UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
http://sero.nmfs.noaa.gov

AUG 1 2018

F/SER31:BGR
SER-2018-19167

Chief, Tampa Permits Section
Jacksonville District Corps of Engineers
Department of the Army
10117 Princess Palm Avenue, Suite 120
Tampa, Florida 33610-8302

Ref.: SAJ-2018-00127 (NW-KRD), City of Anna Maria, Reconstruction of the City of Anna Maria Pier, Anna Maria, Manatee County, Florida

Dear Sir or Madam:

The enclosed Biological Opinion ("Opinion") was prepared by the National Marine Fisheries Service (NMFS) pursuant to Section 7(a)(2) of the Endangered Species Act (ESA). The Opinion considers the effects of a proposal by the Jacksonville District of the United States Army Corps of Engineers (USACE) to authorize the reconstruction of a public fishing pier. We base this Opinion on project-specific information provided in the consultation package as well as NMFS's review of published literature. This Opinion analyzes the project effects on green sea turtles (North Atlantic [NA] Distinct Population Segment [DPS] and South Atlantic [SA] DPS), Kemp's ridley sea turtles, loggerhead sea turtles (Northwest Atlantic Ocean [NWA] DPS), leatherback sea turtles, hawksbill sea turtles, and smalltooth sawfish (U.S. DPS). NMFS concludes that the proposed action may affect, but is not likely to adversely affect, hawksbill and leatherback sea turtles, and is likely to adversely affect, but not likely to jeopardize the continued existence of, green (NA & SA DPSs), Kemp's ridley, and loggerhead (NWA DPS) sea turtles, and smalltooth sawfish (U.S. DPS).

We look forward to further cooperation with you on other USACE projects to ensure the conservation and recovery of our threatened and endangered marine species. If you have any questions regarding this consultation, please contact Bette Rubin, Consultation Biologist, by phone at 727-209-5993, or by email at Bette.Rubin@noaa.gov.

Sincerely,

Roy E. Crabtree, Ph.D.
Regional Administrator

Enclosures:
Biological Opinion
File: 1514-22 F.4

AUG 1 2018

Endangered Species Act - Section 7 Consultation
Biological Opinion

Action Agency: U.S. Army Corps of Engineers (USACE), Jacksonville District

Applicant: City of Anna Maria

Permit Number SAJ-2018-00127 (NW-KRD)

Activity: Fishing Pier Reconstruction, Anna Maria, Manatee County, Florida

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

Consultation Number SER-2018-19167

Approved by:

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

Date Issued: AUG 0 1 2018

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ACRONYMS AND ABBREVIATIONS

CAMP	City of Anna Maria Pier
CFR	Code of Federal Regulations
CPUE	Catch per Unit Effort
DPS	Distinct Population Segment
DTRU	Dry Tortugas Recovery Unit
DWH	Deepwater Horizon
ESA	Endangered Species Act
FL STSSN	Florida Sea Turtle Stranding and Salvage Network
FP	Fibropapillomatosis
FWC	Florida Fish and Wildlife Conservation Commission
FWRI	Fish and Wildlife Research Institute
GADNR	Georgia Department of Natural Resources
GCRU	Greater Caribbean Recovery Unit
ISED	International Sawfish Encounter Database
ITS	Incidental Take Statement
NA DPS	North Atlantic Distinct Population Segment
NCWRC	North Carolina Wildlife Resources Commission
NGMRU	Northern Gulf of Mexico Recovery Unit
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRU	Northern Recovery Unit
NWA DPS	Northwest Atlantic Distinct Population Segment
Opinion	Biological Opinion
PCTS	Public Consultation Tracking System
PFRU	Peninsular Florida Recovery Unit
PRD	Protected Resources Division
PRM	Post-Release Mortality
RPM(s)	Reasonable and Prudent Measure(s)
SA DPS	South Atlantic Distinct Population Segment
SAV	Submerged Aquatic Vegetation
SCDNR	South Carolina Department of Natural Resources
SCL	Straight Carapace Length
SEFSC	Southeast Fisheries Science Center
STSSN	Sea Turtle Stranding and Salvage Network
T&Cs	Terms & Conditions
TED(s)	Turtle Excluder Device(s)
TEWG	Turtle Expert Working Group
US	United States
US DPS	United States Distinct Population Segment
USACE	United States Army Corps of Engineers

USC	United States Code
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service

UNITS OF MEASURE

°C	Degrees Celsius
cm	Centimeter(s)
°F	Degrees Fahrenheit
ft	Foot/Feet
g	Gram(s)
in	Inch(es)
kg	Kilogram(s)
m	Meter(s)
mi	Mile(s)
oz	Ounce(s)
lb(s)	Pound(s)
m^2	Square Meter(s)

1. INTRODUCTION

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 the 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 those species. When the action of a federal agency may affect a protected species or its critical habitat, that agency is required to consult with either the National Marine Fisheries Service (NMFS) or the United States (U.S.) Fish and Wildlife Service (USFWS), depending upon the protected species that may be affected.

Consultations on most listed marine species and their designated critical habitat are conducted between the action agency and NMFS. Consultations are concluded after NMFS determines the action is not likely to adversely affect listed species or critical habitats, or issues a Biological Opinion ("Opinion") that determines whether a proposed action is likely to jeopardize the continued existence of a federally listed species, or destroy or adversely modify federally designated critical habitat. The Opinion also states the amount or extent of listed species interactions (incidental take) that may occur, and develops nondiscretionary measures that the action agency must take to reduce the effects of said anticipated/authorized take. The Opinion may also recommend discretionary conservation measures. No incidental destruction or adverse modification of critical habitat may be authorized. The issuance of an Opinion detailing NMFS's findings concludes ESA Section 7 consultation.

This Opinion analyzes project effects on green, loggerhead, Kemp's ridley, leatherback, and hawksbill sea turtles, and smalltooth sawfish, based on our review associated with U.S. Army Corp of Engineers (USACE) Jacksonville District's proposal to reconstruct a public fishing pier in the city of Anna Maria in Manatee County, Florida (SAJ-2018-00127). Our determination is based on project information provided by USACE, as well as data from the National Oceanic and Atmospheric Association (NOAA) Southeast Fisheries Science Center (SEFSC) Sea Turtle Stranding and Salvage Network (STSSN), the Florida Fish and Wildlife Conservation Commission (FWC) – Fish and Wildlife Research Institute (FWRI), the International Sawfish Encounter Database (ISED), and other sources of information, including the published literature cited herein.

