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National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
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St. Petersburg, Florida 33701-5505
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AUG 1 3 2013

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Ref.: SER-2012-9274

Dr. Jennifer Culbertson
Branch of Environmental Consultation
Division of Environmental Assessment
Bureau of Ocean Energy Management
Washington, DC 20240-0001

Re: BOEM Lease of Offshore Sand Resources to Collier County Parks and Recreation Department for a Collier County Beach Renourishment Project

Dear Dr. Culbertson:

Enclosed is the National Marine Fisheries Service's (NMFS's) biological opinion to the Bureau of Ocean Energy Management (BOEM) analyzing BOEM's proposed issuance of a sand lease to the Collier County Parks and Recreation Department (CCPRD) for the use of sand resources from one offshore site (A1) located in federal waters 33 miles northwest of Collier County, Florida. BOEM proposes to authorize CCPRD's use of the sand borrow area under its Outer Continental Shelf (OCS) Lands Act authority. The sand will be used to renourish and stabilize several beach areas along Collier County, Florida.

The biological opinion analyzes the project's effects in federal waters on sea turtles in accordance with Section 7 of the Endangered Species Act (ESA) of 1973, and is based on information provided in BOEM's letter dated November 6, 2012; e-mails dated January 15, February 25, 28, and March 15, 2013; the biological assessment (BA) prepared by Coastal Planning & Engineering, Inc., dated November 2012, submitted with the consultation package; and information from previous NMFS's consultations. It is NMFS's biological opinion that the action, as proposed, is likely to adversely affect loggerhead, Kemp's ridley, and green sea turtles, but is not likely to jeopardize their continued existence.

We look forward to further cooperation with you on other BOEM projects to ensure the conservation and recovery of our threatened and endangered marine species. If you have any questions regarding this consultation, please contact Joseph Cavanaugh, consultation biologist, by phone (727) 551-5097 or by e-mail at Joseph.Cavanaugh@noaa.gov.

Sincerely,

Miles M. Croom

for Roy E. Crabtree, Ph.D.
Regional Administrator

Enclosure

File: 1514-22.F.4

Endangered Species Act - Section 7 Consultation
Biological Opinion

Action Agency: Bureau of Ocean Energy Management (BOEM)

Activity: Lease of Borrow Area T1 to the Collier County Parks and Recreation Department for the Collier County Beach Renourishment Project (Consultation Number SER-2012-9274)

Consulting Agency: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Regional Office, Protected Resources Division, St. Petersburg, Florida

Approved by: Miles M. Croom

for Roy E. Crabtree, Ph.D., Regional Administrator
NMFS, Southeast Regional Office
St. Petersburg, Florida

Date Issued: AUG 13 2013

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Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1531 *et seq*.), requires that each federal agency ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. When the action of a federal agency may affect a protected species, that agency is required to consult with either the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) or the U.S. Fish and Wildlife Service (USFWS), depending upon the protected species that may be affected.

This document represents NMFS's biological opinion ("opinion") based on our review of the effects of construction (renourishment) of shoreline along Vanderbilt Beach, Pelican Bay, Park Shore, and Naples Beach in Collier County, Florida, on green sea turtles *(Chelonia mydas*), leatherback sea turtles (*Dermochelys coriacea*), hawksbill sea turtles *(Eretmochelys imbricata*), loggerhead sea turtles (*Caretta caretta*), Kemp's ridley sea turtles *(Lepidochelys kempii*), North Atlantic right whales (*Balaena glacialis*), humpback whales (*Megaptera novaeangliae)*, sei whales (*Balaenoptera borealis*), fin whales (*Balaenoptera physalus*), sperm whales (*Physeter macrocephalus*), blue whales (*Balaenoptera musculus*), and smalltooth sawfish (*Pristis pectinata*), in accordance with Section 7 of the Endangered Species Act (ESA). Activities evaluated are BOEM's proposed lease for sand mining in federal waters, and the interdependent and interrelated activities authorized by the U.S. Army Corps of Engineers (USACE) involving sand deposition in inshore waters. The proposed action will not involve sand mining in nearshore (state) waters but rather, all dredged materials will be transported from the borrow site to an offshore (federal waters) pumpout station where they will be pumped onto the beaches via pipelines.

Formal consultations are required when action agencies determine that a proposed action "may affect" listed species or designated critical habitat. Formal consultations on most listed marine species are conducted between the action agency and NMFS. Consultations are concluded after NMFS's issuance of an opinion that identifies whether a proposed action is likely to jeopardize the continued existence of a listed species, or destroy or adversely modify critical habitat. The opinion also states the amount or extent of incidental taking that may occur. Non-discretionary measures ("reasonable and prudent measures" - RPMs) to reduce the likelihood of interactions are developed, and conservation recommendations are made. Notably, there are no reasonable and prudent measures associated with critical habitat, only reasonable and prudent alternatives.

This opinion is based on information provided by BOEM, Coastal Planning & Engineering, Inc. (CP&E), Collier County Parks and Recreation Department (CCPRD), previous NMFS opinions on hopper dredging, and dredging and sea turtle relocation trawling reports submitted by the USACE and/or maintained on their Sea Turtle Data Warehouse Web site (http://el.erdc..army.mil/seaturtles/index.cfm).

1. Consultation History

On November 16, 2012, BOEM requested concurrence from NMFS with BOEM's project effect determinations under Section 7 of the ESA for the CCPRD's proposed beach renourishment along three sections of beach: Vanderbilt Beach, Park Shore, and Naples Beach, all located in Collier County, Florida. Four sections of shoreline are proposed for renourishment: Vanderbilt Beach (R-22+300 to R-30+500), Pelican Bay (R-30+500 to R-37), Park Shore (R-43+500 to R-54+400), and Naples Beach (R-58A-480 to R-79). The Pelican Bay section was appended to the action during our Section 7 consultation in an e-mail between Jennifer Culbertson (BOEM) and Joseph Cavanaugh (NMFS PRD) on February 28, 2013. A hopper dredge(s) is proposed to be used to extract sand from federal waters under the permitting/leasing authority of BOEM. Additional information was requested and received via phone on December 12, 2012; formal consultation was initiated on this date. A subsequent request for additional information was sent via e-mail from NMFS to BOEM on March 4, 2013 and a response was received the same day. Dr. Jennifer Culbertson (BOEM Project Manager) also notified NMFS Protected Resources Division (PRD) of project design changes to the proposed action on January 15, February 25, and 28, 2013, all of which are included in the analysis in this biological opinion. Subsequent communications during early March 2013 between BOEM (Jennifer Culbertson) and NMFS PRD (Joseph Cavanaugh) focused on potential conservation measures that might be adopted such as pre-dredge sweep trawls and the use of sea turtle satellite tags during relocation trawling.

2. Description of the Action

Proposed Actions Occurring in Federal Waters
BOEM is proposing to issue a lease for the use of sand resources from Borrow Area T1 located on the Outer Continental Shelf (OCS) in federal waters approximately 33 miles from Vanderbilt Beach, Naples, Collier County, Florida (Figures 1-2). The Collier County Renourishment Project encompasses approximately 7.5 miles of coastline between Wiggins Pass and Gordon Pass (Figures 2-3). The approximate geographic coordinates for the entire renourishment lie between 26.263681°N latitude, 81.826089°W longitude (North American Datum 1983) for the northern boundary and 26.249447°N latitude, 81.822736 °W longitude for the southern boundary.

The applicant, CCPRD, proposes to renourish the above-referenced portions of beach with approximately 420,000 cubic yards (cy) of dredged material from Borrow Area T1. Collier County shorelines were most recently renourished in 2006; however, the current renourishment plan is mitigation for coastal erosion and damages caused by Tropical Storms Fay and Debby which occurred in June 2012. Based upon a 2012 shoreline monitoring survey, the 420,000 cy of material is needed to rebuild what was renourished in the 2006 project but with a smaller alongshore length and cross shore width and volume, while increasing five profiles' densities with no hardbottom impact. Borrow Area T1 is entirely within federal waters and under the leasing authority of BOEM. The disposal of the dredged sand will occur in state waters that are under the permitting authority of the USACE.

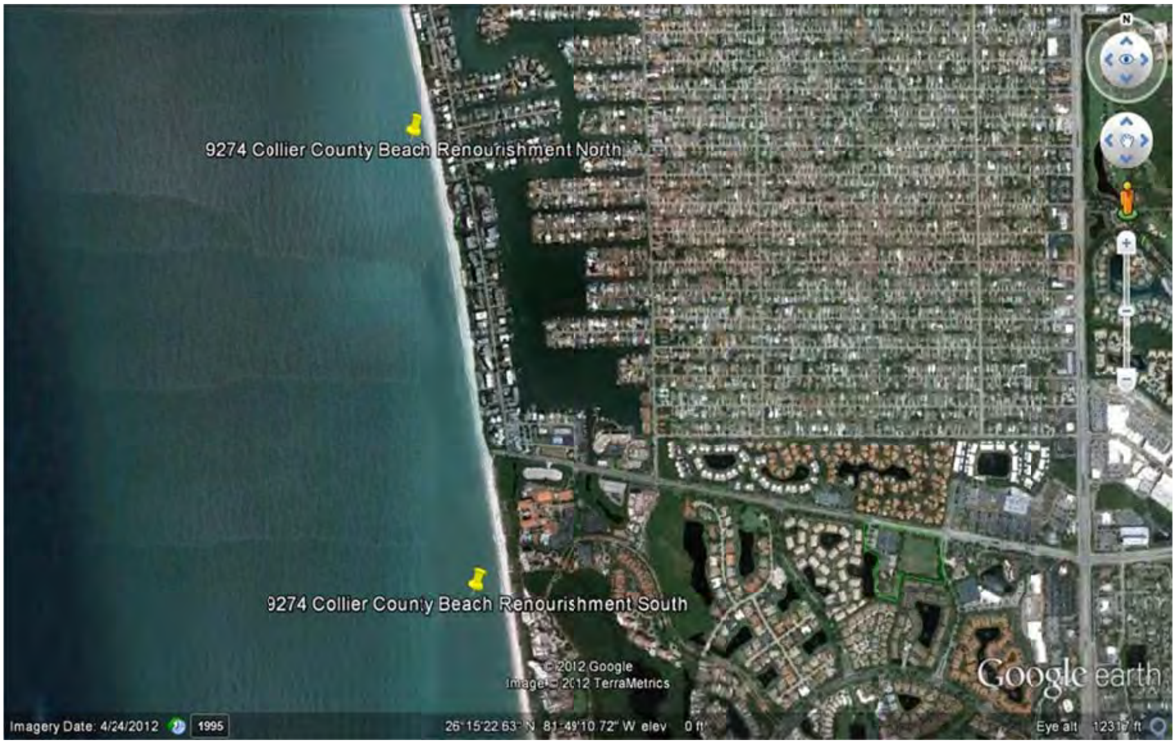


Figure 1: Google earth™ image showing the northern and southern boundaries (marked with pushpins) of the proposed 2013 Collier County Beach Renourishment Project.

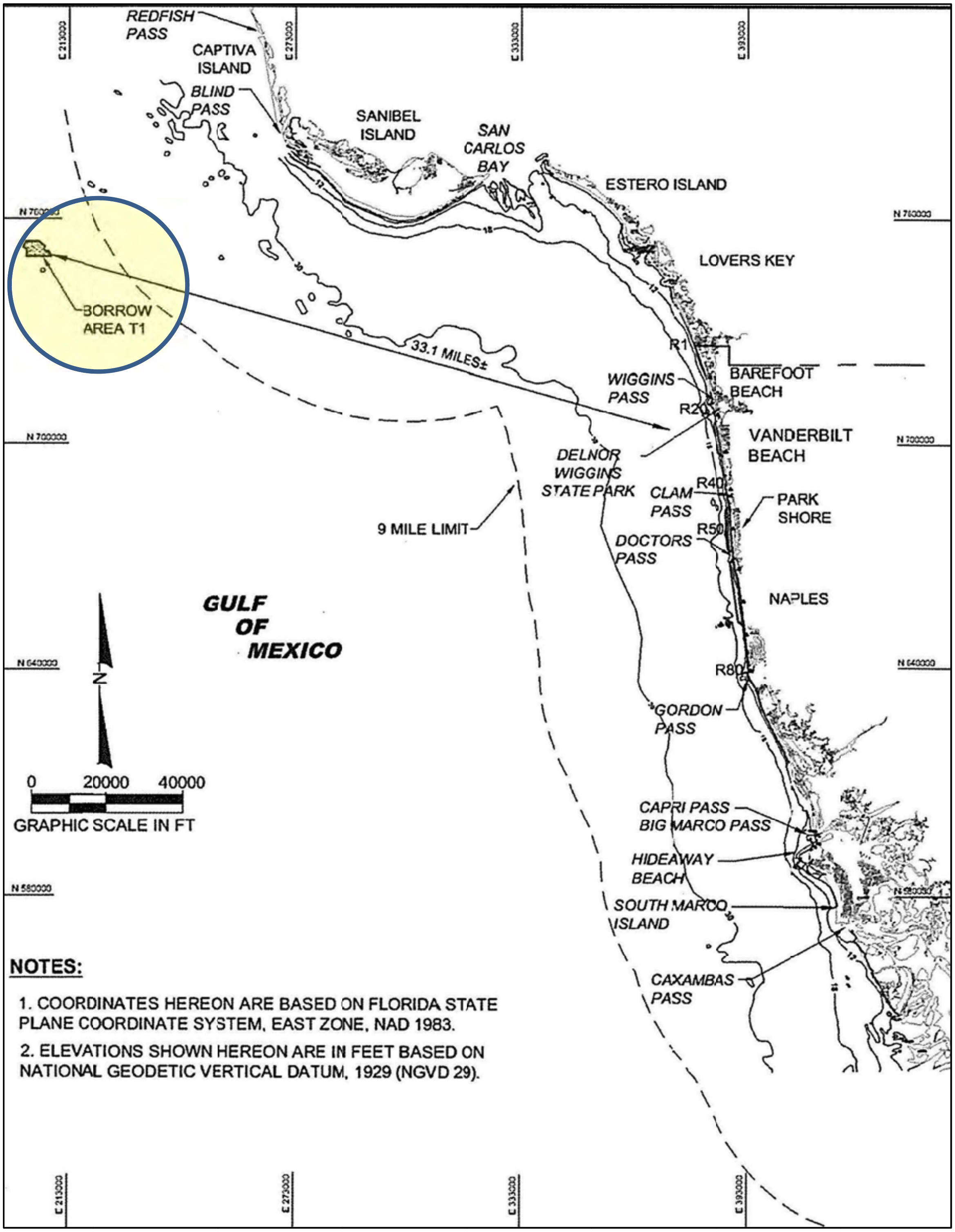


Figure 2: Project area for the Collier County Renourishment Project including Borrow Area T1, 33 miles offshore indicated by yellow circle.

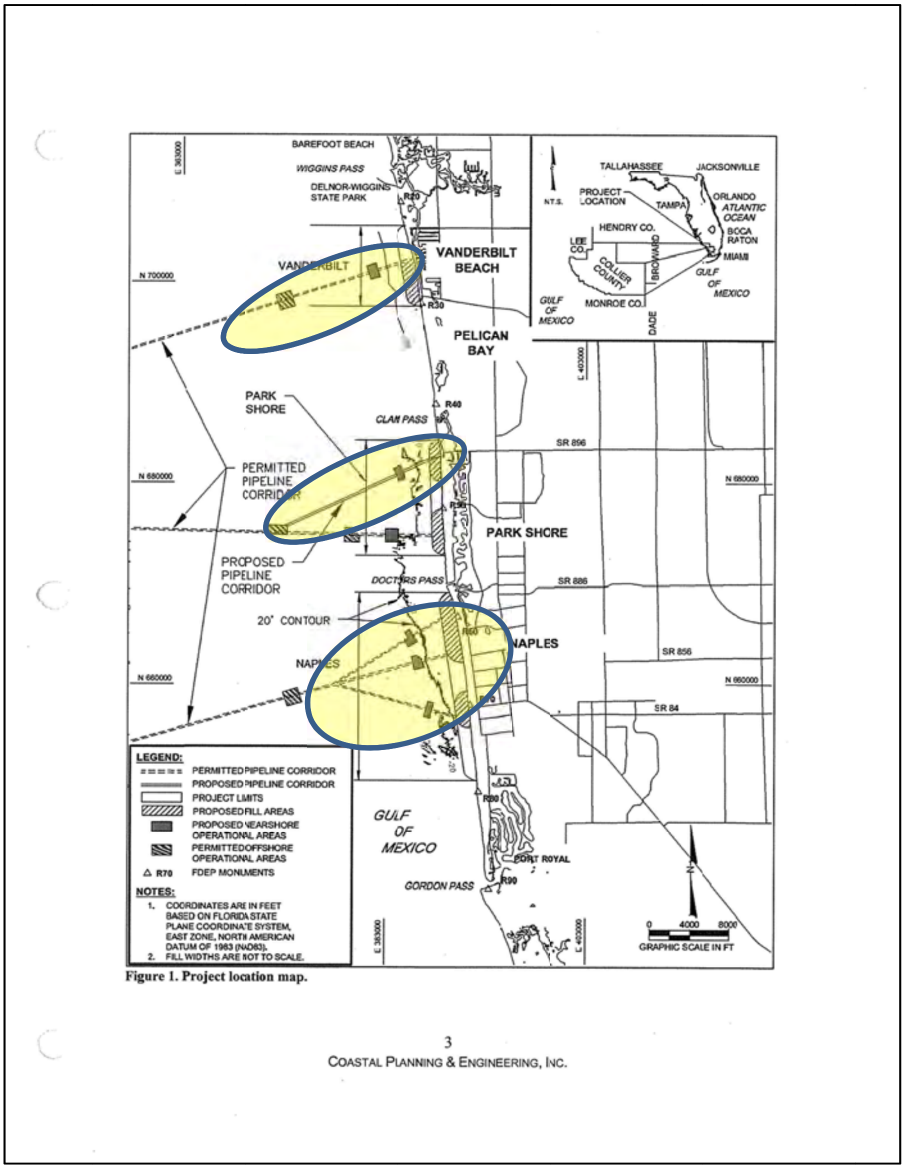


Figure 3: Project location map for Collier County Beach Renourishment (2013). Proposed pipeline corridors highlighted by yellow ovals. All the proposed pipeline corridors will likely be utilized to minimize bulldozer traffic moving sand along beaches.

The project will incorporate several gaps in fill along each segment. Vanderbilt Beach will have a gap between R-22+300 and R-25+500, Park Shore will have a gap between R-47+500 and R-50, the Pelican Bay gap is between R-30+500 to R-37, and Naples Beach will have a gap between R-64+500 and R-68+200 and R-72+600 to R-79. The impacts of Hurricane Isaac have not been factored into the renourishment design and may add up to 95,000 cy of additional fill volume, bringing the maximum total fill needed to 515,000 cy for the entire project. There are two options for sand sources proposed for this 2013 project, offshore (Borrow Area T1) and upland (not yet determined). However, this biological opinion assumes that construction will use the offshore borrow area with either a hydraulic dredge (cutterhead) or hopper dredge since this is more likely construction scenario. In the hopper dredge scenario, sand will be excavated from Borrow Area T1 that was previously permitted by BOEM for use in the 2006 renourishment project. There may be up to two hopper dredges or traveling between the borrow area and the pipeline per day for placement along the seaward end of the submerged pipeline and then pumped to the fill area. Depending on the capacity of the hopper dredge(s) or scowls used, it is anticipated that up to seven round trips will be made per day. Dredge-and-fill activities will be restricted from between September 15-May 31, to avoid sea turtle peak nesting season. The applicant will be required to conduct relocation trawling beginning 24 hours in advance of any hopper dredging at the borrow site and continue during.

The previous nourishment project (2006) was consulted on through ESA Section 7 with the USACE and consultation was concluded in an informal letter of concurrence (I/SER/2004/00233) subject to the authority of the NMFS Gulf of Mexico regional hopper dredging biological opinion (GRBO) issued to the USACE on November 19, 2003. The current project is expected to take up to 120 days (working 24 hours per day, 7 days per week). Following the proposed 2013-14 renourishment project, the area will likely be nourished again approximately six years later.

Activities currently occurring and planned in conjunction with this project, as well as an emergency renourishment project completed in June 2011 and future sand extractions and renourishment activities conducted within *state* waters as part of the Collier County Renourishment project, are within the scope of previously issued GRBO. The GRBO governs (and is limited to) maintenance dredging, sand mining, and beach nourishment activities occurring in state waters, under the USACE's regulatory authority under Section 10 of the Rivers and Harbors Act and/or Section 404 of the Clean Water Act.

Authorization to permit activities in federal waters, such as the proposed offshore sand mining, resides solely with BOEM (pers. comm. with Dr. Jennifer Culbertson, BOEM and Joseph Cavanaugh NMFS PRD, on December 12, 2012), under the Outer Continental Shelf Lands Act . All sand used in the Collier County renourishment project will be taken from a Borrow Area T1 located in federal waters. The associated renourishment activities proposed to occur in state waters which are considered to be interrelated and interdependent to BOEM's proposed action, pursuant to the definition of effects of agency actions (50 CFR § 402.02), and would be considered when these activities are proposed. Therefore, the present opinion to BOEM considers *all* potential effects of the Collier County Renourishment project, including protected species relocation trawling and all sand extractions by hopper dredging in federal waters from the shoreline of Collier County seaward to and including areas under the jurisdiction of BOEM, as well as the beach placement of sand.

Harm Avoidance and Minimization Measures that will be Implemented by BOEM in Federal and State Waters

Conservation actions that must occur during hopper dredging in state waters are laid out in the reasonable and prudent measures, and implementing terms and conditions, of the 2003 GRBO (as amended through Revision 2, dated January 9, 2007) to the USACE. The GRBO is included as Appendix 1 of this document, for ease of reference. Revision 2 of the GRBO is included as Appendix 2.

BOEM proposes to implement similar actions designed to avoid or minimize harm to listed species during hopper dredging in federal waters. Specifically, relocation trawling, which constitutes a reasonable and prudent measure (discussed in more detail in Section 5.4 and see RPM No. 3) will occur at the dredge site according to the terms and conditions of this opinion. Relocation trawling will begin 24 hours in advance of any hopper dredging at the borrow site and once dredging beginsrelocation trawling will occur ahead of the dredge throughout the duration of dredging. In addition, during dredging activities, the applicant has agreed to comply with NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions*. As part of these conditions, if a smalltooth sawfish or sea turtle is observed within 100 yards of construction operations, all appropriate precautions shall be implemented to ensure protection of the species, including cessation of operation if an animal moves within 50 feet of any moving equipment. Additionally, the conditions require avoiding collisions with swimming sea turtles, monitoring of siltation barriers for entanglement, operation at "no wake/idle" speeds in the construction area, and reporting any collision with and/or injury to a sea turtle to NMFS's PRD and the local sea turtle stranding/rescue organization (in this case, Mote Marine Laboratory).

Also included as an RPM, protected species observers will live aboard the dredge, monitoring dredge loads 24 hours a day for evidence of impacts to endangered and threatened species, as well as recording water temperatures, bycatch information, and any sightings of species in the area. The hopper dredge will be required to have rigid turtle deflectors installed on all dragheads. The rigid deflector was developed under controlled conditions by the USACE's Waterways Experimental Station (WES), now known as the Engineer Research and Development Center (ERDC). V-shaped, sea turtle deflector dragheads prevent an unquantifiable yet significant number of sea turtles from being entrained and killed in hopper dredges each year. Without them, turtle takes during hopper dredging operations would unquestionably be higher. Draghead tests conducted in May-June 1993 by the USACE's WES in clear water conditions on the sea floor off Fort Pierce, Florida, with 300 mock turtles placed in rows, showed convincingly that the newly-developed WES deflector draghead performed exceedingly well at deflecting the mock turtles. Thirty-seven of 39 mock turtles encountered were deflected, two turtles were not deflected, and none were damaged. The two sea turtles not deflected were recovered and released in good condition but would assume to be mortalities had an actual hopper dredge been in operation. The V-shape reduced forces encountered by the draghead, and resulted in smoother operation (WES, Sea Turtle Project Progress Report, June 1993). V-shaped deflecting dragheads are now a widely accepted conservation tool, the dredging industry is familiar with them and their operation, and they are used by all USACE Districts conducting hopper dredge operations where turtles may be present. Screening will be placed on all points of dredged-material inflow prior to work beginning. Any captured turtles will be photographed, measured, biopsied for genetics, tagged, any epibionts present recorded, and the turtles relocated at least 3 nautical miles away. During relocation trawling one trawling vessel per dredge will operate 24 hours/day, 7 days/week. Relocation trawling tow times during relocation trawling will be strictly limited to less than 30 minutes total time.

Beach quality sand chosen in part for the suitability for sea turtle nesting, successful incubation, and hatchling emergence will be used for the 2013-14 renourishment. During borrow area selection for this project, a sand compatibility analysis compared the composition characteristics for both beaches and the borrow area including mean grain size, sorting, silt content, shell content, carbonate content, and Munsell color. The results of this analysis show that the material contained within the proposed borrow area is very similar to the existing sand on Collier County beaches. Following construction, any escarpments that might form will be leveled to maintain sea turtle access to the nesting beach.

To reduce potential impacts from project lighting to nesting sea turtles, the CCPRD will limit direct lighting to immediate construction areas during the portion of the work that overlaps with sea turtle nesting season (April 1-May 31; September 1-15). Lighting on offshore and onshore equipment shall be minimized through reduction, shielding, lowering, and appropriate light placement to avoid excessive illumination of the water's surface and nesting beach. Further, light intensity will be lowered to the minimum standard required by the U.S. Occupation Safety and Health Administration for General Construction areas in order to not misdirect sea turtles. Shields shall be affixed to the light housing and be large enough to block light from being transmitted outside the construction area.

The project area is located outside of right whale calving areas in the Gulf of Mexico but the contractor has still agreed to participate in the Right Whale Early Warning System. If a North Atlantic right whale or any other species of whale is reported within the area, then the contractor will be required to follow the NMFS's *Southeast Region Vessel Strike Avoidance Measures and Reporting for Mariners* (revised February 2008 [Appendix 4]). By law, vessels shall maintain a 500-yard buffer between the vessel and any North Atlantic right whale [as required by federal regulation 50 CFR 224.103 (c)]. All vessels greater than 65 feet in length will be required to adhere to the maximum 10 knot speed restriction while traversing the North Atlantic right whale calving area.[1] Also, during the period December through March, barges or dredges moving through the North Atlantic right whale calving area shall take the following precautions: During evening hours or when there is limited visibility due to fog or sea states greater than Beaufort 3 (moderate seas, where the height of the wave crest to trough is 3-5 ft), the tug/barge or dredge operator shall slow down to 5 knots or less when traversing between areas if whales have been spotted within 15 nautical miles of the vessel's path within the previous 24 hours.

2.1 Action Area

"Action area" means all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action area (50 CFR 402.02). The action area ranges from the immediate offshore area of R-70 adjacent to Naples Beach north to R-22 adjacent to Vanderbilt Beach seaward from the northern-most renourishment site to the Borrow Area T1 located 33 miles offshore from Vanderbilt Beach (Figure 4). This area will encompass all areas expected to be impacted directly or indirectly by the proposed project.

[1] In the southeastern United States, this calving area is located in coastal waters between 31° 15" N (approximately located at the mouth of the Altamaha River in Georgia) and 30° 15'' N (approximately Jacksonville, Florida) from the shoreline east to 15 nm
offshore; and the waters between 30° 15" N and 28° 00" N (approximately Sebastian Inlet, Florida) from the shoreline.

