggard and Mark Nicholas, biologists with GINS who coordinate the Pensacola Beach sea turtle surveys, and other sources of information and numerous telephone discussions and onsite observations. A complete administrative record of this consultation is on file in this office.

CONSULTATION HISTORY

August 30, 2001	The Service receives an e-mail from U.S. Army Corps of Engineers (Corps) about the proposed project in relation to the Fish and Wildlife Coordination Act and the Endangered Species Act.
November 28, 2001	The Service receives an e-mail from the Corps notifying us that the public notice for the proposed project is available on the Corps website.
December 4, 2001	The Service receives the project Environmental Assessment, the Borrow Area Video Survey and Benthic Analysis from the applicant's consultant, Olsen Associates, Inc., as requested by the Corps.
December 4, 2001	The Service receives an e-mail from the applicant's consultant, Olsen Associates, Inc., about the Endangered Species Act consultation process with the Corps.
December 4, 2001	The Service provides an e-mail response to the applicant's consultant, Olsen Associates, Inc., about the Endangered Species Act consultation process.
December 6, 2001	The Service receives additional information from the applicant's consultant, Olsen Associates, Inc., about the native beach sand, nourishment material, and project schedule.
December 17, 2001	The Service receives a copy of the public notice for the proposed project from the Corps. In the public notice, the Corps requests initiation of formal section 7 consultation concerning endangered species.
December 26, 2001	The Service receives additional information from the applicant's consultant, Olsen Associates Inc., concerning the project schedule and method of dredging.
January 10, 2002	The Service's Panama City Field Office e-mails project sediment data to the Service's southeast coastal geologist for review.

January 11, 2002	The Service provides a letter to the Corps on the proposed project concerning comments under the Fish and Wildlife Coordination Act and the Endangered Species Act. The Service concurs with the determination of the Corps to initiate undergo formal consultation in accordance with section 7 of the Endangered Species Act regarding potential impacts to nesting sea turtles from the proposed action.
January 14, 2002	The Service's coastal geologist responds to and discusses the project with the Service's Panama City Field Office.
January 15, 2002	The Service transmits the draft Reasonable and Prudent Measures and Terms and Conditions of our biological opinion for the proposed project to FWC, Bureau of Protected Species Management and Service National Sea Turtle Coordinator for review.
January 28, 2002	The Service receives additional information from the applicant's consultant, Olsen Associates, Inc., on sea turtle nesting in the project area.
February 6, 2002.	The Service receives a letter from the Corps dated February 6, 2002, to re-confirm the Service's concurrence of species to undergo consultation for the proposed project.
February 14, 2002	The Service transmits the draft final Reasonable and Prudent Measures and Terms and Conditions (dated January 29, 2002) of our biological opinion for the proposed project to Corps.
February 15, 2002	The Service discusses the dune construction portion of the project with the Florida Department of Environmental Protection Beaches and Wetland Resources project engineer.
February 15, 2002	The Service discusses the dune construction portion of the project with the applicant's consultant, Olsen Associates, Inc. The Service faxes a dune vegetation plant list to the applicant's consultant, Olsen Associates, Inc. for the dune construction portion of the project plan.

February 25, 2002	The Service transmits a letter to the Corps concurring with the Corps determination of listed species to undergo consultation for the proposed project.
February 26, 2002	The Service transmits the draft biological opinion to the Corps.
March 13, 2002	The Service discusses the draft biological opinion with the Corps.
May 14, 2002	The Service receives an e-mail from the Corps stating that they have reviewed the draft opinion and have no comments to provide on the document.

BIOLOGICAL OPINION

Description of the Proposed Action

The applicant, The Santa Rosa Island Authority (SRIA) proposes to place, either by hydraulic or hopper dredge, approximately 4,000,000 cubic yards of beach-compatible sediment on approximately 8 miles of shoreline on Pensacola Beach. The sediment would be discharged over approximately 495 acres of beach area, of which approximately 300 acres would be sub-aerial and approximately 195 acres would be inter-tidal or sub-tidal. Once discharged, the sediment would be tilled to a depth of 36 inches to avoid sediment compaction. Shore-parallel infiltration berms would be temporarily created to allow settling of sediment and protect water quality in the Gulf of Mexico. A dune feature would be constructed at the landward limit of the berms and planted with salt tolerant vegetative species. The borrow area is approximately 290 acres in size and is located approximately 3.5 miles south of Pensacola Beach. The operation schedule for the dredging and transfer of sand would be on a 24-hour/7-day a week schedule. It is expected that it would take 6 to 10 months to complete the project (Browder 2002). The purpose of the project is to restore tourism amenity value, recreational beach, and storm protection.

Conservation Measures

1. Incorporation of the Manatee Special Conservation Conditions.

   a. The permittee shall instruct all personnel associated with the project of the potential presence of manatees and the need to avoid collisions with manatees. All construction personnel are responsible for observing water-related activities for the presence of manatee(s).

b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act of 1972, the Endangered Species Act of 1973, and the Florida Manatee Sanctuary act of 1978. The permittee and/or contractor may be held responsible for any manatee harmed, harassed, or killed as a result of construction activities.

c. All vessels associated with the project shall operate at "no wake/idle" speeds at all times while in water where the draft of the vessel provides less than four feet clearance from the bottom and that vessels shall follow routes of deep water whenever possible.

d. If a manatee is sighted within 100 yards of the project area, all appropriate precautions shall be implemented by the permittee/contractor to ensure protection of the manatee. These precautions shall include the operation of all moving equipment closer than 50 feet of a manatee. Operation of any equipment closer than 50 feet of a manatee shall necessitate immediate shutdown of that equipment. Activities will not resume until the manatee(s) has departed the project area its own volition.

e. Any collision with and/or injury to a manatee shall be reported immediately to the "Manatee Hotline" at 1-800-DIAL-FMP (1-800-342-5367). Collision and/or injury should also be reported to the U.S. Fish and Wildlife Service in Panama City (1-850-769-0552) for northwest Florida.

Action Area

The Action Area under this consultation includes the beach from mean low water (MLW) to the crest of the primary dune or landward structure and is between the west boundary of the Santa Rosa Unit of GINS and the east boundary of the Ft. Pickens Unit of GINS. Property owned by the University of West Florida is included in the Action Area. The Action Area consists of suitable nesting habitat for sea turtles, thus activity in this area could impact nesting females, their nests and eggs, and any hatchlings, either in the nest or upon emergence from the nest and crawling to the Gulf of Mexico.

Status of the Species/Critical Habitat

Sea Turtles
Loggerhead Sea Turtle
Green Sea Turtle
Leatherback Sea Turtle
Kemp's ridley Sea Turtle

The U.S. Fish and Wildlife Service has responsibility for implementing recovery of sea turtles when they come ashore to nest. The National Marine Fisheries Service has jurisdiction over sea turtles in the marine environment.

Species/critical habitat description

Four species of sea turtles, the loggerhead sea turtle (*Caretta caretta*), the green sea turtle (*Chelonia mydas*), the leatherback sea turtle (*Dermochelys coriacea*), and the Kemp's ridley sea turtle (*Lepidochelys kempii)* are considered in this biological opinion.

The loggerhead sea turtle (*Caretta caretta*) was federally listed as a threatened species on July 28, 1978 (43 FR 32800). This species inhabits the continental shelves and estuarine environments along the margins of the Atlantic, Pacific, and Indian oceans. Loggerhead sea turtles nest within the continental U.S. from Louisiana to Virginia (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991a). Major nesting concentrations in the U.S. are found on the coastal islands of North Carolina, South Carolina, and Georgia, and on the Atlantic and Gulf coasts of Florida (Hopkins and Richardson 1984). Critical habitat has not been designated for loggerhead sea turtles along the Gulf Coast of Florida.

From a global perspective, the southeastern U.S. loggerhead sea turtle nesting aggregation is important to the survival of the species, and is second in size only to the nesting on islands in the Arabian Sea (Ross 1982, Ehrhart 1989, National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991a). Nesting by loggerhead sea turtles has been documented in all northwest Florida counties from Franklin through Escambia County (Brost 2001).

The green sea turtle (*Chelonia mydas*) was federally listed on July 28, 1978 (43 FR 32808). Breeding populations of the green sea turtle in Florida and along the Pacific Coast of Mexico are listed as endangered; all other populations are listed as threatened. The green sea turtle is a circumglobal species in tropical and subtropical waters. Within the U.S., green sea turtles nest in small numbers in the U.S. Virgin Islands and Puerto Rico, and in larger numbers along the east coast of Florida (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991b). Nesting also has been documented as far north as North Carolina and along the northwest and southwest Gulf coasts of Florida (Meylan *et al*. 1995, Brost 2001). Critical habitat has not been designated for green sea turtles along the Gulf coast of Florida.

The leatherback sea turtle (*Dermochelys coriacea*) was federally listed as an endangered species on June 2, 1970 (35 FR 8491). Nesting grounds are distributed circumglobally, with the Pacific coast of Mexico supporting the world's largest known concentration of nesting leatherbacks (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1992, National Research Council 1990a). The leatherback regularly nests in Puerto Rico, the U.S. Virgin Islands, and along the Atlantic coast of Florida as far north as Georgia (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1992). Sporadic leatherback nesting also has been documented in northwest Florida and North Carolina (LeBuff 1990, Longieliere *et al*. 1997,

Brost 2001, Boettcher 1998). Critical habitat has not been designated for leatherback sea turtles along the Gulf coast of Florida.

The Kemp's ridley sea turtle (*Lepidochelys kempii*) has received protection in Mexico since the 1960's and was federally listed as an endangered species throughout its range on December 2, 1970. They occur in the Gulf of Mexico and the northern Atlantic Ocean (Pritchard 1989, Marquez 1994 as cited in Turtle Expert Working Group 1997 and 1998) and are assumed to constitute a single stock. The range of the species includes the Gulf coasts of Mexico, the U.S., and the Atlantic coast of North America as far north as Nova Scotia and Newfoundland. They also have been reported from Bermuda, European Atlantic waters, the Mediterranean Sea, Madeira, the Azores and Nicaragua (Marquez 1994 as cited in Turtle Expert Working Group 1997 and 1998, U.S. Fish and Wildlife Service and National Marine Fisheries Service 1992).