2. CONSULTATION HISTORY

NMFS received a request from USACE for emergency consultation on March 6, 2018, to demolish the existing City of Anna Maria Pier (CAMP), which suffered significant structural damage during Hurricane Irma in September 2017, and posed a threat to navigation and safety. That consultation request was given the Public Consultation Tracking System (PCTS) number SER-2018-19155. The emergency request also included plans to reconstruct the pier; however, as the reconstruction component does not pose a threat to navigation or safety, NMFS asked USACE to submit the reconstruction proposal as a separate consultation request. NMFS received the separate consultation request from USACE to reconstruct the CAMP on March 13, 2018. This project was given the PCTS number SER-2018-19167. In the consultation request, USACE determined that the proposed action may affect, but is not likely to adversely affect, green sea turtles (North Atlantic [NA] Distinct Population Segment [DPS] and South Atlantic [SA] DPS), Kemp's ridley sea turtles, loggerhead sea turtles (Northwest Atlantic Ocean [NWA] DPS), hawksbill sea turtles, leatherback sea turtles, and smalltooth sawfish (U.S. DPS). NMFS requested additional information on April 6, 2018. We received a final response on April 9, 2018, and initiated formal consultation that day. This Opinion analyzes only the reconstruction project, SER-2018-19167, Anna Maria Pier Reconstruction.

3. DESCRIPTION OF THE PROPOSED ACTION

3.1 Proposed Action

The applicant requested a permit from USACE to reconstruct the CAMP in Anna Maria, Manatee County, Florida. The CAMP will be reconstructed in the exact footprint as the previous CAMP. The pier will form a T-shape, with the main pier running approximately 683 feet (ft) long and 12 ft wide, and the T-head being approximately 58 ft long and 111 ft wide. In addition, the T-head will house a temporary tie-off dock/landing, measuring approximately 5 ft wide and 50.5 ft long. The T-head currently has a restaurant and bait & tackle shop which will be rebuilt as part of the overall pier reconstruction. It is anticipated that the project will take one year to complete.

Prior to any construction activity, a seagrass survey will be conducted to identify any submerged aquatic vegetation (SAV) in the area, so that it can be avoided during construction to the maximum extent practicable. This project will require the installation of approximately 240 concrete piles. Of those 240 piles, 10 will have a diameter of 12 inches (in), and the other 230 will have a diameter of 10 in. Piles will be driven either to 20 ft deep or until stable, and will be installed using vibratory and impact hammers.

Work will mostly be conducted from a barge on the water, though some work may occur from the uplands. All work will be conducted during daylight hours only, and the applicant has agreed to comply with NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions*, including the use of turbidity curtains. Any lighting deemed necessary will comply with FWC's turtle-friendly lighting requirements.

Upon completion of the pier, signs will be posted in visible locations alerting users of listed threatened and endangered species in the area, and providing contact information for the sea turtle and marine mammal stranding networks and the smalltooth sawfish encounter database. In addition, monofilament recycling bins will be provided at the landing (temporary tie-off dock) to reduce the risk of turtle or sawfish entanglement in, or ingestion of, monofilament line and other marine debris. The bins will be constructed, labeled, maintained, and emptied according to FWC standards.

3.2 Action Area

The proposed project is located on Anna Maria Island, at 100 South Bay Boulevard, Anna Maria, Manatee County, Florida (27.532928°N, 82.731869°W [North American Datum 1983]). The project site is an existing public fishing pier (CAMP) that was first built in 1910. It has been repaired several times after suffering damage due to hurricanes over the last 100 years, with each repair maintaining approximately the same footprint as the original. The pier extends out into Tampa Bay, and is less than 1 mile (mi) from the Gulf of Mexico (Figure 1). Approximately 0.5 mi northwest of the CAMP is the Rod and Reel Pier, another recreational fishing pier. Anna Maria Island's northwestern shore borders the primary route into and out of Tampa Bay, making this a heavily-trafficked area.