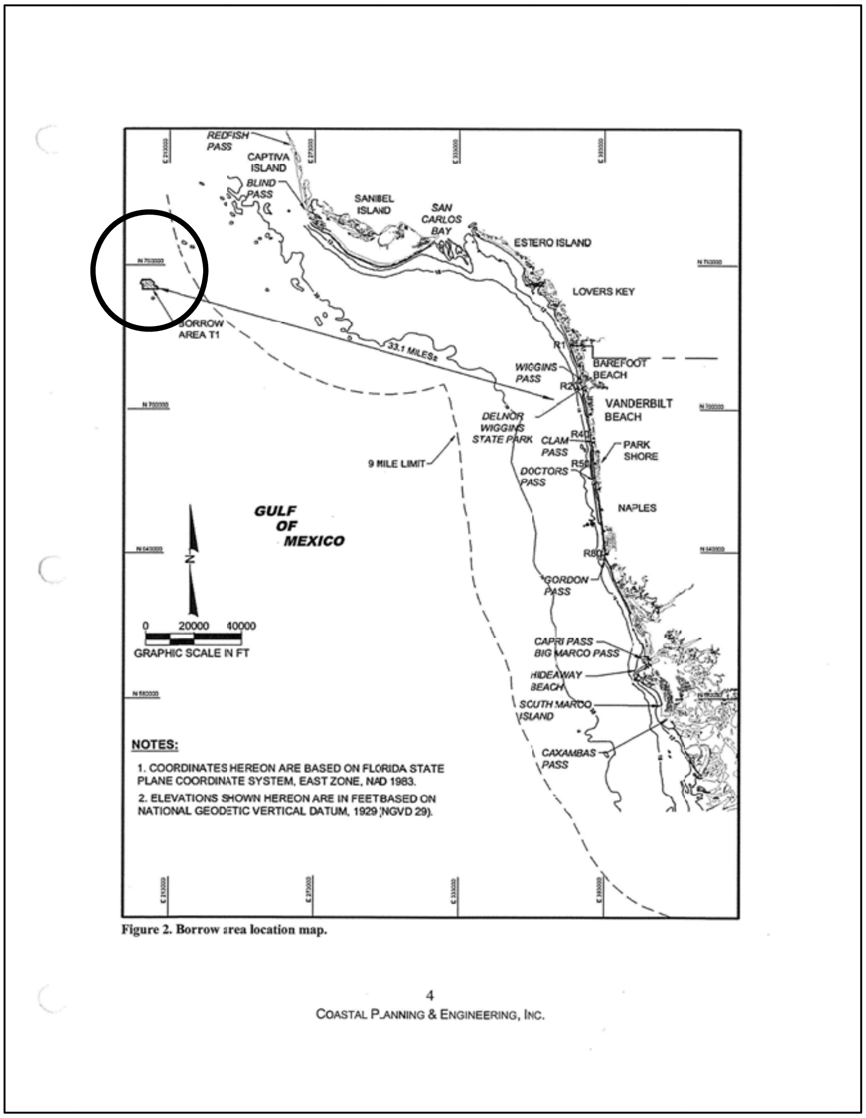


Figure 4: The action area includes the T1 Borrow site in federal waters 33 miles offshore, indicated by the black circle.

3. Status of the Species

Much of the information for this section, as well as additional detailed information relating to the species biology, habitat requirements, threats, and recovery objectives, can be found in the recovery plan for each species (see References Cited section). The following listed species under NMFS's jurisdiction are known to occur near the action area:

Common Name	Scientific Name	Status
Sea Turtles		
Green sea turtle	*Chelonia mydas*[2]	E/T
Kemp's ridley sea turtle	*Lepidochelys kempii*	E
Leatherback sea turtle	*Dermochelys coriacea*	E
Hawksbill sea turtle	*Eretmochelys imbricata*	E
Loggerhead sea turtle	*Caretta caretta*[3]	T
Fish		
Smalltooth sawfish	*Pristis pectinata*[4]	E
Marine Mammals		
North Atlantic right whale	*Eubalaena glacialis*	E
Humpback whale	*Megaptera novaeangliae*	E
Fin whale	*Balaenoptera physalus*	E
Blue whale	*Balaenoptera musculus*	E
Sei whale	*Balaenoptera borealis*	E
Sperm whale	*Physeter macrocephalus*	E

3.1 Species Not Likely to be Adversely Affected

3.1.1 Smalltooth sawfish

NMFS believes the project may affect, but is not likely to adversely affect, smalltooth sawfish. The project location is in between the two designated critical habitat units for smalltooth sawfish, the Charlotte Harbor Estuary Unit and the Ten Thousand Islands/Everglades Unit. Smalltooth sawfish are likely common near to the action area and this is confirmed by public sightings of sawfish reported in the National Sawfish Encounter Database (NSED).[5] The NSED has several reported sightings of smalltooth sawfish juveniles along mangrove-fringed wetlands north and south of the project site (Figure 4).

[2] Green turtles in U.S. waters are listed as threatened except for the Florida and Pacific coast of Mexico breeding populations, which are listed as endangered.
[3] Northwest Atlantic Ocean, Distinct Population Segment (DPS).
[4] U.S. DPS.
[5] The National Sawfish Encounter Database (NSED) is a publicly accessible sawfish encounter reporting database created in 1998 and now housed at the University of Florida’s Florida Program for Shark Research.

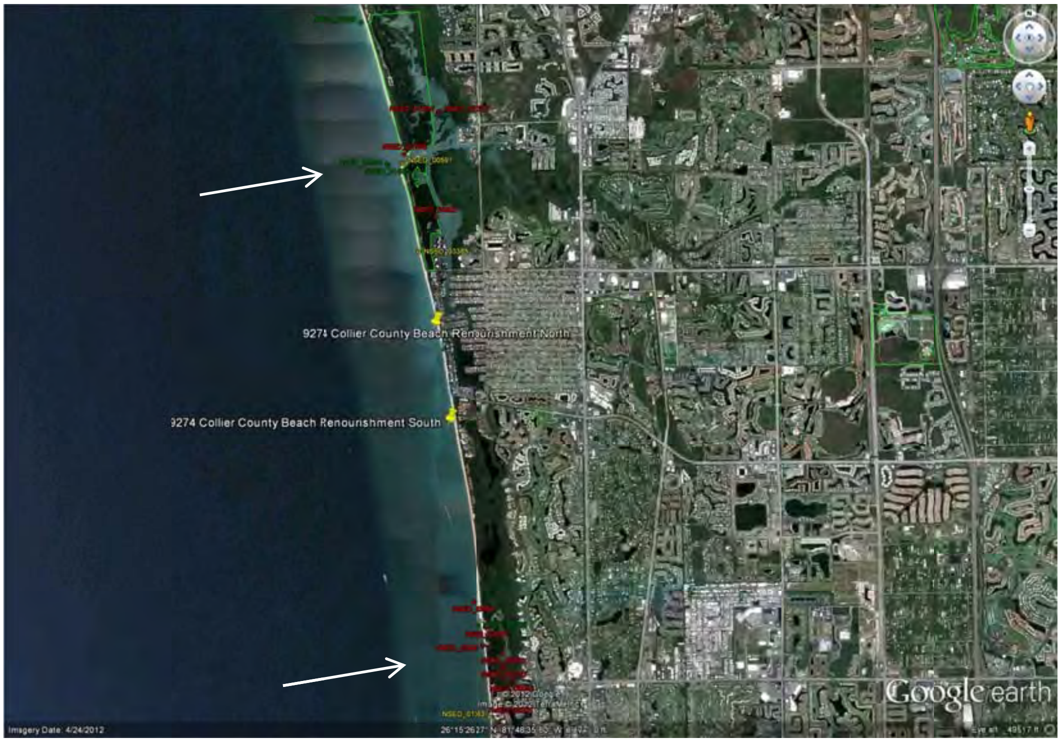


Figure 5: Project site located between pushpins. Arrows indicate sawfish sightings reported to the NSED ranging from the closest reported sighting less than a mile away from the northern boundary of the project area and less than 2 miles away from the southern boundary.

Along the entire coast of Collier County, there have been dozens of reported smalltooth sawfish sightings between 1998-2012 (http://www.flmnh.ufl.edu/fish/sharks/sawfish/srt/database.html). Smalltooth sawfish presumably use extensive estuary areas characterized by mangroves and shallow sandy bottoms, both north and south of the project area. They possibly use the nearshore habitat along the proposed beach nourishment sites. However, there are no red mangroves within the action area and the shallow-water habitat is all beach shoreline habitat within high surf zones and it is not high quality smalltooth sawfish foraging or refuge habitat.

NMFS believes that the likelihood of a sawfish being adversely affected by the project's short-term elevated noise levels is discountable because smalltooth sawfish are likely to avoid the area during construction operations. Smalltooth sawfish will also not suffer any adverse effects from potential loss of habitat, or exclusion from habitat, because there is no foraging or refuge habitat in the action area. Juvenile smalltooth sawfish in south Florida have a strong affinity for red mangroves and shallow, euryhaline water depths less than one meter; however, the action area does not contain these features. Further, CCPRD will comply with NMFS's March 23, 2006, *Sea Turtle and Smalltooth Sawfish Construction Conditions*, which will further reduce the potential for interactions with smalltooth sawfish from the proposed project.

For the dredging portion of the project, NMFS does not expect any adverse effects from the hopper dredge(s) used to excavate sand at the borrow area or during any dredging-related relocation trawling because long-term dredge-related data shows almost no impacts to smalltooth sawfish. While smalltooth sawfish can be caught by trawls (one large adult was captured and released several years ago during relocation trawling associated with Egmont Key [Tampa Bay] channel dredging), it is rare and none have ever been taken by relocation trawling conducted during the extensive past use of the T1 Borrow Area. This is likely due to their rarity offshore compared to other areas of the state in which they have been captured by trawls (nearshore). Based on the preceding, we believe that the likelihood of smalltooth sawfish being adversely affected by the proposed action is discountable. As a result, this species will not be discussed further in this opinion.

3.1.2 Marine Mammals

Of the six endangered whale species known to occur in the Gulf of Mexico (Table 1), only sperm whales are considered to commonly occur and over the greatest range of water depths (Scott et al. 1994). Typically, these six species of whales do not occur in the nearshore waters (0-200 m depths). Occasionally however, North Atlantic right whales may be found in nearshore waters in particular during winter months. Given that the action area is both nearshore and shallow, NMFS does not expect any interactions between dredges and trawlers with any of the above species other than a very small and unlikely potential seasonal interaction with right whales. Therefore, NMFS believes the proposed action will have no effect on blue, fin, sei, humpback, and sperm whales.

Table 1: Endangered whale species observed in the Gulf of Mexico.

Marine Mammals	
North Atlantic right whale	*Eubalaena glacialis*
Humpback whale	*Megaptera novaeangliae*
Fin whale	*Balaenoptera physalus*
Blue whale	*Balaenoptera musculus*
Sei whale	*Balaenoptera borealis*
Sperm whale	*Physeter macrocephalus*

NMFS has determined that potential effects on North Atlantic right whales from the proposed action are limited to the following: injury from potential interactions with construction equipment (e.g., a dredge vessel striking a whale), disturbance of cow/calf pairs, and temporary avoidance of the area during construction (i.e., dredging/renourishment) operations. The project is scheduled to be implemented overlapping with the annual North Atlantic right whale calving season; however, the action area is located on the west coast of Florida, which is outside of the nearest right whale calving grounds which have been identified as critical habitat for the species on the west coast of Florida. The closest right whale critical habitat is located approximately 700 miles away on the opposite coast of Florida (Atlantic). Therefore, it is less likely that right whales will traverse the action area during the proposed action. Dredge vessels will not operate in or travel across the calving grounds. Of note however, in 2006, a North Atlantic right whale mother and calf pair was observed offshore of Sanibel Island, just north of the action area so it is not unheard of that a mother and calf pair could traverse the area during construction. Because

BOEM will require adherence to the conservation measures below and given the unlikelihood of right whales occupying inshore, shallow waters during the project duration, NMFS believes the proposed project is not likely to adversely affect North Atlantic right whales.

The contractors will be required to abide by the federal 10-knot speed restriction during North Atlantic right whale calving season, participate in the North Atlantic Right Whale Early Warning System, and follow NMFS's *Vessel Strike Avoidance and Reporting Guidelines.* Marine mammal and sea turtle observers will be onboard the hopper dredge during all operations. During dredging operations between April 1 and November 30, and whenever surface water temperatures are 11°C or greater there will be two observers onboard that may trade shifts to ensure one observer is on duty at all times. If a whale is sighted near the dredge, all in-water operations will be shut down immediately and the dredge contractor will notify NMFS and USACE. Sand will be dredged offshore and transported via barge or scow to the submerged pipeline dredge where the materials will be re-pumped via pipeline to the beach. The captain of the dredge will also be instructed to avoid whales encountered while traveling between the dredge site and the submerged pipeline and to contact NMFS and USACE if a whale is observed in the vicinity. With implementation of these mandatory conservation measures, NMFS believes that the likelihood of North Atlantic right whales being affected by the proposed action is discountable due to the combination of speed restrictions, vessel strike avoidance measures (e.g., maintaining 500-yard buffer), submerged pipeline, and onboard observers. As a result, North Atlantic right whales will not be discussed further in this opinion.

3.1.3 Sea Turtles

NMFS has analyzed the routes of potential effects on five species of sea turtles (loggerhead, Kemp's ridley, leatherback, hawksbill, and green) from the proposed action. Responsibility for ESA consultation on the effects related to failure to nest (i.e., "false crawls") and/or loss of nests and nesting habitat are the purview of the U.S. Fish and Wildlife Service (USFWS) and will not be discussed in this biological opinion. We have determined the potential routes of effects to sea turtles in the marine environment include injury or death from potential interactions with and operation of hopper dredge suction dragheads, relocation trawlers, cutterhead dredges and pipeline, and avoidance of the area during construction operations due to disturbance caused by construction, lighting, and disposal of spoil at the staging area or on the shoreline. We have previously analyzed these routes of effects in the GRBO and have determined that, of these, only interactions with hopper dredges and relocation trawlers have the potential for adverse effects and only for certain turtle species, as discussed below and in the Effects of the Action section.

We believe the proposed project may affect, but is not likely to adversely affect leatherback and hawksbill sea turtles, and is likely to adversely affect loggerhead, green, and Kemp's ridley sea turtles, as described below. Because CCPRD will comply with NMFS's March 23, 2006, *Sea Turtle and Smalltooth Sawfish Construction Conditions*, we believe this will reduce the potential for interactions with sea turtles from the proposed project. However, the potential for injury and/or death exists because hopper dredging has been proposed. CCPRD has agreed to follow the Terms and Conditions in NMFS's 2003 GRBO, as revised in the latest revision (No. 2) to reduce the potential for lethal interactions, but even with implementation of the Terms and Conditions, the potential for interactions is not discountable.

Based on the best available data from the USACE during the 2006 renourishment of Collier County beaches (http://el.erdc.usace.army.mil/seaturtles/project.cfm?Id=421&Code=Project), we believe only loggerhead, Kemp's ridley, and green sea turtles are likely to be adversely affected by hopper dredging in the action area. We believe leatherback sea turtles are not likely to be adversely affected and there will be no effect to hawksbill sea turtles.

Leatherback sea turtles tend to be open ocean foragers and are uncommon in shallow nearshore waters, except during nesting season. They undertake extensive migrations between northern foraging grounds and tropical and subtropical nesting beaches. The closest known nesting beaches for leatherback turtles are over 200 miles away in northwest Florida. With the exception of a few nests on the west coast, leatherback nesting occurs primarily on the east coast of Florida; almost 50 percent of all leatherback nests in Florida occur in Palm Beach County (FWRI, 2012). Leatherbacks are not known to nest on Collier County beaches (FWRI, 2012). Although the T1 Borrow Area is in open water, it does not contain any of the foraging features used by this species (such as mangroves, corals, and seagrasses). The proposed dredge-and-fill activities will be limited from between September 15-May 31, to avoid sea turtle peak nesting season, and leatherbacks are unlikely to be found in the inshore portion of the action area based on sea turtle stranding data showing no leatherback strandings inshore or offshore of Collier County in the past 5-year reporting period (http://www.sefsc.noaa.gov/species/turtles/strandings.htm), and further confirmed by past Collier County renourishment activities (http://el.erdc.usace.army.mil/seaturtles/project.cfm?Id=421&Code=Project).

Not only is the interaction probability between construction equipment and leatherbacks unlikely given the information above, there have only been seven leatherback sea turtles captured in relocation trawls for the period from 2006 to 2013 (as of March 20, 2013) within all of the Gulf of Mexico; therefore, the probability of a leatherback being encountered by relocation trawling is extremely low. Further, CCPRD is required to follow NMFS's March 23, 2006, *Sea Turtle and Smalltooth Sawfish Construction Conditions*. NMFS determined in the 2003 GRBO that leatherback sea turtles are unlikely to be adversely affected by hopper dredging (we have not received any new information that would change the basis of this determination). Therefore, NMFS believes that the likelihood of leatherback sea turtles being adversely affected by the proposed project is discountable. As a result, this species will not be discussed further in this opinion.

Hawksbill sea turtles are also rare in the nearshore waters of Collier County. Based on stranding data from NOAA's Sea Turtle Stranding Network (SSTSN) only two hawksbill sea turtles stranded in the last 5-year period (2008-2012). Within the continental United States, hawksbill nesting is restricted to and rare in the southeast coast of Florida and the Florida Keys (NMFS 2012). There are no foraging resources for hawksbill turtles in the project area such as reef habitats located waterward of nearshore hardbottom habitat. Pprey items preferred by hawksbills, such as sponges, are more abundant on reef habitats and are unlikely to be found within the project areas (e.g., both the T1 Borrow Site and the nearshore beaches where renourishment will occur). Data from the USACE indicates that no hawksbill turtles have been taken as a result of dredging or relocation trawling in the action area since monitoring began in 1980 (http://el.erdc.usace.army.mil/seaturtles/info.cfm?Type=District&Code=SAJ). In fact, hawksbill takes by relocation tawling are extremely rare in the Gulf of Mexico and the Eastern Seaboard, and there have been no documented takes of hawksbills by a hopper dredge. As a result, there are no potential impacts to hawksbill sea turtles from the proposed action and NMFS believes the proposed action will have no effect on hawksbills. This species will not be discussed further in this opinion.

Habitat related effects to the three species of sea turtles considered here will be insignificant. The borrow areas and fill areas are all devoid of most of the features (mangroves, corals, and seagrasses, and crustacean-rich sandy/muddy bottoms) that greens, loggerheads, and/or Kemp's ridleys turtles use for foraging/shelter. Hopper dredging and filling will not alter the habitat other than to change the bottom elevation (making the borrow areas slightly deeper and the fill areas more shallow).

3.2 Species Likely to be Adversely Affected

NMFS believes the proposed action is likely to adversely affect loggerhead, Kemp's ridley, and green sea turtles. The status of these species is discussed in the following sections.

3.2.1 Green Sea Turtle

The green sea turtle was listed as threatened under the ESA on July 28, 1978, except for the Florida and Pacific coast of Mexico breeding populations which were listed as endangered. Critical habitat for the green sea turtle was designated on September 2, 1998, for the waters surrounding Isla Culebra, Puerto Rico, and its associated keys. No critical habitat exists in the action area for this consultation.

3.2.1.1 Species Description, Distribution, and Population Structure

Green sea turtles have a smooth carapace with four pairs of lateral (or costal) scutes and a single pair of elongated prefrontal scales between the eyes. They typically have a black dorsal surface and a white ventral surface although the carapace of green sea turtles in the Atlantic Ocean has been known to change in color from solid black to a variety of shades of grey, green, brown and black in starburst or irregular patterns (Lagueux 2001).

Green sea turtles are distributed circumglobally, mainly in waters between the northern and southern 20^{o}C isotherms (Hirth 1971) and nesting occurs in more than 80 countries worldwide (Hirth and USFWS 1997). The two largest nesting populations are found at Tortuguero, on the Caribbean coast of Costa Rica, and Raine Island, on the Great Barrier Reef in Australia. The complete nesting range of green sea turtles within the southeastern United States includes sandy beaches of mainland shores, barrier islands, coral islands, and volcanic islands between Texas and North Carolina as well as the U.S. Virgin Islands (USVI) and Puerto Rico (NMFS and USFWS 1991; Dow et al. 2007). However, the vast majority of green sea turtle nesting within the southeastern United States occurs in Florida (Johnson and Ehrhart 1994; Meylan et al. 1995). Principal U.S. nesting areas for green sea turtles are in eastern Florida, predominantly Brevard through Broward counties. For more information on green sea turtle nesting in other ocean basins, refer to the 1991 Recovery Plan for the Atlantic Green Turtle (NMFS and USFWS 1991) or the 2007 Green Sea Turtle 5-Year Status Review (NMFS and USFWS 2007a).

In U.S. Atlantic and Gulf of Mexico waters, green turtles are found in inshore and nearshore waters from Texas to Massachusetts. Principal benthic foraging areas in the southeastern United States include Aransas Bay, Matagorda Bay, Laguna Madre, and the Gulf inlets of Texas (Hildebrand 1982; Doughty 1984; Shaver 1994), the Gulf of Mexico off Florida from Yankeetown to Tarpon Springs (Caldwell and Carr 1957; Carr 1984), Florida Bay and the Florida Keys (Schroeder and Foley 1995), the Indian River Lagoon system in Florida (Ehrhart 1983), and the Atlantic Ocean off Florida from Brevard through Broward Counties (Guseman and Ehrhart 1992; Wershoven and Wershoven 1992). The summer developmental habitat for green turtles also encompasses estuarine and coastal waters from North Carolina to as far north as Long Island Sound (Musick and Limpus 1997). Additional important foraging areas in the western Atlantic include the Culebra archipelago and other Puerto Rico coastal waters, the south coast of Cuba, the Mosquito Coast of Nicaragua, the Caribbean coast of Panama, scattered areas along Colombia and Brazil (Hirth 1971), and the northwestern coast of the Yucatan Peninsula.

Adults of both sexes are presumed to migrate between nesting and foraging habitats along corridors adjacent to coastlines and reefs (Hays et al. 2001) and, like loggerheads, are known to migrate from northern areas in the summer back to warmer southern waters to the south in the fall and winter to avoid seasonally cold seawater temperatures. In terms of genetic structure, regional subpopulations show distinctive mitochondrial DNA properties for each nesting rookery (Bowen et al. 1992; Fitzsimmons et al. 2006). Despite the genetic differences, turtles from separate nesting origins are commonly found mixed together on foraging grounds throughout the species' range. However, such mixing occurs at extremely low levels in Hawaiian foraging areas, perhaps making this central Pacific population the most isolated of all green turtle populations occurring worldwide (Dutton et al. 2008).

3.2.1.2 Life History Information

Green sea turtles exhibit particularly slow growth rates [about 1-5 centimeters per year (Green 1993; McDonald-Dutton and Dutton 1998)] and also have one of the longest ages to maturity of any sea turtle species [i.e., 20-50 years (Chaloupka and Musick 1997; Hirth and USFWS 1997)]. The slow growth rates are believed to be a consequence of their largely herbivorous, low-net energy diet (Bjorndal 1982). Upon reaching sexual maturity, females begin returning to their natal beaches (i.e., the same beaches where they were born) to lay eggs (Balazs 1982; Frazer and Ehrhart 1985) and are capable of migrating significant distances (hundreds to thousands of kilometers) between foraging and nesting areas. While females lay eggs every 2-4 years, males are known to reproduce every year (Balazs 1983).

Green sea turtle mating occurs in the waters off nesting beaches. In the southeastern United States, females generally nest between June and September, and peak nesting occurs in June and July (Witherington and Ehrhart 1989). During the nesting season, females nest at approximately two-week intervals, laying an average of 3-4 clutches (Johnson and Ehrhart 1996). Clutch size often varies among subpopulations, but mean clutch size is around 110-115 eggs. In Florida, green sea turtle nests contain an average of 136 eggs (Witherington and Ehrhart 1989), which will incubate for approximately two months before hatching. Survivorship at any particular nesting site is greatly influenced by the level of anthropogenic stressors, with the more pristine and less disturbed nesting sites (e.g., Great Barrier Reef in Australia) showing higher survivorship values than nesting sites known to be highly disturbed (e.g., Nicaragua) (Campbell and Lagueux 2005; Chaloupka and Limpus 2005). After emerging from the nest, hatchlings swim to offshore areas and go through a posthatchling pelagic stage where they are believed to live for several years, feeding close to the surface on a variety of marine algae and other life associated with drift lines and other debris.

This early oceanic phase remains one of the most poorly understood aspects of green turtle life history (NMFS and USFWS 2007b). However, at approximately 20- to 25-cm caprapace length, juveniles leave pelagic habitats and enter benthic foraging habitats when they gain enough buoyancy control to dive to the sea floor and adopt a benthic feeding strategy. Growth studies using skeletochronology indicate that for green sea turtles in the Western Atlantic shift from the oceanic phase to nearshore development habitats (protected lagoons and open coastal areas rich in sea grass and marine algae) after approximately 5-6 years (Zug and Glor 1998; Bresette et al. 2006). As adults, they feed almost exclusively on sea grasses and algae in shallow bays, lagoons, and reefs (Rebel and Ingle 1974) although some populations are known to also feed heavily on invertebrates (Carballo et al. 2002). While in coastal habitats, green sea turtles exhibit site fidelity to specific foraging and nesting grounds and it is clear they are capable of "homing in" on these sites if displaced (McMichael et al. 2003). Reproductive migrations of Florida green turtles have been identified through flipper tagging and/or satellite telemetry. Based on these studies, the majority of adult female Florida green turtles are believed to reside in nearshore foraging areas throughout the Florida Keys from Key Largo to the Dry Tortugas and in the waters southwest of Cape Sable, Florida, with some post-nesting turtles also residing in Bahamian waters as well (NMFS and USFWS 2007b).

3.2.1.3 Abundance and Trends

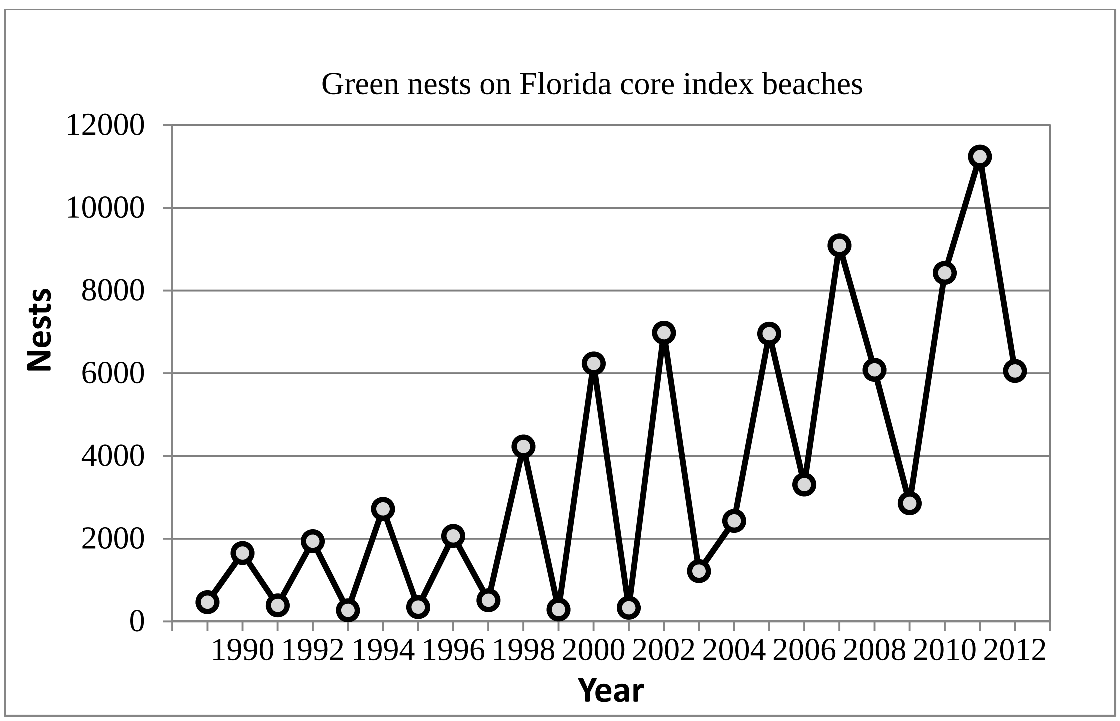
A summary of nesting trends is provided in the most recent 5-year status review for the species (NMFS and USFWS 2007b) in which the authors collected and organized abundance data from 46 individual nesting concentrations organized by ocean region (i.e., Western Atlantic Ocean, Central Atlantic Ocean, Eastern Atlantic Ocean, Mediterranean Sea, Western Indian Ocean, Northern Indian Ocean, Eastern Indian Ocean, Southeast Asia, Western Pacific Ocean, Central Pacific Ocean, and Eastern Pacific Ocean). The authors were able to determine trends at 23 of the 46 nesting sites and found that ten appeared to be increasing, nine appeared to be stable, and four appeared to be decreasing. With respect to regional trends, the Pacific, the Western Atlantic, and the Central Atlantic regions appeared to show more positive trends (i.e., more nesting sites increasing than decreasing) while the Southeast Asia, Eastern Indian Ocean, and possibly the Mediterranean Sea regions appeared to show more negative trends (i.e., more nesting sites decreasing than increasing). These regional determinations should be viewed with caution since trend data was only available for about half of the total nesting concentration sites examined in the review and that site specific data availability appeared to vary across all regions.

The western Atlantic region (focus of this opinion) was one of the best performing in terms of abundance in the entire review as there were no sites that appeared to be decreasing. The 5-year status review for the species identified eight geographic areas considered to be primary sites for green sea turtle nesting in the Atlantic/Caribbean and reviewed the trend in nest count data for each (NMFS and USFWS 2007a). These sites include (1) Yucatán Peninsula, Mexico; (2) Tortuguero, Costa Rica; (3) Aves Island, Venezuela; (4) Galibi Reserve, Suriname; (5) Isla Trindade, Brazil; (6) Ascension Island, United Kingdom; (7) Bioko Island, Equatorial Guinea; and (8) Bijagos Achipelago, Guinea-Bissau. Nesting at all of these sites was considered to be stable or increasing with the exception of Bioko Island and the Bijagos Archipelago where the lack of sufficient data precluded a meaningful trend assessment for either site (NMFS and USFWS 2007a). Seminoff (2004) likewise reviewed green sea turtle nesting data for eight sites in the western, eastern, and central Atlantic, including all of the above with the exception that nesting in Florida was reviewed in place of Isla Trindade, Brazil. Seminoff (2004) concluded that all sites in the central and western Atlantic showed increased nesting, with the exception of nesting at Aves Island, Venezuela, while both sites in the eastern Atlantic demonstrated decreased nesting. These sites are not inclusive of all green sea turtle nesting in the Atlantic. However, other sites are not believed to support nesting levels high enough that would change the overall status of the species in the Atlantic (NMFS and USFWS 2007a). More information about site specific trends for the other major ocean regions can be found in the most recent 5-year status review for the species (see NMFS and USFWS (2007a)).