Life history (growth, life span, survivorship, and mortality)

Extensive research has been conducted on sea turtles. The recovery plans for the loggerhead, green, leatherback, and ridley sea turtles (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991a, 1991b, 1992; U.S. Fish and Wildlife Service and National Marine Fisheries Service 1992) provide a summary and references for detailed information on the species. In brief, the greatest portion of a sea turtle's life is spent in ocean and estuarine waters where it breeds, feeds, migrates, and hibernates. The remainder of the female's life is spent on the beaches where she digs a nest and lays her eggs. The eggs then hatch and the hatchlings crawl to the sea to become part of the marine ecosystem again (Nelson 1988).

The reproductive strategy of sea turtles involves producing many offspring to compensate for the high natural mortality through their first several years of life. Some mortality factors include disease, predation of the nest by racoons, fox, coyote, hogs, and ghost crabs, loss of the nest from inundation or erosion due to wave action, storms, beach erosion or rain, predation of hatchlings on the beach by birds, fox, and ghost crabs, and predation in the aquatic environment by fish or marine species. However, increased unnatural mortality is now occurring due to increased human-caused pressures on sea turtle populations. One such pressure is the loss and degradation of nesting habitat because of coastal development. Activities that affect the behavior and/or survivability of turtles on their nesting beaches could significantly reduce our ability to conserve sea turtles. The recovery of sea turtles is based on the protection of all nesting beaches through habitat conservation, minimizing effects of beachfront lighting, and minimization of the incidental catch of sea turtles in marine commercial fisheries.

Loggerhead sea turtle nesting has been documented on all beaches in northwest Florida from Franklin to Escambia counties. Loggerhead turtles are the most common nesting sea turtle and account for over 99 percent of the nests in the region. The loggerhead sea turtle nesting and hatching season for northwest Florida beaches generally extends from about May 1 through October 31; the earliest loggerhead nest was documented on April 29 (St. Joseph Peninsula

State Park) and the latest nest on November 1 (Cape San Blas). Nest incubation ranges from about 49 to 95 days.

Recent genetic analyses have been employed to identify management units among loggerhead nesting cohorts of the southeastern United States. Assays of nest samples from North Carolina to northwest Florida have identified three genetically distinct nesting sub-populations: (1) north nesting sub-population - Hatteras, North Carolina, to Cape Canaveral, Florida; (2) south Florida nesting sub-population - Cape Canaveral to Naples, Florida; and (3) northwest Florida nesting sub-population - Eglin Air Force Base and the beaches around Panama City, Florida. These data indicate that gene flow between the three regions is very low. If nesting females are extirpated from one of these regions, regional dispersal will not be sufficient to replenish the depleted nesting population (Encalada *et al.* 1998, Bowen *et al*. 1993).

Green sea turtle nesting has been documented in all counties (but not on all beaches) in northwest Florida from Franklin to Escambia counties. The green sea turtle nesting and hatching season for northwest Florida beaches extends from May 1 through October 31; the earliest nest was documented on May 22 (Dog Island) and the latest nest was documented on August 21 (Gulf Islands National Seashore). Nest incubation ranges from about 60 to 90 days. Nesting in northwest Florida has been consistently documented at least every other year since 1990 (Brost 2001).

Documented leatherback nests are rare in northwest Florida. From 1993 to 2001, only fifteen have been reported for northwest Florida beaches, ten in Franklin County, three in Okaloosa County, and one each in Gulf and Escambia counties (Brost 2001). The first recorded leatherback nest was in 1974 on St. Vincent Island, Franklin County. The greatest number of successful nests in any one season occurred in 2000, when leatherback nesting was confirmed for one nest on Gulf Islands National Seashore, Ft. Pickens Unit, Escambia County and for two nests on Eglin Air Force Base, Okaloosa Island, Okaloosa County. The leatherback sea turtle nesting and hatching season for northwest Florida beaches extends from May 1 through October 31. For confirmed nesting, the earliest nest was documented on April 29 (St. George Island) and the latest nest documented on June 19 (Eglin AFB). Documented nest incubation in northwest Florida ranges from about 63 to 84 days (Brost 2001, Miller 2001, Nicholas 2000a; 2002).

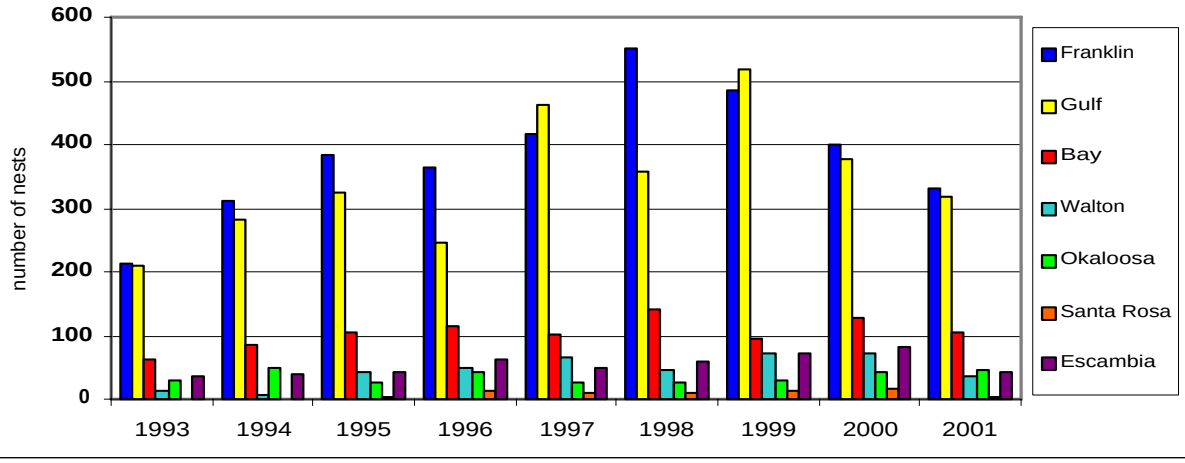
Documented Kemp's ridley nests are extremely rare in northwest Florida. Only one nests in 1998, has been documented. It was located on Gulf Islands National Seashore, Perdido Key Unit, Escambia County. The nest was laid on May 31 and it hatched on August 3, with a 64-day incubation period (Nicholas 2000b).

Population dynamics (population size, population variability, population stability)

At present, it is only feasible to estimate the size of the nesting female loggerhead population in U.S. territorial waters. There is general agreement with Meylan (1982) that enumeration of nesting females provides a useful index to population size and stability (Turtle Expert Working Group 2000). Through aerial and ground surveys, it is estimated that approximately 50,000 to 70,000 nests are laid per year on southeast U.S. beaches. In 2000, there were over 84,000 nests laid in Florida alone (Brost 2001).

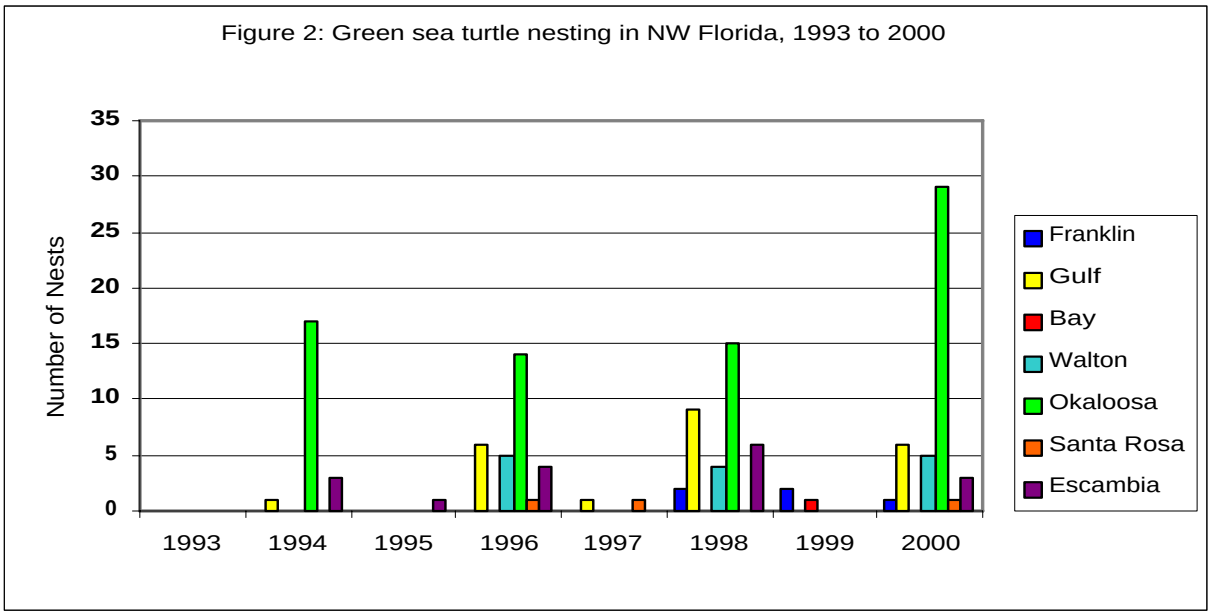
Since 1993, when consistent nest reporting began in northwest Florida, the annual nest numbers have ranged between 560 and 1,300 nests (Figure 1) (Brost 2001). The number of nests has increased each year, but it is unknown whether this is because of increased surveying, more experienced surveyors, or an increase in nests. Franklin and Gulf counties have always reported the greatest number of loggerhead sea turtle nests (Figure 1). Based on the average of approximately 4.1 nests per female, (Turtle Expert Working Group 2000), the female nesting