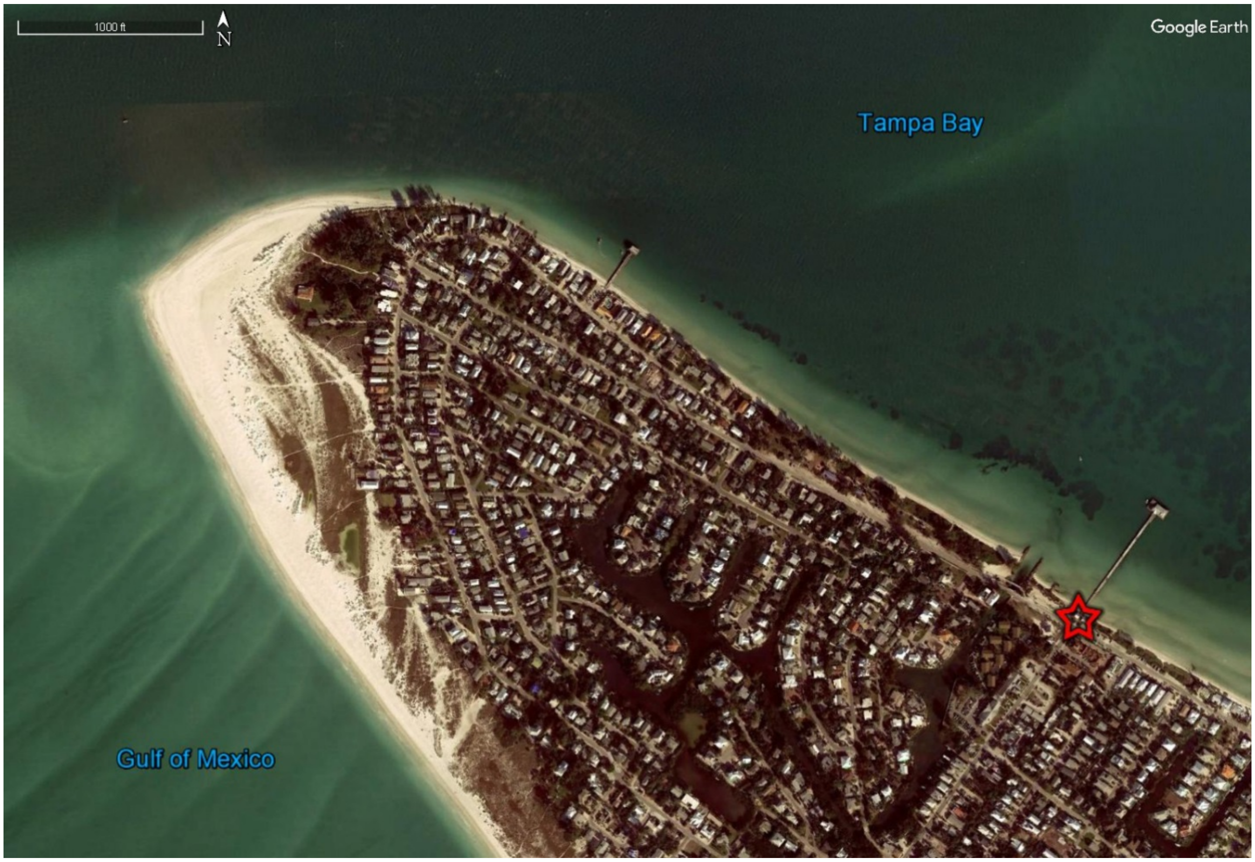

Figure 1. Project location (red star) and the proximity of the project area to the Gulf of Mexico (©2018 Google)

The term *action area* is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 Code of Federal Regulations [CFR], §402.02). For purposes of this Opinion, the action area includes the footprint of the CAMP and its surrounding area within a 705-ft (215-meter [m]) radius, to account for construction equipment and any potential impacts to listed species as a result of noise generated from the activity, as explained in further detail in Section 4.1, below. A bathymetric survey of the area was performed. Depth in the action area ranges from 0 ft at the shoreward end of the pier, to approximately 11 ft at the end of the T-head. The substrate type in the action area is listed as sand, and the water in the action area is tidally influenced due to its location at the confluence of Tampa Bay and the greater Gulf of Mexico. While neither a seagrass survey nor a benthic survey were conducted for this project, the USACE and applicant believe the presence of seagrasses or other SAV would be unlikely due to the shade created by the existing pier deck. However, FWC, in collaboration with the Florida Department of Environmental Protection, indicated that seagrasses may be present at the end of the pier. The USACE and applicant believe that any seagrasses at the end of the pier would be sparse, again due to shading from the pier, but also because the depth in this part of the action area is at least 8-10 ft, at which point there would be diminished light penetration through the water column. As noted above, a seagrass survey will be done prior to construction to verify the absence or presence of SAV. The pier extends 741 ft from the beach (638 ft for the main pier + 58 ft for the T-head) (Figure 2).

Figure 2. The old CAMP, with the bait shop and restaurant on the T-head (right), and the temporary landing/tie-off dock just left of the T-head (below main pier) (©2018 Google)

4. STATUS OF LISTED SPECIES AND CRITICAL HABITAT

The ESA-listed species under NMFS's jurisdiction that may occur in or near the proposed action area are listed below (Table 2). The project is not located in designated critical habitat, and there are no potential routes of effect to any designated critical habitat.

To determine which species would most likely occur near the CAMP, we evaluated several data sources. First, we reviewed data from the Florida STSSN. A major collaboration between NOAA SEFSC and FWC FWRI, the Florida STSSN is responsible for gathering standardized data on stranded marine turtles throughout the state. A stranding is any dead sea turtle that is found floating or washed ashore, or live turtles that are found with life-threatening problems (e.g., sick, injured, or entangled) (FWRI et al. 2016). The Florida STSSN functions as a part of an 18-state network led by NMFS. In Florida, strandings are documented by FWRI staff biologists and by a network of permitted participants located around the state. Live strandings are rescued and transported to properly permitted rehabilitation facilities. Data from strandings are collected on a standardized reporting form and include date, species, location, carapace length and width, carcass condition, carcass disposition, and information on anomalies (e.g., entanglement, propeller damage, fibropapillomas). Additionally, certain carcasses are regularly collected by FWRI staff for gross or detailed necropsy. Each week, FWRI reports Florida strandings to NMFS and also generates monthly and yearly stranding summary reports to monitor mortality and to detect and describe any unusual stranding events. Stranding data collected through the Florida STSSN have been used extensively in the identification of mortality factors and in the development of recovery actions (e.g., Turtle Excluder Device (TED) requirements, gill net regulations) (FWRI et al. 2016).

The CAMP is located in Florida (FL) STSSN Zone 5, which falls within Latitude 27, spanning the area just north of Clearwater, Florida, to just north of Englewood, Florida (Figure 3).