By far, the largest known nesting assemblage in the western Atlantic region occurs at Tortuguero, Costa Rica. According to monitoring data on nest counts as well as documented emergences (both nesting and non-nesting events), there appears to be an increasing trend in this nesting assemblage since monitoring began in the early 1970s. For instance, from 1971-1975 there were approximately 41,250 average emergences documented per year and this number increased to an average of 72,200 emergences documented per year from 1992-1996 (Bjorndal et al. 1999). Troëng and Rankin (Troëng and Rankin 2005) collected nest counts from 1999-2003 and also reported increasing trends in the population consistent with the earlier studies, with nest count data suggesting 17,402-37,290 females per year (NMFS and USFWS 2007a). Modeling by (Chaloupka et al. 2008) using data sets of 25 years or more resulted in an estimate of the Tortuguero, Costa Rica, population growing at 4.9 percent annually. The number of females nesting per year on beaches in the Yucatán, Aves Island, Galibi Reserve, and Isla Trindade number in the hundreds to low thousands, depending on the site (NMFS and USFWS 2007a). In the continental United States, green turtle nesting occurs along the Atlantic coast, primarily along the central and southeast coast of Florida where an estimated 200-1,100 females nest each year (Meylan et al. 1994; Weishampel et al. 2003). Occasional nesting has also been documented along the Gulf coast of Florida as well as the beaches on the Florida Panhandle (Meylan et al. 1995). More recently, green turtle nesting occurred on Bald Head Island, North Carolina; just east of the mouth of the Cape Fear River; on Onslow Island; and on Cape Hatteras National Seashore. In 2010, a total of 18 nests were found in North Carolina, 6 nests in South Carolina, and 6 nests in Georgia (nesting databases maintained on www.seaturtle.org). Increased nesting has also been observed along the Atlantic coast of Florida, on beaches where only loggerhead nesting was observed in the past (Pritchard 1997).

In Florida, index beaches were established to standardize data collection methods and effort on key nesting beaches. Since establishment of the index beaches in 1989 up until recently, the pattern of green turtle nesting has shown biennial peaks in abundance with a generally positive trend during the ten years of regular monitoring. According to data collected from Florida's index nesting beach survey from 1989-2011, green turtle nest counts across Florida have increased approximately tenfold from a low of 267 in the early 1990s to a high of 10,701 in 2011. In 2007, there were 9,455 green turtle nests found just on index nesting beaches, the highest since index beach monitoring began in 1989. The number fell back to 6,385 in 2008 and dropped under 3,000 in 2009, at first causing some concern, but 2010 saw an increase back to 8,426 nests on the index nesting beaches and then the high of 10,701was measured in 2011 (Fish and Wildlife Conservation Commission [FWC] Index Nesting Beach Survey Database). Modeling by Chaloupka and Balazs (2007) using data sets of 25 years or more has resulted in an estimate of the Florida nesting stock at the Archie Carr National Wildlife Refuge growing at an annual rate of 13.9 percent.

There are no reliable estimates of the number of immature green sea turtles that inhabit coastal areas of the southeastern United States, where they come to forage. Ehrhart et al. (2007) have documented a significant increase in in-water abundance of green turtles in the Indian River Lagoon area. It is likely that immature green sea turtles foraging in the southeastern United States come from multiple genetic stocks; therefore, the status of immature green sea turtles in the southeastern United States might also be assessed from trends at all of the main regional nesting beaches, principally Florida, Yucatán, and Tortuguero.



3.2.1.4 Threats

The principal cause of past declines and extirpations of green sea turtle assemblages has been the overexploitation of green sea turtles for food and other products. Although intentional take of green sea turtles and their eggs is not extensive within the southeastern United States, green sea turtles that nest and forage in the region may spend large portions of their life history outside the region and outside U.S. jurisdiction, where exploitation is still a threat. There are also significant and ongoing threats to green sea turtles from human-related causes in the United States. These threats include beach armoring, erosion control, artificial lighting, beach disturbance (e.g., driving on the beach), pollution, foraging habitat loss as a result of direct destruction by dredging, siltation, boat damage, interactions with fishing gear, and oil spills. For all sea turtle species, the potential impacts of the 2010 Deepwater Horizon oil well blowout are discussed in the Environmental Baseline section below (Section 4.2.1.5).

Fibropapillomatosis disease is an increasing threat to green sea turtles. Presently, this disease is cosmopolitan and has been found to affect large numbers of animals in some areas, including Hawaii and Florida (Jacobson 1990; Jacobson et al. 1991; Herbst 1994). Other sources of natural mortality include cold-stunning and biotoxin exposure. Cold-stunning is not considered a major source of mortality in most cases; however, in unseasonal cold snap events large numbers of sea turtles are killed. As temperatures fall below 8°-10°C, turtles may lose their ability to swim and dive, often floating to the surface. The rate of cooling that precipitates cold-stunning appears to be the primary threat, rather than the water temperature itself (Milton and Lutz 2003). Sea turtles that overwinter in inshore waters are most susceptible to cold-stunning because temperature changes are most rapid in shallow water (Witherington and Ehrhart 1989). During January 2010, an unusually large cold-stunning event in the southeastern United States resulted in around 4,600 sea turtles, mostly greens, found cold-stunned, with hundreds found dead or dying. A large cold-stunning event occurred in the western Gulf of Mexico in February 2011, resulting in approximately 1650 green turtles being found cold-stunned in Texas. Of these, approximately 620 were found dead or died after stranding and approximately 1030 were rehabilitated and released. Additionally, during this same time frame, approximately 340 green turtles were found cold-stunned in Mexico, with approximately 300 of those reported as being subsequently released.

The likely effects of global climate change discussed below for loggerheads also apply to green turtles. Additionally, green sea turtle hatchling size also appears to be influenced by incubation temperatures, with smaller hatchlings produced at higher temperatures (Glen et al. 2003).

3.2.2 Northwest Atlantic Ocean DPS of Loggerhead Sea Turtle

The loggerhead sea turtle was listed as a threatened species throughout its global range on July 28, 1978. NMFS and USFWS subsequently re-listed loggerheads as nine DPSs that are treated as species for purposes of the ESA (76 FR 58868, September 22, 2011; effective October 24, 2011). The DPSs established by this rule are (1) Northwest Atlantic Ocean (threatened); (2) Northeast Atlantic Ocean (endangered); (3) South Atlantic Ocean (threatened); (4) Mediterranean Sea (endangered); (5) North Pacific Ocean (endangered); (6) South Pacific Ocean (endangered); (7) North Indian Ocean (endangered); (8) Southeast Indo-Pacific Ocean (endangered); and (9) Southwest Indian Ocean (threatened). The Northwest Atlantic DPS (NWA DPS) is the only one that occurs within the action area and therefore is the only one to be considered in this opinion. No critical habitat has been designated as of the time of this opinion.

3.2.2.1 Species Description, Distribution, and Population Structure

Loggerheads are large sea turtles with the mean straight carapace length (SCL) of adults in the southeast United States being approximately 92 cm. The corresponding mass is approximately 116 kg (Ehrhart and Yoder 1978). Adult and subadult loggerhead sea turtles typically have a light yellow plastron and a reddish brown carapace covered by non-overlapping scutes that meet along seam lines. They typically have 11 or 12 pairs of marginal scutes, five pairs of costals, five vertebrals, and a nuchal (precentral) scute that is in contact with the first pair of costal scutes (Dodd 1988).

The loggerhead sea turtle inhabits continental shelf and estuarine environments and occurs throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans (Dodd 1988). The majority of loggerhead nesting occurs at the western rims of the Atlantic and Indian Oceans concentrated in the north and south temperate zones and subtropics (NRC 1990).

In the western North Atlantic, the majority of loggerhead nesting is concentrated along the coasts of the United States from southern Virginia to Alabama. Additional nesting beaches are found along the northern and western Gulf of Mexico, eastern Yucatán Peninsula, at Cay Sal Bank in the eastern Bahamas (Addison and Morford 1996; Addison 1997), off the southwestern coast of Cuba (Gavilán 2001), and along the coasts of Central America, Colombia, Venezuela, and the eastern Caribbean Islands.

Non-nesting, adult female loggerheads are reported throughout the United States and Caribbean Sea. Little is known about the distribution of adult males who are seasonally abundant near nesting beaches. Aerial surveys suggest that loggerheads in U.S. waters are distributed as a whole in the following proportions: 54 percent in the southeast U.S. Atlantic, 29 percent in the northeast U.S. Atlantic, 12 percent in the eastern Gulf of Mexico, and 5 percent in the western Gulf of Mexico (TEWG 1998). Shallow water habitats with large expanses of open ocean access, such as Florida Bay, provide year-round resident foraging areas for significant numbers of male and female adult loggerheads while juveniles are also found in enclosed, shallow water estuarine environments not frequented by adults (Epperly et al. 1995c). Further offshore, adults primarily inhabit continental shelf waters, from New England south to Florida, the Caribbean, and Gulf of Mexico (Schroeder et al. 2003). Benthic, immature loggerheads foraging in northeastern U.S. waters are known to migrate southward in the fall as water temperatures cool and then migrate back northward in spring (Shoop and Kenney 1992; Keinath 1993; Epperly et al. 1995c; Morreale and Standora 1998).

Within the NWA DPS, most loggerhead sea turtles nest from North Carolina to Florida and along the Gulf coast of Florida. Previous Section 7 analyses have recognized at least five Western Atlantic subpopulations, divided geographically as follows: (1) a northern nesting subpopulation, occurring from North Carolina to Northeast Florida at about 29ºN; (2) a South Florida nesting subpopulation, occurring from 29°N on the east coast to Sarasota on the west coast; (3) a Florida Panhandle nesting subpopulation, occurring at Eglin Air Force Base and the beaches near Panama City, Florida; (4) a Yucatán nesting subpopulation, occurring on the Eastern Yucatán Peninsula, Mexico (Márquez M 1990; TEWG 2000); and (5) a Dry Tortugas nesting subpopulation, occurring in the islands of the Dry Tortugas, near Key West, Florida (NMFS-SEFSC 2001). The recovery plan for the Northwest Atlantic population of loggerhead sea turtles concluded, based on recent advances in genetic analyses, that there is no genetic distinction between loggerheads nesting on adjacent beaches along the Florida Peninsula and that specific boundaries for subpopulations could not be designated based on genetic differences alone. Thus, the plan uses a combination of geographic distribution of nesting densities, geographic separation, and geopolitical boundaries, in addition to genetic differences, to identify recovery units. The recovery units are (1) the Northern Recovery Unit (Florida/Georgia border north through southern Virginia); (2) the Peninsular Florida Recovery Unit (Florida/Georgia border through Pinellas County, Florida); (3) the Dry Tortugas Recovery Unit (islands located west of Key West, Florida); (4) the Northern Gulf of Mexico Recovery Unit (Franklin County, Florida, through Texas); and (5) the Greater Caribbean Recovery Unit (Mexico through French Guiana, the Bahamas, Lesser Antilles, and Greater Antilles) (NMFS and USFWS 2008). The recovery plan concluded that all recovery units are essential to the recovery of the species. Although the recovery plan was written prior to the listing of the NWA DPS, the recovery units for what was then termed the Northwest Atlantic population apply to the NWA DPS.

3.2.2.2 Life History Information

Loggerhead sea turtles reach sexual maturity between 20 and 38 years of age, although this varies widely among populations (Frazer and Ehrhart 1985; NMFS and SEFSC 2001). The annual mating season for loggerhead sea turtles occurs from late March to early June, and eggs are laid throughout the summer months. Female loggerheads deposit an average of 4.1 nests within a nesting season (Murphy and Hopkins 1984) and have an average remigration interval of 3.7 years (Tucker 2010). Mean clutch size varies from 100 to 126 eggs for nests occurring along the southeastern U.S. coast (Dodd 1988).

Loggerheads originating from the western Atlantic nesting aggregations are believed to lead a pelagic existence in the North Atlantic Gyre for a period as long as 7-12 years (Bolten et al. 1998). Stranding records indicate that when immature loggerheads reach 40-60 centimeters straight carapace length, they begin to occur in coastal inshore waters of the continental shelf throughout the U.S. Atlantic and Gulf of Mexico (Witzell 2002). Recent studies have suggested that not all loggerhead sea turtles follow the model of circumnavigating the North Atlantic Gyre as pelagic juveniles, followed by permanent settlement into benthic environments (Laurent et al. 1998; Bolten and Witherington 2003). These studies suggest some turtles may either remain in the pelagic habitat in the North Atlantic longer than hypothesized or move back and forth between pelagic and coastal habitats interchangeably (Witzell 2002).

As post-hatchlings, loggerheads hatched on United States beaches migrate offshore and become associated with Sargassum habitats, driftlines, and other convergence zones (Carr 1986) (Witherington 2002). Juveniles are omnivorous and forage on crabs, mollusks, jellyfish and vegetation at or near the surface (Dodd 1988). Subadult and adult loggerheads are primarily found in coastal waters and prey on benthic invertebrates such as mollusks and decapod crustaceans in hard bottom habitats.

3.2.2.3 Abundance and Trends

A number of stock assessments and similar reviews (TEWG 1998; TEWG 2000; NMFS and SEFSC 2001; Heppell et al. 2003; NMFS and USFWS 2008; Conant et al. 2009; TEWG 2009; NMFS-SEFSC 2009d) have examined the stock status of loggerheads in the Atlantic Ocean, but none have been able to develop a reliable estimate of absolute population size.

Numbers of nests and nesting females can vary widely from year to year. However, nesting beach surveys can provide a reliable assessment of trends in the adult female population, due to the strong nest site fidelity of females turtles, as long as such studies are sufficiently long and effort and methods are standardized [see e.g., NMFS and USFWS (2008)]. NMFS and USFWS (2008) concluded that the lack of change in two important demographic parameters of loggerheads, remigration interval and clutch frequency, indicate that time series on numbers of nests can provide reliable information on trends in the female population. Analysis of available data for the Peninsular Florida Recovery Unit up through 2008 led to the conclusion that the observed decline in nesting for that unit could best be explained by an actual decline in the number of adult female loggerheads in the population (Witherington et al. 2009).

Annual nest totals from beaches within the Northern Recovery Unit (NRU) averaged 5,215 nests from 1989-2008, a period of near-complete surveys of NRU nesting beaches (Georgia Department of Natural Resources (GDNR) unpublished data, North Carolina Wildlife Resources Commission unpublished data, South Carolina Department of Natural Resources (SCDNR) unpublished data), and represent approximately 1,272 nesting females per year [4.1 nests per female (Murphy and Hopkins 1984)]. The loggerhead nesting trend from daily beach surveys showed a significant decline of 1.3 percent annually. Nest totals from aerial surveys conducted by SCDNR showed a 1.9 percent annual decline in nesting in South Carolina from 1980 through 2008. Overall, there is strong statistical data to suggest the NRU has experienced a long-term decline. Data in 2008 showed improved nesting numbers. In 2008, 841 loggerhead nests were observed compared to the 10-year average of 715 nests in North Carolina. The number dropped to 276 in 2009, but rose again in 2010 (846 nests) and 2011 (948 nests). In South Carolina, 2008 was the seventh highest nesting year on record since 1980, with 4,500 nests, but this did not change the long-term trend line indicating a decline on South Carolina beaches. Nesting dropped in 2009 to 2,183, with an increase to 3,141 in 2010. Georgia beach surveys located a total of 1,648 nests in 2008. This number surpassed the previous statewide record of 1,504 nests in 2003. In 2009, the number of nests declined to 998, and in 2010, a new statewide record was established with 1,760 loggerhead nests (GDNR, NCWRC, and SCDNR nesting data located at www.seaturtle.org).

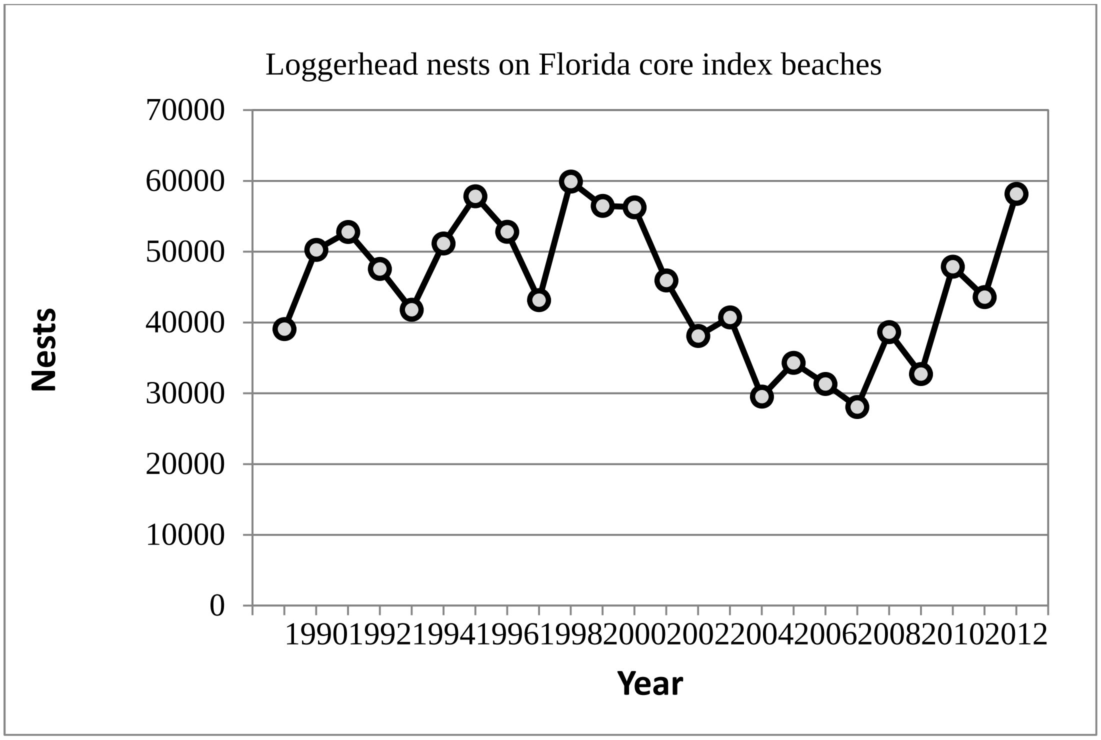
Another consideration that may add to the importance and vulnerability of the NRU is the sex ratio of this nesting population and its potential importance for genetic diversity. Research conducted over a limited timeframe but across multiple years found that while the small Northern nesting population can produce a larger proportion of male hatchlings than the large Peninsular Florida population, the sex ratio is female biased. In most years, the extent of the female bias is likely to be less extreme based upon current information. However, because their absolute numbers are small, their contribution to overall hatchling sex ratios is small (Wyneken et al. 2004; Wyneken et al. 2012). Since nesting female loggerhead sea turtles exhibit nest fidelity, the continued existence of the Northern nesting population is related to the number of female hatchlings that are produced. Fewer females will limit the number of subsequent offspring produced by the subpopulation.

The Peninsular Florida Recovery Unit (PFRU) is the largest loggerhead nesting assemblage in the Northwest Atlantic. A near-complete nest census (all beaches including index nesting beaches) undertaken from 1989 to 2007 showed a mean of 64,513 loggerhead nests per year, representing approximately 15,735 nesting females per year (NMFS and USFWS 2008). The statewide estimated total for 2010 was 73,702 (Fish and Wildlife Research Institute (FWRI) nesting database). An analysis of index nesting beach data shows a 26 percent decline in nesting by the PFRU between 1989 and 2008, and a mean annual rate of decline of 1.6 percent despite a large increase in nesting for 2008, to 38,643 nests (NMFS and USFWS 2008; Witherington et al. 2009), FWRI nesting database). In 2009, nesting levels, while still higher than the lows of 2004, 2006, and 2007, dropped below 2008 levels to approximately 32,717 nests, but in 2010 a large increase was seen, with 47,880 nests on the index nesting beaches (FWRI nesting database). The 2010 Florida index nesting number is the largest since 2000. With the addition of data through 2010, the nesting trend for the NWA DPS of loggerheads became only slightly negative and not statistically different from zero (no trend) (NMFS and USFWS 2010). Nesting at the index nesting beaches in 2011 declined from 2010, but was still the second highest since 2001, at 43,595 nests (FWRI nesting database).

The remaining three recovery units—Dry Tortugas (DTRU), Northern Gulf of Mexico (NGMRU), and Greater Caribbean (GCRU)—are much smaller nesting assemblages but still considered essential to the continued existence of the species. Nesting surveys for the DTRU are conducted as part of Florida's statewide survey program. Survey effort was relatively stable during the 9-year period from 1995-2004 (although there was no data for 2002). Nest counts ranged from 168-270, with a mean of 246, but with no detectable trend during this period (NMFS and USFWS 2008). Nest counts for the NGMRU are focused on index beaches rather than all beaches where nesting occurs. Analysis of the 12-year dataset (1997-2008) of index nesting beaches in the area shows a significant declining trend of 4.7 percent annually (NMFS and USFWS 2008). Nesting on the Florida Panhandle index beaches, which represents the majority of NGMRU nesting, had shown a large increase in 2008, but then declined again in 2009 and 2010 before rising back to a level similar to the 2003-2007 average in 2011. Similarly, nesting survey effort has been inconsistent among the GCRU nesting beaches and no trend can be determined for this recovery unit. Zurita et al. (2003) found a statistically significant increase in the number of nests on seven of the beaches on Quintana Roo, Mexico, from 1987-2001, where survey effort was consistent during the period. However, nesting has declined since 2001, and the previously reported increasing trend appears to not have been sustained (NMFS and USFWS 2008).

Determining the meaning of the long-term nesting decline data is confounded by various in-water research that suggests the abundance of neritic juvenile loggerheads is steady or increasing. Ehrhart et al. (2007) found no significant regression-line trend in the long-term dataset. However, notable increases in recent years and a statistically significant increase in CPUE of 102.4 percent from the 4-year period of 1982-1985 to the 2002-2005 periods were found. Epperly et al. (2007) determined the trends of increasing loggerhead catch rates from all the aforementioned studies in combination provide evidence there has been an increase in neritic juvenile loggerhead abundance in the southeastern United States in the recent past. A study led by the South Carolina Department of Natural Resources found that standardized trawl survey CPUEs for loggerheads from South Carolina to North Florida was 1.5 times higher in summer 2008 than summer 2000. However, even though there were persistent inter-annual increases from 2000-2008, the difference was not statistically significant, likely due to the relatively short time series. Comparison to other datasets from the 1950s through 1990s showed much higher CPUEs in recent years regionally and in the South Atlantic Bight, leading SCDNR to conclude that it is highly improbable that CPUE increases of such magnitude could occur without a real and substantial increase in actual abundance (Arendt et al. 2009). Whether this increase in abundance represents a true population increase among juveniles or merely a shift in spatial occurrence is not clear. NMFS and USFWS (2008), citing Bjorndal et al. (2005), caution about extrapolating localized in-water trends to the broader population and relating localized trends in neritic sites to population trends at nesting beaches. The apparent overall increase in the abundance of neritic loggerheads in the southeastern United States may be due to increased abundance of the largest Stage III individuals (oceanic/neritic juveniles, historically referred to as small benthic juveniles), which could indicate a relatively large cohort that will recruit to maturity in the near future (TEWG 2009). However, in-water studies throughout the eastern United States also indicate a substantial decrease in the abundance of the smallest Stage III loggerheads, a pattern also corroborated by stranding data (TEWG 2009).

The SEFSC has developed a preliminary stage/age demographic model to help determine the estimated impacts of mortality reductions on loggerhead sea turtle population dynamics (NMFS-SEFSC 2009d). This model does not incorporate existing trends in the data (such as nesting trends) but instead relies on the available information on relevant life-history parameters for sea turtles and then predicts future population trajectories based upon model runs using those parameters. Therefore, the model results do not build upon, but instead are complementary to, the trend data obtained through nest counts and other observations. The model uses the range of published information for the various parameters including mortality by stage, stage duration (years in a stage), and fecundity parameters such as eggs per nest, nests per nesting female, hatchling emergence success, sex ratio, and remigration interval. Model runs were done for each individual recovery unit as well as the western North Atlantic population as a whole, and the resulting trajectories were found to be very similar. One of the most robust results from the model was an estimate of the adult female population size for the western North Atlantic in the 2004-2008 timeframe. The distribution resulting from the model runs suggests the adult female population size is likely between 20,000 and 40,000 individuals, with a low likelihood of being up to 70,000 (NMFS-SEFSC 2009d). A much less robust estimate for total benthic females in the western North Atlantic was also obtained, with a likely range of approximately 30,000-300,000 individuals, up to less than 1 million (NMFS-SEFSC 2009d).



3.2.2.4 Threats

The Loggerhead Biological Review Team determined that the greatest threats to the Northwest Atlantic DPS of loggerheads result from cumulative fishery bycatch in neritic and oceanic habitats (Conant et al. 2009). Domestic fishery operations often capture, injure, and kill sea turtles at various life stages. Loggerheads in the pelagic environment are exposed to U.S. Atlantic pelagic longline fisheries. Although loggerhead sea turtles are most vulnerable to pelagic longlines during their immature life history stage, there is some evidence that benthic juveniles may also be captured, injured, or killed by pelagic fisheries as well (Lewison et al. 2004). Southeast U.S. shrimp fisheries have historically been the largest fishery threat to benthic sea turtles in the southeastern United States, and continue to interact with and kill large numbers of turtles each year. Loggerheads in the benthic environment in waters off the coastal United States are exposed to a suite of other fisheries in federal and state waters including trawl, gillnet, purse seine, hook-and-line, including bottom longline and vertical line (e.g., bandit gear, handline, and rod-reel), pound net, and trap fisheries (refer to the Environmental Baseline section of this opinion for more specific information regarding federal and state managed fisheries affecting sea turtles within the action area). In addition to domestic fisheries, sea turtles are subject to incidental capture in numerous foreign fisheries, further exacerbating the ability of sea turtles to survive and recover on a global scale. For example, pelagic, immature loggerhead sea turtles circumnavigating the Atlantic are exposed to international longline fisheries including the Azorean, Spanish, and various other fleets (Bolten et al. 1994; Aguilar et al. 1995; Crouse 1999). Bottom set lines in the coastal waters of Madeira, Portugal, are reported to take an estimated 500 pelagic immature loggerheads each year (Dellinger and Encarnaçâo 2000) and gillnet fishing is known to occur in many foreign waters, including (but not limited to) the northwest Atlantic, western Mediterranean, South America, West Africa, Central America, and the Caribbean.

Shrimp trawl fisheries are also occurring off the shores of numerous foreign countries and pose a significant threat to sea turtles similar to the impacts seen in U.S. waters. Many unreported takes or incomplete records by foreign fleets, making it difficult to characterize the total impact that international fishing pressure is having on listed sea turtles. Nevertheless, international fisheries represent a continuing threat to sea turtle survival and recovery throughout their respective ranges.

There are also many non-fishery impacts affecting the status of sea turtle species, both in the marine and terrestrial environment. In nearshore waters of the United States, the construction and maintenance of federal navigation channels has been identified as a source of sea turtle mortality. Hopper dredges, which are frequently used in ocean bar channels and sometimes in harbor channels and offshore borrow areas, move relatively rapidly and can entrain and kill sea turtles (NMFS 1997). Sea turtles entering coastal or inshore areas have been affected by entrainment in the cooling-water systems of electrical generating plants. Other nearshore threats include harassment and/or injury resulting from private and commercial vessel operations, military detonations and training exercises, and scientific research activities.

Coastal development can deter or interfere with nesting, affect nesting success, and degrade nesting habitats for sea turtles. Structural impacts to nesting habitat include the construction of buildings and pilings, beach armoring and renourishment, and sand extraction (Lutcavage et al. 1997; Bouchard et al. 1998). These factors may directly, through loss of beach habitat, or indirectly, through changing thermal profiles and increasing erosion, serve to decrease the amount of nesting area available to females and may change the natural behaviors of both adults and hatchlings (Ackerman 1997; Witherington et al. 2003; Witherington et al. 2007). In addition, coastal development is usually accompanied by artificial lighting which has been known to alter the behavior of nesting adults (Witherington 1992) and is often fatal to emerging hatchlings that are drawn away from the water (Witherington and Bjorndal 1991).

Predation by various land predators is a threat to developing nests and emerging hatchlings. Additionally, direct human harvest of eggs and adults from beaches in foreign countries continues to be a problem for various sea turtle species throughout their ranges (NMFS and USFWS 2008).