Figure 1: Loggerhead sea turtle nests in NW Florida, 1993-2001

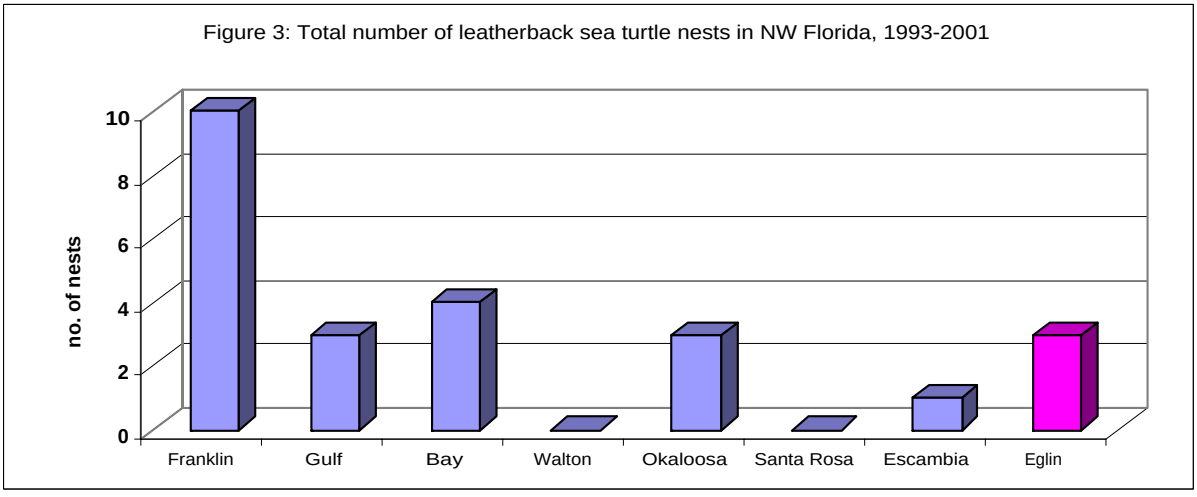


population for northwest Florida could be around 250 females.

No population estimates of green sea turtles are available. The status of green sea turtle populations is difficult to determine because of the long generation time and inaccessibility of the early life stages. Green turtle nesting in the southeast U.S. is regionally significant, with approximately 2,800 nests per year in Florida. Small numbers of greens nest in the U.S. Virgin Islands and Puerto Rico. Occasional green nesting is reported from Alabama, Georgia, and South and North Carolina. During peak nesting years, green turtle nests in northwest Florida account for about 30 to 40 of the total nests laid in the southeast U.S. At least half of those nests are usually laid on Okaloosa/Santa Rosa Island, on Eglin Air Force Base lands (Figure 2) (Brost 2001).



Pritchard (1992) estimated that 115,000 adult female leatherbacks remained worldwide. The largest U.S. nesting assemblages of leatherback turtles occur in the U.S. Virgin Islands and Puerto Rico. Small numbers (300 nests) of leatherback turtles nest in the southeast U.S., primarily along the Florida Atlantic Coast. In any one year, only seven leatherback nests have been documented in northwest Florida (Brost 2001) (Figure 3). The U.S. Atlantic and Caribbean nesting population appears to be increasing.



The Kemp's ridley sea turtle exhibits an aggregated nesting behavior and very restricted breeding range. The major nesting beach is near Rancho Nuevo in southern Tamaulipas (northeastern coast of Mexico). In the U.S., increased nesting has been documented on the Gulf

Coast of Texas. Two nests have been documented in Alabama (MacPherson 2002, South 2001). Kemp's ridley nesting is extremely rare in Florida and only a few nests have been documented in Volusia, Lee, Sarasota, Pinellas, and Escambia counties (Brost 2001, Nicholas 2000b).

Status and distribution (reasons for listing, rangewide trend, new threats)

Sea turtles are threatened by many factors when onshore or in the aquatic environment. Threats in nesting environment include coastal development, beach erosion, beach armoring, beach nourishment, artificial lighting, beach cleaning, increased human presence, recreational beach equipment, beach driving, exotic beach and dune vegetation, nest depredation, inundation, sand accretion over incubating nests, and poaching. Threats in the aquatic environment include oil and gas exploration and development, dredging, marina and dock development, pollution, seagrass bed degradation, trawl fisheries, purse seine fisheries, hook and line fisheries, gill net fisheries, pound net fisheries, longline fisheries, trap fisheries, boat collisions, power plant entrapment, underwater explosions, offshore artificial lighting, marine debris (ingestion and entanglement), poaching, predation, disease and parasites (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991a, 1991b, 1992, U.S. Fish and Wildlife Service and National Marine Fisheries Service 1992).

Coastal Development

Loss of nesting habitat related to development of the coastline has had the greatest impact on nesting sea turtles in Florida. Beachfront development not only causes the loss of suitable nesting habitat but can result in the disruption of dynamic coastal processes accelerating erosion and interruption of natural shoreline migration (National Research Council 1990b). This may in turn cause the need to protect upland structures and infrastructure by armoring, groin placement, beach berm construction, and beach nourishment which cause additional loss or impact remaining sea turtle habitat.

Beachfront development along the Gulf coast of Florida began in the 1950's. Through an act of the State of Florida Legislature, approved in June 1947, the Santa Rosa Island Authority (SRIA) was created as an agency of Escambia County. The act gave the SRIA general powers to develop and improve Santa Rosa Island for beach, resort, and recreational purposes. The portion of the island known as Pensacola Beach was developed by the SRIA. By the middle 1970's most of Pensacola Beach within the Action Area was developed or leased to be developed. However, at that time the SRIA retained 40 percent of the available land in dune preservation or un-leased lots (U.S. Environmental Protection Agency 1981). However, development of the beach continued. Currently, the western 5.7 miles of the beach in the Action Area are developed and the eastern 2.3 miles are undeveloped (University of West Florida property), except for beach access parking (Browder 2002).

Hurricanes

A predominant threat to sea turtle nests is tropical storms and hurricanes. In general, hurricanes result in severe erosion of the beach and dune systems. Overwash and blowouts are common on barrier islands. Hurricanes and other storms can result in the direct or indirect loss of sea turtle nests, either by erosion or washing away of the nests by wave action or inundation or "drowning" of the eggs or hatchlings developing within the nest and indirectly by loss of nesting habitat. Depending on their frequency, hurricanes can affect sea turtles on either a short-term basis (nests lost for one season and/or temporary loss of habitat) or long term, if frequent (habitat unable to recover). How hurricanes affect sea turtle nesting also depends on its characteristics (winds, storm surge, rainfall), the time of year (within or outside of the nesting season), and where the eye crosses land (side of hurricane-clockwise or counterclockwise).

Because of the limited remaining nesting habitat, frequent or successive severe weather events could compromise the ability of certain sea turtle populations to survive and recover. Hurricanes are a natural coastal environmental phenomenon to which sea turtles have evolved. Hurricanes were probably responsible for maintaining coastal beach and dune nesting habitat through repeated cycles of destruction, alteration, and recovery. The extensive amount of pre-development coastal beach and dune habitat allowed sea turtles to survive even the most severe hurricane events. It is only within the last 20 to 30 years that the combination of habitat loss to beachfront development and destruction of remaining habitat by hurricanes have increased the threat to sea turtle survival and recovery. On developed beaches, typically little space remains for sandy beaches to become re-established after episodic storms. While the beach itself moves landward during such storms, reconstruction or persistence of structures at their pre-storm locations can result in significant loss of suitable nesting habitat.

Hurricane Frederic in 1979 caused extensive damage within the Action Area, parts of the island were overwashed and the high water mark reached as high as 15 feet in some areas (U.S. Environmental Protection Agency 1981). The area was relatively unaffected by severe storms until 1995 when Hurricanes Erin's and Opal's storm surge and wave energy inflicted severe erosion along the beaches and dunes of the Action Area. Along most of northwest Florida 95 to 100 percent of the sea turtle nests were lost. Some dune restoration efforts in the form of planting sea oats were implemented on Pensacola Beach after Hurricane Opal. Hurricane Danny in 1997 resulted in the direct loss of 6 nests out of 19 nests within the Action Area. Hurricane Earl in 1998 caused washout of four nests of 5 nests within the Action Area (Ercelawn 1998). The remaining nest was relocated for protection when Hurricane Georges came through the area a month later in 1998. Hurricanes Earl and Georges also caused setback of the post-Hurricane Opal recovering dune habitats. After Hurricane Georges, a beach berm was constructed with funding assistance from the Federal Emergency Management Agency and the State of Florida.

Beachfront Lighting

Beachfront lighting may cause disorientation (loss of bearings) and misorientation (incorrect orientation) of sea turtle hatchlings. Visual cues are the primary sea-finding mechanism for hatchlings (Mrosovsky and Carr 1967, Mrosovsky and Shettleworth 1968, Dickerson and Nelson 1989, Witherington and Bjorndal 1991). Artificial beachfront lighting is a well documented cause of hatchling disorientation and misorientation on nesting beaches (Philbosian 1976; Mann 1977; Conti 2002). The emergence from the nest and crawl to the sea is one of the most critical periods of a sea turtle's life. Hatchlings that do not make it to the sea quickly become food for ghost crabs and birds, or become dehydrated and may never reach the sea. Some types of beachfront lighting attract hatchlings and lead them away from their destination to the sea. Conversely, adult female sea turtles have a tendency to avoid stretches of brightly illuminated beach. Research has documented significant reduction in sea turtle nesting activity on beaches illuminated with artificial lights; being devoid of nests relative to adjacent areas (Witherington 1992). During the 2001 sea turtle nesting season in Florida, condominiums caused the greatest disorientation (30.6 percent) with sky glow causing 23.8 percent, unknown sources causing 23.2 percent, and street lights causing 20.2 percent of the disorientations (Conti 2002).