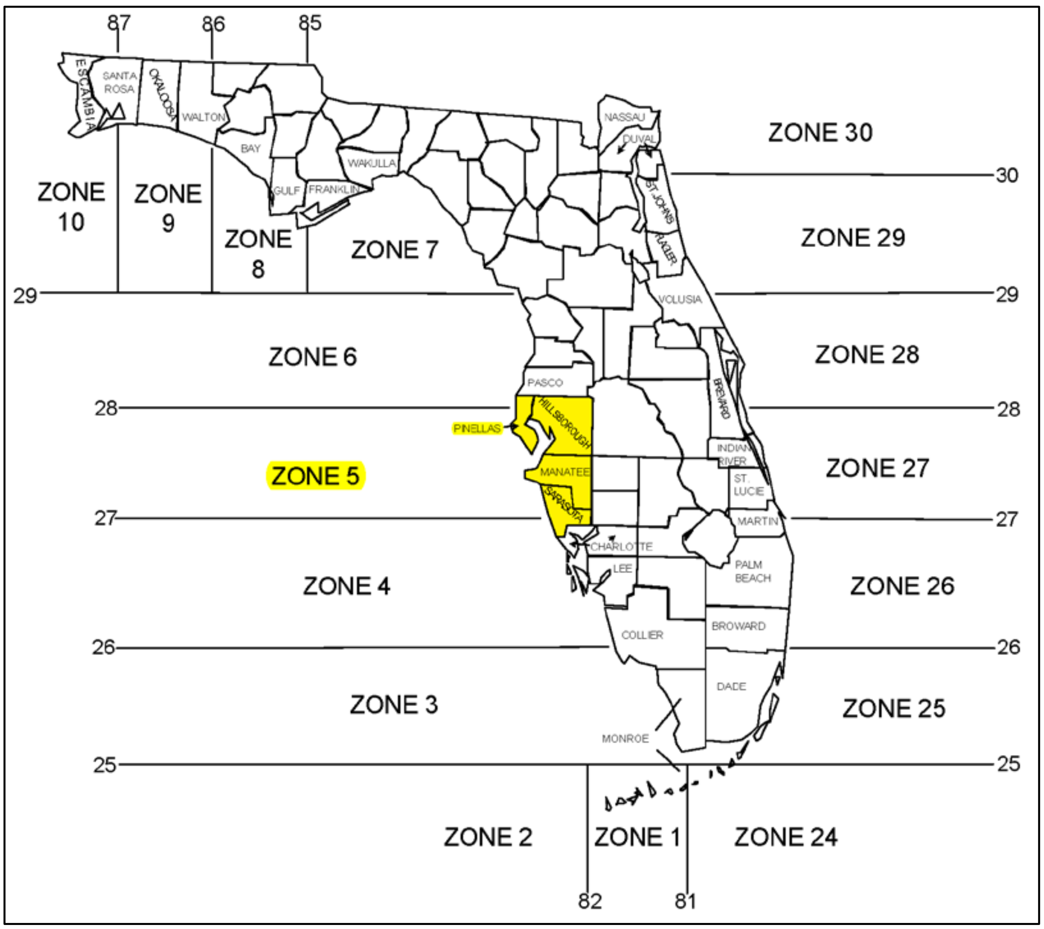

Figure 3. Map of coastal counties in Florida, along with latitudes and longitudes across the state, and the FL STSSN Zones. Zone 5 of the FL STSSN, in Latitude 27, includes Pinellas, Hillsborough, Manatee, and Sarasota counties (highlighted) (*Source: FWC*).

The FL STSSN data provides the number of stranded sea turtles in Zone 5, separated by species and year, from 2008-2016 (Table 1). From this data, we are able to estimate the composition of sea turtle species in the area according to relative amount of stranding reports for each species. The FL STSSN data includes a category for unknown sea turtle species, but since we need to estimate the composition of sea turtle species, the "unknown" incidents will not be of use. Therefore, Table 1 reflects the FL STSSN data without the "unknown" records.

Table 1. Number of recorded sea turtle stranding incidents in FL STSSN Zone 5, by species, 2008-2016, not including "Unknown" species

	Species					
Year	**Loggerhead**	**Green**	**Kemp's ridley**	**Hawksbill**	**Leatherback**	**Total**
2008	85	25	18	0	0	**128**
2009	66	42	13	1	1	**123**
2010	65	139	14	18	0	**236**
2011	39	58	18	1	0	**116**
2012	40	41	27	1	0	**109**
2013	46	42	33	0	0	**121**
2014	68	69	34	0	0	**171**
2015	89	103	41	1	0	**234**
2016	79	367	45	3	0	**494**
Total	**577**	**886**	**243**	**25**	**1**	**1732**
% of Total Strandings	***33.31%***	***51.15%***	***14.03%***	***1.44%***	***0.06%***	***100%***

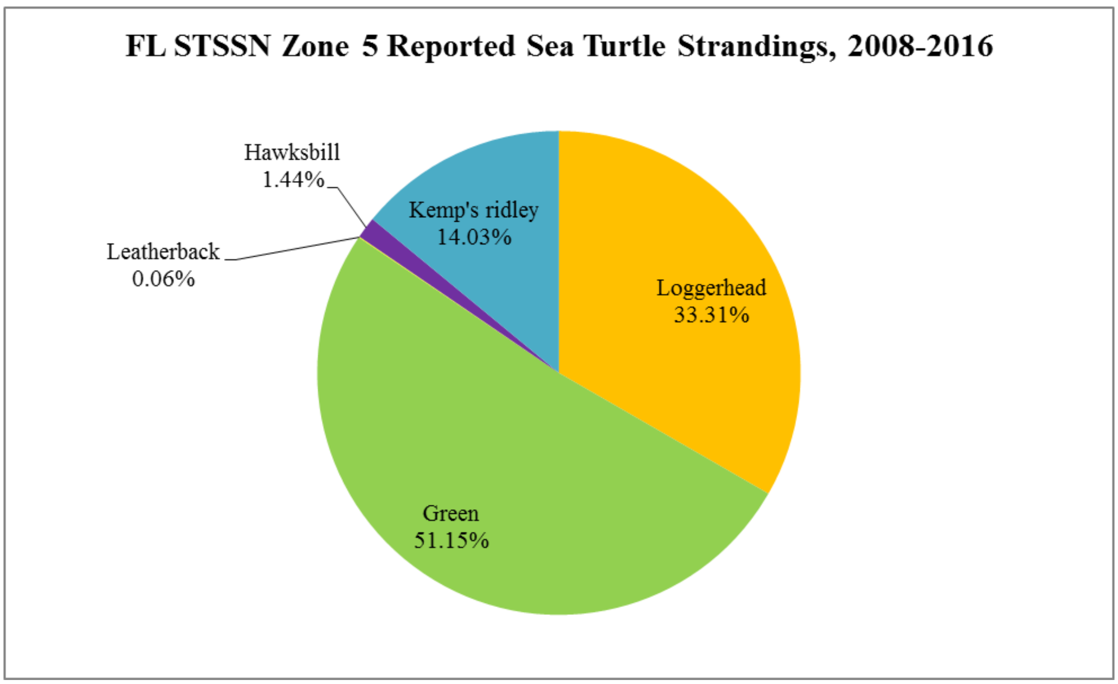

Figure 4. Species composition (number and percentage) of sea turtle strandings from 2008-2016 in the Tampa Bay area (FL STSSN Zone 5), not including incidents where the species was unidentifiable (*Source: FL STSSN*)

Using the data from FL STSSN, as well as the best available information on the life history strategies of ESA-listed species under NMFS's jurisdiction, we are able to make the following determinations about the effects the proposed action may have on endangered and threatened species (Table 2).