Multiple municipal, industrial, and household sources, as well as atmospheric transport, introduce various pollutants such as pesticides, hydrocarbons, organochlorides (e.g., DDT and PCBs), and others that may cause adverse health effects to sea turtles (Iwata et al. 1993; Grant and Ross 2002; Garrett 2004; Hartwell 2004). Loggerheads may be particularly affected by organochlorine contaminants as they were observed to have the highest organochlorine contaminant concentrations in sampled tissues (Storelli et al. 2008). Dietary preferences were likely to be the main differentiating factor among species. Storelli et al. (2008) analyzed tissues from stranded loggerhead sea turtles and found that mercury accumulates in sea turtle livers while cadmium accumulates in their kidneys, as has been reported for other marine organisms like dolphins, seals and porpoises (Law et al. 1991). Recent efforts have led to improvements in regional water quality, although the more persistent chemicals are still detected and are expected to endure for years (Mearns 2001; Grant and Ross 2002). Acute exposure to hydrocarbons from petroleum products released into the environment via oil spills and other discharges may directly injure individuals through skin contact with oils (Geraci 1990), inhalation at the water's surface and ingesting compounds while feeding (Matkin and Saulitis 1997). Hydrocarbons also have the potential to impact prey populations, and therefore may affect listed species indirectly by reducing food availability in the action area. There is a large and growing body of literature on past, present, and future impacts of global climate change, exacerbated and accelerated by human activities. Some of the likely effects commonly mentioned are sea level rise, increased frequency of severe weather events, and change in air and water temperatures. NOAA's climate information portal provides basic background information on these and other measured or anticipated effects (see http://www.climate.gov).

Climate change impacts on sea turtles currently cannot, for the most part, be predicted with any degree of certainty; however significant impacts to the hatchling sex ratios of loggerhead turtles may result (Poloczanska et al. 2009; NMFS and USFWS 2007c). In marine turtles, sex is determined by temperature in the middle third of incubation with female offspring produced at higher temperatures and males at lower temperatures within a thermal tolerance range of 25°-35°C (Ackerman 1997). Increases in global temperature could potentially skew future sex ratios toward higher numbers of females (NMFS and USFWS 2007c). Modeling suggests an increase of 2°C in air temperature above pre-industrial levels would result in a sex ratio of over 80 percent female offspring for loggerheads nesting near Southport, North Carolina. The same increase in air temperatures at nesting beaches in Cape Canaveral, Florida, would result in close to 100 percent female offspring. More ominously, an air temperature increase of 3°C above pre-industrial levels is likely to exceed the thermal threshold of most clutches, leading to death (Hawkes et al. 2007). Warmer sea surface temperatures have been correlated with an earlier onset of loggerhead nesting in the spring (Weishampel et al. 2004; Hawkes et al. 2007), as well as short inter-nesting intervals (Hays et al. 2002) and shorter nesting season (Pike et al. 2006).

The effects of global climate change may be exacerbated on developed nesting beaches where shoreline armoring and construction have denuded vegetation. Erosion control structures could potentially result in the permanent loss of nesting beach habitat or deter nesting females (NRC 1990). These impacts will be exacerbated by sea level rise. If females nest on the seaward side of the erosion control structures, nests may be exposed to repeated tidal overwash (NMFS and USFWS 2007c). Sea level rise from global climate change is also a potential problem for areas with low-lying beaches where sand depth is a limiting factor, as the sea may inundate nesting sites and decrease available nesting habitat (Daniels et al. 1993; Fish et al. 2005; Baker et al. 2006). The loss of habitat as a result of climate change could be accelerated due to a combination of other environmental and oceanographic changes such as an increase in the frequency of storms and/or changes in prevailing currents, both of which could lead to increased beach loss via erosion (Antonelis et al. 2006; Baker et al. 2006).

Other changes in the marine ecosystem caused by global climate change (e.g., ocean acidification, salinity, oceanic currents, dissolved oxygen levels, nutrient distribution, etc.) could influence the distribution and abundance of phytoplankton, zooplankton, submerged aquatic vegetation, crustaceans, mollusks, forage fish, etc., which could ultimately affect the primary foraging areas of sea turtles.

3.2.3 Kemp's Ridley Sea Turtle

The Kemp's ridley sea turtle was listed as endangered on December 2, 1970, under the Endangered Species Conservation Act of 1969, a precursor to the ESA. Internationally, the Kemp's ridley is considered the most endangered sea turtle (Groombridge 1982; TEWG 2000; Zwinenberg 1977). No critical habitat has been designated for this species.

3.2.3.1 Species Description, Distribution, and Population Structure

The Kemp's ridley sea turtle is the smallest of all sea turtles. Hatchlings generally range from 1.65-1.89 inches (42-48 mm) in straight-line carapace length, 1.26-1.73 inches (32-44 mm) in width, and 0.3-0.4 pounds (15-20 g) in weight. Adults generally weigh less than 100 pounds (45 kg) and have a carapace length of around 2.1 feet (65 cm). Adult Kemp's ridley shells are almost as wide as they are long. Coloration changes significantly during development from the grey-black dorsum and plastron of hatchlings, a grey-black dorsum with a yellowish-white plastron as post pelagic juveniles and then to the lighter grey-olive carapace and cream-white or yellowish plastron of adults. There are 2 pairs of prefrontal scales on the head, 5 vertebral scutes, usually 5 pairs of costal scutes, and generally 12 pairs of marginal scutes on the carapace. In each bridge adjoining the plastron to the carapace, there are 4 scutes, each of which is perforated by a pore.

Adult Kemp's ridley sea turtles are primarily found in the Gulf of Mexico basin, but are also found on the U.S. Atlantic coast. Their habitat largely consists of sandy and muddy areas in shallow, nearshore waters less than 120 feet (37 m) deep, although they can also be found in deeper offshore waters. These areas support the primary prey species of the Kemp's ridley sea turtle, which consist of swimming crabs, but may also include fish, jellyfish, and an array of mollusks.

3.2.3.2 Life History Information

Kemp's ridleys share a general life history pattern similar to other sea turtles. Females lay their eggs on coastal beaches where the eggs incubate in sandy nests. After 45-58 days of embryonic development, the hatchlings emerge and swim offshore into deeper, ocean water where they feed and grow until returning at a larger size to nearshore coastal habitats, typically around 2 years of age (Ogren 1989), although the time spent in the oceanic zone may vary from 1-4 years or perhaps more (TEWG 2000). Juvenile Kemp's ridley sea turtles utilize these nearshore coastal habitats from April through November, but move towards more suitable overwintering habitat in deeper offshore waters (or more southern waters along the Atlantic coast) as water temperature drops.

Mean growth rates may vary by location, but generally fall within 2.2-2.9 ± 2.4 inches per year (5.5-7.5 ± 6.2 cm/year) (Schmid and Barichivich 2006; Schmid and Woodhead 2000). Age to sexual maturity ranges greatly from 5-16 years, though NMFS et al. (2011) determined the best estimate of age to maturity for Kemp's ridley sea turtles was 12 years. It is unlikely that most adults grow very much after maturity. While some turtles nest annually, the weighted mean remigration rate is approximately 2 years. Nesting generally occurs from April to July and females lay approximately 2.5 nests per season with each nest containing approximately 100 eggs (Márquez M 1994).

3.2.3.3 Population Dynamics

Of the seven species of sea turtles in the world, the Kemp's ridley has declined to the lowest population level. Most of the population of adult females nest on the beaches of Rancho Nuevo, Mexico (Pritchard 1969). When nesting aggregations at Rancho Nuevo were discovered in 1947, adult female populations were estimated to be in excess of 40,000 individuals (Hildebrand 1963). By the mid-1980s, however, nesting numbers from Rancho Nuevo and adjacent Mexican beaches were below 1,000 (with a low of 702 nests in 1985). Nesting steadily increased through the 1990s, however, and then accelerated during the first decade of the 21st century (Figure 6), indicating the species is recovering. It is worth noting that when the Bi-National Kemp's Ridley Sea Turtle Population Restoration Project was initiated in 1978, only Rancho Nuevo nests were recorded. In 1988, data from southern beaches at Playa Dos and Barra del Tordo were added, in 1989, data from the northern beaches of Barra Ostionales and Tepehuajes were added, and, most recently in 1996, data from La Pesca and Altamira beaches were recorded. Currently, nesting at Rancho Nuevo accounts for just over 81 percent of all recorded Kemp's ridley nests in Mexico. Following a significant, unexplained 1-year decline in 2010, Kemp's ridley nests in Mexico reached a record high of 21,797 in 2012 (Gladys Porter Zoo nesting database 2013). A small nesting population is also emerging in the United States, primarily in Texas, rising from 6 nests in 1996 to 42 in 2004, and 199 in 2011; Kemp's ridley nesting reached a record high of 209 nests along Texas beaches in 2012 (National Park Service data http://www.nps.gov/pais/naturescience/strp.htm, http://www.nps.gov/pais/naturescience/current-season.htm).

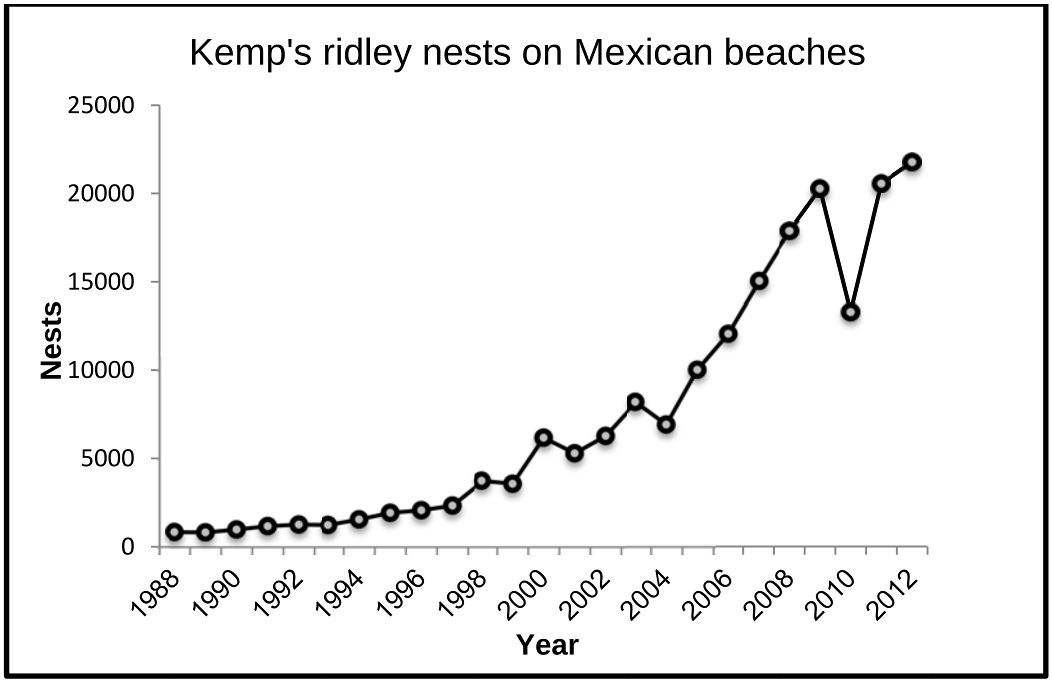


Figure 6: Kemp’s ridley nest totals from Mexican beaches (Gladys Porter Zoo nesting database 2013).

Figure 7 presents nesting data through 2012 for Kemp’s ridley along the Texas coast (http://www.nps.gov/pais/naturescience/nesting2012.htm). Kemp’s ridley nesting has also been increasing on the Texas coast (NPS Web site: http://www.nps.gov/pais/naturescience/strp.htm.)

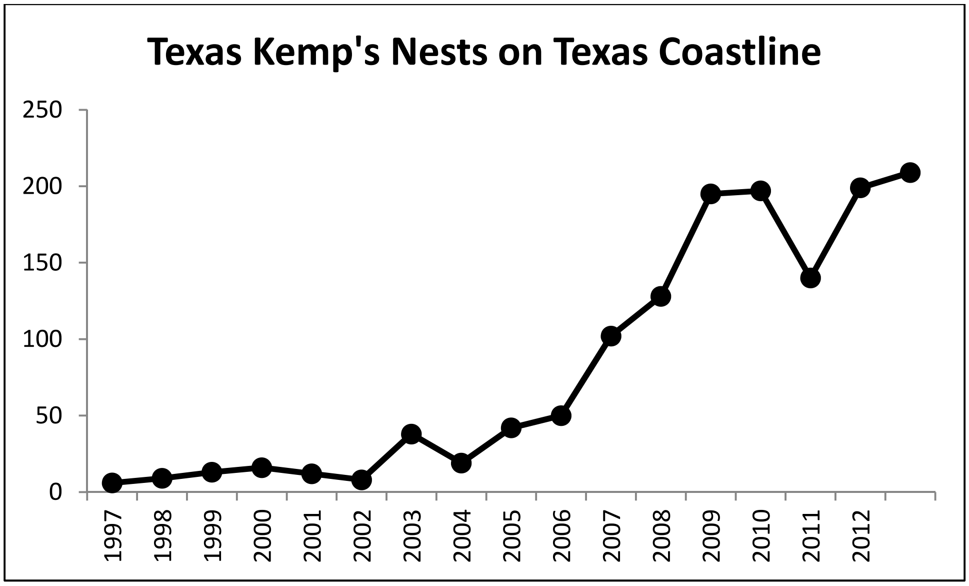


Figure 7: Kemp's ridley nests documented on the Texas coast since 1996.
Source: National Park Service.

Heppell et al. (2005) predicted in a population model that the population is expected to increase at least 12-16 percent per year and that the population could attain at least 10,000 females nesting on Mexico beaches by 2015. NMFS et al. (2011) contains an updated model which predicts that the population is expected to increase 19 percent per year and that the population could attain at least 10,000 females nesting on Mexico beaches by 2011. Approximately 25,000 nests would be needed for an estimate of 10,000 nesters on the beach, based on an average 2.5 nests/nesting female. Excluding the single anomalous nesting year of 2010 (13,302 nests), Kemp's ridley nesting is on track with this model. The recent increases in Kemp's ridley sea turtle nesting seen in the last two decades is likely due to a combination of management measures including elimination of direct harvest, nest protection, the use of TEDs, reduced trawling effort in Mexico and the U.S., and possibly other changes in vital rates (TEWG 1998; TEWG 2000). While these results are encouraging, the species limited range as well as low global abundance makes it particularly vulnerable to new sources of mortality as well as demographic and environmental randomness, all of which are often difficult to predict with any certainty.

The primary range of Kemp's ridley sea turtles is within the Gulf of Mexico basin, though they also occur in coastal and offshore waters of the U.S. Atlantic Ocean. Juvenile turtles, possibly carried by oceanic currents, have been recorded as far north as Nova Scotia. Historic nesting records range from Mustang Island, Texas in the north, to Veracruz, Mexico in the south. Kemp's ridley sea turtles have recently been nesting along the Atlantic Coast of the United States, with nests recorded from beaches in Florida, Georgia, and the Carolinas. In 2012, the first Kemp's ridley sea turtle nest was recorded in Virginia. The Kemp's ridley nesting population is exponentially increasing, which may indicate a similar increase in the population as a whole (NMFS et al. 2011).

3.2.3.4 Threats

Kemp's ridleys face many of the same threats as other sea turtle species, including destruction of nesting habitat from storm events, oceanic events such as cold-stunning, pollution (plastics, petroleum products, petrochemicals, etc.), ecosystem alterations (nesting beach development, beach nourishment and shoreline stabilization, vegetation changes, etc.), poaching, global climate change, fisheries interactions, natural predation, and disease. A discussion on specific threats to sea turtles in the action area can be found in Section 4.2; the remainder of this section will expand on a few of the aforementioned threats and how they may specifically impact Kemp's ridley sea turtles.

As Kemp's ridley sea turtles continue to recover and nesting arribadas are increasingly established, bacterial and fungal pathogens in nests are also likely to increase. Bacterial and fungal pathogen impacts have been well documented in the large arribadas of the olive ridley at Nancite in Costa Rica (Mo 1988). In some years and on some sections of the beach the hatching success can be as low as 5 percent (Mo 1988). As the Kemp's ridley nest density at Rancho Nuevo and adjacent beaches continue to increase, appropriate monitoring of emergence success will be necessary to determine if there are any density dependent effects on emergence success.

The major natural predators of Kemp's ridley nests are mammals, including raccoons, dogs, pigs, skunks, and badgers. Emergent hatchlings are preyed upon by ghost crabs, laughing gulls, raccoons, coyotes, skunks, and badgers. The exotic South American fire ant (*Solenopsis invicta*) is also a predator of Kemp's ridley eggs and emerging hatchlings.

Over the past 3 years NMFS has documented (STSSN data) elevated sea turtle strandings in the Northern Gulf of Mexico, particularly throughout the Mississippi Sound area. In the first three weeks of June 2010, over 120 sea turtle strandings were reported from Mississippi and Alabama waters, none of which exhibited any signs of external oiling to indicate effects associated with the DWH oil spill event. A total of 644 sea turtle strandings were reported in 2010 from Louisiana, Mississippi, and Alabama waters, 561 (87 percent) of which were Kemp's ridley sea turtles. During March through May of 2011, 267 sea turtle strandings were reported from Mississippi and Alabama waters alone. A total of 525 sea turtle strandings were reported in 2011 from Louisiana, Mississippi, and Alabama waters, with the majority (455) occurring from March through July, 390 (86 percent) of which were Kemp's ridley sea turtles. During 2012, a total of 428 sea turtles were reported from Louisiana, Mississippi, and Alabama waters, though the data is incomplete. Of these reported strandings, 301 (70 percent) were Kemp's ridley sea turtles. These stranding numbers are significantly greater than reported in past years; Louisiana, Mississippi, and Alabama waters reported 42 and 73 sea turtle strandings for 2008 and 2009, respectively, however, it should be noted that stranding coverage has increased considerably due to the DWH oil spill event as discussed in more detail in Section 4.2.1.5. Nonetheless, considering that strandings typically represent only a small fraction of actual mortality, these stranding events potentially represent a serious impact to the recovery and survival of the local sea turtle populations. While a definitive cause for these strandings has not been identified, necropsy results indicate a significant number of stranded turtles from these events likely perished due to forced submergence, which is commonly associated with fishery interactions. Yet, available information indicates fishery effort was extremely limited during the stranding events. The fact that in both 2010 and 2011 approximately 85 percent of all Louisiana, Mississippi, and Alabama stranded turtles were Kemp's ridleys is notable; however, this could simply be a function of the species' preference for shallow, inshore waters coupled with increased population abundance as reflected in recent Kemp's ridley nesting increases.

In response to these strandings and due to speculation that fishery interactions may be the causative agent, fishery observer effort was shifted to evaluate the inshore skimmer trawl fishery during the summer of 2012. During May-July, observers reported 24 sea turtle interactions in the skimmer trawl fishery, all but one of which were identified as Kemp's ridleys (one turtle was an unidentified hardshell turtle). Encountered turtles were all small, juvenile specimens ranging from 7.6-19.0 inches (19.4-48.3 cm) curved carapace length, and all turtles were released alive. The small average size of encountered Kemp's ridleys introduces a potential conservation issue, as over 50 percent of these reported turtles could potentially pass through the maximum 4-inch bar spacing of TEDs currently required in the shrimp fishery. Due to this issue, a proposed 2012 rule to require TEDs in the skimmer trawl fishery (77 FR 27411) was not implemented. Based on anecdotal information, these interactions were a relatively new issue for the inshore skimmer trawl fishery. Given the nesting trends and habitat utilization of Kemp's ridley sea turtles, it is likely that fishery interactions in the Northern Gulf of Mexico may continue to be an issue of concern for the species, and one that may potentially slow the rate of recovery for Kemp's ridley sea turtles.

4. Environmental Baseline

This section is an analysis of 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.

By regulation, environmental baselines for biological opinions include the past and present impacts of all state, federal or private actions and other human activities in the action area. We identify the anticipated impacts of all proposed federal projects in the specific action area of the consultation at issue, that have already undergone formal or early Section 7 consultation as well as the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02, emphasis added).

NMFS focuses our impact analysis specifically within the action area. This is important because, in some phenotypic states or life history stages, listed individuals will commonly exhibit, or be more susceptible to, adverse responses to stressors than they would be in other states, stages, or areas within their distributions. The same is true for localized populations of endangered and threatened species: the consequences of changes in the fitness or performance of individuals on a population's status depends on the prior state of the population.

4.1 Status of Loggerhead, Green, and Kemp's Ridley Sea Turtles within the Action Area

Sea Turtle Nesting Data
Loggerhead, green, and Kemp's ridley sea turtles are located in the nearshore Atlantic Ocean and may be affected by the proposed action. All of these species are migratory, traveling for forage grounds or reproduction purposes. The nearshore and inshore waters of the Gulf of Mexico along the west coast of Florida may be used by these sea turtles as post-hatchling developmental habitat or foraging habitat. Primarily loggerhead sea turtles use the beaches of Collier County for nesting. The Sea Turtle Protection Program within the CCPRD monitors 27.2 km (16.9 mi) of shoreline on Barefoot, Vanderbilt, Park Shore, and Marco Island. The remaining 9.0 km (5.6 mi) of beach in the City of Naples is subcontracted to the Conservancy of Southwest Florida (CSWF). An additional 1.2 miles of shoreline nesting is reported to CCPRD by Delnor-Wiggins Pass State Park. Figure 8 presents the total number of sea turtle nests as documented from these monitoring programs. With the exception of one green turtle nest laid on Barefoot Beach in 2007, all nests laid along this 23.7 miles of shoreline have been loggerhead nests.

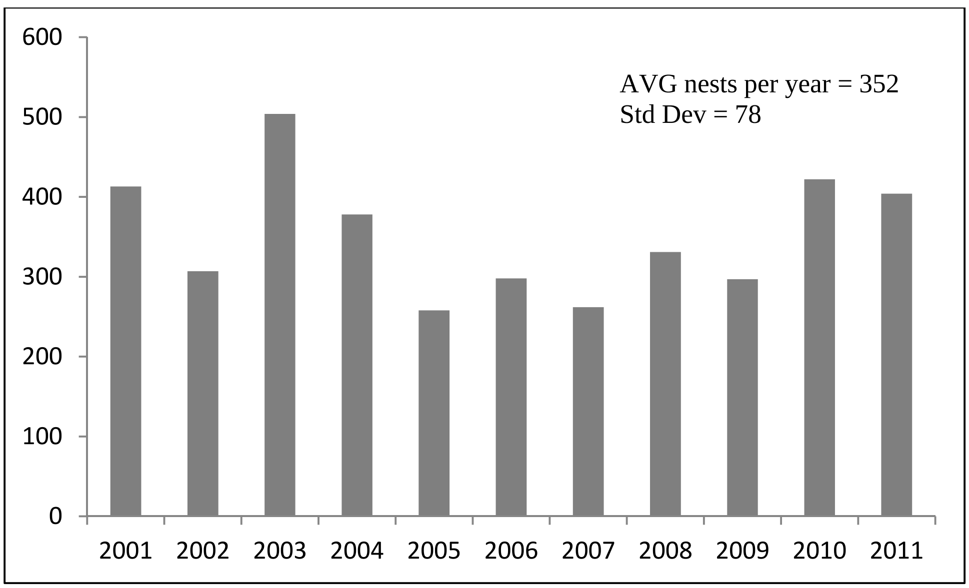


Figure 8: Sea turtle nesting data (2001-2011) for Collier County shoreline, number of nests per year.

NMFS believes that no individual sea turtles are likely to be permanent residents of the action area, although some individuals may be present at any given time. These same individuals will migrate into offshore waters, as well as other areas of the Gulf of Mexico, Caribbean Sea, and North Atlantic Ocean at certain times of the year, and thus may be impacted by activities occurring there. Therefore, these species' statuses in the action area are considered to be the same as their range-wide statuses and supported by the species accounts in Section 3.0. Because they travel widely, individuals in the action area are impacted by activities that occur in other areas within their geographic range.

Sea turtle interactions with hopper dredges within the USACE Jacksonville District show that during the past 25-year reporting period since monitoring began, 330 sea turtles (199 loggerhead; 58 greens; 19 Kemp's; 1 leatherback; and, 53 unknown) have been killed by hopper dredging-related projects. In addition to 330 lethal sea turtle interactions with hopper dredges, we analyzed pre-dredge relocation trawling data for all hopper dredge projects and expanded our data pool to include relocation trawl data for the USACE's entire Gulf Region (includes New Orleans, Mississippi, Jacksonville, and Galveston Districts). Over the past six years, relocation trawls captured over 1,000 turtles: 745 loggerhead; 303 Kemp's ridley; 25 green; 3 leatherback; and 2 hawksbill. The USACE relocation data is for the larger Gulf of Mexico area (i.e., USACE Gulf Region) and includes data from all hopper dredge projects over the past six years and is not necessarily representative of the action area, but at the same time, these data provide NMFS with useful information in the absence of robust data from the action area itself. NMFS is not aware of any quantitative studies within the action area assessing the trend or density of in-water loggerhead, Kemp's ridley, or green sea turtle populations. However, valuable stranding data is available for the action area and is discussed in the sections below. This data can be used to estimate project effects.

In 2006, during the previous Collier County Beach Renourishment (SAJ-2003-12405 [IP-MFN]), no sea turtles were taken lethally during either dredging operations or during pre-dredge associated trawling. Relocation trawling captured 87 sea turtles (86 loggerhead, 1 green) with no mortalities. A total of 173 days of dredging were completed for the previous renourishment with a total volume dredged of 609,391 cy of bottom materials.

Sea Turtle Stranding Data
The STSSN was established in 1980 to collect information on and document strandings of marine turtles along the U.S. Gulf of Mexico and Atlantic coasts. The network, which includes federal, state, and private partners, encompasses the coastal areas of the eighteen-state region from Maine to Texas, and includes portions of the U.S. Caribbean (Gulf of Mexico zones shown in Figure 9). STSSN uses this extensive regional and partner collaboration to report data on dead sea turtles and live strandings (data available at http://www.sefsc.noaa.gov/seaturtlesprogram.jsp). These data show that there were 75 registered sea turtle strandings between 2008 and 2012 for Zone 3 (Figure 10), within which, all aspects of the proposed action will be conducted. Loggerheads accounted for most of the strandings (63 percent), followed by 31 percent Kemp's, 13 percent green, and 3 percent hawksbills (Figure 11). The total number of turtles reported by STSSN for Zone 3 is just two percent of the total number of stranded turtles reported for the combined west coast zones for the state of Florida Gulf Coast [6] (Figure 12). Approximately 41 percent of all reported strandings for the Florida Gulf Coast were loggerheads and 40 percent were greens for the 5-year period from 2008-2012 (Figure 13). Kemp's ridley sea turtle strandings accounted for 16 percent of the total and showed an increasing trend (Figure 9) over the same time period likely due to increasing populations in the Gulf of Mexico.

[6] Zone 3 strandings = 75 divided by 3,183 (total combined zones 1-10) = 0.024 (2 percent).

Annual sea turtle stranding data for Collier County from 1996-2011 when data was available show an average of about 49 sea turtles per year and a total of 776 turtles for the 16-year period. These data are available as part of the Collier county Sea Turtle Protection Plan Annual Report (2011), available at http://www.colliergov.net/modules/showdocument.aspx?documentid=45792.

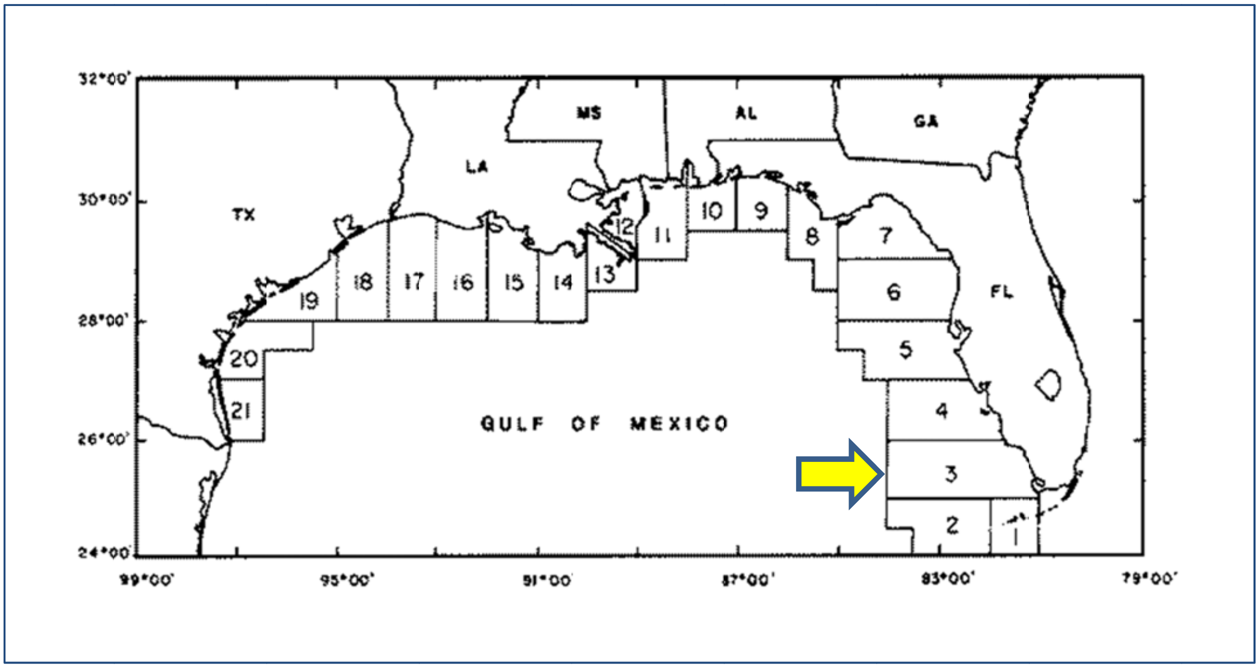


Figure 9: SSTSN Zone 3 encompasses all of Collier County and a portion of Monroe and Lee Counties.