Within the Action Area, disorientation of sea turtle hatchlings have been caused by ambient light from the surrounding developed areas (Pensacola Beach, Gulf Breeze, Perdido Key, and the City of Pensacola) and the Pensacola Naval Air Station (NAS). A nest was considered disoriented if 25 percent of the hatchlings became confused or misoriented in their attempts to reach the Gulf of Mexico. From 1996 to 2001, over 52 percent (range 33 to 88 percent) of the nests hatched within the Action Area were documented as being disoriented (Ercelawn 1998, Ogurcak 2000, Nicholas 2000a; 2002).

Predation

Depredation by a variety of predators can significantly decrease sea turtle nest hatching success. Depredation and/or harassment of nesting turtles, eggs, nests, and hatchlings by native and non-native species, such as raccoon, coyote, fox, feral hog, birds, and ghost crab, have been documented on the Atlantic and Gulf coasts of Florida. As nesting habitat dwindles, it is essential that nest production be maximized as naturally as possible.

Predators of sea turtle nests and hatchlings within the Action Area have included fox, ghost crabs, and birds. Average documented depredation rate in the Action Area from 1996 to 2001 was 43 percent (range 8 to 46 percent) (Ercelawn 1998, Ogurcak 2000, Nicholas 2000a; 2002). Nests are screened if predation is identified or appears to be a potential problem.

Stranding and salvage

Within the Action Area, GINS participates in the State of Florida Stranding and Salvage Sea Turtle Network (SSTN) and completes and submits a SSTN report as appropriate. From 1996 to 2001, 11 sea turtles were documented to strand within the Action Area. The average strandings per year for the six-year period were two strandings per year (range 0 to 4 per year). The majority of the turtles were loggerheads (9), two were leatherbacks, 1 was a green, and 1 was a Kemp's ridley (Ercelawn 1998, Nicholas 2000a; 2002). Strandings in northwest Florida have increased 80 percent from the previous ten-year average in the 1990s (Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute 2002).

A particular stranding event in northwest Florida occurs from turtle excluder devices (TED) test trials. TEDs are used on shrimp trawl nets to "discharge" sea turtles that are caught in the nets during trawling. Based out of the National Marine Fisheries Service (NMFS) laboratory in Panama City (Bay County), the NMFS Galveston laboratory conducts annual trials on proposed TEDs. Juvenile loggerhead sea turtles raised at the Galveston laboratory are used for the tests. However, when the TED trials are completed in mid-July the turtles are tagged and released into the Gulf of Mexico. Until recently, the turtles were released offshore Panama City. These turtles are acclimated to humans and tend to swim back to shore even crawling up on the beach. The turtles are easily recognized as TED turtles by their behavior and size. Numerous turtles are documented as stranded following the releases. No tagged TED turtles have been documented as stranded within Action Area. In 2000, a new release location was tried in St. Joseph Bay, in Gulf County. There is not enough data at this time to suggest any difference in release locations and strandings of TED turtles onshore (Redlow 2001).

Nesting

Sea Turtle Nest Monitoring within the Action Area

Consistent surveying of sea turtle nesting along Pensacola Beach was not initiated until 1996. Biologists from GINS checked on nests reported by the public prior to that time. In 1996, the GINS formed a partnership with the Santa Rosa Island Authority to monitor sea turtle nesting activity on Pensacola Beach. The partnership has continued through the 2001 sea turtle nesting season. The monitoring is conducted under GINS's State of Florida permit no. 032 (Florida Fish and Wildlife Conservation Commission 2002). Surveys are conducted seven days a week from May 1 to October 31. Surveys begin at sunrise. Approximately 7.5 miles were surveyed in 1996 consisting of the area between the western boundary of University of West Florida property and the eastern boundary of the Ft. Pickens Unit of GINS. In 1997, the monitoring area was expanded to include the University of West Florida property at a total of 8.3 miles. Surveys are conducted using all terrain vehicles (ATVs). Turtle crawls are identified as a true nesting crawl or false crawl. Nests are marked with stakes and surrounded with surveyor flagging tape, and if needed screened to prevent predation. The marked nests are monitored throughout the incubation period for storm damage, hatching activity, and predation. If

threatened by erosion or inundation, nests are relocated within the first 12 hours of being deposited, or before 9 a.m. the morning following deposition. GINS biologists accomplish the nest relocations (Ercelawn 1998).

Analysis of the species/critical habitat likely to be affected

The project public notice dated December 14, 2001, and subsequent letter dated February 6, 2002, indicated that the Corps had determined that the proposed action would not likely adversely affect the piping plover, manatee or Perdido Key beach mouse nor would the project adversely modify designated critical habitat for the piping plover. We concur with that determination.

Since the proposed action will be placing material dredged from the offshore on sea turtle nesting habitat during the sea turtle nesting season, the action could adversely affect nesting female sea turtles, their eggs and hatchlings. The effect of this impact on sea turtle survival and recovery for each species will be considered in this biological opinion. Direct effects of the project include the loss of sea turtles through disruption of adult nesting activity, burial or crushing of nests or hatchlings, and damage to eggs or nests from relocation. Indirectly, the project could affect the behavior of adult sea turtles approaching the beach to nest because of escarpment formation, equipment, lights, or noise on the beach, selecting a suitable site to nest because of sand compaction, affecting the incubation of the nest because of a change in sand grain size distribution, compaction, and color.

ENVIRONMENTAL BASELINE

This section describes the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat, and ecosystem, within the Action Area. The environmental baseline is a "snapshot" of a species health at a specified point in time. It does not include the effects of the action under review in the consultation.

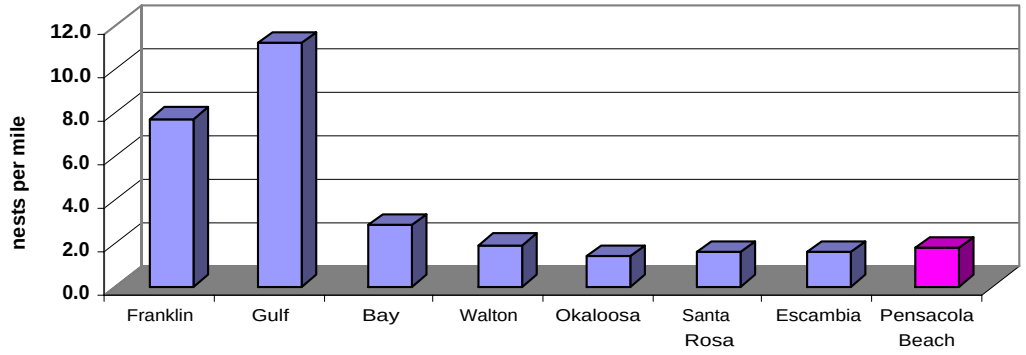
Sea Turtles

Status of the species within the Action Area

Nesting

Loggerhead nesting within the Action Area is considered moderately low density compared to other northwest Florida beaches (Figure 4). Average annual nesting density from 1996 to 2001 was 1.8 nests per mile within the Action Area and is similar to the non-developed beaches located within the Santa Rosa and Ft. Pickens Units of the GINS (Ercelawn 1998, Ogurcak 2000, Nicholas 2000a; 2002).

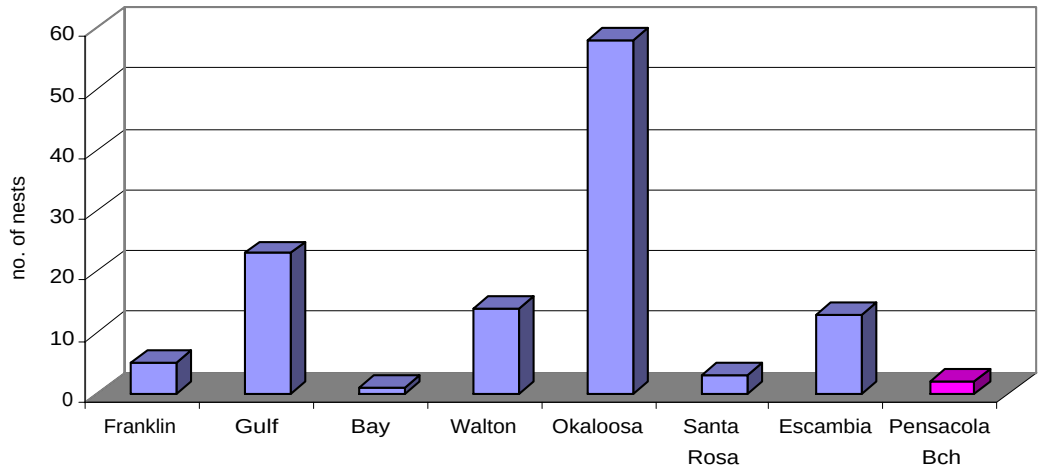
Figure 4: Average annual nesting density of loggerhead sea turtles in NW Florida, 1996 - 2001



During the sea turtle nesting seasons of 1996 to 2001, 85 loggerhead nests were documented. Approximately 33 percent of all turtle crawls observed were false (non-nesting) crawls. Nests were either left in place (in situ) or relocated. Of the total 85 nests, 65 were left *in situ* and 20 were relocated. *In situ* nests had a mean hatching success rate of 76 percent (range 0 to 90 percent), discounting nests lost to hurricanes and tropical storms. Nests that were relocated were moved to higher beach elevations within the same vicinity of the original nest location. The relocated nests had a mean hatching success rate of 76 percent (range 4 to 95 percent). Loggerhead nests have been fairly evenly distributed along the 8.3 miles within no apparent nesting density difference between developed and undeveloped beaches within the Action Area. Average nest incubation period was 64 days (range 52 to 77 days) (Ercelawn 1998, Ogurcak 2000, Nicholas 2000a; 2002).