Table 2. Effects Determinations for Species the Action Agency and/or NMFS Believes May Be Affected by the Proposed Action

Species	ESA Listing Status	Action Agency Effect Determination	NMFS Effect Determination
Sea Turtles			
Green (NA DPS)	T	NLAA	LAA
Green (SA DPS)	T	NLAA	LAA
Kemp's ridley	E	NLAA	LAA
Leatherback	E	NLAA	NLAA
Loggerhead (NWA DPS)	T	NLAA	LAA
Hawksbill	E	NLAA	NLAA
Fish			
Smalltooth sawfish (U.S. DPS)	E	NLAA	LAA
E = endangered; T = threatened; NLAA = may affect, not likely to adversely affect; LAA = may affect, likely to adversely affect			

Sea turtles and smalltooth sawfish occurring in the action area could be affected by the proposed action by becoming entangled in, ingesting, or being physically injured by, fishing gear at the CAMP. However, we believe this risk will be discountable for hawksbill and leatherback sea turtles, due to their foraging preferences and extremely low encounter numbers in the action area and the entire state of Florida. Hawksbill sea turtles forage primarily on encrusting sponges, while leatherback sea turtles forage primarily on soft-bodied prey such as jellies and salps. Because of their forage preferences we do not expect hawksbill and leatherback sea turtles to attempt to forage on recreational fishing bait. This decreases hawksbill and leatherback sea turtles' risk of incidental hooking or ingestion of, or entanglement in, fishing gear at the CAMP. Additionally, from 2007-2016, only 26 stranded hawksbill sea turtles and only 5 stranded leatherback sea turtles were observed within FL STSSN Zone 5, and none of the stranding reports indicated hook and line interaction as the cause of injury or stranding (FL STSSN). Finally, hook and line incidental capture data on sea turtles from 2008-2016 reveals that only 3 hawksbill sea turtles and 1 leatherback sea turtle were reported to have been caught via hook and line over that time period across the entire state of Florida, and none of these incidents occurred along Florida's Gulf coast (FL STSSN). This further illustrates our belief that these species are not likely to be adversely affected from interactions with fishing gear at the CAMP.

As discussed below, we have also concluded that the other components of the proposed action related to construction activities are not likely to adversely affect hawksbill and leatherback sea turtles. Therefore, we have determined that these species are not likely to be adversely affected by the proposed action.

4.1 Components of the Action Not Likely to Adversely Affect Species

Although loggerhead (NWA DPS), Kemp's ridley and green sea turtles (NA and SA DPSs), and smalltooth sawfish (U.S. DPS) are likely to be adversely affected by the proposed action, there are some components of the proposed action that may affect, but are not likely to adversely affect, any of the species listed in Table 2. These components are discussed here. Section 4.2 and the remainder of this Opinion will then focus on those aspects of the proposed action that are likely to adversely affect loggerhead, Kemp's ridley and green sea turtles, and smalltooth sawfish.

Effects to sea turtles and smalltooth sawfish include the risk of injury from construction equipment or materials throughout the pier reconstruction, which will be discountable due to the species' ability to move away from the project site if disturbed. The applicant's implementation of NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions* will further reduce the risk by requiring all construction workers to watch for sea turtles and smalltooth sawfish. Operation of any mechanical construction equipment will cease immediately if a sea turtle of smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities will not resume until the protected species has departed the project area of its own volition.

Sea turtles and smalltooth sawfish may be affected by being temporarily unable to access the project area for foraging or refuge, due to their avoidance of construction activities, related noise, and physical exclusion from areas blocked by turbidity curtains. Although sea turtles and smalltooth sawfish may be temporarily unable to access the construction area, we believe these effects will be insignificant as this is an open-water area with similar surrounding habitat. The site does not provide substantial forage and refuge resources. Additionally, the turbidity curtains will be removed after construction, and will not appreciably block use of the areas by the species.

The new pier will be constructed in the exact same footprint as the old pier, so there will be no permanent change to the habitat in the action area. Therefore, we do not anticipate any permanent habitat effects that would impact sea turtles or smalltooth sawfish.

Pile driving may generate turbidity in the area, which can decrease the water quality for sea turtles and smalltooth sawfish; however, this effect will be insignificant given the deployment of turbidity curtains around in-water construction to contain suspended sediments.

The project proposes to reconstruct a temporary vessel landing, and sea turtles swimming at the surface may be injured or killed if they are struck by a vessel. However, we believe this effect is discountable due to the fact that this structure was present at the old pier and thus won't change the amount or frequency of vessels docking at the CAMP (no new vessels are being added). Furthermore, according to a NMFS Protected Resources Division analysis (Barnette 2013), it would take an introduction of at least 300 new vessels to an area to result in the injury or death (due to vessel collision) of 1 sea turtle in any single year. Because this project will not result in the addition of new vessels, we believe it is extremely unlikely that sea turtles will be killed or injured by new or increased vessel traffic. Therefore, this effect is discountable. Smalltooth sawfish are demersal species, and do not typically swim at the surface; therefore, we do not expect there to be an increased risk of vessel strike for smalltooth sawfish, regardless of any changes in vessel traffic.

Effects to listed species as a result of noise created by construction activities can physically injure animals in the affected areas or change animal behavior in the affected areas. Injurious effects can occur in 2 ways. First, immediate adverse effects can occur to listed species if a single noise event exceeds the threshold for direct physical injury. Second, effects can result from prolonged exposure to noise levels that exceed the daily cumulative exposure threshold for the animals, and these can constitute adverse effects if animals are exposed to the noise levels for sufficient periods. Behavioral effects can be adverse if such effects interfere with animals migrating, feeding, resting, or reproducing. Our evaluation of effects to listed species as a result of noise created by construction activities is based on the analysis prepared in support of the Opinion for SAJ-82 (NMFS 2014). The noise analysis in this consultation evaluates effects to ESA-listed fish and sea turtles identified by NMFS as potentially affected in Table 2, above.

The project will involve the installation of piles using both vibratory and impact hammer methods. When there are multiple methods of pile driving in one proposed action, we generally provide the most conservation-oriented analysis for listed species, and evaluate the activity with the most significant potential impact. The effects of impact hammering are far greater than those of vibratory pile driving, so the use of a vibratory pile driver for this project will not be discussed further.

Based on our noise calculations, installation of 240 concrete piles, up to 12-in in diameter, by impact hammer will not cause single-strike or peak-pressure injurious noise effects. However, the cumulative sound exposure level of multiple pile strikes over the course of a day may cause injury to ESA-listed fishes and sea turtles up to 72 ft (22 m) away from the pile. Due to the mobility of sea turtles and ESA-listed fish species, and because the project occurs in open water, we expect them to move away from noise disturbances. Because we anticipate the animal will move away, we believe that an animal's suffering physical injury from noise is extremely unlikely to occur and is therefore discountable. An animal's movement away from the injurious sound radius is a behavioral response, with the same effects discussed below.