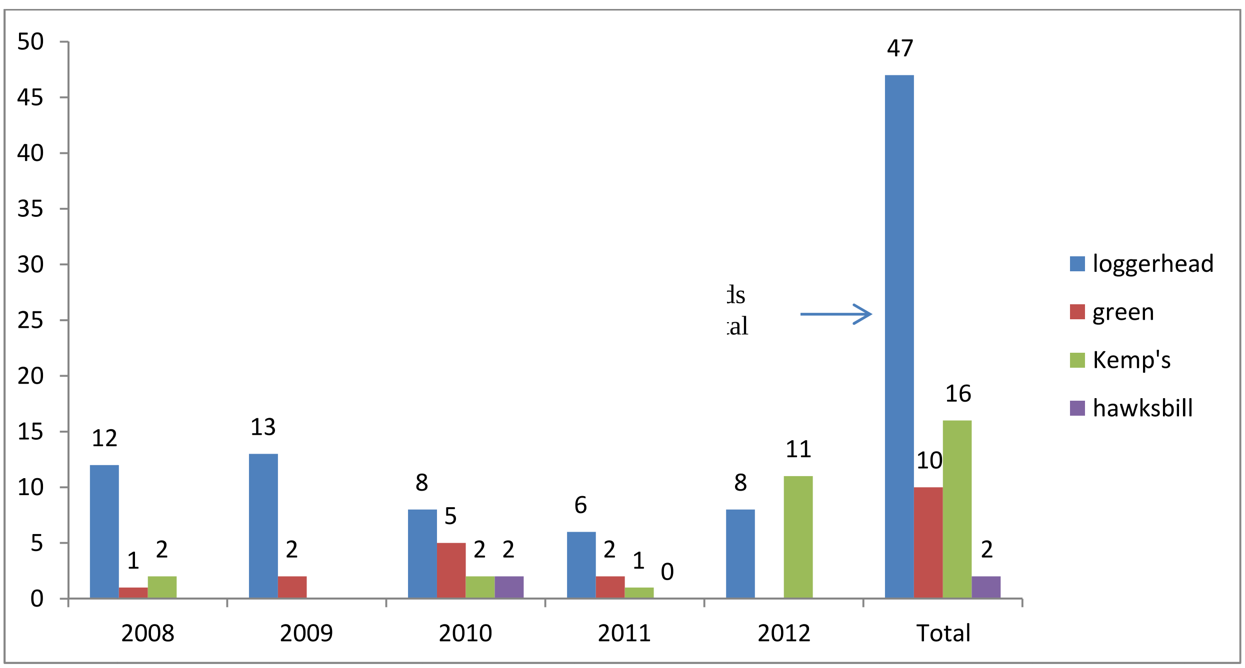


Figure 10: STSSN sea turtle strandings (2008-2012) by species.

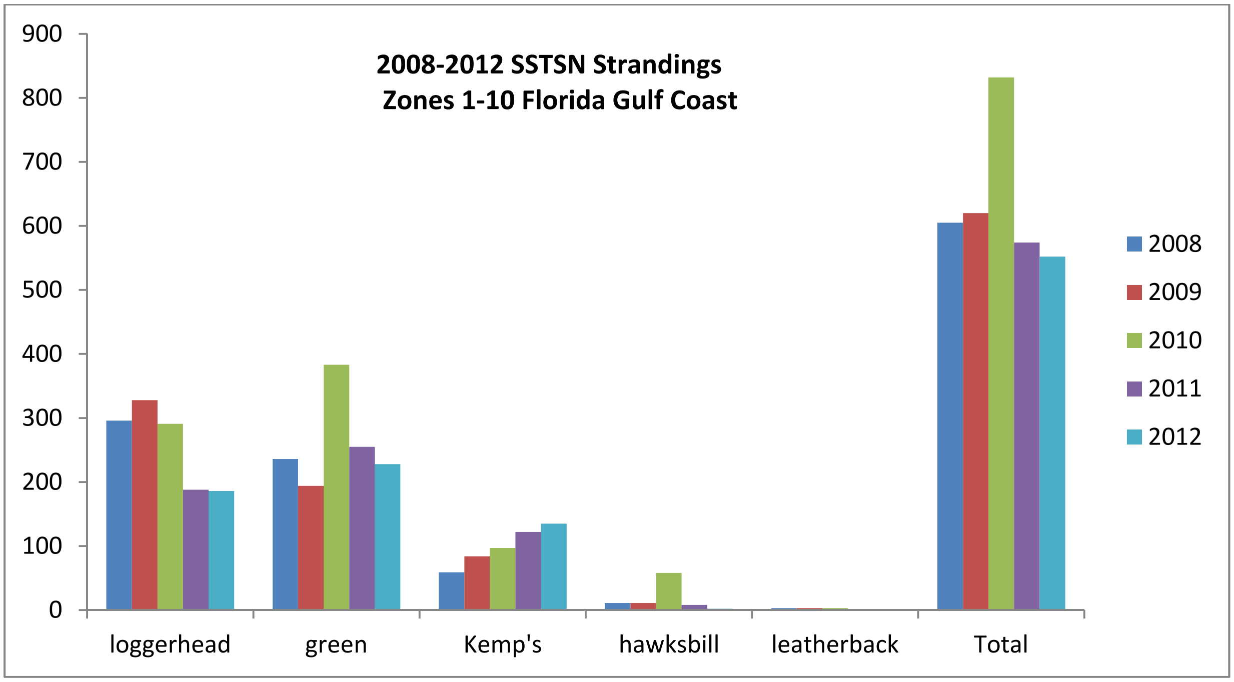


Figure 11: Sea turtle strandings reported to STSSN for 2008-2011 for all zones within the Florida Gulf Coast, including Zone 3.

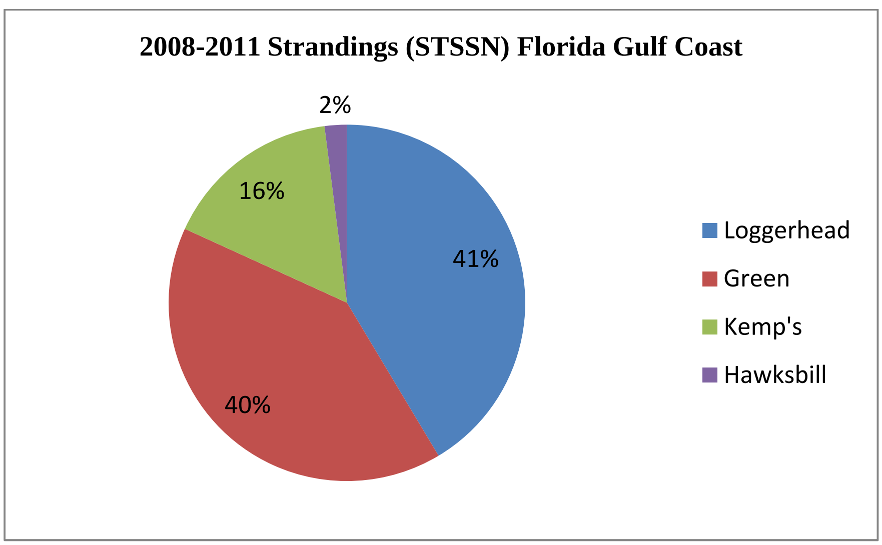


Figure 12: SSTSN Strandings for 2008-2012 Florida Gulf Coast. Leatherbacks accounted for less than one percent of strandings and are not shown.

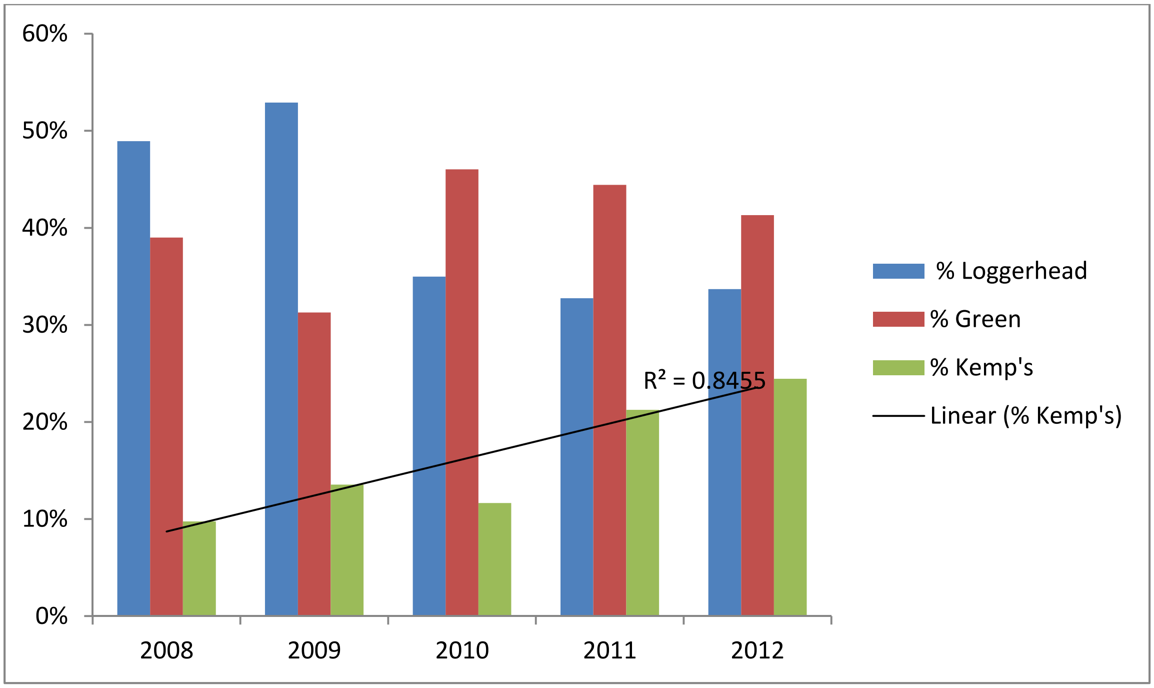


Figure 13: Proportional strandings of sea turtles along the Florida Gulf Coast (Zones 1-10) for 2008-2012. Not shown are hawksbills (2 percent for all years combined) and leatherbacks (<1 percent). Loggerheads made up 41% of the strandings, 40% were greens, and 16% Kemp's ridleys.

In summary, three separate datasets indicate that loggerhead sea turtles are the most likely sea turtles that will be encountered during the Collier County Beach Renourishment. Sea turtle stranding data over the past 5-year time frame indicate that 63 percent of the total strandings were loggerheads. With the exception of one green turtle nest laid on Barefoot Beach in 2007, all nests laid along 23.7 miles of Collier County shoreline have been loggerhead nests (1 green in 3,874 nests from 2001-2011). USACE hopper dredge relocation trawls for the previous Collier County renourishment in 2006 relocated 87 sea turtles, 99 percent of which were loggerheads. The slight increase in Kemp's ridley populations in the region serves as the only notable change in species demographics over the last 5-year period.

4.2 Factors Affecting Sea Turtles within the Action Area

As stated in Section 2.0 ("Action Area"), the action area ranges from the immediate offshore area of R-70 adjacent to Naples Beach north to R-22 adjacent to Vanderbilt Beach seaward from the northern-most renourishment site to the Borrow Area T1 located 33 miles offshore from Vanderbilt Beach. Numerous activities have been identified as threats and may affect sea turtles while the following analysis examines actions that may affect these species' environment within the action area.

4.2.1 Federal Actions

In recent years, NMFS has undertaken several ESA Section 7 consultations to address the effects of federally-permitted fisheries and other federal actions on threatened and endangered species. Each of those consultations sought to develop ways of reducing the probability of adverse effects of the action on sea turtles and/or smalltooth sawfish. Similarly, recovery actions NMFS has undertaken under the ESA are addressing the problem of interactions with sea turtles by the fishing and oil and gas industries, vessel operations, and other activities such as USACE dredging operations.

4.2.1.1 Fisheries

Fisheries

Adverse effects on threatened and endangered species from several types of fishing gear occur in the Gulf of Mexico. Efforts to reduce the adverse effects of commercial fisheries are addressed through the ESA Section 7 process. Longline, trawl, hook-and-line, gillnet, and cast net gear fisheries have all been documented as interacting with sea turtles. For each of these fisheries for which there is a federal fishery management plan (FMP) or for which any federal action is taken to manage that fishery, impacts have been evaluated under Section 7. Several formal consultations have been conducted on the following fisheries that NMFS has determined are likely to adversely affect threatened and endangered species: Gulf of Mexico Reef Fish Fishery, Atlantic Pelagic Swordfish/Tuna/Shark Longline Fishery, Highly Migratory Species (HMS) Atlantic Shark Fishery, Coastal Migratory Pelagics Fishery, Gulf of Mexico/South Atlantic Spiny Lobster Fishery, and the Gulf of Mexico and South Atlantic Shrimp Trawl Fishery. An Incidental Take Statement (ITS) has been issued for the take of sea turtles in each of these fisheries.

Gulf of Mexico Reef Fish Fishery

The Gulf of Mexico reef fish fishery uses two basic types of gear: spear or powerhead, and hook-and-line gear. Hook-and-line gear used in the fishery includes both commercial bottom longline and commercial and recreational vertical line (e.g., handline, bandit gear, rod-and-reel). Prior to 2008, the reef fish fishery was believed to have relatively moderate levels of sea turtle bycatch attributed to the hook-and-line component of the fishery (i.e., approximately 107 captures and 41 mortalities annually, all species combined, for the entire fishery) (NMFS 2005). In 2008, SEFSC observer programs and subsequent analyses indicated that the overall amount and extent of incidental take for sea turtles specified in the incidental take statement of the 2005 opinion on the reef fish fishery had been severely exceeded by the bottom longline component of the fishery (approximately 974 captures and at least 325 mortalities estimated for the period July 2006-2007).

In response, NMFS published an emergency rule prohibiting the use of bottom longline gear in the reef fish fishery shoreward of a line approximating the 50-fathom depth contour in the eastern Gulf of Mexico, essentially closing the bottom longline sector of the reef fish fishery in the eastern Gulf of Mexico for six months pending the implementation of a long-term management strategy. The Gulf of Mexico Fishery Management Council (GMFMC) developed a long-term management strategy via a new amendment (Amendment 31 to the Reef Fish FMP).

The amendment included a prohibition on the use of bottom longline gear in the Gulf of Mexico reef fish fishery, shoreward of a line approximating the 35-fathom contour east of Cape San Blas, Florida, from June through August; and a reduction in the number of bottom longline vessels operating in the fishery via an endorsement program and a restriction on the total number of hooks that may be possessed onboard each Gulf of Mexico reef fish bottom longline vessel to 1,000, only 750 of which may be rigged for fishing.

On October 13, 2009, SERO completed an opinion that analyzed the expected effects of the continued operation of the Gulf of Mexico reef fish fishery under the changes proposed in Amendment 31 (NMFS-SEFSC 2009b). The opinion concluded that sea turtle takes would be substantially reduced compared to the fishery as it was previously prosecuted, and that operation of the fishery would not jeopardize the continued existence of any sea turtle species. Amendment 31 was implemented on May 26, 2010. In August 2011, consultation was reinitiated to address the DWH oil release event and potential changes to the environmental baseline. Reinitiation of consultation was not related to any material change in the fishery itself, violations of any terms and conditions of the 2009 opinion, or an exceedance of the incidental take statement. The resulting September 30, 2011, opinion concluded the continued operation of the Gulf of Mexico reef fish fishery is not likely to jeopardize the continued existence of any listed sea turtles (NMFS 2011c).

HMS-Atlantic Pelagic Fisheries for Swordfish, Tuna, and Billfish
Atlantic pelagic fisheries for swordfish, tuna, and billfish are known to incidentally capture large numbers of sea turtles, particularly in the pelagic longline component. Pelagic longline, pelagic driftnet, bottom longline, and/or purse seine gear have all been documented taking sea turtles. The Northeast swordfish driftnet portion of the fishery was prohibited during an emergency closure that began in December 1996, and was subsequently extended. A permanent prohibition on the use of driftnet gear in the swordfish fishery was published in 1999. NMFS reinitiated consultation on the pelagic longline component of this fishery (NMFS 2004a) because the authorized number of incidental takes for loggerheads and leatherbacks sea turtles were exceeded. The resulting biological opinion stated the long-term continued operation this sector of the fishery was likely to jeopardize the continued existence of leatherback sea turtles, but RPAs were identified allowing for the continued authorization of the pelagic longline fishing that would not jeopardize leatherback sea turtles.

HMS Atlantic Shark and Smoothhound Fisheries
These fisheries include commercial shark bottom longline and gillnet fisheries and recreational shark fisheries under the FMP for Atlantic Tunas, Swordfish, and Sharks (HMS FMP). NMFS has formally consulted three times on the effects of HMS shark fisheries on sea turtles (i.e., NMFS 2003c, NMFS 2008c, NMFS 2012). NMFS also began authorizing a federal smoothhound fishery that will be managed as part of the HMS shark fisheries. NMFS (2012) analyzed the potential adverse effects from the smoothhound fishery on sea turtles for the first time. Both bottom longline and gillnet are known to adversely affect sea turtles. From 2007-2011, the sandbar shark research fishery had 100 percent observer coverage, with 4-6 percent observer coverage in the remaining shark fisheries. During that period, 10 sea turtle (all loggerheads) takes were observed on bottom longline gear in the sandbar shark research fishery

and 5 were taken outside the research fishery. The five non-research fishery takes were extrapolated to the entire fishery, providing an estimate of 45.6 sea turtle takes (all loggerheads) for non-sandbar shark research fishery from 2007-2010 (Carlson and Richards 2011). No sea turtle takes were observed in the non-research fishery in 2011 (NMFS unpublished data). Since the research fishery has a 100 percent observer coverage requirement those observed takes were not extrapolated (Carlson and Richards 2011). Because few smoothhound trips were observed, no sea turtle captures were documented in the smoothhound fishery.

The most recent ESA Section 7 consultation was completed on December 12, 2012, on the continued operation of those fisheries and Amendments 3 and 4 to the Consolidated HMS FMP (NMFS 2012). The consultation concluded the proposed action was not likely to jeopardize the continued existence of sea turtles. An ITS was provided authorizing 18 takes (9 of which could be lethal) of each species for hawksbill and leatherback sea turtles every three years.

Coastal Migratory Pelagics Fishery
In 2007, NMFS completed a Section 7 consultation on the continued authorization of the coastal migratory pelagics fishery in the Gulf of Mexico and South Atlantic (NMFS 2007). In the Gulf of Mexico, hook-and-line, gillnet, and cast net gears are used. Gillnets are the primary gear type used by commercial fishermen in the South Atlantic regions as well, while the recreational sector uses hook-and-line gear. The hook-and-line effort is primarily trolling. The biological opinion concluded that green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles may be adversely affected by operation of the fishery. However, the proposed action was not expected to jeopardize the continued existence of any of these species and an ITS was provided. In November 2012, NMFS requested reinitiation of consultation to evaluate the potential impact of this fishery on the recently listed five distinct population segments of Atlantic sturgeon.

Gulf of Mexico/South Atlantic Spiny Lobster Fishery
NMFS completed a Section 7 consultation on the Gulf and South Atlantic Spiny Lobster FMP on August 27, 2009 [i.e., (NMFS 2009)]. The commercial component of the fishery consists of diving, bully net and trapping sectors; recreational fishers are authorized to use bully net and hand-harvest gears. Of the gears used, only traps are expected to result in adverse effects on sea turtles. The consultation determined the continued authorization of the fishery would not jeopardize any listed species. An ITS was issued for takes in the commercial trap sector of the fishery. Fishing activity is limited to waters off south Florida and, although the FMP does authorize the use of traps in federal waters, historic and current effort is very limited. Thus, potential adverse effects on sea turtles are believed to also be very limited (e.g., no more than a couple sea turtle entanglements annually).

Gulf of Mexico and the South Atlantic Shrimp Trawl Fisheries
Southeast shrimp fisheries target primarily brown, white, and pink shrimp in inland waters and estuaries through the state-regulated territorial seas and in federal waters of the Gulf of Mexico Exclusive Economic Zone (EEZ). Fisheries in state and federal waters must comply with sea turtle conservation regulations promulgated under the ESA, including requirements to use turtle excluder devices. Fisheries in federal waters are managed by NMFS under the Magnuson Stevens Fishery Conservation Act and associated FMPs. Brown shrimp are caught out to at least

50 fathoms (1 ftm = approximately 1.83 meters), but most come from waters less than 30 fathoms. White shrimp, second in value, are found in nearshore waters to 20 fathoms, with most of the catch coming from less than 15 fathoms (i.e., mainly inshore of the action area). Pink shrimp are most abundant off Florida's west coast and particularly in the Tortugas off the Florida Keys.

Of all anthropogenic stressors, shrimp trawling has had the greatest adverse effect on sea turtles in the Gulf of Mexico. As sea turtles rest, forage, or swim on or near the bottom, they are captured by shrimp trawls pulled along the bottom. Shrimp trawling can be conducted for hours to days continuously, day and night, without the net being retrieved. Shrimp trawling increased dramatically in the Gulf between the 1940s and the 1960s. By the late 1970s, there was evidence that thousands of sea turtles were being killed annually in the Southeast (Henwood and Stunz 1986). In 1990, the National Research Council, Committee on Sea Turtle Conservation (NRC) concluded the Southeast shrimp trawl fishery affected more sea turtles than all other activities combined and was the most significant anthropogenic source of sea turtle mortality in the U.S. waters, in part due to the high reproductive value of larger and older turtles taken in this fishery (NRC 1990).

NMFS has prepared opinions on the Gulf of Mexico shrimp trawling numerous times over the years (most recently 2002 and 2012). The consultation history is closely tied to the lengthy regulatory history governing the use of TEDs and a series of regulations aimed at reducing potential for incidental mortality of sea turtles in commercial shrimp trawl fisheries. The level of annual mortality described in NRC (1990) is believed to have continued until 1992-1994, when U.S. law required all shrimp trawlers in the Atlantic and Gulf of Mexico to use TEDs, allowing at least some sea turtles to escape nets before drowning (NMFS 2002c).[7] TEDs approved for use have had to demonstrate 97 percent effectiveness in excluding sea turtles from trawls in controlled testing. These regulations have been refined over the years to ensure that TED effectiveness is maximized through proper placement and installation, configuration (e.g., width of bar spacing), flotation, and more widespread use.

Despite the apparent success of TEDs for some species of sea turtles (e.g., Kemp's ridleys), it was later discovered that TEDs were not adequately protecting all species and size classes of sea turtles. Analyses by Epperly and Teas (2002) indicated that the minimum requirements for the escape opening dimension in TEDs in use at that time were too small for some sea turtles and that as many as 47 percent of the loggerheads stranding annually along the Atlantic and Gulf of Mexico were too large to fit the existing openings. On December 2, 2002, NMFS completed an opinion on shrimp trawling in the southeastern United States (NMFS 2002c) under proposed revisions to the TED regulations requiring larger escape openings (68 FR 8456, February 21, 2003). This opinion determined that the shrimp trawl fishery under the revised TED regulations would not jeopardize the continued existence of any sea turtle species. The determination was based in part, on the opinion's analysis that shows the revised TED regulations are expected to

[7] TEDs were mandatory on all shrimping vessels. However, certain shrimpers (e.g., fishers using skimmer trawls or targeting bait shrimp) could operate without TEDs if they agreed to follow specific tow time restrictions.

reduce shrimp trawl related mortality by 94 percent for loggerheads and 97 percent for leatherbacks. In February 2003, NMFS implemented the revisions to the TED regulations.

On May 9, 2012, NMFS completed the new opinion which analyzed the continued implementation of the sea turtle conservation regulations and the continued authorization of the Southeast U.S. shrimp fisheries in federal waters under the Magnuson-Stevens Act (NMFS 2012c). The opinion also considered a proposed amendment to the sea turtle conservation regulations that would withdraw the alternative tow time restriction at 50 CFR 223.206(d)(2)(ii)(A)(*3*) for skimmer trawls, pusher-head trawls, and wing nets (butterfly trawls) and instead require all of these vessels to use TEDs. The opinion concluded that the proposed action would not jeopardize the continued existence of any sea turtle species. Sea turtle interactions and captures were estimated to be significantly higher than estimated in the 2002 opinion due to increases in Kemp's ridley and green sea turtle population abundance, incorporation of the TED compliance data and the effects those violations have on expected sea turtle captures rates, and incorporation of interactions in shrimp trawl gear types previously not estimated (i.e. skimmer trawls and try nets). An ITS was provided that used trawl effort and capture rates as proxies for sea turtle take levels. The new biological opinion requires NMFS to minimize the impacts of incidental takes through monitoring of shrimp effort and regulatory compliance levels, conducting TED training and outreach, and continuing to research the effects of shrimp trawling on listed species. On November 21, 2012, NMFS determined that a final rule requiring TEDs in skimmer trawls, pusher-head trawls, and wing nets was not warranted at this time and withdrew the proposal. The decision to not implement the final rule created a change to the proposed action analyzed in the 2012 opinion, with effects to listed species that have not previously been considered, thus triggered the need to reinitiate consultation. Consequently, on November 26, 2012, via a memorandum from the Southeast Regional Administrator to the File, NMFS reinitiated consultation; the consultation is ongoing.

4.2.1.2 Construction and Operation of Public Fishing Piers

Several public fishing piers have been constructed within the state of Florida over the past ten years. Most of these have been constructed following the active hurricane seasons of 2004 and 2005, which resulted in damage to the then existing piers. All public fishing piers but one were constructed along the Gulf coast of Florida; only the Jacksonville fishing pier was constructed along the Atlantic coast of Florida. NMFS has not consulted on any fishing piers within Collier County.

4.2.1.3 Dredging

Dredging

The construction and maintenance of federal navigation channels and dredging or sand mining from borrow areas has been documented to result in capture, injury and death of sea turtles. Hopper dredges move relatively rapidly (compared to sea turtle swimming speeds) and can entrain and kill sea turtles as the drag arm of the moving dredge overtakes the slower moving sea turtle. The USACE has biological opinions from NMFS covering their implementation and authorization of hopper dredging in the Atlantic and Gulf of Mexico. For the entire Gulf of Mexico from the U.S.-Mexico border to Key West, the annual documented USACE incidental take per fiscal year by injury or mortality, is expected to consist of 20 Kemp's ridley turtles, 14 green turtles, 4 hawksbill turtles and 40 loggerhead turtles (GRBO 2003). The total take of turtle species is predicted to be twice these levels because 50 percent of turtles taken by hopper dredges are expected to go unobserved (GRBO 2003).

4.2.1.4 Beach Nourishment

The activity of beach nourishment, especially when impacts include the loss of nearshore hardbottom habitat along the east coast of Florida, has been documented to result in injury and death of juvenile green sea turtles. Juvenile green turtles are known to utilize these high-energy, dynamic habitats for foraging and as refugia, and show a preference for this habitat even when abundant deeper-water sites are available. The loss of such limited habitat, especially when considering the cumulative loss as a result of beach nourishment activities occurring along the entire range of the habitat and continually over time, is expected to result in loss of foraging opportunities and protective refuge. The stresses are also expected to contribute to mortality of individuals already in poor condition as a result of disease or other factors (NMFS 2008a). NMFS issued a biological opinion on March 13, 2008, for proposed beach renourishment of Reach 8 in Palm Beach County, Florida (F/SER/2007/08929). This opinion authorized take of up to 19 green sea turtles associated with the permanent loss of 6.95 acres of nearshore hardbottom, which serves as foraging and resting habitat for juvenile green turtles. While it was NMFS's opinion that the project was likely to adversely affect green sea turtles, NMFS concluded that the proposed action was not likely to jeopardize their continued existence. A hopper dredge was used for the project and incidental take from hopper dredging was authorized by the incidental take statement of the regional biological opinion on hopper dredging along the South Atlantic Coast (SARBO), dated September 25, 1997.