Green sea turtle nesting was documented within the Action Area in 1996 and 1998 (Figure 5). The nests were found in the same years as with other green sea turtle nests in northwest Florida (every other year pattern). Both nests were laid within undeveloped areas of the Action Area. Both nests were left *in situ* and had an average nest hatch success of 84.6 percent (range 74.6 to 94.6 percent). Average incubation period for the nests was 65 days (range 61 to 69 range) (Ercelawn 1998, Ogurcak 2000, Nicholas 2000a; 2002).

Figure 5: Total number of green sea turtle nests in NW Florida, 1996 to 2000



No leatherback or Kemp's ridley sea turtle nests have been documented within the Action Area. Leatherback nests have been documented on Santa Rosa Island on Eglin Air Force Base (Miller 2001). In 1998 a ridley nest was documented on Gulf Islands National Seashore, Perdido Key Unit, in Escambia County (Nicholas 2000b).

Factors affecting the species environment within the action area

Coastal Development

The development along the coastline within the Action Area has resulted in a reduction of the width and quality of beach and dune habitats for sea turtle nesting. The decrease in the width of the beach may also be interfering or disrupting the dynamic shoreline process of erosion and accretion such that erosion is accelerated within the Action Area. The degradation of the quality of the nesting beach habitat is related to excessive beachfront lighting and increased human presence.

Beachfront Lighting

Currently, lighting impacts to nesting turtles and their hatchlings are the greatest threat within the Action Area. The negative effects of beachfront lighting increase with beach nourishment because the beach is elevated with the addition of sand. Dunes can help shield some of the light from beachfront development. However, the dunes that will be constructed as part of the proposed project (elevation 12 feet) will not be high to substantially reduce lighting disorientation from neither beachfront development nor the ambient glow from Pensacola, Gulf Breeze or the Naval Air Station.

Coastal Erosion

The entire 8.3 miles of the Action Area have been designated as critically eroding by the State of Florida (Browder 2002, FDEP, Office of Beaches and Coastal Systems 1999). Critical erosion is defined by State of Florida as "a segment of the shoreline where natural processes or human activity have caused or contributed to erosion and recession of the beach or dune system to such a degree that upland development, recreational interests, wildlife habitat, or important cultural resources are threatened or lost. Critical erosion areas may also include peripheral segments or gaps between identified critical erosion areas which, although they may be stable or slightly erosional now, their inclusion is necessary for continuity of management of the coastal system or for the design integrity of adjacent beach management projects" FDEP, Office of Beaches and Coastal Systems 1999). The 8.3 miles are between reference monument R-107 and R-151 (FDEP Office of Beaches and Coastal Systems 2001).

Predation of Sea Turtle Nests

Predators of sea turtle nests and hatchlings on the beaches within the Action Area have been primarily ghost crabs, birds, and fox. It is unknown when the greatest occurrence of the predation occurs (immediately after the nests are deposited, during the incubation period, immediately before the nest hatches, or as the hatchlings emerge and crawl to the sea). Placing flat screens over the nests during the initial marking of the nest could substantially decrease depredation while minimally impact the nest.

Effects of the Action

This section is an analysis of the beneficial, direct and indirect effects of the proposed action on nesting sea turtles, nests, eggs, and hatchling sea turtles within the Action Area. The analysis includes effects interrelated and interdependent effects of the project activities. An interrelated activity is an activity that is part of a proposed action and depends on the proposed activity. An interdependent activity is an activity that has no independent utility apart from the action.

Factors to be Considered

The proposed project will occur within habitat that is used by sea turtles for nesting and is proposed to be constructed during a portion of the sea turtle nesting season. Long-term and permanent impacts from the dredging could include a change in the nest incubation environment from the nourishment material. Short-term and temporary impacts to sea turtle nesting activities could result from project work occurring on the nesting beach during the active nesting or hatching period, changes in the physical characteristics of the beach from the placement of the beach nourishment material and change in the nest incubation environment from the nourishment material.

Analysis for effects of the action

Beneficial effects

Placement of sand on a severely eroded beach can increase sea turtle nesting habitat in an area as long as protective measures are incorporated into the project. Also, a properly engineered and constructed beach may be more stable than the eroding one it replaces, thereby benefitting sea turtles.

Direct effects

Placement of sand on an eroded section of beach or an existing beach may not provide suitable nesting habitat for sea turtles. Although beach nourishment may increase the potential nesting area, significant negative impacts to sea turtles may result if protective measures are not incorporated during construction. Nourishment during the nesting season, particularly on or near high density nesting beaches, can cause increased loss of offspring from human-caused mortality and, along with other mortality sources, may significantly impact the long-term survival of the species. For instance, projects conducted during the nesting and hatching season could result in the loss of sea turtles through disruption of adult nesting activity and by burial or crushing of nests or hatchlings. While a nest monitoring and egg relocation program would reduce these impacts, nests may be inadvertently missed or misidentified as false crawls during daily patrols. In addition, nests may be destroyed by operations at night prior to beach patrols being performed. Even under the best of conditions, about 7 percent of the nests can be misidentified as false crawls by experienced sea turtle nest surveyors (Schroeder 1994).

1. Nest relocation

Besides the potential for missing nests during a nest relocation program, there is a potential for eggs to be damaged during movement or for unknown biological mechanisms to be affected. Nest relocation can have adverse impacts on incubation temperature (and hence sex ratios), gas exchange parameters, hydric environment of nests, hatching success, and hatchling emergence (Limpus *et al*. 1979, Ackerman 1980, Parmenter 1980, Spotila *et al*. 1983, McGehee 1990). Relocating nests into sands deficient in oxygen or moisture can result in mortality, morbidity, and reduced behavioral competence of hatchlings. Water availability is known to influence the incubation environment of the embryos and hatchlings of turtles with flexible-shelled eggs, which has been shown to affect nitrogen excretion (Packard *et al*. 1984), mobilization of calcium (Packard and Packard 1986), mobilization of yolk nutrients (Packard *et al*. 1985), hatchling size (Packard *et al*. 1981, McGehee 1990), energy reserves in the yolk at hatching (Packard *et al*. 1988), and locomotory ability of hatchlings (Miller *et al*. 1987).
Comparisons of hatching success between relocated and *in situ* nests have noted significant variation ranging from a 21 percent decrease to a 9 percent increase for relocated nests (Moody 1998). Comparisons of emergence success between relocated and *in situ* nests have also noted

significant variation ranging from a 23 percent decrease to a 5 percent increase for relocated nests (Moody 1998). The study of hatching and emergence success of *in situ* and relocated nests at seven sites in Florida found that hatching success was lower for relocated nests in five of seven cases with an average decrease for all seven sites of 5.01 percent (range 7.19 percent increase to 16.31 percent decrease). Emergence success was lower for relocated nests in all seven cases by an average of 11.67 percent (range 3.6 to 23.36 percent) (Moody 1998).

A final concern about nest relocation is that it may concentrate eggs in an area resulting in a greater susceptibility to catastrophic events. Hatchlings released from concentrated areas also may be subject to greater predation rates from both land and marine predators, because the predators learn where to concentrate their efforts. The GINS will be responsible for the relocation of sea turtle nests within the Action Area to GINS lands. The GINS will also be responsible for monitoring the relocated nests throughout incubation and hatching.

2. Equipment

The placement of pipelines and the use of heavy machinery on the beach during a construction project may also have adverse effects on sea turtles. They can create barriers to nesting females emerging from the surf and crawling up the beach, causing a higher incidence of false crawls and unnecessary energy expenditure. Entrapment or barriers can be created to hatchling sea turtles as they emerge from the nest and crawl to the sea.

3. Artificial lighting

Another impact to sea turtles is disorientation (loss of bearings) and misorientation (incorrect orientation) of hatchlings from artificial lighting. Visual cues are the primary sea-finding mechanism for hatchlings (Mrosovsky and Carr 1967, Mrosovsky and Shettleworth 1968, Dickerson and Nelson 1989, Witherington and Bjorndal 1991). Artificial beachfront lighting is a well documented cause of hatchling disorientation and misorientation on nesting beaches (Philbosian 1976; Mann 1977; Florida Department of Environmental Protection, unpubl. data). In addition, research has also documented significant reduction in sea turtle nesting activity on beaches illuminated with artificial lights (Witherington 1992). Therefore, construction lights along a project beach and on the dredging vessel may deter females from coming ashore to nest, disorient females trying to return to the surf after a nesting event, and disorient and misorient emergent hatchlings from adjacent non-project beaches. Any source of bright lighting can profoundly affect the orientation of hatchlings, both during the crawl from the beach to the ocean and once they begin swimming offshore. Hatchlings attracted to light sources on dredging barges may not only suffer from interference in migration, but may also experience higher probabilities of predation to predatory fishes that are also attracted to the barge lights. This impact could be reduced by using the minimum amount of light necessary (may require shielding) or low pressure sodium lighting during project construction.

Indirect effects

Indirect effects are those effects that are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Effects from the proposed project may continue to affect sea turtle nesting on the project beach and adjacent beaches in future years. These effects consist of the following.

1. Changes in the physical environment

Beach nourishment may result in changes in sand density (compaction), beach shear resistance (hardness), beach moisture content, beach slope, sand color, sand grain size, sand grain shape, and sand grain mineral content if the placed sand is dissimilar from the original beach sand (Nelson and Dickerson 1988a). These changes could result in adverse impacts on nest site selection, digging behavior, clutch viability, and emergence by hatchlings (Nelson and Dickerson 1987, Nelson 1988).

Beach compaction and unnatural beach profiles that may result from beach nourishment activities could negatively impact sea turtles regardless of the timing of projects. Very fine sand and/or the use of heavy machinery can cause sand compaction on nourished beaches (Nelson *et al*. 1987, Nelson and Dickerson 1988a). Significant reductions in nesting success (i.e., false crawls occurred more frequently) have been documented on severely compacted nourished beaches (Fletemeyer 1980, Raymond 1984, Nelson and Dickerson 1987, Nelson *et al*. 1987), and increased false crawls may result in increased physiological stress to nesting females . Sand compaction may increase the length of time required for female sea turtles to excavate nests and also cause increased physiological stress to the animals (Nelson and Dickerson 1988c). Nelson and Dickerson (1988b) concluded that, in general, beaches nourished from offshore borrow sites are harder than natural beaches, and while some may soften over time through erosion and accretion of sand, others may remain hard for 10 years or more. The applicant has proposed to till the nourish beach without conducting compacting sampling.