The installation of piles using an impact hammer could also result in behavioral effects at radii 705 ft (215 m) for ESA-listed fishes and 151 ft (46 m) for sea turtles. Due to the mobility of sea turtles and ESA-listed fish species, we expect them to move away from noise disturbances in this open-water environment. Because there is similar habitat nearby, we believe behavioral effects will be insignificant. If an individual chooses to remain within the behavioral response zone, it could be exposed to behavioral noise impacts during pile installation. Since installation will occur only during the day, these species will be able to resume normal activities during quiet periods between pile installations and at night. Therefore, we anticipate any behavioral effects will be insignificant.

Because these components of the action are not likely to adversely affect listed species, they will not be analyzed further in this Opinion.

4.2 Status of Species Likely to be Adversely Affected by the Proposed Action

The main goal of the CAMP is to facilitate recreational fishing, which could injure or kill sea turtles and smalltooth sawfish via accidental hooking and entanglement either by actively fished lines, discarded, remnant, or broken-off fishing lines, and/or other debris. We evaluated the threats posed by the proposed project to these species based on their abundance in the area, their habitat and feeding preferences, and the best available scientific and commercial data on recreational fishing from piers in Florida and the Gulf of Mexico.

Green sea turtles (NA and SA DPSs), Kemp's ridley sea turtles, loggerhead sea turtles (NWA DPS), and smalltooth sawfish (U.S. DPS) are likely to be adversely affected by the proposed action.

The analyses of the effects which are likely to adversely affect these species are discussed in Section 6, Effects of the Action, below.

The following subsections are synopses of the best available information on the status of each species likely to be adversely affected by one or more components of the proposed action, including information on the distribution, population structure, life history, abundance, population trends of each species, and threats to each species. The biology and ecology of these species, as well as their status and trends, inform the effects analysis for this Opinion.

Additional background information on the status of these species can be found in a number of published documents, including: proposed and final listing rules, recovery plans, 5-year status reviews, stock assessments, and biological reports. These can all be found on NMFS's Endangered Species Conservation website: http://www.fisheries.noaa.gov/topic/endangered-species-conservation.

4.3 Sea Turtles

Green sea turtles (NA and SA DPSs), Kemp's ridley sea turtles, and loggerhead sea turtles (NWA DPS) travel widely throughout the South Atlantic, Gulf of Mexico and the Caribbean. These species are highly migratory and therefore could occur within the action area. Here we address general threats faced by all sea turtle species. Sections 4.3.1, 4.3.2, and 4.3.3 will address information on the distribution, life history, population structure, abundance, population trends, and unique threats to each species of sea turtle likely to be adversely affected by the proposed action (greens, loggerheads, and Kemp's ridleys, respectively).

General Threats Faced by All Sea Turtle Species

Sea turtles face numerous natural and man-made threats that shape their status and affect their ability to recover. Many of the threats are either the same or similar in nature for all listed sea turtle species, those identified in this section are discussed in a general sense for all sea turtles. Threat information specific to a particular species are then discussed in the corresponding status sections where appropriate.

Fisheries

Incidental bycatch in commercial fisheries is identified as a major contributor to past declines, and threat to future recovery, for all of the sea turtle species (NMFS et al. 2011; NMFS and USFWS 1991; NMFS and USFWS 1992; NMFS and USFWS 1993; NMFS and USFWS 2008). Domestic fisheries often capture, injure, and kill sea turtles at various life stages. Sea turtles in the pelagic environment are exposed to U.S. Atlantic pelagic longline fisheries. Sea turtles in the benthic environment in waters off the coastal United States are exposed to a suite of other fisheries in federal and state waters. These fishing methods include trawls, gillnets, purse seines, hook-and-line gear (including bottom longlines and vertical lines [e.g., bandit gear, handlines, and rod-reel]), pound nets, and trap fisheries. The Environmental Baseline (Section 5) of this Opinion has more specific information regarding federal and state managed fisheries affecting sea turtles within the action area. The 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 sea turtles each year.

In addition to domestic fisheries, sea turtles are subject to direct as well as incidental capture in numerous foreign fisheries, further impeding the ability of sea turtles to survive and recover on a global scale. For example, pelagic stage sea turtles, especially loggerheads and leatherbacks, circumnavigating the Atlantic are susceptible to international longline fisheries including the Azorean, Spanish, and various other fleets (Aguilar et al. 1994; Bolten et al. 1994). Bottom longlines 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 incidents or incomplete records by foreign fleets make 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.

Non-Fishery In-Water Activities
There are also many non-fishery impacts affecting the status of sea turtle species, both in the ocean and on land. 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 also 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, in-water construction activities, and scientific research activities.

Coastal Development and Erosion Control
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 (Bouchard et al. 1998; Lutcavage et al. 1997). These factors may decrease the amount of nesting area available to females and change the natural behaviors of both adults and hatchlings, directly or indirectly, through loss of beach habitat or changing thermal profiles and increasing erosion, respectively (Ackerman 1997; Witherington et al. 2003; Witherington et al. 2007). In addition, coastal development is usually accompanied by artificial lighting which can 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). In-water erosion control structures such as

breakwaters, groins, and jetties can impact nesting females and hatchling as they approach and leave the surf zone or head out to sea by creating physical blockage, concentrating predators, creating longshore currents, and disrupting of wave patterns.

Environmental Contamination

Multiple municipal, industrial, and household sources, as well as atmospheric transport, introduce various pollutants such as pesticides, hydrocarbons, organochlorides (e.g., dichlorodiphenyltrichloroethane [DDT], polychlorinated biphenyls [PCBs], and perfluorinated chemicals [PFCs]), and others that may cause adverse health effects to sea turtles (Garrett 2004; Grant and Ross 2002; Hartwell 2004; Iwata et al. 1993). 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.

The April 20, 2010, explosion of the Deepwater Horizon (DWH) oil rig affected sea turtles in the Gulf of Mexico. An assessment has been completed on the injury to Gulf of Mexico marine life, including sea turtles, resulting from the spill (DWH Trustees 2015). Following the spill, juvenile Kemp's ridley, green, and loggerhead sea turtles were found in *Sargassum* algae mats in the convergence zones, where currents meet and oil collected. Sea turtles found in these areas were often coated in oil and/or had ingested oil. The spill resulted in the direct mortality of many sea turtles and may have had sublethal effects or caused environmental damage that will impact other sea turtles into the future. Information on the spill impacts to individual sea turtle species is presented in the following sections for each species (Section 4.3.1 for green sea turtles, Section 4.3.2 for loggerhead sea turtles, and Section 4.3.3 for Kemp's ridley sea turtles).