NMFS issued a biological opinion on September 4, 2008, for the Brevard County Mid-Reach beach renourishment project (F/SER/2005/06003). The Mid-Reach project is located just north of the South Beach Reach A project and used the same proposed borrow areas (Canaveral Shoals). A hopper dredge was also used for the Mid-Reach project. NMFS authorized nonlethal take in the biological opinion for of up to 15 green turtles associated with the estimated loss of 2.95 acres of nearshore foraging and resting habitat. While it was NMFS's opinion that the project was likely to adversely affect green sea turtles, NMFS concluded that the proposed action was not likely to jeopardize their continued existence. Lethal incidental take associated with hopper dredging was also covered under the SARBO.

NMFS issued a biological opinion on January 9, 2009, for proposed renourishment of Juno Beach in Palm Beach County, Florida (F/SER/2008/04413). NMFS authorized the nonlethal take of 8 green juvenile sea turtles and the lethal take of one juvenile green sea turtle associated with the permanent loss of approximately 1.7 acres of nearshore hardbottom, which serves as foraging and resting habitat for juvenile green turtles. While it was NMFS's opinion that this project was likely to adversely affect green sea turtles, NMFS concluded that the proposed action was not likely to jeopardize their continued existence. Lethal incidental take associated with the hopper dredging was also covered under the 1997 SARBO for this project.

NMFS issued a biological opinion on June 1, 2011, for proposed renourishment of C in Palm Beach County, Florida (F/SER/2008/04413). NMFS authorized the nonlethal take of 8 green sea turtles and the lethal take of one green sea turtle associated with the permanent loss of approximately 1.7 acres of nearshore hardbottom, which serves as foraging and resting habitat for juvenile green turtles. While it was NMFS's opinion that this project was likely to adversely affect green sea turtles, NMFS concluded that the proposed action was not likely to jeopardize their continued existence. Lethal incidental take associated with the hopper dredging was also covered under the 1997 SARBO for this project.

4.2.1.5 Oil and Gas Exploration and Extraction

Although oil and gas exploration, production, and development do not occur within the action area, oil and gas activities may indirectly impact protected sea turtles located there. Oil spills and marine debris from nearby oil and gas activities could affect protected turtles within the action area. Many Section 7 consultations have been completed on MMS (now BOEM) oil and gas lease activities. Opinions issued on July 11, 2002 (NMFS 2002b), November 29, 2002 (NMFS 2002c), August 30, 2003 [Lease Sales 189 and 197, (NMFS 2003)], and June 29, 2007 [2007-2012 Five-Year Lease Plan, (NMFS 2007c)] have concluded that sea turtle takes may result from vessel strikes, marine debris, and oil spills.

NMFS's June 29, 2007, opinion issued to MMS concluded that the five-year leasing program for oil and gas development in the coastal and the Western Planning Areas of the Gulf of Mexico. and its associated actions were not likely to jeopardize the continued existence of threatened or endangered species or destroy or adversely modify designated critical habitat. NMFS estimated the number of listed species that could potentially experience adverse effects as the result of exposure to an oil spill over the lifetime of the action. However, as discussed below, on April 20, 2010, a massive oil well explosion, and then subsequent release of oil at DWH MC252 well occurred. Given the effects of the spill, on July 30, 2010, BOEM requested reinitiation of interagency consultation under Section 7 of the ESA on the June 29, 2007, opinion on the Five-Year Outer Continental Shelf Oil and Gas Leasing Program (2007-2012) in the Central and Western Planning Areas of the Gulf of Mexico.

NMFS has begun synthesizing data from the spill, and it is clear that BOEM underestimated the size, frequency, and impacts associated with a catastrophic spill under the 2007-2012 lease sale program. The size and duration of the DWH oil spill were greater than anticipated, and the effects on listed species have exceeded NMFS's projections. However, NMFS has not yet issued an opinion concluding the reinitiated consultation.

The DWH Oil Spill and Recent Increase in Sea Turtle Strandings in the Northern Gulf

On April 20, 2010, while working on an exploratory well approximately 50 miles offshore Louisiana, the semi-submersible drilling rig DWH experienced an explosion and fire. The rig subsequently sank and oil and natural gas began leaking into the Gulf of Mexico. Oil flowed for 86 days, until finally being capped on July 15, 2010. Millions of barrels of oil were released into the Gulf. Additionally, approximately 1.84 million gallons of chemical dispersant was applied both subsurface and on the surface to attempt to break down the oil. There is no question that the unprecedented DWH spill and associated response activities (e.g., skimming, burning, and application of dispersants) have resulted in adverse effects on listed sea turtles.

At this time, the total effects of the oil spill on species found throughout the Gulf of Mexico, including sea turtles, are not known. Potential DWH-related impacts to all sea turtle species include direct oiling or contact with dispersants from surface and subsurface oil and dispersants, inhalation of volatile compounds, disruption of foraging or migratory movements due to surface or subsurface oil, ingestion of prey species contaminated with oil and/or dispersants, loss of foraging resources which could lead to compromised growth and/or reproductive potential, harm to foraging, resting and/or nesting habitats, and disruption of nesting turtles and nests. There is currently an ongoing investigation and analysis being conducted under the Oil Pollution Act (33 U.S.C. 2701 et seq.) to assess natural resource damages and to develop and implement a plan for the restoration, rehabilitation, replacement or acquisition of the equivalent of the injured natural resources. The final outcome of that investigation may not be known for many months to years from the time of this opinion. Consequently, other than some emergency restoration efforts, most restoration efforts that occur pursuant to the Oil Pollution Act have yet to be determined and implemented, and so the ultimate restoration impacts on the species are unknowable at this time.

During the response phase to the DWH oil spill (April 26 – October 20, 2010) a total of 1,146 sea turtles were recovered, either as strandings (dead or debilitated generally onshore or nearshore) or were collected offshore during sea turtle search and rescue operations (Table 2). Subsequent to the response phase a few sea turtles with visible evidence of oiling have been recovered as strandings. The available data on sea turtle strandings and response collections during the time of the spill are expected to represent a fraction (currently unknown) of the actual losses to the species, as most individuals likely were not recovered. The number of strandings does not provide insights into potential sub-lethal impacts that could reduce long-term survival or fecundity of individuals affected. However, it does provide some insight into the potential relative scope of the impact among the sea turtle species in the area.

Table 2. Sea Turtles Recovered in the DWH Spill Response Area (April 26 – October 20, 2010).

Turtle Species	Alive	Dead	Total
Green turtle (*Chelonia mydas*)	172	29	201
Hawksbill turtle (*Eretmochelys imbricata*)	16	0	16
Kemp's ridley turtle (*Lepidochelys kempii*)	328	481	809
Loggerhead turtle (*Caretta caretta*)	21	67	88
Unknown turtle species	0	32	32
Total	537	609	1146

(http://www.nmfs.noaa.gov/pr/health/oilspill/turtles.htm)

Another period of high stranding levels occurred in 2011, similar to that in 2010. Investigations, including necropsies, were undertaken by NMFS to attempt to determine the cause of those strandings. Based on the findings, the two primary considerations for the cause of death of the turtles that were necropsied are forced submergence or acute toxicosis. With regard to acute toxicosis, sea turtle tissue samples were tested for biotoxins of concern in the northern Gulf of Mexico. Environmental information did not indicate a harmful algal bloom of threat to marine animal health was present in the area. With regard to forced submergence, the only known plausible cause of forced submergence that could explain this event is incidental capture in fishing gear. NMFS has assembled information regarding fisheries operating in the area during and just prior to these strandings. While there is some indication that lack of compliance with existing TED regulations and the operations of other trawl fisheries that do not require TEDs may have occurred in the area at the time of the strandings, direct evidence that those events caused the unusual level of strandings is not available. More information on the stranding event, including number of strandings, locations, and species affected, can be found at http://www.nmfs.noaa.gov/pr/species/turtles/gulfofmexico.htm.

In addition to effects on subadult and adult sea turtles, the 2010 May through September sea turtle nesting season in the northern Gulf may also have been adversely affected by the DWH oil spill. Setting booms to protect beaches, cleanup activities, lights, people, and equipment all may have had unintended effects, such as preventing females from reaching nesting beaches and thereby reducing nesting in the northern Gulf. The spill could have also affected the emergence success of hatchlings from nests along the Gulf coast. In an attempt to reduce the loss of the 2010 northern Gulf cohort, many of nests were relocated to the east coast of Florida to reduce the risk to hatchlings. The survivorship and future nesting success of individuals from one nesting beach being transported to and released at another nesting beach is unknown.

4.2.1.6 ESA Section 10 Permits

Section 10(a)(1)(A) of the ESA allows the issuance of permits to capture/interact with ESA-listed species for the purposes of scientific research. Authorized activities range from photographing, weighing, and tagging protected species incidentally taken in fisheries, to blood sampling, tissue sampling (biopsy), and performing laparoscopy on intentionally-captured organisms. The number of authorized takes varies widely depending on the research and species involved, but may involve the taking of hundreds of individuals annually. Most captures/interactions authorized under these permits are nonlethal. Before any research permit is issued, the proposal must be reviewed under the permit regulations (i.e., must show a benefit to the species). In addition, issuance of research permits by NMFS must be reviewed for compliance with Section 7(a)(2) of the ESA to ensure that issuance of the permit is not likely to jeopardize the continued existence of affected species.

4.2.2 State or Private Actions

4.2.2.1 Vessel Traffic

Commercial vessel traffic and recreational boating pursuits can have adverse effects on sea turtles through propeller and boat strike damage. The extent of the impact on sea turtles in the action area is not known at this time.

4.2.2.2 State Fisheries

Recreational fishing from private vessels, private and public piers, and from shore does occur in the area. Observations of state recreational fisheries have shown that green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles are known to bite baited hooks, and loggerheads frequently ingest the hooks. Hooked turtles have been reported by the public fishing from boats, piers, beaches, banks, and jetties and from commercial fishermen fishing for reef fish and for sharks with both single rigs and bottom longlines (NMFS 2001b). Additionally, lost fishing gear such as line cut after snagging on rocks, or discarded hooks and line, can also pose an entanglement threat to sea turtles in the area. A detailed summary of the known impacts of hook-and-line incidental captures to loggerhead sea turtles can be found in the TEWG reports (1998; 2000).

Although few of these state regulated fisheries are currently authorized to incidentally capture or kill listed species, several state agencies have approached NMFS to discuss applications for a Section 10(a)(1)(B) incidental take permit. Since NMFS's issuance of a Section 10(a)(1)(B) permit requires formal consultation under Section 7 of the ESA, the effects of these activities are considered in Section 7 consultation. Any fisheries that come under a Section 10(a)(I)(B) permit in the future will likewise be subject to Section 7 consultation. Although the past and current effects of these fisheries on listed species are currently not determinable, based upon observations of sea turtles stranded as a result of recreational fishing activities (STSSN data provided by W. Teas, NMFS, pers. comm. to A. Brame, NMFS, April 22, 2011), NMFS believes that ongoing state fishing activities may be responsible for seasonally high levels of observed strandings of sea turtles on both the Atlantic and Gulf of Mexico coasts.

4.2.3 Other Potential Sources of Impacts in the Environmental Baseline

4.2.3.1 In-water Research

In Florida, in-water sea turtle research has increased in recent years, but no coordinated trend monitoring program exists for in-water populations. In other words, no centralized database exists that links in-water research with sea turtle injuries or mortalities. The cumulative impacts to sea turtles from multiple annual in-water research projects in the state of Florida is unknown.

4.2.3.2 Marine Debris and Acoustic Impacts

A number of activities that may indirectly affect listed species in the action area of this consultation include anthropogenic marine debris (e.g., plastic bags, balloons, tar balls, ghost fishing line, etc.) and acoustic impacts. The impacts to sea turtles from marine debris range from ingesting plastics when feeding to entanglements in discarded fishing line, ghost traps, and nets.

These effects are difficult to quantify since mortalities often go uncounted, especially in the case of entanglements. However, recent studies have begun to quantify the effects of plastics in the oceans to sea turtles (Wabnitz and Nichols 2010) and targeted research demonstrates that the volume and spatial coverage of plastics in the ocean environment is astounding (Law et al. 2010). Sea turtles are particularly prone to harm from feeding on anthropogenic marine debris (Balazs 1985; Carr 1987; Barreiros & Barcelos 2001). Sea turtles foraging on floating plastic bags they mistake for jellyfish represents an acute problem but ingestion of even very small plastic particles in small amounts can obstruct the oesophagus or perforate the bowel. Approximately 0.2 – 0.3 percent of plastics eventually migrate into the ocean through one pathway or another (Andrady & Neal 2009) and considering the large volume of plastics produced each year, this small percentage results in an enormous amount of plastics that wend their way into every trophic niche from plankton to whales. Sea turtles are particularly susceptible to these impacts due to their life cycles that increase their encounter rates with plastics when foraging resources and plastics converge together (e.g., juvenile pelagic foraging habits, large home range sizes, etc.). For instance, juvenile sea turtles (e.g., juvenile loggerheads and green turtles) in the pelagic life cycle will drift along the surface within large, floating mats of *Sargassum* and other seaweeds where floating plastics also concentrate by the same advection currents (Pichel et al. 2007; Wong et al. 1974). Fishing line ingestion is also an acute problem whereby sea turtles clog up their digestive tracts, tear their tracts apart, or slowly starve to death from plastics displacing surface area needed in the gut for energy absorption (Bjorndal *et al*. 1994).

Discarded fishing gear (e.g., fishing lines, drift nets) also presents significant impacts to sea turtles through entanglement (Bugoni *et al*. 2001). However, an unknown number of sea turtles killed by entanglement in disgarded (ghost) fishing gear are unrecoverable because they either remain ensnared in the gear or suffer lethal injuries upon freeing themselves and are then eaten by predators. Sea turtles stranding networks worldwide have recorded live and dead sea turtles washed ashore with gear entangled or lacerations from where they were previously entangled by fishing gear. Anthropogenic marine debris, whether ghost fishing gear, plastics, or other sources now poses a significant but as yet unquantifiable negative impact to sea turtle species when their life cycles intersect with these debris.

Although the ecological role of hearing in sea turtles is still nascent, we do know that sea turtles hear in the low frequency range of 100 to 1000 Hz with greatest sensitivity at 200 to 400 Hz (Southwood et al. 2008). Acoustic sources of impacts to sea turtles include vessel noise ranging from small recreation craft to the largest ships on the oceans to a suite or nearshore construction activities ranging from noise generated from dredging equipment, pipeline construction, piling driving associated with bridges and docks, and military in-water ordnance testing to name just a few. Because sea turtle species life cycles overlap with a broad range of marine habitats during hatchling, juvenile, and mature stages of development, sea turtles are exposed to myriad noises during their lifetime. Noise-related stress can alter sea turtle migratory pathways costing them increased energetic demand; noise below water and above the surface can impede sea turtles from egg deposition on beaches; and, high decibel, low frequency sounds from naval military operations can cause injurious effects to sea turtles. NMFS is working to better understand the impacts to sea turtles from noise associated with construction activities and the impacts to the specific life stage affected (i.e., hatchlings, juveniles, adults).

4.2.3.3 Marine Pollution

Sources of pollutants along the Gulf of Mexico and the Atlantic Ocean include atmospheric loading of pollutants such as polychlorinated biphenyls (PCBs), stormwater runoff from coastal towns into rivers and canals emptying into bays and the ocean, and groundwater and other discharges. Nutrient loading from land-based sources such as coastal community discharges is known to stimulate plankton blooms in closed or semi-closed estuarine systems. The effects on larger embayments are unknown. Although pathological effects of oil spills have been documented in laboratory studies of marine mammals and sea turtles (Vargo et al. 1986), the impacts of many other anthropogenic toxins have not been investigated.

Coastal runoff, marina and dock construction, dredging, aquaculture, oil and gas exploration and extraction, and pollution from vessel operations can degrade marine habitats used by sea turtles. The development of marinas and docks in inshore waters can negatively impact nearshore habitats. An increase in the number of docks built increases boat and vessel traffic. Fueling facilities at marinas can sometimes discharge oil, gas, and sewage into sensitive estuarine and coastal habitats. Although these contaminant concentrations do not likely affect the more pelagic waters, sea turtles analyzed in this biological opinion travel between nearshore and offshore habitats and may be exposed to and accumulate these contaminants during their life cycles.

4.2.4 Conservation and Recovery Actions Shaping the Environmental Baseline

NMFS has implemented a series of regulations aimed at reducing potential for incidental mortality of sea turtles from commercial fisheries in the action area. These include sea turtle release gear requirements for Atlantic Highly Migratory Species fisheries and TED requirements for the southeastern shrimp trawl fisheries. These regulations have relieved some of the pressure on sea turtle populations.

Actions have been taken to reduce anthropogenic impacts to sea turtles from various sources, particularly since the early 1990s. These include lighting ordinances, predation control, and nest relocations to help increase hatchling survival, as well as measures to reduce the mortality of pelagic immatures, benthic immatures, and sexually mature age classes from various fisheries and other marine activities. Recent actions have taken significant steps towards reducing the recurring sources of mortality of sea turtles in the environmental baseline and improving the status of all sea turtle subpopulations. For example, the Turtle Excluder Device (TED) regulation published on February 21, 2003 (68 FR 8456), represents a significant improvement in the baseline effects of trawl fisheries on loggerhead sea turtles, though shrimp trawling is still considered to be one of the largest source of anthropogenic mortality on loggerheads (NMFS-SEFSC 2009d).

Under Section 6 of the ESA, NMFS may enter into cooperative research and conservation agreements with states to assist in recovery actions of listed species. NMFS has such an agreement with the state of Florida. Prior to issuance of these agreements, the proposal must be reviewed for compliance with Section 7 of the ESA.

4.2.4.1 Outreach and Education, Sea Turtle Entanglements, and Rehabilitation

NMFS and cooperating states have established an extensive network of (STSSN) participants along the Atlantic coast that collects data on dead sea turtles, and also rescues and rehabilitates any live stranded sea turtles.

4.2.4.2 Sea Turtle Handling and Resuscitation Techniques

NMFS published a final rule (66 FR 67495, December 31, 2001) detailing handling and resuscitation techniques for sea turtles that are incidentally caught during scientific research or fishing activities. Persons participating in fishing activities or scientific research are required to handle and resuscitate (as necessary) sea turtles as prescribed in the final rule. These measures help to prevent mortality of hard-shelled turtles caught in fishing or scientific research gear.

A final rule (70 FR 42508) published on July 25, 2005, allows any agent or employee of NMFS, the USFWS, the U.S. Coast Guard, or any other federal land or water management agency, or any agent or employee of a state agency responsible for fish and wildlife, when acting in the course of his or her official duties, to take endangered sea turtles encountered in the marine environment if such taking is necessary to aid a sick, injured, or entangled endangered sea turtle, or dispose of a dead endangered sea turtle, or salvage a dead endangered sea turtle that may be useful for scientific or educational purposes. NMFS already affords the same protection to sea turtles listed as threatened under the ESA [50 CFR 223.206(b)].

On August 3, 2007, NMFS published a final rule requiring selected fishing vessels to carry observers on board to collect data on sea turtle interactions with fishing operations, to evaluate existing measures to reduce sea turtle takes, and to determine whether additional measures to address prohibited sea turtle takes may be necessary (72 FR 43176). This rule also extended from 30 to 180 days, the maximum period NMFS observers may be placed on vessels in response to a determination by the Assistant Administrator that the unauthorized take of sea turtles may be likely to jeopardize their continued existence under existing regulations,.

4.2.4.3 Other Actions

A revised recovery plan for the loggerhead sea turtle was completed December 8, 2008 (NMFS and USFWS 2008). An updated bi-national recovery plan for the Kemp's ridley sea turtle was completed in 2011 (NMFS et al. 2011). Recovery teams comprised of sea turtle experts have been convened and are currently working towards revising other plans based upon the latest and best available information. Five-year status reviews have recently been completed for green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles. These reviews were conducted to comply with the ESA mandate for periodic evaluation of listed species to ensure that their threatened or endangered listing status remains accurate. Each review determined that no delisting or reclassification of a species status (i.e., threatened or endangered) was warranted at the time. However, further review of species data for the green, hawksbill, leatherback, and loggerhead sea turtles was recommended, to evaluate whether distinct population segments

(DPS) should be established for these species (NMFS and USFWS 2007a; NMFS and USFWS 2007b; NMFS and USFWS 2007c; NMFS and USFWS 2007d; NMFS and USFWS 2007e). The Services published a final rule on September 22, 2011, listing loggerhead sea turtles as separate DPSs.

4.2.5 Summary and Synthesis of Environmental Baseline

In summary, several factors adversely affect sea turtles in the action area. These factors are ongoing and are expected to occur contemporaneously with the proposed action. Fisheries in the action area likely had the greatest adverse impacts on sea turtles in the mid to late 80's, when effort in most fisheries was near or at peak levels. With the decline of the health of managed species, effort since that time has generally been declining. Over the past five years, the impacts to turtles associated with fisheries have also been reduced through the Section 7 consultation process and regulations implementing effective bycatch reduction strategies. However, interactions with commercial and recreational fishing gear are still ongoing and are expected to occur contemporaneously with the proposed action. Other environmental impacts including effects of commercial vessel operations, dredging, permits allowing take under the ESA, recreational vessel traffic, and marine pollution have also had and continue to have adverse effects on sea turtles in the action area in the past.

5. Effects of the Action

Effects of the action include the direct and indirect effects of an action on the species, together with the effects of other activities that are interrelated or interdependent with the action that will be added to the baseline. Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

The full scope of effects of the project results from BOEM's proposed action and all activities that are interdependent and interrelated to the proposed action. Therefore, effects must be evaluated from dredging of sand from sources located in federal waters, and precautionary sea turtle relocation trawling in federal waters, and sand deposition along Collier County. These actions are analyzed individually and additively in the following paragraphs.

5.1 Dredging in Federal Waters (Hopper Dredge)

Sand will be excavated from Borrow Area T1 located 33 miles offshore from Vanderbilt Beach in federal waters and a pipeline will disperse the sand along the seven-mile restoration area. The action area ranges from the immediate offshore area of R-70 adjacent to Naples Beach north to R-22 adjacent to Vanderbilt Beach seaward from the northern-most renourishment site to the T1 borrow site 33 miles offshore from Vanderbilt beach (Figure 3). This area will encompass all areas expected to be impacted directly or indirectly by the proposed project. It is anticipated that one to two medium-sized hopper dredges will be utilized for offshore dredging, resulting in up to seven round-trips from the borrow area to the pipeline per day. Three previously used permitted pipeline corridors for a 2006 renourishment may be utilized for the proposed project. Construction is expected to commence no sooner than September 2013 and to be completed by the end of May 2014 and will last approximately 120 days (working 24 hours per day, 7 days a week).

As discussed above, hopper dredges have been documented as capturing, injuring, and killing sea turtles. Hopper dredges move relatively rapidly compared to sea turtle swimming speeds of 1 to 1.5 mph for sea turtles other than leatherbacks [1.5-5.8 mph] and can entrain and kill sea turtles as the drag arm of the moving dredge overtakes the slower moving sea turtle, or a turtle that is resting on the bottom. During hopper dredging operations, protected species observers will live aboard the dredge, monitoring every dredge haul 24 hours a day, for evidence of dredge related impacts to protected species, particularly sea turtles. Additionally, rigid turtle deflectors will be installed on the dredge's two dragheads before work begins and all points of inflow will be screened. Cages will be attached to the ends of discharge pipes, be constructed of steel bar-stock, and welded in a grid pattern with openings approximately 4-in x 4-in. Observers will clean and inspect these screens intermittently throughout all operational hours to document any evidence of sea turtle interactions by looking for sea turtle body parts. Observers will also maintain a bridge watch for protected species and keep a logbook noting the date, time, location, species, number of animals, distance and bearing from dredge, direction of travel, and other information, for all sightings. During all phases of dredging operations, the dredge and crew will be required to adhere to NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions*.

NMFS determined that dredged material screening is only partially effective, and observed interactions likely provide only partial estimates of total sea turtle mortality. NMFS believes that some turtles killed by hopper dredges go undetected because body parts are forced through the sampling screens by water pressure and are buried in the dredged material, or animals are crushed or killed but their bodies or body parts are not entrained by the suction and so the interactions may go unnoticed. Mortalities are only noticed and documented when body parts float, are large enough to be caught in the screens, and can be identified as sea turtle parts. Body parts that are forced through the 4-in (or greater) inflow screens by the suction-pump pressure and that do not float are very unlikely to be observed, since they will sink to the bottom of the hopper and not be detected by the overflow screening. Thus, observed interactions may under-represent actual lethal interactions because it is not known how many turtles are killed but unobserved. NMFS estimated in the GRBO that up to one out of two impacted turtles may go undetected (i.e., that observed interactions constitute only about 50 percent of total takes). We will apply this conservative analysis in the present opinion, since we have no new information that would change the basis of that previous conclusion and estimate.

NMFS wrote a Section 7 letter of concurrence in 2004 (I/SER/2004/00233) for the most recent previous renourishment for Collier County beaches, performed in 2006. The 2006 renourishment placed approximately 668,000 cy of sand from offshore Borrow Area T1 and 53,600 cy of sand from ongoing inlet maintenance at Doctors Pass onto the shoreline. No sea turtles were taken during the previous renourishment. At the time, by USACE understanding with BOEM and NMFS, any potential sea turtle takes were covered by the 2003 GRBO and would have counted against the GRBO's annual ITS for the USACE's Jacksonville District.

However, since then, the USACE has decided that it does not have the legal authority to cover (under the GRBO) sea turtle takes occurring outside of state waters, and will no longer count sea turtle takes that occur in federal waters (e.g., those occurring during BOEM-authorized sand mining) toward the USACE's Gulf-wide hopper dredging ITS. Those actions warrant a separate ITS authorized through a separate Section 7 biological opinion which must be issued by NMFS.

5.2 Dredge Vessel Collisions with Sea Turtles

NMFS believes that the possibility that the hopper dredge itself will collide with and injure or kill sea turtles during dredging and/or sand pumpout operations is discountable, given the vessel's slow speed, the mobility of these species, and anticipated avoidance behavior by sea turtles. This is different from the possibility of the drag arm killing or injuring sea turtles during dredging. The likelihood of the hopper dredge colliding with sea turtles while moving at a maximum speed typically of 5 knots during dredge-related operations is discountable because sea turtles have ample time to avoid large, slow-moving vessels such as dredges. NMFS has not received any reports of hopper dredge strikes on sea turtle while dredges are in transit.

5.3 Sand Placement

Sand mined from federal waters will be pumped into the nearshore waters adjacent to four sections of shoreline that are proposed for renourishment: (1) Vanderbilt Beach (R-22+300 to R-30+500); (2) Park Shore (R-43+500 to R-54+400); (3) Naples Beach (R-58A-480 to R-79); and (4) Pelican Bay (R-43+500 to R-37). NMFS believes this activity is not likely to adversely affect sea turtles because these species are unlikely to be in the very shallow, nearshore construction area where sand is being deposited, except during nesting season. Also, there are very limited nearshore hardbottom areas (i.e., areas of rock or consolidated sediments that potentially serve as foraging/sheltering habitat for sea turtles) near to the renourishment sites. Hardbottom resources in the project area were monitored annually from 2003-2009 during pre- and post-construction of the 2006 renourishment project. Monitoring revealed a community dominated by turf and macroalgae species. The macroalgae community primarily consisted of *Gracilaria*, *Hypnea*, *Caulerpa*, and *Botrycladia* species; *Jania* and *Sargassum* were also observed. Tunicates and sponges dominated the invertebrate community. Coral cover in the nearshore benthic community was generally less than 1 percent. *Leptogorgia* spp. were the primary octocoral species encountered; the stony coral community included *Siderastrea siderea*, *Solenastrea* spp., *Phyllangia americana*, *Oculina robusta*, and *Cladocora arbuscula*. The average size of stony coral colonies in the nearshore habitat was small (<5cm). The 2006 renourishment event post-construction monitoring revealed that, in general, the GRBO's required standard 400-ft buffer zones between borrow areas and hardbottom resources greatly reduced the potential for negative impacts to occur due to increased turbidity and sedimentation.

Collier County constructed 1.09 acres of artificial reef as required mitigation for what the Florida Department of Environmental Protection anticipated would be 1.09 acres of impact to the nearshore natural hardbottom described above. These reef installations were monitored simultaneously with the nearshore hardbottom in conjunction with the 2006 renourishment.

Results of monitoring[8] did not show any project impacts to the nearby hardbottom resources. Therefore, the performance of the beach nourishment estimated by the previous toe of fill analysis exceeded expectations. Additionally, although Tropical Storms Fay and Debby which occurred in June 2012 caused shoreline erosion significant enough to warrant the current proposed beach nourishment, the sediment transport from those tropical storm events did not affect hardbottom resources. Therefore, NMFS anticipates that the previous hardbottom mitigation will ostensibly cover the proposed renourishment. In other words, the toe of fill analysis for the previous renourishment adequately protected nearshore hardbottom resources and should be adequate for the proposed renourishment as well.