These impacts can be minimized by using suitable sand and by tilling the beach after nourishment if the sand becomes compacted. The level of compaction of a beach can be assessed by measuring sand compaction using a cone penetrometer (Nelson 1987). Tilling of a nourished beach may reduce the sand compaction to levels comparable to unnourished beaches. However, a pilot study by Nelson and Dickerson (1988c) showed that a tilled nourished beach will remain uncompacted for up to 1 year. Therefore, the Service requires multi-year beach compaction monitoring and, if necessary, tilling to ensure that project impacts on sea turtles are minimized. A root rake with tines at least 42 inches long and less than 36 inches apart pulled through the sand is recommended for compacted beaches. Service policy calls for beaches to be tilled if compaction levels exceed 500 psi.

A change in sediment color on a beach could change the natural incubation temperatures of nests in an area, which, in turn, could alter natural sex ratios. To provide the most suitable sediment for nesting sea turtles, the color of the nourished sediments must resemble the natural beach sand in the area. Natural reworking of sediments and bleaching from exposure to the sun would help to lighten dark nourishment sediments; however, the timeframe for sediment mixing and bleaching to occur could be critical to a successful sea turtle nesting season.

The Service's review of the sediment data for the borrow area and the native beach indicates that the nourishment material closely resembles the native beach characteristics. Thus, we would anticipate that because of the similarity of the nourishment material and the native beach sand impacts to sea turtles, nests, eggs, and hatchlings should be minimized.

2. Escarpments

On nourished beaches, steep escarpments may develop along their water line interface as they adjust from an unnatural construction profile to a more natural beach profile (Coastal Engineering Research Center 1984, Nelson *et al*. 1987). These escarpments can hamper or prevent access to nesting sites. Researchers have shown that female turtles coming ashore to nest can be discouraged by the formation of an escarpment, leading to situations where they choose marginal or unsuitable nesting areas to deposit eggs (e.g., in front of the escarpments, which often results in failure of nests due to prolonged tidal inundation). This impact can be minimized by leveling any escarpments prior to the nesting season and during the nesting season if needed.

Species response to the proposed action

This biological opinion is based on effects that are anticipated to loggerhead, green, leatherback, or Kemp's ridley sea turtles (nesting females or hatchlings) because: 1) the project may be conducted during the sea turtle nesting season, and 2) the nourished beach may cause a change in the behavior of nesting female turtles or a change in the nest incubation environment for an unknown period of time. In the context of sea turtle nests within the 8.3 mile Action Area, an average of 14 loggerhead sea turtles could be deposited during any one nesting season during the life of the project including the year the project is constructed, one green sea turtle nest could be deposited every other year during the life of the project or during the year the project is constructed, less than one leatherback sea turtle nest could be deposited every year during the life of the project, and less than one Kemp's ridley sea turtle nest could be deposited every other year during the life of the project. Any of these nests could be impacted by the proposed project.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, local, or private actions that are reasonably certain to occur in the proposed Action Area considered in this biological opinion.

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. The lands to the east and west of the project area are federal lands and would undergo section 7 consultation as appropriate. The majority of the land within the Action Area is privately owned and is close to build out. What property has not been developed is expected to be rapidly developed. Further, re-development of some of the older built out beachfront areas may also occur in the future.

CONCLUSION

After reviewing the current status of the loggerhead, green, leatherback, and Kemp's ridley sea turtles, the environmental baseline for the Action Area, the effects of the proposed dredging and beach nourishment, and the cumulative effects, it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of the loggerhead, green, leatherback, or Kemp's ridley sea turtles. No critical habitat has been designated for any of the sea turtle species in the continental United States; therefore, none will be affected.

The proposed project will directly and indirectly affect approximately 495 acres of sea turtle nesting habitat along approximately 8.3 miles of Gulf of Mexico beachfront. The Action Area beach supports an average of 14 loggerhead sea turtle nests annually, one green sea turtle nest bi-annually, less than one leatherback sea turtle nest annually, and less than one Kemp's ridley sea turtle nest bi-annually. Using nourishment material similar to the native beach, placing the nourishment material appropriately, leveling the escarpment, and tilling the beach reduces the potential risk for the nourishment project to affect nesting sea turtles.

INCIDENTAL TAKE STATEMENT

Section 9 of the Endangered Species Act and federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered or 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, carrying out 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 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 included in the permit issued by the Corps so that they become binding special conditions of the permit for the exemption in

section 7(o)(2) to apply. If Corps or the applicant (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of the incidental take statement, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps must report the progress of the permit and its impacts on the species to the Service as specified in the incidental take statement [50 CFR §402.14(I)(3)].

AMOUNT OR EXTENT OF TAKE

The Service has reviewed the biological information and other information relevant to this action. Based on this review, incidental take is anticipated for (1) all sea turtle nests that may be constructed and eggs that may be deposited and missed by a nest survey and egg relocation program within the boundaries of the Action Area; (2) all sea turtle nests deposited during the period when a nest survey and egg relocation program is not required to be in place within the boundaries of the Action Area; (3) harassment in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches as a result of construction activities; (4) disorientation of hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of project lighting; (5) behavior modification of nesting females due to escarpment formation within the Action Area during a nesting season, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs; (6) all nests destroyed as a result of escarpment leveling within a nesting season when such leveling has been approved by the Fish and Wildlife Service; and (7) reduced hatching success due to egg mortality during relocation and adverse conditions at the relocation site

Incidental take is anticipated for only the 8.3 miles of beach that have been identified for sand placement. The Service anticipates incidental take of sea turtles will be difficult to detect for the following reasons: (1) the turtles nest primarily at night and all nests are not found because [a] natural factors, such as rainfall, wind, and tides may obscure crawls and [b] human-caused factors, such as pedestrian and vehicular traffic, may obscure crawls, and result in nests being destroyed because they were missed during a nesting survey and egg relocation program; (2) the total number of hatchlings per undiscovered nest is unknown; (3) the reduction in percent hatching and emerging success per relocated nest over the natural nest site is unknown; (4) an unknown number of females may avoid the project beach and be forced to nest in a less than optimal area; (5) lights may disorient an unknown number of hatchlings and cause death; and (6) escarpments may form and cause an unknown number of females from accessing a suitable nesting site. However, the level of take of these species can be anticipated by the disturbance and nourishment of suitable turtle nesting beach habitat because: (1) turtles nest within the project site; (2) beach nourishment will likely occur during a portion of the nesting season; (3) the nourishment project will modify the incubation substrate, beach slope, and sand compaction; and (4) artificial lighting will disorient nesting females and hatchlings.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to loggerhead, green, leatherback, or Kemp's ridley sea turtles. Critical habitat has not been designated in the Action Area; therefore, the project will not result in destruction or adverse modification of critical habitat for loggerhead, green, leatherback, or Kemp's ridley sea turtles.

Incidental take of nesting and hatchling sea turtles is anticipated to occur during the project construction and during the life of the project. The take will occur on nesting habitat consisting of the length of the beach the nourishment material will be placed. However, measures to reduce potential impacts to nesting females, their nests and eggs, and hatchling are proposed.

REASONABLE AND PRUDENT MEASURES

The following reasonable and prudent measures are necessary and appropriate to minimize take of sea turtles in the proposed beach nourishment Action Area.

The Pensacola Beach nourishment project will be allowed and may be conducted during the sea turtle nesting season (May 1 through October 31), provided the following reasonable and prudent measures are incorporated as conditions of the Corps permit.

1. Only beach quality sand suitable for sea turtle nesting, successful incubation, and hatchling emergence must be used for the beach nourishment.

2. Sea turtle nesting surveys must be conducted to determine the status of sea turtle nesting within the nourishment area and any impacts that may be a result of the nourishment project.

3. If the beach nourishment project is conducted during the sea turtle nesting season, the eggs of any nest laid in the area of beach nourishment must be relocated.

4. Immediately after completion of the beach nourishment project and prior to the next three nesting seasons, beach compaction must be monitored and tilling must be conducted as required to reduce the likelihood of impacting sea turtle nesting and hatching activities.

5. Immediately after completion of the beach nourishment project and prior to the next three nesting seasons, monitoring must be conducted to determine if escarpments are present, and if present, must be leveled as required to reduce the likelihood of impacting sea turtle nesting activities.

6. The applicant must ensure that contractors conducting the beach nourishment work fully understand the sea turtle protection measures detailed in this incidental take statement.

7. During the sea turtle nesting season, construction equipment and pipes must be stored in a manner that will minimize impacts to sea turtles to the maximum extent practicable.

8. During the sea turtle nesting season, lighting associated with the project must be minimized to reduce the possibility of disrupting and disorienting nesting and/or hatchling sea turtles.

9. All dune restoration and planting must be designed and conducted to minimize impacts to sea turtles.

10. The applicant must ensure that the terms and conditions are accomplished and completed as detailed in this incidental take statement.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Endangered Species Act, the Corps must assure that the applicant complies with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

Proposed Work

1. All fill material placed must be sand that is similar to a native beach in the vicinity of the site that has not been affected by prior nourishment activities. The fill material must be similar in both coloration and grain size distribution to the native beach. All such fill material must be free of construction debris, rocks, or other foreign matter and must not contain, on average, greater than 10 percent fines (i.e., silt and clay) (passing the #200 sieve) and must not contain, on average, greater than 5 percent coarse gravel or cobbles, exclusive of shell material (retained by the #4 sieve).