Marine debris is a continuing problem for sea turtles. Sea turtles living in the pelagic environment commonly eat or become entangled in marine debris (e.g., tar balls, plastic bags/pellets, balloons, and ghost fishing gear) as they feed along oceanographic fronts where debris and their natural food items converge. This is especially problematic for sea turtles that spend all or significant portions of their life cycle in the pelagic environment (i.e., leatherbacks, juvenile loggerheads, and juvenile green turtles).

Climate Change

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 be predicted with any degree of certainty; however, significant impacts to the hatchling sex ratios of sea turtles may result (NMFS and USFWS 2007b). In sea turtles, sex is determined by the ambient sand temperature (during 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 2007b).

The effects from increased temperatures may be intensified 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 (Baker et al. 2006; Daniels et al. 1993; Fish et al. 2005). 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) could influence the distribution and abundance of lower trophic levels (e.g., phytoplankton, zooplankton, submerged aquatic vegetation, crustaceans, mollusks, forage fish) which could ultimately affect the primary foraging areas of sea turtles.

Other Threats

Predation by various land predators is a threat to developing nests and emerging hatchlings. The major natural predators of sea turtle nests are mammals, including raccoons, dogs, pigs, skunks, and badgers. Emergent hatchlings are preyed upon by these mammals as well as ghost crabs, laughing gulls, and the exotic South American fire ant (*Solenopsis invicta*). In addition to natural predation, direct 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).

Diseases, toxic blooms from algae and other microorganisms, and cold stunning events are additional sources of mortality that can range from local and limited to wide-scale and impacting hundreds or thousands of animals.

4.3.1 Green Sea Turtles

The green sea turtle was originally 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. On April 6, 2016, the original listing was replaced with the listing of 11 DPSs (81 FR 20057 2016). The Mediterranean, Central West Pacific, and Central South Pacific DPSs were listed as endangered. The North Atlantic, South Atlantic, Southwest Indian, North Indian, East Indian-West Pacific, Southwest Pacific, Central North Pacific, and East Pacific were listed as threatened. For the purposes of this consultation, only the SA DPS and NA DPS will be considered, as they are the only two DPSs with individuals occurring in the Atlantic and Gulf of Mexico waters of the United States.

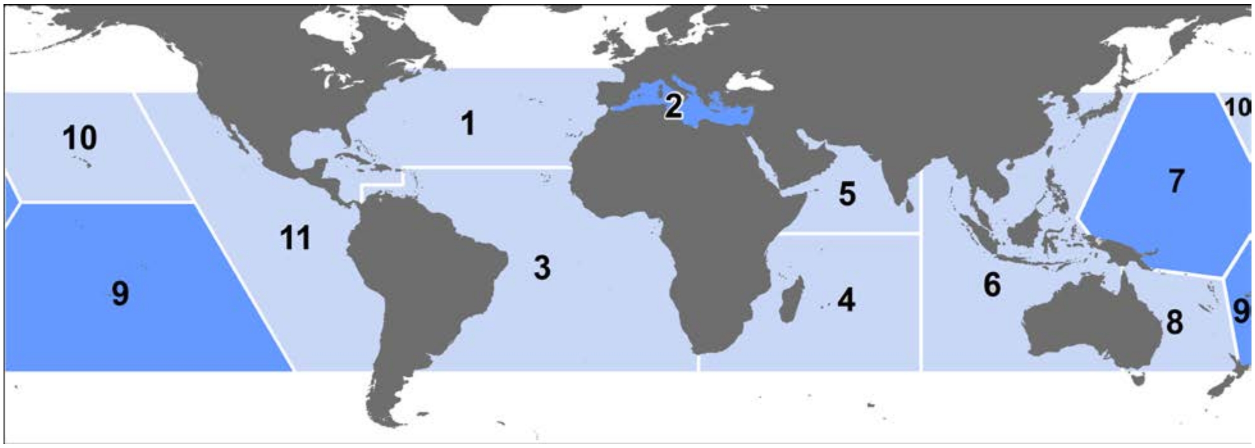

Figure 5. Threatened (light) and endangered (dark) green turtle DPSs: 1. North Atlantic, 2. Mediterranean, 3. South Atlantic, 4. Southwest Indian, 5. North Indian, 6. East Indian-West Pacific, 7. Central West Pacific, 8. Southwest Pacific, 9. Central South Pacific, 10. Central North Pacific, and 11. East Pacific.

Species Description and Distribution

The green sea turtle is the largest of the hardshell marine turtles, growing to a weight of 350 lb (159 kg) with a straight carapace length of greater than 3.3 ft (1 m). Green sea turtles have a smooth carapace with 4 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, or brown and black in starburst or irregular patterns (Lagueux 2001).

With the exception of post-hatchlings, green sea turtles live in nearshore tropical and subtropical waters where they generally feed on marine algae and seagrasses. They have specific foraging grounds and may make large migrations between these forage sites and natal beaches for nesting (Hays et al. 2001). Green sea turtles nest on sandy beaches of mainland shores, barrier islands, coral islands, and volcanic islands in more than 80 countries worldwide (Hirth 1997). The 2 largest nesting populations are found at Tortuguero, on the Caribbean coast of Costa Rica (part of the NA DPS), and Raine Island, on the Pacific coast of Australia along the Great Barrier Reef.

Differences in mitochondrial DNA properties of green sea turtles from different nesting regions indicate there are genetic subpopulations (Bowen et al. 1992; FitzSimmons et al. 2006). Despite the genetic differences, sea turtles from separate nesting origins are commonly found mixed together on foraging grounds throughout the species' range. Within U.S. waters individuals from both the NA and SA DPSs can be found on foraging grounds. While there are currently no in-depth studies available to determine the percent of NA and SA DPS individuals in any given location, two small-scale studies provide an insight into the degree of mixing on the foraging grounds. An analysis of cold-stunned green turtles in St. Joseph Bay, Florida (northern Gulf of Mexico) found approximately 4% of individuals came from nesting stocks in the SA DPS (specifically Suriname, Aves Island, Brazil, Ascension Island, and Guinea Bissau) (Foley et al. 2007). On the Atlantic coast of Florida, a study on the foraging grounds off Hutchinson Island found that approximately 5% of the turtles sampled came from the Aves Island/Suriname nesting assemblage, which is part of the SA DPS (Bass and Witzell 2000). All of the individuals in both studies were benthic juveniles. Available information on green turtle migratory behavior indicates that long distance dispersal is only seen for juvenile turtles. This suggests that larger adult-sized turtles return to forage within the region of their natal rookeries, thereby limiting the potential for gene flow across larger scales (Monzón-Argüello et al. 2010). While all of the mainland U.S. nesting individuals are part of the NA DPS, the U.S. Caribbean nesting assemblages are split between the NA and SA DPS. Nesters in Puerto Rico are part of the NA DPS, while those in the U.S. Virgin Islands are part of the SA DPS. We do not currently have information on what percent of individuals on the U.S. Caribbean foraging grounds come from which DPS.