The majority of the project will be conducted outside of sea turtle nesting season. Dredge-and-fill activities will be restricted to September 15 through May 31, to avoid sea turtle peak nesting season. In doing so, the likelihood that sea turtles will be using the nearshore hardbottom areas is reduced. Also, there will be less likelihood of nesting sea turtles transiting through the T1 Borrow Area en route to nesting beaches. NMFS's *Sea Turtle and Smalltooth Sawfish Construction Guidelines* will also be implemented as a condition of the USACE-issued regulatory permit, which will protect turtles in the marine environment as they approach and depart the nesting beach.

5.4 Relocation Trawling

The applicant will be required to conduct relocation trawling beginning 24 hours in advance of any hopper dredging at the borrow site and continue during. Capture relocation trawling is used to capture sea turtles that may be in the dredge's path and relocate them away from the action area. By reducing the sea turtle density immediately in front of the dredge's suction dragheads, the potential for draghead-turtle interactions is reduced. NMFS believes, as explained in detail below, that properly conducted and supervised relocation trawling (i.e., observing NMFS-recommended trawl speed, low tow-time limits, and taking adequate precautions to release captured animals) and tagging is unlikely to result in adverse effects (i.e., injury or death) to sea turtles. As discussed below, NMFS estimates that, overall, sea turtle trawling and relocation efforts will result in considerably less than 0.5 percent mortality of captured turtles, with any mortalities that do occur being primarily due to the turtles being previously stressed or diseased or struck by trawl doors or suffering accidents on deck during retrieval and handling. On the other hand, hopper dredge entrainments invariably result in injury, and are almost always fatal.

Even though relocation trawling involves the direct capture and collection of sea turtles, it has been determined to constitute a legitimate RPM in past NMFS biological opinions on hopper dredging because it reduces the level of almost certain injury and mortality of sea turtles by hopper dredges, and it allows the sea turtles captured non-injuriously by trawl to be relocated out of the path of the dredges. The Consultation Handbook (for Procedures for Conducting Consultation and Conference Activities under Section 7 of the Endangered Species Act, U.S.

[8] Dr. Jennifer Culbertson (BOEM) pers. comm. with Joe Cavanaugh (NMFS PRD) on April 1, 2013; post-construction monitoring completed by Coastal Planning & Engineering, Inc.

Fish and Wildlife Service and National Marine Fisheries Service, March 1998) expressly authorizes such directed interactions as an RPM at page 4-54.

The relocation trawler typically pulls two standard (60-foot headrope) shrimp trawl nets, as close as safely possible in front of the advancing hopper dredge, as shown in the photograph below (photo credits: C. Slay, Coastwise Consulting, 2013).

Figure 14: Relocation trawling in front of hopper dredges.

The trawler also continues sweeping the area to be dredged (channels or borrow areas) even while the hopper dredge is not actively dredging, e.g., while it is en route to pipelines or disposal areas. Relocation trawling has been successful at temporarily displacing Kemp's ridley, loggerhead, hawksbill, and green sea turtles from channels in the Atlantic Ocean and Gulf of Mexico during periods when hopper dredging was imminent or ongoing (Dickerson et al. 2007). Historically, relocation trawling has been used to reduce turtle interactions with the dredge by capturing the turtle in a modified shrimp net, bringing it onboard the trawler, and transporting it approximately 3-5 miles from the dredging site where it is released into the ocean. Dickerson et al. (2007) analyzed historical data for USACE dredging projects in the Atlantic Ocean and Gulf of Mexico and concluded that relocation trawling is effective at reducing the rate of sea turtle entrainment by hopper dredges. Dickerson et al. (2007) also found that the effectiveness of relocation trawling was increased (1) when the trawling was initiated at the beginning or early in the project, and (2) by the intensity of trawling effort (i.e., more time trawling per hour). Dickerson noted that when a relocation trawler is used–whether or not turtles are actually captured–the incidence of lethal sea turtle take by hopper dredges decreases. Dickerson concluded that the action of the trawl gear on the bottom results in stimulating turtles off the bottom and into the water column, where they are no longer likely to be impacted by the suction draghead of a hopper dredge.[9] The effects of relocation trawling on sea turtles will be further discussed below.

[9] As a result, some relocation trawling projects are now conducted with open nets, where the turtles simply pass through the open net (the cod end has been removed), the nets are retrieved far less frequently, and no on-deck handling of sea turtles is required. This type of trawling is called non-capture relocation trawling or sweep trawling.

5.5 Relocation Trawling: Effects of Trawl Capture and Tow Times on Sea Turtles

The effects of capture and handling on sea turtles during relocation trawling can result in elevated levels of stressor hormones and tagging procedures can cause some discomfort. Based on past observations obtained during similar research-trawling for turtles, these effects are expected to dissipate within a day (Stabenau and Vietti 1999). However, the Commission on Life Sciences (1990) reported the proportion of sea turtles caught in nets that are dead or comatose increased with an increase in tow time from 0 percent during the first 50 minutes to about 70 percent after 90 minutes. The NRC report “Decline of the Sea Turtles: Causes and Prevention” (NRC 1990) suggested that limiting tow durations to 40 minutes in summer and 60 minutes in winter would yield sea turtle survival rates that approximate those required for the approval of new TED designs, i.e., 97 percent. The NRC report also concluded that mortality of turtles caught in shrimp trawls increases markedly for tow times greater than 60 minutes. Current NMFS TED regulations allow, under very specific circumstances, for shrimpers with no mechanical-advantage trawl retrieval devices on board, to be exempt from TED requirements if they limit tow times to 55 minutes during April through October and 75 minutes from November through March. The presumption is that these tow time limits will result in turtle survivability comparable to having TEDs installed. Because turtles can drown from prolonged, forced submergence, current NMFS SER opinions limit tow times for relocation trawling to 42 minutes or less, measured from the time the trawl doors enter the water when setting the net to the time the trawl doors exit the water during haulback (“doors in–doors out”). This equates to approximately 30 minutes of bottom-trawling time.

The USACE’s current hopper dredging/relocation trawling protocol limits capture-trawling relocation tow times to 30 minutes or less, doors in to doors out. Overall, the significantly reduced tow times used by relocation trawling contractors, compared to those used during the 1998 studies on the effects of unrestricted, 55-minute, and 75-minute tow times, lead NMFS to conclude that current relocation trawling mortalities occur (and will continue to occur) at a consistently low rate under 0.5 percent of turtles captured. Recent relocation trawling data bears this out strikingly: from October 1, 2006, to February 28, 2013, USACE dredging projects relocated 1,359 turtles in the Gulf of Mexico and South Atlantic, and there were only 5 documented mortalities during those relocation events, or 0.4 percent overall (USACE Sea Turtle Data Warehouse, queried March 20, 2013).

Since 1991, the USACE has documented more than 65 hopper-dredging projects in the South Atlantic and Gulf of Mexico where a trawler was used as part of the project, consisting of thousands of individual tows of relocation trawling nets. In addition, the USACE has also conducted or permitted abundance assessments and/or project-specific relocation trawling of sea turtles in navigation channels and sand borrow areas in the Southeast and Gulf of Mexico using commercial shrimp vessels equipped with otter trawls (Sea Turtle Warehouse Data; D. Dickerson 2007). While usually very safe, even properly conducted relocation trawling can result in accidental sea turtle deaths. Entanglements in trawl gear, strikes by trawl doors, and forced submergence as a sea turtle is near breath holding limits can all lead to a lethal take in relocation trawling. However, past relocation trawling data shows that lethal takes are relatively rare, isolated incidents. The benefits of relocation trawling on the other hand outweigh the relatively small chance of a lethal take in that these trawls reduce the number of sea turtles that interact with the hopper dredge where the outcome is almost always lethal.

5.6 Past Relocation Trawling: Turtle Captures by Species and Locations

From October 1, 2005, through September 30, 2011 (i.e., fiscal years 2006-2011), 1,251 sea turtle captures were made by relocation trawlers associated with hopper dredging projects. The majority (1,180) occurred in the Gulf of Mexico, while 71 occurred in the South Atlantic (USACE Sea Turtle Data Warehouse, October 3, 2012. The number and species of sea turtles collected or captured by trawlers in association with hopper dredging projects varies considerably by project area, amount of effort, and time of year. Additionally, sea turtle distribution can be very patchy, resulting in significant differences in number of turtle captures by relocation trawler, and in some areas, one or two species may dominate the captures. For example, Canaveral, Florida, is known for its abundance of loggerhead and green turtles; Calcasieu, Louisiana, and Gulfport, Mississippi, for their almost exclusive capture of Kemp's ridleys; Brunswick, Georgia, and Mississippi-River Gulf Outlet, Louisiana, captures are predominantly loggerheads (E. Hawk, NMFS, pers. comm. to Joe Cavanaugh, NMFS, May 6, 2013). During the previous renourishment for Collier County, 99 percent of the captures were loggerheads (86 loggerheads and one green were captured).

5.7 Relocation Trawling: Effects of Recapture

Some sea turtles captured during relocation trawling operations return to the dredge site and subsequently are recaptured. The relocation trawl data available over the past 10-year period (2003-2012) indicate two things: (1) that sea turtle recaptures during relocation trawling are infrequent to rare occurrences; (2) when these recaptures do occur it is extremely rare that they result in mortalities. Since 2003 for the Jacksonville USACE hopper dredging projects, 21 out of 78 total hopper dredge projects used relocation trawling. A combined 662 total sea turtles were captured in relocation trawls and only 24 sea turtles were subsequently recaptured (3.6 percent recapture rate). These 24 sea turtles were recaptured from just two of the 21 projects. Only one fatality was recorded on a separate project where 119 sea turtles were relocated. It should be noted that post-release mortalities are not known but thought to be rare based on sea turtles tagged during relocation trawling efforts and subsequently picked up in stranding data as mortalities attributable to relocation trawl-induced deaths[10]. However, a small number of sea turtles that have injuries sustained prior to or during trawling are removed to sea turtle rehabilitation centers for recovery. Past observations obtained for directed research-trawling effects to sea turtles indicate that capture effects from relocation trawling are expected to dissipate within a day (Stabenau and Vietti 1999). In other words, it is expected that sea turtles recover within a day from the effects of being trawled. Since sea turtle recaptures are rare, and recaptures that do occur typically happen several days to weeks after initial capture, cumulative adverse effects of recapture are not expected. Based on past projects' relocation trawling recapture data indicated above, and the recaptures recorded in the previous Collier County

[10] A small number of sea turtles may be removed from the relocation trawls depending on their condition when trawled to rehabilitiation centers. Two sea turtles were transported from trawls to rehabilitation centers in the 21 projects for the Jacksonville District (2003-2013 [as of April 2013]).

renourishment where 14 of 87 trawled sea turtles were recaptured, NMFS expects the potential for recapture of sea turtles during this project will have insignificant adverse effects on them. The previous Collier County beach renourishment (2006) did have a 16 percent recapture rate and several factors may have accounted for this higher than average recapture rate. The distance sea turtles are relocated from the area where captured (minimum of 3 nm under the GRBO), the presence/absence of foraging resources in the area, the potential for migratory routes being intersected, and the time of year the action takes place are all factors that can affect the likelihood of recaptures.

5.8 Estimates of Lethal and Non-Injurious Project Effects from Dredging and Relocation Trawling on Sea Turtles from the Proposed Action

Hopper Dredge Effects from the Proposed Action
In this section we determine the number of turtles that may be killed (by hopper dredging and/or relocation trawling) and the number of turtles that may be taken, nonlethally, by the act of capturing and relocating them during relocation trawling. This is necessary for our jeopardy analysis and developing our Incidental Take Statement. We will begin our analysis with an estimate of the number of turtles that may be killed by hopper dredging, using the 2006 Collier County Beach renourishment project as a proxy to estimate take from the proposed action. Borrow Area T1 and approximately the same beach areas will be used for the current proposed action. The USACE posted the reported sea turtle takes from the 2006 Collier County project on their Sea Turtle Data Warehouse web site. They reported no sea turtle takes from this renourishment in the 173 days combined for two hopper dredges operating to complete the project (http://el.erdc.usace.army.mil/seaturtles/project.cfm?Id=421&Code=Project).

The total number of cubic yards dredged during the Collier County 2006 renourishment project was 668,000 cy, 153,000 cy more than estimated for the current project ([2006 nourishment] 668,000-515,000 [current project]), and no sea turtles were killed by the two hopper dredges. The hopper dredge *Sugar Island* was on site from the beginning of the project on February 20, 2006, to the end of the project, May 22, 2006, a total of 91 days. The *Manhattan Island* was on site from March 1, 2006 to May 21, 2006, for a total of 82 days. Over the course of these combined 173 days between the two dredges, no evidence of turtle take by either dredge was documented; this is significant when dredge effort is figured at 173 "dredge days," based on the operation of both dredges.

The amount of fill needed for the current renourishment to bring the historic project areas back to design standard with a six-year design life is less than was placed in 2006, i.e., the current proposal is for a total of 515,000 cy of fill for the four renourishment sites combined over a projected 120 days of dredging using one or two hopper dredges.

NMFS also reviewed another dredge/renourishment project approximately 100 miles north of the Collier County renourishment sites for the Longboat Key renourishment completed in 2011. Over the course of 90 days of dredging, 139,867 cy of material has been dredged for the Longboat Key renourishment. During that time, 25 sea turtles were relocated, 22 loggerheads, 2 Kemp's ridley, and one green sea turtle. No sea turtles were taken by the hopper dredge. (A discussion of observed vs. unobserved takes follows later in the sub-section titled Summary of Estimated Sea Turtle Lethal Interactions by Dredge and Trawler.)

The proposed action would dredge approximately 515,000 cubic yards of material from Borrow Area T1. Since no sea turtles were taken during the previous renourishment at Collier County beaches, NMFS cannot calculate incidental take from dredge operations based on the average take per cubic yard calculations we typically use in these instances. NMFS believes that the high numbers of sea turtles (loggerheads) caught in the relocation trawls for the previous BOEM Collier County beach nourishment project (2006) increases the likelihood that over the course of the proposed renourishment in the same area(s) a few loggerheads may get caught in the dredge; therefore we should (conservatively) anticipate some level of sea turtles that will be *observed* killed. However, because of the inherent variability in effects among different dredging projects; the imprecision in our estimates of year-to-year variations in offshore sea turtle species densities; stochastic events; and the relatively few number of previous projects (i.e., small sample size) from which to draw comparisons and calculate an average take number, we are hesitant to rely entirely or too heavily on averages derived from previous projects near to or in the same area as the Collier County renourishment. Seasonality of dredge operations between different projects is certainly a determinant in sea turtle mortalities and interannual variation in seawater temperatures as well. In addition to these inherent uncertainties, there have been recent documented increases in populations of some sea turtle species. For example, we know that green and Kemp's ridley populations have greatly increased in the last decade (refer to graphs in Sections 3.2.1 and 3.2.3 above) and juveniles and subadults are being seen with increasing frequency in Florida coastal waters. Also see Figure 15 below showing an increasing trend in Kemp's ridley strandings during the last 5-year period for Zones 1-10 along the Florida Gulf coast as reported by the SSTSN.

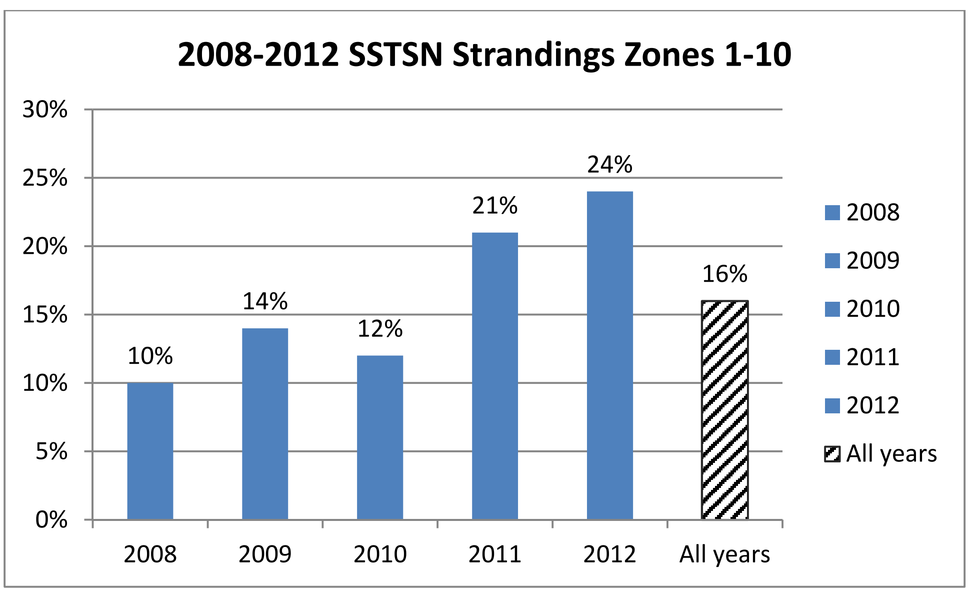


Figure 15: Kemp's ridley sea turtle strandings over the last 5-yr period along the Florida Gulf coast; Kemp's stranding increases likely represent increased abundance of this species in the eastern Gulf of Mexico.

From 1996 through 2012, 18 sea turtle mortalities were reported by hopper dredge observers monitoring Florida east Gulf coast hopper dredging projects, 13 projects in total (13,509,299 cy dredged). Of these 18 sea turtle mortalities, there were 13 loggerheads, 3 Kemp's ridleys, and 1 green sea turtle. However, to be conservative, we believe it is prudent to expect higher total lethal takes for Kemp's ridleys than previously observed for Florida Gulf coast dredging projects. Although there were no lethal takes on the previous Collier County renourishment project, there were 87 nonlethal takes in the relocation trawls. NMFS therefore believes a conservative estimate of observed sea turtle takes for the proposed action is 2 observed lethal takes by the hopper dredge observers. Based on the aforementioned estimate of 50 percent detection rate (Section 5.1); it is likely that two additional unobserved turtles will also be lethally taken. Therefore, we expect that 2 of these 4 total turtles will be observed and documented by onboard protected species observers in federal waters and 2 additional turtles will be taken unobserved by dredge personnel or observers. Also given the heavily weighted loggerhead takes for the region (72 percent of dredge takes for eastern Gulf coast of Florida and 99 percent of nonlethal trawl takes for the previous Collier County[2006] renourishment), NMFS anticipates that 75 percent of lethal takes resulting from hopper dredging will be loggerhead turtles, or 3 out of 4 (total: observed plus unobserved) lethal takes. Given the increases in Kemp's ridley sea turtles regionally and in the project area, NMFS anticipates the remaining 25 percent, or 1 sea turtle, will be a Kemp's ridley turtle. Green sea turtles account for only 5 percent (1 individual) of lethal takes by hopper dredge for all projects over the previous 17-year period for the eastern Gulf coast of Florida. This species is much less likely to be taken by hopper dredges where projects are not located near foraging areas (seagrass beds) or between foraging areas and nesting beaches. The proposed borrow site and beach nourishment sites have neither foraging or nesting sites for green sea turtles. Therefore, NMFS anticipates that it is more likely that a Kemp's ridley sea turtle would be killed by hopper dredging on Borrow Area T1 than a green turtle because of Kemp's life history data, distribution, and increasing population numbers along the Florida eastern Gulf coast. Because we expect that 75 percent of the lethal take (3 out of 4 turtles) will be loggerhead but anticipate one could be a Kemp's ridley sea turtle, a Kemp's ridley may be lethally taken along with a loggerhead; therefore either 2 loggerheads, or 1 loggerhead and 1 Kemp's ridley, may be lethally taken (observed) in the proposed action.

Relocation Trawl Effects from the Proposed Action

In addition to lethal interactions by hopper dredge, we believe the proposed action has the potential to capture numerous sea turtles by relocation trawling. In general, we believe that the majority of sea turtles affected by relocation trawling will not be injured or killed. As discussed earlier in this opinion, NMFS believes that properly conducted and supervised relocation trawling (i.e., observing NMFS-approved trawl speed and tow-time limits, using proper procedures for sea turtle tagging, and taking adequate precautions to release captured animals) is unlikely to result in injury to or death to trawl-captured sea turtles.

As noted previously in this section, relocation trawling conducted in association with hopper dredging on the previous Collier County renourishment (2006) resulted in large numbers of loggerhead (86 loggerhead, 1 green sea turtle) captures over the entire 103 days of trawling. Collier County relocation trawl data in addition to STSSN stranding data mentioned earlier and nesting data, in combination, indicate that loggerhead sea turtles are the most likely species that will be encountered by relocation trawling associated with the proposed action.

Relocation trawling associated with dredging projects in the region occurred in 4 out of 14 total projects (1996-2013[through Feb 2013]) for the Gulf Region – East Gulf Sub Region according to the USACE Sea Turtle Data Warehouse (http://el.erdc.usace.army.mil/seaturtles/info.cfm?Type=Region&Code=Gulf&Sub=EG). In those four projects that had relocation trawling, not including the previous Collier County project, 83 percent of the combined total 84 sea turtles captured were loggerheads, 15 percent Kemp's ridleys, and 2 percent greens. If we combine the previous Collier County renourishment with the other 4 projects that had relocation trawling, the percentage of loggerhead turtles captured increases to 91 percent (156 loggerheads/171 total trawled over 5 projects), and Kemp's ridleys drop to 7 percent of the total, and greens drop to just 1 percent of the total captured in relocation trawls (Figure 16). No hawksbills or leatherback sea turtles were captured as part of relocation trawls for the USACE sub-region nearest the action area and no mortalities were recorded from any of the relocation trawl captures. These data indicate that loggerhead sea turtles are the most likely sea turtle that will be encountered in relocation trawling associated with the proposed renourishment.

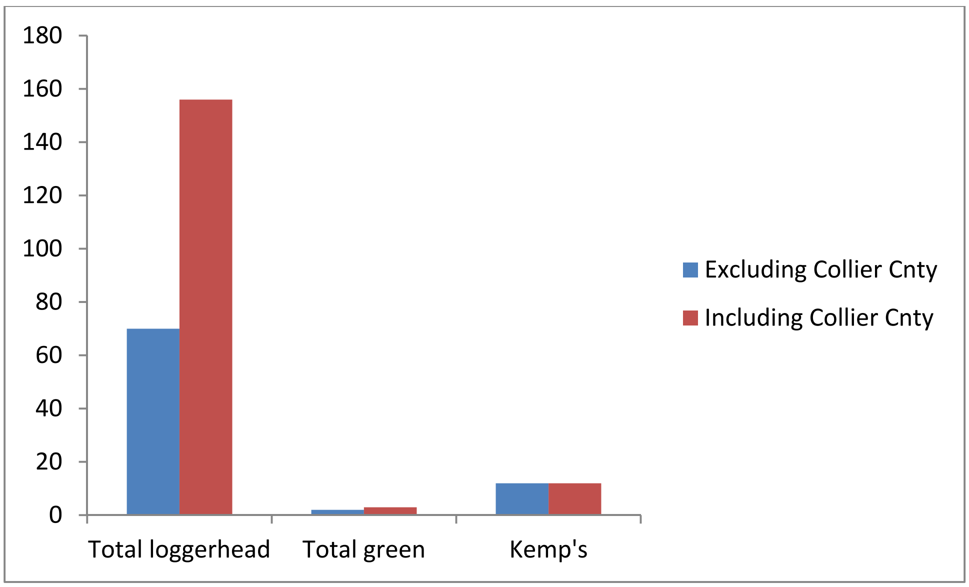


Figure 16: Sea turtles captured in relocation trawls for all 5 hopper dredge projects nearest the proposed action site (1996-2013). Loggerheads accounted for 91% of total captures in relocation trawls.

Three of the 14 projects discussed above also had associated pre-dredge trawling and there were 3 loggerhead, 3 Kemp's ridley, and 1 green sea turtle captured between those three projects, with no relocation mortalities. The GRBO authorizes up to two sea turtles may be lethally taken during relocation trawling for all projects under its jurisdiction annually. In general, takes of sea turtles during relocation trawling are not anticipated in projects that adhere to the relocation trawl guidelines (e.g., short trawl times, etc.). As mentioned earlier, in 21 total hopper dredge projects using relocation trawling (Jacksonville USACE District) from 2003 to 2013 (April), only 1 sea turtle was lethally taken in those trawls.

5.9 Trawl Capture Estimation Method

NMFS estimates, based on 103 days of previous relocation trawling in federal waters which resulted in 87 turtle captures in 2006 (i.e., per trawl day capture rate of 0.835 turtle) that directed relocation trawling interactions in federal waters will result in 100.2 (“100”) trawl captures over the projected 120 days for the proposed action. NMFS estimates, based on STSSN species Gulfwide strandings composition data (Figure 9 [41% loggerhead, 40% green, 16% Kemp’s]), that the 100 trawl captures may consist of 41loggerheads, 40 greens, and 16 Kemp’s ridleys based solely on the stranding data. However, because the previous renourishment using the same borrow site in 2006 captured 99 percent loggerheads (86/87) and one green sea turtle, inflating the percentage of loggerhead sea turtles is a prudent choice. Also, given the increasing trend of Kemp’s ridleys in the area (Figure11), we adjust their percentage of captures accordingly. Given these three sets of data and the absence of any other localized data that might suggest otherwise, NMFS anticipates that 75 percent of the 100 sea turtles captured during relocation trawling will be loggerheads, 15 percent greens, and 10 percent Kemp’s ridley. This means that 75 loggerheads, 15 greens, and 10 Kemp’s ridley sea turtles may be trawled nonlethally during relocation efforts accompanying dredging operations. Because there is no green sea turtle foraging areas within Borrow Area T1, if a green turtle is encountered, this encounter will more than likely occur with the relocation trawl rather than the dredge assuming any greens in the area would be transiting through and therefore off the bottom habitat where the hopper dredge dragheads operate. Relocation trawls are more likely to capture a sea turtle swimming off the bottom. Therefore, we expect that if green turtles are in the Borrow Site T1 area, encounter rates will be much higher for the relocation trawler than the hopper dredge dragheads.

Based on a 0.5 percent estimate of trawl-related sea turtle mortality (as previously discussed in *Total Impact of Relocation Trawling on Sea Turtles* section), we would estimate 0.5 turtle mortality associated with 100 trawl captures (100 x 0.5 percent) in federal waters trawling; therefore, to be conservative, we estimate that one sea turtle may die from relocation trawling injuries during this project. Because hopper dredging will occur in federal waters, we predict that if there is a relocation trawl-related mortality this event will occur in federal waters.

5.10 Anticipated Number of Sea Turtle Takes by Dredge and Trawler

As previously discussed, NMFS believes that for every turtle observed killed (i.e., found dead on the inflow or overflow screening of the hopper dredge by onboard protected species observers monitoring the inflow of dredged material into the hopper), another turtle is killed that is not entrained or is not observed, and thus is not counted. NMFS estimates that total mortality by hopper dredge for this project is 4 sea turtles.

As discussed above, NMFS estimates that the 4 incidental, lethal interactions occurring in federal waters will consist of either 2 observed loggerheads or 1 observed loggerhead and 1 observed Kemp’s ridley sea turtle during the estimated 120 days of dredging in federal waters. In addition, NMFS estimates nonlethal take by relocation trawling will consist of 75 loggerheads, 10 greens, and 10 Kemp's ridley sea turtles. There are no lethal takes of sea turtles anticipated from relocation trawling other than the one turtle based on the 0.5 percent estimate of trawl-related sea turtle mortality; however, this turtle does not count towards the authorized take in Section 9.1 *Anticipated Amount or Extent of Incidental Take*.

Table 3: Observed take proposed for the Collier County Beach Renourishment.

Takes by Hopper Dredge		Takes by Relocation Trawling	
Species	Observed Take #	Species	Observed Take #
Loggerhead	2	Loggerhead	75
OR		Kemp's ridley	10
Loggerhead	1	Green	15
Kemp's ridley	1		
Total	2 *	Total	100*
*Does not account for 2 unobserved takes that NMFS assumes will be loggerheads		*No lethal take authorized for relocation trawling	

6. Cumulative Effects

ESA Section 7 regulations require NMFS to consider cumulative effects in formulating their biological opinions (50 CFR 402.14). 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 opinion.

Cumulative effects from unrelated, non-federal actions occurring in the area may affect sea turtles and their habitats. Stranding data indicate sea turtles in the Gulf of Mexico waters die of various natural causes, including cold stunning and hurricanes, as well as human activities, such as incidental capture in state fisheries, ingestion of and/or entanglement in debris, ship strikes, and degradation of nesting habitat. The cause of death of most sea turtles recovered by the stranding network is unknown.

Within the action area, major future changes are not anticipated in the ongoing human activities described in the environmental baseline. The present, major human uses of the action area such as commercial fishing, recreational boating and fishing, and the transport of mineral resources and other waterborne commerce throughout the Gulf of Mexico are expected to continue at the present levels of intensity in the near future as are their associated risks of injury or mortality to listed species posed by incidental capture by fishermen, accidental oil spills, vessel collisions, marine debris, chemical discharges, and anthropogenic noise.

The fisheries described as occurring within the action area (see Section 4, Environmental Baseline) are expected to continue as described into the foreseeable future, concurrent with the proposed action. Numerous fisheries in state waters of the Gulf of Mexico regions have also been known to adversely affect sea turtles. The past and present impacts of these activities have been discussed in the Environmental Baseline section of this opinion. NMFS is not aware of any proposed or anticipated changes in these fisheries (except perhaps the southeastern shrimp fisheries) that would substantially change the impacts each fishery has on sea turtles covered by this opinion.