Protection of Sea Turtles

2. Daily early morning surveys will be required if any portion of the beach nourishment project occurs during the period from May 1 through October 31. Nesting surveys will be initiated 70 days prior to nourishment activities or by May 1, whichever is later. Nesting surveys must continue through the end of the project or through September 1, whichever is earlier. Hatching and emerging success monitoring will involve checking

nests beyond the completion date of the daily early morning nesting surveys. If nests are laid in areas where they may be affected by nourishment activities, eggs must be relocated per the following requirements.

a. Nest surveys and egg relocations will only be conducted by personnel with prior experience and training in nest survey and egg relocation procedures. Surveyors must have a valid Florida Fish and Wildlife Conservation Commission permit. Nest surveys must be conducted daily between sunrise and 9 a.m. Surveys must be performed in such a manner so as to ensure that construction activity does not move occur in any location prior to completion of the necessary sea turtle protection measures.

b. Only those nests that may be affected by construction activities will be relocated. Nests requiring relocation must be moved no later than 9 a.m. the morning following deposition to a nearby self-release beach site in a secure setting where artificial lighting will not interfere with hatchling orientation. The relocation sites must be approved by the Fish and Wildlife Service prior to usage. Nest relocations in association with construction activities must cease when construction activities no longer threaten nests.

c. Nests deposited within areas where nourishment activities have ceased or will not occur for 70 days must be marked and left *in situ* unless other factors threaten the success of the nest. The turtle permit holder must install an on-beach marker at the nest site and a secondary marker at a point landward as possible to assure that future location of the nest will be possible should the on-beach marker be lost. A series of stakes and highly visible survey ribbon or string must be installed to establish an area of 10 feet radius surrounding the nest. No activity will occur within this area nor will any activity occur which could result in impacts to the nest. Nest sites must be inspected daily to assure nest markers remain in place and the nest has not been disturbed by the nourishment activity.

2. Immediately after completion of the beach nourishment project and prior to March 15, for 3 subsequent years, sand compaction must be monitored in the area of beach nourishment in accordance with a protocol agreed to by the Fish and Wildlife Service, the Florida Fish and Wildlife Conservation Commission, and the applicant. At a minimum, the protocol provided under a. and b. below must be followed. If required, the area shall be tilled to a depth of 24 in. All tilling activity must be completed prior to April 15. If the project is completed during the nesting season, tilling will not be performed in areas where nests have been left in place or relocated. A report on the results of compaction monitoring shall be submitted to the Fish and Wildlife Service prior to any tilling actions being taken. An annual summary of compaction surveys and the actions taken must be submitted to the Fish and Wildlife Service. (NOTE: The requirement for compaction monitoring can be eliminated if the decision is made to till regardless of post-construction compaction levels. Also, out-year compaction

monitoring and remediation are not required if placed material no longer remains on the dry beach.)

a. Compaction sampling stations must be located at 500-foot intervals along the project area. One station must be at the seaward edge of the dune/bulkhead line (when material is placed in this area); and one station must be midway between the dune line and the high water line (normal wrack line).

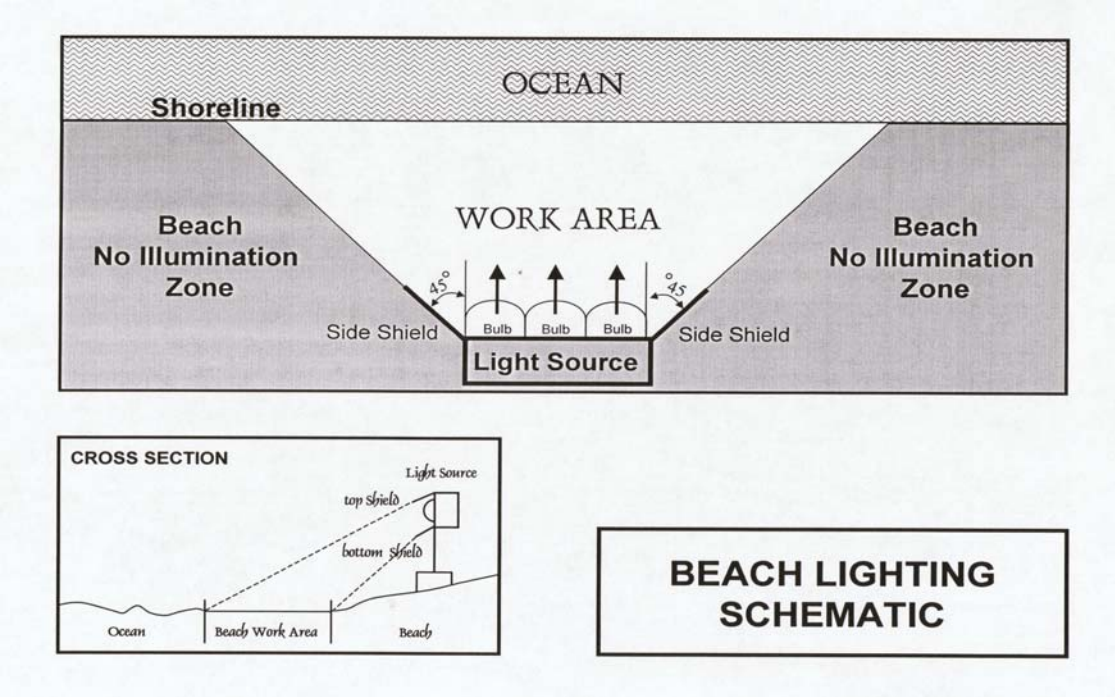
At each station, the cone penetrometer will be pushed to a depth of 6, 12, and 18 inches three times (three replicates). Material may be removed from the hole if necessary to ensure accurate readings of successive levels of sediment. The penetrometer may need to be reset between pushes, especially if sediment layering exists. Layers of highly compact material may lay over less compact layers. Replicates will be located as close to each other as possible, without interacting with the previous hole and/or disturbed sediments. The three replicate compaction values for each depth will be averaged to produce final values for each depth at each station. Reports will include all 18 values for each transect line, and the final 6 averaged compaction values.

b. If the average value for any depth exceeds 500 psi for any two or more adjacent stations, then that area must be tilled prior to April 15. If values exceeding 500 psi are distributed throughout the project area, but in no case do those values exist at two adjacent stations at the same depth, then consultation with the Fish and Wildlife Service will be required to determine if tilling is required. If a few values exceeding 500 psi are randomly present within the project area, tilling will not be required.

3. Visual surveys for escarpments along the project area must be started immediately upon completion of each section of beach if within the time period May 1 through October 31, and prior to April 1, for 3 subsequent years. Results of the surveys must be submitted to the Fish and Wildlife Service prior to any action being taken. Escarpments that interfere with sea turtle nesting as determined by the nesting surveyors or that exceed 18 inches in height for a distance of 100 ft must be leveled to the natural beach contour by April 15. If the project is completed during the sea turtle nesting and hatching season, escarpments may be required to be leveled immediately, while protecting nests that have been relocated or left in place. The Fish and Wildlife Service must be contacted immediately if subsequent reformation of escarpments that interfere with sea turtle nesting as determined by the nesting surveyors or that exceed 18 inches in height for a distance of 100 ft occurs during the nesting and hatching season to determine the appropriate action to be taken. If it is determined that escarpment leveling is required during the nesting or hatching season, the Fish and Wildlife Service will provide a brief written authorization that describes methods to be used to reduce the likelihood of impacting existing nests. An annual summary of escarpment surveys and actions taken must be submitted to the Fish and Wildlife Service. To ensure compliance with this condition, turtle nesting surveys must be conducted for 3 years following beach nourishment.

4. From May 1 through October 31, staging areas for construction equipment must be located off the beach to the maximum extent practicable. Night-time storage of construction equipment not in use must be off the beach to minimize disturbance to sea turtle nesting and hatching activities. In addition, all construction pipes that are placed on the beach must be located as far landward as possible without compromising the integrity of the existing or reconstructed dune (berm) system. Temporary storage of pipes must be off the beach to the maximum extent possible. Temporary storage of pipes on the beach must be in such a manner so as to impact the least amount of nesting habitat and must likewise not compromise the integrity of the dune systems (placement of pipes perpendicular to the shoreline is recommended as the method of storage).

5. From May 1 through October 31, direct lighting of the beach and near shore waters must be limited to the immediate construction area and must comply with safety requirements. Lighting on offshore or onshore equipment must be minimized through reduction, shielding, lowering, and appropriate placement to avoid excessive illumination of the waters surface and nesting beach while meeting all Coast Guard, EM 385-1-1, and OSHA requirements. Light intensity of lighting plants must be reduced to the minimum standard required by OSHA for General Construction areas, in order not to mis-direct sea turtles. Shields must be affixed to the light housing and be large enough to block light from all lamps from being transmitted outside the construction area (see below schematic).



6. The applicant must arrange a meeting between representatives of the contractor, the Fish and Wildlife Service, the Florida Department of Environmental Protection, Bureau of Beaches and Wetland Resources, and the Florida Fish and Wildlife Conservation Commission, Bureau of Protected Species Management, and the permitted person responsible for egg relocation at least 14 days prior to the commencement of work on this project. At least 10 days advance notice must be provided prior to conducting this meeting. This will provide an opportunity for explanation and/or clarification of the sea turtle protection measures.

Dune Creation

1. Planting of dune vegetation may be implemented during the turtle nesting season (May 1 through October 31) but must incorporate the following conditions:

   a. Daily early morning nesting surveys will be required during the period from May 1 through October 31. Nest surveys must only be conducted by personnel with prior experience and training in nest surveys. Surveyors must have a valid Florida Fish and Wildlife Conservation Commission permit. Nest surveys must be conducted daily between sunrise and 9 a.m. No dune planting activity will occur until after the daily turtle survey and nest conservation and protection efforts have been completed.

   b. Nesting surveys must be initiated 70 days prior to dune planting activities or by May 1, whichever is later. Nesting surveys must continue through the end of the project or through September 1, whichever is earlier. Hatching and emerging success monitoring will involve checking nests beyond the completion date of the daily early morning nesting surveys.

   c. Any nests deposited in the dune planting area not requiring relocation for conservation purposes shall be left *in situ*. The turtle permit holder must install an on-beach marker at the nest site and a secondary marker at a point as far landward as possible to assure that future location of the nest will be possible should the on-beach marker be lost. A series of stakes and highly visible survey ribbon or string must be installed to establish an area of 3 ft radius surrounding the nest. No planting or other activity will occur within this area nor will any activity occur which could result in impacts to the nest. Nest sites must be inspected daily to assure nest markers remain in place and the nest has not been disturbed by the planting activity.

   d. If a nest is disturbed or uncovered during planting activity, the permittee must cease all work and immediately contact the responsible turtle permit holder. If a nest(s) cannot be safely avoided during planting, all activity within the affected project site

must be delayed until hatching and emerging success monitoring of the nest is completed.

e. All dune planting activities must be conducted during daylight hours only.

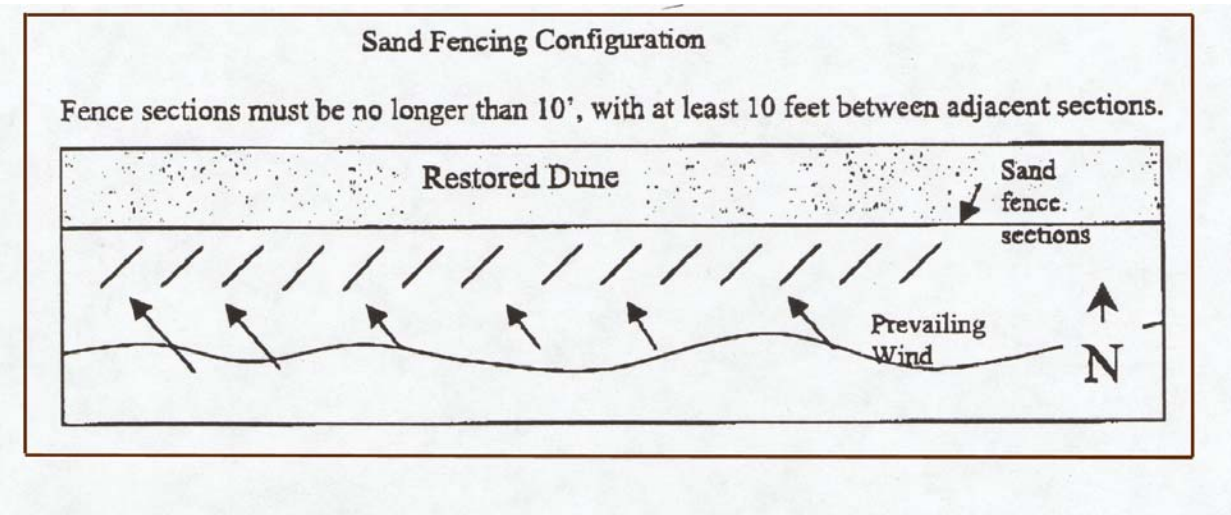
f. All dune vegetation must consist of plant species native to the area and be planted in accordance with Florida Department of Environmental Protection guidelines.

g. No use of heavy equipment (trucks) will occur on the dunes or seaward. A lightweight (ATV type) vehicle, with tire pressures of 10 psi or less may be operated on the beach.

h. All irrigation, if proposed, must be installed by hand labor or tools and entrenched 1 to 3 inches below grade so as not to pose a barrier to hatchling turtles and to allow for easy removal. The irrigation system must be designed and maintained so that watering of the adjacent sandy beach does not occur. If a turtle nest is deposited within the newly established planted dune area, the applicant must modify the irrigation system so that no watering occurs within 10 ft of the nest. Daily inspection of the irrigation system must be conducted to assure the irrigation system is properly working and meets the above conditions. The irrigation system must be completely removed once watering is no longer needed or before May of the next year.

2. Any sand fencing or other dune restoration material placed in the project area must be installed as follows:

a. A maximum of 10 foot- long spurs of parallel fence spaced at a minimum of 7 ft (2.1 m) apart must be installed on a northeast-southwest (diagonal) alignment (below schematic).



b. All fence material must be repositioned as necessary to facilitate dune building and must be removed when 30 percent of the fence is covered with sand.

c. Upon site inspection by the Fish and Wildlife Service, Florida Department of Environmental Protection, Bureau of Beaches and Wetland Resources, or the Florida Fish and Wildlife Conservation Commission, Bureau of Protected Species Management, if it is determined that the fence adversely impacts nesting or hatchling turtles, the fence must be removed or repositioned as appropriate.

Reporting

1. A report describing the actions taken to implement the terms and conditions of this incidental take statement must be submitted to the Project Leader, U.S. Fish and Wildlife Service, 1601 Balboa Avenue, Panama City, Florida, 32405, within 60 days of completion of the terms and conditions for each year. This report will include the dates of actual construction activities, names and qualifications of personnel involved in nest surveys and relocation activities, descriptions and locations of self-release beach sites, nest survey and relocation results, and hatching and emerging success of nests.
2. In the event a sea turtle nest is excavated during construction activities, the permitted person responsible for egg relocation for the project must be notified so the eggs can be moved to a suitable relocation site.

3. Upon locating a sea turtle adult, hatchling, or egg harmed or destroyed as a direct or indirect result of the project, notification must be made to either the Florida Fish and Wildlife Conservation Commission Stranding and Salvage Network by pager: 1-800-241-4653, ID#274-4867 (make sure you input your area code with your telephone number) or the FWC Division of Law Enforcement at 1-888-404-FWCC; and the U.S. Fish and Wildlife Service Office located in Panama City, Florida at (850) 769-0552.

Care should be taken in handling injured turtles or eggs to ensure effective treatment or disposition, and in handling dead specimens to preserve biological materials in the best possible state for later analysis.

The Service believes that incidental take will be limited to the 8.3 miles of beach that have been identified for sand placement. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. With implementation of these measures, the Service believes that incidental take of sea turtles as a result of the proposed project will only include the following: (1) all sea turtle nests that may be constructed and eggs that may be deposited and missed by a nest survey and egg relocation program within the boundaries of the proposed project; (2) all sea turtle nests deposited during the period when a nest survey and egg relocation program is not required to be in place within the boundaries of the proposed project; (3) harassment in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent project and non-project beaches; (4) disorientation of hatchling turtles on adjacent project and non-project beaches as they emerge from the nest and crawl to the water; (5) behavior modification of nesting females due to escarpment formation within the project area during a nesting season, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs; (6) all nests destroyed as a result of escarpment leveling within a nesting season when such leveling has been approved by the Fish and Wildlife Service; and (7) reduced hatching success due to egg mortality during relocation and adverse conditions at the relocation site. The amount or extent of incidental take for sea turtles will be considered exceeded if the project results in more than an one-time placement of sand on the 8.3 miles of beach that have been identified for sand placement.

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 Federal agency 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 Endangered Species Act (Act) directs federal agencies to utilize 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 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. We encourage the applicant to meet with the Service to discuss conservation of sea turtles and ways that they could help contribute to their recovery.

1. Construction activities for this project and similar future projects should be planned to take place outside the main part of the sea turtle nesting and hatching season.

2. The beach nourishment material should have a Munsell color value of 9.25 or above (nearly white scale) once the natural bleaching and weathering process is complete.

3. Pre-project sand compaction sampling of the existing beach should be conducted according to the protocol as described under Protection of Sea Turtles, No. 2 in the above Terms and Conditions.

4. The beach nourishment project should be tapered at both the eastern and western ends to minimize the potential for up or down drift effects of the nourishment on Gulf Islands National Seashore lands.

5. A sea turtle-friendly lighting ordinance should be adopted and implemented. In the interim, Escambia County and/or the Santa Rosa Island Authority should: a) replace or retrofit existing County or SRIA-controlled lighting to sea turtle friendly lighting, b) assist the FDEP in identifying and encouraging private beachfront property owners to correct lighting or use sea turtle-friendly lighting, and c) work with Gulf Power to retrofit street lights as appropriate.

6. The proposed dunes should be created by either planting only vegetation and allowing the dunes to form naturally or by piling the sand in wide rather than tall mounds. If the second method is selected, the dunes should be formed using the existing sand on the beach. The existing sand on the beach should be pushed landward prior to the placement of the nourishment material from offshore.
7. Dune walkovers and parking areas should be constructed where appropriate to protect dune habitats at beach access points.

8. Escambia County should consider measures to limit coastal development that would exacerbate coastal erosion and then require storm protection in the future.

9. To increase public awareness about sea turtles, informational signs should be placed at beach access points where appropriate. The signs should describe the importance of the beach to sea turtles and/or the life history of sea turtle species that nest in the area.

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.

If you have any questions regarding biological opinion, please contact Ms. Lorna Patrick at ext. 229. We appreciate the opportunity to provide comments at this time.

Sincerely yours,

Gail A. Carmody Field Supervisor

cc:
FWS, Jacksonville, FL (Sandy MacPherson)(w/ copy of PN)
NMFS, Habitat Conservation, Panama City, FL (Mark Thompson)
NMFS, Protected Species, St. Pete., FL
FWC, Non-game program, Panama City, FL (Karen Lamonte)
FWC, Bureau of Protected Species Mgmt., Tallahassee, FL (Robbin Trindell)
FWC, Tallahassee, FL (Brad Hartman)
USEPA, Atlanta, GA (Haynes Johnson)
FDEP, Bureau of Beaches and Wetland Resources, Tallahassee, FL (Michael Corrigan)
FDEP, Panama City, FL
Mark Nicholas, GINS, Gulf Breeze, FL
Debbie Norton, Santa Rosa Island Authority, Pensacola, FL
Al Browder, Olsen Associates, Inc., Jacksonville, FL

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