In addition to fisheries, NMFS is not aware of any proposed or anticipated changes in other human-related actions (e.g., poaching) or natural conditions (e.g., trophic level shifts that might change predator/prey dynamics, for instance, etc.) that would substantially change the impacts that each threat has on the sea turtles covered by this opinion. NMFS will continue to work with states to develop ESA Section 6 agreements and with researchers in Section 10 permits to enhance programs to quantify and mitigate these takes. Effects to sea turtles from human-induced climate change have a large degree of uncertainty but NMFS does not yet have data to extrapolate how significant these effects will be beyond what was discussed in Section 3 in the next few years. Therefore, NMFS expects that the levels of interactions with sea turtles described for each of the fisheries and non-fisheries will continue at similar levels into the next year when the proposed action will occur.

The level of authorized incidental take in the Gulf of Mexico is expected to continue to increase in the future. Increased pressures from coastal development, pollution, noise, recreational and commercial fisheries, marine transportation, and mineral resource exploration and development is expected to result in increased risks to listed species and the ecosystems on which they depend. Although some unavoidable take is anticipated from present and future actions, harm avoidance measures are expected to reduce or eliminate many of the takes that may be associated with these actions.

7. Jeopardy Analysis

This section evaluates the likelihood that the proposed action will jeopardize the continued existence of loggerhead, green, and Kemp's ridley sea turtles in the wild. To *jeopardize the continued existence of* is defined as "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02). Section 5.0 (Effects of the Action) describes the effects of the proposed action on loggerhead, green, and Kemp's ridley sea turtles, and the extent of those effects in terms of an estimate of the number of sea turtles that would be killed or otherwise "taken." Under the ESA, "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. As explained above, the effects and jeopardy analyses of this opinion consider the full effects of BOEM's proposed action, including effects of interdependent and interrelated dredging and renourishment activities in state waters, thus, under the jurisdiction of the USACE.

The following jeopardy analysis first considers the effects of the action to determine if we would reasonably expect the action to result in reductions in reproduction, numbers, or distribution of these sea turtle species (including reductions that may not necessarily be observed as discussed in Section 5.0). The analysis next considers whether any such reduction would in turn result in an appreciable reduction in the likelihood of survival of these species in the wild, and the likelihood of recovery of these species in the wild.

In the following analyses, we find that although some reduction in numbers and reproduction is expected for sea turtles species, the anticipated lethal take (by hopper dredge) and non-injurious take (by relocation trawler) of loggerhead, green, and Kemp's ridley sea turtles will not appreciably reduce the likelihood of survival of these species in the wild, or appreciably interfere with achieving recovery objectives for the species.

All life stages are important to the survival and recovery of the species; however, it is important to note that individuals of one life stage are not equivalent to those of other life stages. For example, the take of male juveniles may affect survivorship and recruitment rates into the reproductive population in any given year, and yet not significantly reduce the reproductive potential of the population. A very low percent of hatchlings is typically expected to survive to reproductive age. The death of mature, breeding females can have an immediate effect on the reproductive rate of the species. Sub-lethal effects on adult females may also reduce reproduction by hindering foraging success, as sufficient energy reserves are necessary for producing multiple clutches of eggs in a breeding year. Different age classes may experience varying rates of mortality and resilience (Crouse et al. 1987). Similarly, different actions (e.g., hopper dredging) are more likely to affect some life stages of sea turtle over others depending on the location and time of year of the action. The jeopardy analysis in this opinion focuses on reproductive-aged female sea turtles because we can somewhat quantify lost reproductive fitness to species based upon published fecundity for adult females (i.e., numbers of eggs produced over time) and survivability of hatchlings.

7.1 Loggerhead Sea Turtles

The nonlethal capture of 75 loggerheads in relocation trawls will not result in a reduction in the species' numbers because relocation efforts are not expected to result in mortality either at the time of trawling or post-release. The lethal take of 4 (2 documented and 2 unobserved) loggerhead sea turtles by hopper dredge would result in an instantaneous, but temporary reduction in total population numbers. Thus, the proposed action will result in a reduction of sea turtle numbers. Sea turtle mortality resulting from hopper dredges could result in the loss of reproductive value of an adult turtle. For example, an adult female loggerhead sea turtle can lay 3 or 4 clutches of eggs every 2 to 4 years, with 100 to 130 eggs per clutch. The loss of 4 adult female sea turtles during the 120 day project could preclude the production of thousands of eggs and hatchlings, of which a small percentage is expected to survive to sexual maturity. Thus, the death of 4 adult females (2 observed, 2 unobserved) eliminates several individuals' contributions to future generations, and the action will result in an overall reduction in sea turtle reproduction.

Considering their population sizes in the western North Atlantic, we believe loggerhead sea turtle populations are sufficiently large enough to persist and recruit new individuals to replace those expected to be lethally taken. We use the following estimates for loggerhead sea turtle populations to support our determination.

Because nesting activity by loggerheads is highly monitored it produces reliable data from which to evaluate numbers of adult female sea turtles. NMFS SEFSC (2009a) estimated the likely minimum adult female population size for the western North Atlantic subpopulation in the 2004-2008 time frame to be between 20,000 to 40,000 (median 30,050) female individuals, with a low likelihood of there being as many as 70,000 individuals. The estimate of western North Atlantic adult loggerhead females was considered conservative for several reasons. The number of nests used for the western North Atlantic was based primarily on U.S. nesting beaches; as such, the results are a slight underestimate of total nests because of the inability to collect complete nest counts for many non-U.S. nesting beaches. In estimating the current population size for adult nesting female loggerhead sea turtles, NMFS SEFSC (2009a) simplified the number of assumptions and reduced uncertainty by using the minimum total annual nest count over the last five years (i.e., 48,252 nests). This was a particularly conservative assumption considering how the number of nests and nesting females can vary widely from year to year, (cf., 2008's nest count of 69,668 nests, which would have increased proportionately the adult female estimate to between 30,000 and 60,000). Further, minimal assumptions were made about the distribution of remigration intervals and nests per female parameters, which are fairly robust and well-known parameters.

Although not included in the NMFS SEFSC (2009) report, in conducting its loggerhead assessment NMFS SEFSC also produced a much less robust estimate for total benthic females[11] in the western North Atlantic, with a likely range of approximately 60,000 to 700,000, up to less than one million. The estimate of overall benthic females is considered less robust because it is model-derived, assumes a stable age/stage distribution, and is highly dependent upon the life history input parameters that are difficult to quantify. Relative to the more robust estimate of adult females, this estimate of total benthic female population is consistent with our knowledge of loggerhead life history and the relative abundance of adults and benthic juveniles: the benthic juvenile population is an order of magnitude larger than adults. Therefore, we believe female benthic loggerheads number in the hundreds of thousands. Benthic females are an important life history stage in estimating reproductive output for loggerheads because they are near to reproductive maturity and have their entire reproductive future ahead of them. Current reproductive age females contrastingly, are somewhere along the continuum of their reproductive life cycle with some unknown proportion of the overall population near the end of their reproductive lives at any given time.

Our population estimate is based on the total numbers of adult females (reproductive age) and benthic females (females that have shifted from a pelagic, surface foraging life stage to a benthic foraging life stage prior to reaching sexual maturity) estimated by NMFS SEFSC for the western

[11] Benthic females in this instance are subadult females that have migrated from a water column feeding strategy to a benthic strategy once they reach a size where they can control their buoyancy to dive to the sea floor.

North Atlantic population of loggerhead sea turtles. The anticipated lethal take of 4 loggerheads resulting from the proposed action (i.e., 2 observed and 2 unobserved mortality in dredges) represents the removal of, at most, approximately 0.01 percent (2/20,000 x 100[12]) of the estimated adult loggerhead female population. Even though we believe the number of benthic females to number in the hundreds of thousands, using the most conservative approach, the level of lethal take of sea turtles by this project represents the removal of only 0.003 percent (2/60,000 x 100[13]) of the conservatively estimated female benthic loggerhead population. These removals are very small and contribute only minimally to the overall mortality on the population. For benthic juvenile females, the contribution to overall mortality is less. Further, these percentages are likely an overestimation of the impact of the anticipated lethal take resulting from the proposed project on loggerhead sea turtles for the following reasons. These percentages represent impacts to adult and benthic juvenile female loggerhead sea turtles only, and not to the population as a whole. Because this estimated contribution to mortality is a tiny part of our range of uncertainty across what total mortality might be for loggerhead sea turtles, we believe that the small effect posed by the lethal take resulting from the proposed project will not result in a detectable or appreciable reduction in the species' likelihood of survival in the wild.

The Services' recovery plan for the Northwest Atlantic population of the loggerhead turtle (NMFS and USFWS 2009), which is in essence the same population of turtles as comprise the NWA DPS, provides additional explanation of the goals and vision for recovery for this population. The objectives of the recovery plan most pertinent to the threats posed by hopper dredging associated activities are numbers 1, 11, and 13:

1. Ensure that the number of nests in each recovery unit is increasing and that this increase corresponds to an increase in the number of nesting females….
11. Minimize trophic changes from … habitat alteration….
13. Minimize vessel strike mortality.

The recovery plan anticipates that, with implementation of the plan, the western North Atlantic population will recover within 50 to 150 years, but notes that reaching recovery in only 50 years would require a rapid reversal of the declining trends of the Northern, Peninsular Florida, and Northern Gulf of Mexico Recovery Units.

The potential lethal take of 4 loggerheads over the duration of the project will result in reduction in numbers when take occurs and possibly by lost future reproduction, but, given the magnitude of these trends and likely large absolute population size, it is unlikely to have any detectable influence on the population objectives and trends noted above. The expected 75 nonlethal takes from relocation trawling are not expected to impact the reproductive potential, fitness, or growth of the captured sea turtle because they will be immediately released unharmed, or released with only minor injuries from which they are expected to fully recover, or be rehabilitated prior to release. Thus, the proposed action will not interfere with achieving the recovery objectives and

[12] Number of anticipated lethal take of loggerheads (2) divided by the minimum adult female population size (20,000) x 100 = 0.01 percent.
[13] Number of anticipated lethal take of loggerheads (2) divided by the maximum estimated number of adult females (60,000) x 100 = 0.003 percent.

will not result in an appreciable reduction in the likelihood of loggerhead sea turtles' recovery in the wild.

7.2 Green Sea Turtles

There is no anticipated lethal take of green turtles from either relocation trawls or hopper dredging associated with the proposed action. However, up to 15 green sea turtles may be captured in relocation trawls and this constitutes take as defined under the ESA as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. This nonlethal take of green turtles will not result in any reduction in the likelihood of green sea turtles' recovery in the wild.

Given the global listing of green sea turtles, the impact of the effects of the proposed action on the Atlantic populations must be evaluated for the global populations of the species, as listed in the ESA. Because the proposed action will not reduce the likelihood of survival and recovery of the Atlantic populations of green sea turtles it is our opinion that the proposed project is also not likely to jeopardize the continued existence of green sea turtles throughout their global range.

7.3 Kemp's Ridley Sea Turtles

The nonlethal trawl capture of 10 Kemp's ridleys will not result in a reduction in the species' numbers because relocation efforts are not expected to result in injury or mortality. The anticipated lethal take of up to 1 Kemp's ridley is a reduction in numbers. This lethal take is expected to result in a reduction in reproduction as well, as a result of foregone reproduction by any adults captured or reductions in fitness and growth prior to maturity of any juveniles that are captured. For example, females lay approximately 2.5 nests per season with each nest containing approximately 100 eggs, though only a small percentage is expected to survive to sexual maturity.

Kemp's ridleys are wide ranging throughout the Gulf of Mexico and along the Atlantic coast, and while the potential lethal take would result in a displacement of individuals from important developmental habitat, the loss is not expected to be measurable in terms of the species' rangewide distribution as a whole.

The proposed action's reductions in numbers and reproduction would reduce the species' population compared to the number that would have been present in the absence of the proposed action, assuming all other variables remained the same. Whether the reductions in numbers and reproduction of Kemp's ridley sea turtles species would appreciably reduce this species' likelihood of survival depends on the probable effect the changes in numbers and reproduction would have on current population sizes and trends.

Heppell et al. (2005) predicted in a population model that the Kemp's ridley sea turtle population is expected to increase at least 12-16 percent per year and that the population could attain at least 10,000 females nesting on Mexico beaches by 2015. NMFS et al. (2011) contains an updated model which predicts that the population is expected to increase 19 percent per year and that the population could attain at least 10,000 females nesting on Mexico beaches by 2011. Approximately 25,000 nests would be needed for an estimate of 10,000 nesters on the beach, based on an average 2.5 nests/nesting female. In 2009 the population was on track with 21,144 nests, but an unexpected and as yet unexplained drop in nesting occurred in 2010 (13,302), deviating from the NMFS et al. (2011) model prediction. A subsequent increase to 20,570 nests in 2011 occurred. Though we will not know if the population is continuing the recovery trajectory and timeline predicted by the model until future nesting data is available, there is nothing to indicate the trend of increases in this species' population will cease. Based on these trends, we do not expect the potential lethal take of 1 Kemp's ridley will appreciably reduce the likelihood of survival of this species in the wild.

The recovery plan for the Kemp's ridley sea turtle (NMFS et al. 2011) lists the following relevant recovery objectives:

- A population of at least 10,000 nesting females in a season (as measured by clutch frequency per female per season) distributed at the primary nesting beaches (Rancho Nuevo, Tepehuajes, and Playa Dos) in Mexico is attained. Methodology and capacity to implement and ensure accurate nesting female counts have been developed.

The recovery plan states average nests per female is 2.5 and sets a recovery goal of 10,000 nesting females that would be represented by 25,000 nests in a season. As discussed above, nesting levels had been steadily increasing to a high of 21,144 nests in 2009, exhibited a substantial decline in 2010, but rebounded markedly in 2011 to 20,570 nests. The potential lethal take of up to 1 Kemp's ridley by the proposed action will not affect the overall level or trend in adult female nesting population numbers or number of nests per nesting season. Thus, the proposed action will not result in an appreciable reduction in the likelihood of Kemp's ridley sea turtle recovery in the wild.

8. Conclusion

Based on the analyses of the proposed action on the Northwest Atlantic DPS of loggerhead, Kemp's ridley, and green sea turtles, it is our opinion that the proposed action is not likely to jeopardize the continued existence of these populations in the wild. Therefore, the proposed action is not likely to jeopardize the continued existence of loggerhead, Kemp's ridley, and green sea turtles in the wild.

9. Incidental Take Statement

Section 9 of the ESA and protective regulations issued pursuant to Section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. 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 ESA provided that such taking is in compliance with the RPMs and terms and conditions of the ITS.

Section 7(b)(4)(c) of the ESA specifies that in order to provide an ITS for an endangered or threatened species of marine mammal, the taking must be authorized under Section 101(a)(5) of the MMPA. Since no incidental take of listed marine mammals is expected or has been authorized under Section 101(a)(5) of the Marine Mammal Protection Act no statement on incidental take of endangered whales is provided, and no take is authorized. Nevertheless, BOEM must immediately notify (within 24 hours, if communication is possible) NMFS's Office of Protected Resources should a take of a listed marine mammal occur.

9.1 Anticipated Amount or Extent of Incidental Take

Section 9 of the ESA and federal regulations pursuant to Section 4(d) of the ESA prohibit 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 NMFS 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. 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 ESA 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 provided that such taking is in compliance with the terms and conditions of this ITS. This ITS applies only to those actions in federal waters, i.e., those occurring under BOEM's authority. The ITS does not include activities occurring in state waters under the authority of the USACE. The ITS for that portion of the project is covered under the 2007 GRBO.

Based on historical distribution data, hopper dredge observer reports, nesting data, relocation trawling information, and observations of past strandings, loggerhead, Kemp's ridley, and green sea turtles may occur in the action area and may be taken by the relocation trawling or hopper dredging operations in federal waters for this project. NMFS anticipates that documented (i.e., by onboard observers) incidental take in federal waters, by hopper dredge entrainment, will consist of 2 sea turtle mortalities (either 2 loggerheads or 1 loggerhead and 1 Kemp's ridley). NMFS also anticipates the non-injurious incidental take, by relocation trawling, of 100 sea turtles (75 loggerheads, 10 Kemp's ridleys, and 15 green sea turtles) during the 120 days of the hopper dredging in federal waters (see previous Table 3).

9.2 Effect of the Take

Sea Turtles
NMFS has determined the anticipated level of incidental take specified in Section 9.1 is not likely to jeopardize the continued existence of green, loggerhead, or Kemp's ridley sea turtles.

9.3 Reasonable and Prudent Measures

Section 7(b)(4) of the ESA requires NMFS to issue a statement specifying the impact of any incidental take on listed species, which results from an agency action otherwise found to comply with Section 7(a)(2) of the ESA. It also states the RPMs necessary to minimize the impacts of take and the terms and conditions to implement those measures, must be provided and must be followed to minimize those impacts. Only incidental taking by the federal agency that complies with the specified terms and conditions is authorized.

The RPMs and terms and conditions are specified as required, by 50 CFR 402.01(i)(1)(ii) and (iv), to document the incidental take by the proposed action and to minimize the impact of that take on ESA-listed species. These measures and terms and conditions are non-discretionary, and must be implemented by BOEM in order for the protection of Section 7(o)(2) to apply. BOEM has a continuing duty to regulate the activity covered by this ITS. If BOEM fails to adhere to the terms and conditions through enforceable terms, and/or fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of Section 7(o)(2) may lapse.

NMFS has determined that the following reasonable and prudent measures must be implemented by BOEM:

1. BOEM shall have measures in place to monitor and report all interactions with any protected species (ESA or MMPA) resulting from the proposed action. Reports shall be sent to the Assistant Regional Administrator (Mr. David Bernhart) for NMFS's PRD, Southeast Regional Office, 263 13th Avenue South, St. Petersburg, Florida 33701-5505.

2. BOEM will require NMFS-approved observers to monitor dredged material inflow and overflow screening baskets on the hopper dredge.

3. BOEM will implement relocation trawling.

4. BOEM will require the hopper dredge's sea turtle deflector draghead to be inspected prior to startup of hopper dredging operations. In addition, BOEM shall ensure that all contracted personnel involved in operating hopper dredges receive thorough training on measures of dredge operation that will minimize sea turtle takes.

9.4 Terms and Conditions

In order to be exempt from the prohibitions of Section 9 of the ESA, BOEM and/or CCPRD are required to comply with the terms and conditions which implement the RPMs. The following terms and conditions are nondiscretionary. BOEM shall condition the lease/permit to require the following terms and conditions to minimize the effects of take on loggerhead, green, and Kemp's ridley sea turtles:

1. A project report summarizing the results of the dredging and the sea turtle take (if any) must be submitted to the NMFS within 30 working days of completion. Reports shall contain information on project location, start-up and completion dates, cubic yards of material dredged, problems encountered, incidental takings (include photographs, if available) and sightings of protected species, mitigative actions taken (if relocation trawling, the number and species of turtles relocated), screening type (inflow, overflow) utilized, daily water temperatures, name of dredge, names of endangered species observers, percent observer coverage, and any other information the BOEM and/or contractor deems relevant. This report must be provided to NMFS'’s PRD at the address provided in RPM 1 above and notification of take shall be provided to NMFS at the following e-mail address within 24 hours, referencing the present opinion by NMFS identifier number (SER-2012-9274), title, and date: **takereport.nmfsser@noaa.gov**. BOEM shall provide NMFS’s Southeast Regional Office (address provided in RPM 1 above) with an end-of-project relocation trawling report within 30 days of completion of any relocation trawling. This report may be included within the project report (RPM 1).

2. The BOEM project manager shall notify the STSSN state representative (contact information available at http://www.sefsc.noaa.gov/seaturtleSTSSN.jsp) of the start-up and completion of hopper dredging operations and ask to be notified of any sea turtle strandings in the project area that, in the estimation of the STSSN personnel, bear signs of potential draghead impingement or entrainment. Information on any such strandings shall be reported in writing within 30 days of project end to NMFS’s Southeast Regional Office (address provided in RPM 1 above), or included in the project report (Term and Condition # 1). Because of different possible explanations for, and subjectivity in the interpretation of potential causes of strandings, these strandings will not normally be counted against BOEM’s take limit (in this biological opinion); however, if compelling STSSN observer reports and evidence convinces NMFS that a turtle was killed by a hopper dredge, that take will be deducted from the ITS's anticipated take level for the project (RPM 1).

3. BOEM shall arrange for NMFS-approved protected species observers to be aboard the hopper dredge to monitor the hopper bin, screening, and dragheads for sea turtles and their remains. For the proposed action, 100 percent observer monitoring is required. Beach observers cannot be used in place of shipboard observers for hopper dredging of borrow areas (RPM 2).

4. Relocation trawling is required to commence 24 hours prior to dredging and will continue throughout the dredging portion of the project. (RPM 3).

5. The following conditions must be observed during relocation trawling. (RPM 3):

    a. *Trawl Time*: Trawl tow-time duration shall not exceed 42 minutes (doors in - doors out) and trawl speeds shall not exceed 3.5 knots.

b. *Handling During Trawling*: Sea turtles and smalltooth sawfish[14] captured pursuant to relocation trawling shall be handled in a manner designed to ensure their safety and viability, by implementing the measures below.

c. Captured Turtle Holding Conditions: Captured turtles shall be kept moist, and shaded whenever possible, until they are released. They may be held for up to 24 hours if opportunistic, ancillary, "piggy-back" research (e.g., opportunistic satellite tagging) is proposed. NMFS encourages the USACE to make fuller use of protected species taken during hopper dredging and relocation trawling by allowing and encouraging duly-permitted "piggy-back" research projects on protected species taken during these activities (In accordance with the GRBO's T &C 15-d, Conservation Recommendation 5).

d. *Weight and Size Measurements and Tagging*: All turtles shall be measured (standard carapace measurements including body depth), tagged (Passive Integrative Transponder [PIT] or Inconel), and weighed prior to release when safely possible; smalltooth sawfish shall be measured (fork length and total length) and–when safely possible–tagged, weighed, and a tissue sample taken prior to release. Only NMFS-approved observers or observer candidates in training under the direct supervision of a NMFS-approved observer shall conduct the tagging/measuring/weighing/tissue sampling operations.

Flipper Tagging: All sea turtles captured by relocation trawling shall be flipper-tagged prior to release with external tags which shall be obtained prior to the project from the University of Florida's Archie Carr Center for Sea Turtle Research. This opinion serves as the permitting authority for any NMFS-approved endangered species observer a relocation trawler to flipper-tag with external tags (e.g., Inconel tags) captured sea turtles. Columbus crabs or other organisms living on external sea turtle surfaces may also be sampled and removed under this authority.

PIT Tagging and Scanning: All sea turtles captured by relocation trawling or dredges shall be thoroughly scanned for the presence of PIT tags prior to release using a scanner powerful enough to read dual frequencies (125 and 134 kHz) and read tags deeply embedded deep in muscle tissue (e.g., manufactured by Biomark or Avid). Turtles which have been previously PIT tagged shall never-the-less be externally flipper tagged. The data collected (PIT-tag scan data and external tagging data) shall be submitted to NOAA, National Marine Fisheries Service, Southeast Fisheries Science Center, Attn: Lisa Belskis, 75 Virginia Beach Drive, Miami, Florida 33149. All data collected shall be submitted in electronic format within 60 working days to Lisa.Belskis@noaa.gov. PIT tagging may only be conducted by observers with PIT-tagging training or experience. This opinion provides the authority to NMFS-approved observers to PIT tag captured sea turtles without the need for an ESA Section 10 permit.

[14] Although smalltooth sawfish trawl captures are not expected, these terms and conditions are included for such an eventuality. Any take of sawfish would require immediate reinitiation of consultation with NMFS.

e. *Take and Release Time During Trawling - Turtles*: Turtles shall be kept no longer than 12 hours prior to release (except as noted in 5.c. above) and shall be released not less than 3 nautical miles (nm) from the dredge site. Recaptured turtles shall be released not less than 5 nm away and shall be released over the side of the vessel, away from the propeller, and only after ensuring that the vessel's propeller is in the neutral, or disengaged, position (i.e., not rotating). If it can be done safely, turtles may be transferred onto another vessel for transport to the release area to enable the relocation trawler to keep sweeping the dredge site without interruption.

f. *Take and Release Time During Trawling – Smalltooth Sawfish*: Smalltooth sawfish shall be released immediately after capture, away from the dredge site or into already dredged areas, unless the trawl vessel is equipped with a suitable well-aerated seawater holding tank (e.g., plastic "kiddie pool" not less than 1 ft in depth by 5 ft in diameter), where a maximum of one smalltooth sawfish may be held for not longer than 30 minutes before it must be released or relocated away from the dredge site.

g. *Injuries and Incidental Take Quota*: Any protected species injured or killed in federal waters during or as a consequence of relocation trawling shall count toward the incidental take quota. Minor skin abrasions resulting from trawl capture are considered non-injurious. Injured sea turtles shall be immediately transported by BOEM at its own expense to the nearest sea turtle rehabilitation facility; all rehabilitation costs and sea turtle transportation costs shall be borne by BOEM.

h. *CMTTP:* External flipper tag and PIT-tag data generated and collected by relocation trawlers shall also be submitted to the Cooperative Marine Turtle Tagging Program (CMTTP), on the appropriate CMTTP form, at the University of Florida's Archie Carr Center for Sea Turtle Research.

i. *Tissue Sampling*: All live or dead sea turtles captured by relocation trawling or dredging shall be tissue-sampled prior to release, according to the protocols described in Appendix II or Appendix III of the November 19, 2003, Gulf of Mexico Regional Biological Opinion on Hopper Dredging, as revised through Revision No. 2, included as Appendix 1 of this opinion. Tissue samples shall be sent within 60 days of capture to: NOAA, National Marine Fisheries Service, Southeast Fisheries Science Center, Attn:Lisa Belskis, 75 Virginia Beach Drive, Miami, Florida 33149. All data collected shall be submitted in electronic format within 60 working days to Lisa.Belskis@noaa.gov. The present opinion to BOEM serves as the permitting authority for any NMFS-approved endangered species observers aboard relocation trawlers or hopper dredges to tissue-sample live- or dead-captured sea turtles, without the need for an ESA Section 10 permit.

6. For the proposed action, 100 percent shipboard observer monitoring is required year-round. If conditions disallow 100 percent inflow screening, inflow screening can be reduced gradually, but 100 percent overflow screening is required, and an explanation must be included in the project report. The hopper's inflow screens should have 4-inch by 4-inch screening. If BOEM, in consultation with observers and the draghead operator, determines

that the draghead is clogging and reducing production substantially, the screens may be modified sequentially: mesh size may be increased to 6-inch by 6-inch, then 9-inch by 9-inch, then 12-inch by 12-inch openings. NMFS believes that this flexible, graduated-screen option may be necessary since the need to constantly clear the inflow screens will increase the time it takes to complete the project; therefore, it will increase the exposure of sea turtles to the risk of impingement or entrainment Inflow screen clogging should be greatly reduced with these flexible options; however, further clogging (e.g., as when encountering heavy clay or debris) may compel removal of the inflow screening altogether, in which case *effective* 100 percent overflow screening is mandatory. BOEM shall notify NMFS *beforehand* if inflow screening is going to be reduced or eliminated, and provide details of how effective overflow screening will be achieved. NMFS, in consultation with the dredging company and BOEM/USACE, shall determine what constitutes effective overflow screening (RPM 4).

10. Conservation Recommendations

Section 7(a)(1) of the ESA directs federal agencies to utilize their authority to further the purposes of the ESA 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. For the Collier County renourishment, NMFS provides the following conservation recommendations:

1. BOEM should consider devising and implementing some method of significant economic incentives to hopper dredge operators to engineer solutions to prevent/reduce sea turtle entrainments in hopper dredge suction dragheads, such as financial reimbursement based on their satisfactory completion of dredging operations, or X number of cubic yards of material moved, or hours of dredging performed, without taking turtles. This may encourage dredging companies to research and develop "turtle friendly" dredging methods; more effective deflector dragheads; pre-deflectors; top-located water ports on dragarms, forward-facing waters jets to startle turtles out of the draghead path, etc.

2. NMFS PRD (Joe Cavanaugh) and BOEM (Dr. Jennifer Culbertson) are currently exploring the feasibility of (a) applying satellite tags through a Section 10 permit under Lesley Stokes (NMFS Miami); and, (b) BOEM sharing all relocation trawl data with Lesley Stokes to assist her in NMFS's sea turtle population dynamic studies for Florida.

11. Reinitiation of Consultation

This concludes formal consultation on BOEM's proposed issuance of a sand lease to CCPRD to allow BOEM to extract sand from the Canaveral Shoals sand borrow areas in federal waters of the OCS to build a sandbar off South Beach Reach A, Brevard County, Florida, near the town of Melbourne Beach. 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 taking specified in the ITS is exceeded;

(2) new information reveals effects of the action may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified action.

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Appendix 1

Appendix 2

Appendix 3

Appendix 4