North Atlantic DPS Distribution

The NA DPS boundary is illustrated in Figure 1. Four regions support nesting concentrations of particular interest in the NA DPS: Costa Rica (Tortuguero), Mexico (Campeche, Yucatan, and Quintana Roo), U.S. (Florida), and Cuba. By far the most important nesting concentration for green turtles in this DPS is Tortuguero, Costa Rica. Nesting also occurs in the Bahamas, Belize, Cayman Islands, Dominican Republic, Haiti, Honduras, Jamaica, Nicaragua, Panama, Puerto Rico, Turks and Caicos Islands, and North Carolina, South Carolina, Georgia, and Texas, U.S.A. In the eastern North Atlantic, nesting has been reported in Mauritania (Fretey 2001).

The complete nesting range of NA DPS green sea turtles within the southeastern United States includes sandy beaches between Texas and North Carolina, as well as Puerto Rico (Dow et al. 2007; NMFS and USFWS 1991). 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 south through Broward counties.

In U.S. Atlantic and Gulf of Mexico waters, green sea turtles are distributed throughout 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 (Doughty 1984; Hildebrand 1982; Shaver 1994), the Gulf of Mexico off Florida from Yankeetown to Tarpon Springs (Caldwell and Carr 1957), 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 sea 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 Yucatán Peninsula.

South Atlantic DPS Distribution

The SA DPS boundary is shown in Figure 1, and includes the U.S. Virgin Islands in the Caribbean. The SA DPS nesting sites can be roughly divided into four regions: western Africa, Ascension Island, Brazil, and the South Atlantic Caribbean (including Colombia, the Guianas, and Aves Island in addition to the numerous small, island nesting sites).

The in-water range of the SA DPS is widespread. In the eastern South Atlantic, significant sea turtle habitats have been identified, including green turtle feeding grounds in Corisco Bay, Equatorial Guinea/Gabon (Formia 1999); Congo; Mussulo Bay, Angola (Carr and Carr 1991); as well as Principe Island. Juvenile and adult green turtles utilize foraging areas throughout the Caribbean areas of the South Atlantic, often resulting in interactions with fisheries occurring in those same waters (Dow et al. 2007). Juvenile green turtles from multiple rookeries also frequently utilize the nearshore waters off Brazil as foraging grounds as evidenced from the frequent captures by fisheries (Lima et al. 2010; López-Barrera et al. 2012; Marcovaldi et al. 2009). Genetic analysis of green turtles on the foraging grounds off Ubatuba and Almofala, Brazil show mixed stocks coming primarily from Ascension, Suriname and Trindade as a secondary source, but also Aves, and even sometimes Costa Rica (North Atlantic DPS)(Naro-Maciel et al. 2007; Naro-Maciel et al. 2012). While no nesting occurs as far south as Uruguay and Argentina, both have important foraging grounds for South Atlantic green turtles (Gonzalez Carman et al. 2011; Lezama 2009; López-Mendilaharsu et al. 2006; Prosdocimi et al. 2012; Rivas-Zinno 2012).

Life History Information

Green sea turtles reproduce sexually, and mating occurs in the waters off nesting beaches and along migratory routes. Mature females return to their natal beaches (i.e., the same beaches where they were born) to lay eggs (Balazs 1982; Frazer and Ehrhart 1985) every 2-4 years while males are known to reproduce every year (Balazs 1983). In the southeastern United States, females generally nest between June and September, and peak nesting occurs in June and July (Witherington and Ehrhart 1989b). During the nesting season, females nest at approximately 2-week intervals, laying an average of 3-4 clutches (Johnson and Ehrhart 1996). Clutch size often varies among subpopulations, but mean clutch size is approximately 110-115 eggs. In Florida, green sea turtle nests contain an average of 136 eggs (Witherington and Ehrhart 1989b). Eggs incubate for approximately 2 months before hatching. Hatchling green sea turtles are approximately 2 inches (5 cm) in length and weigh approximately 0.9 ounces (25 grams). Survivorship at any particular nesting site is greatly influenced by the level of man-made stressors, with the more pristine and less disturbed nesting sites (e.g., along the Great Barrier Reef in Australia) showing higher survivorship values than nesting sites known to be highly disturbed (e.g., Nicaragua) (Campell and Lagueux 2005; Chaloupka and Limpus 2005).

After emerging from the nest, hatchlings swim to offshore areas and go through a post-hatchling pelagic stage where they are believed to live for several years. During this life stage, green sea turtles feed close to the surface on a variety of marine algae and other life associated with drift lines and debris. This early oceanic phase remains one of the most poorly understood aspects of green sea turtle life history (NMFS and USFWS 2007). Green sea turtles exhibit particularly slow growth rates of about 0.4-2 inches (1-5 cm) per year (Green 1993), which may be attributed to their largely herbivorous, low-net energy diet (Bjorndal 1982). At approximately 8-10 inches (20-25 cm) carapace length, juveniles leave the pelagic environment and enter nearshore developmental habitats such as protected lagoons and open coastal areas rich in sea grass and marine algae. Growth studies using skeletochronology indicate that green sea turtles in the western Atlantic shift from the oceanic phase to nearshore developmental habitats after approximately 5-6 years (Bresette et al. 2006; Zug and Glor 1998). Within the developmental habitats, juveniles begin the switch to a more herbivorous diet, and by adulthood feed almost exclusively on seagrasses and algae (Rebel 1974), although some populations are known to also feed heavily on invertebrates (Carballo et al. 2002). Green sea turtles mature slowly, requiring 20-50 years to reach sexual maturity (Chaloupka and Musick 1997; Hirth 1997).

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 sea turtles have been identified through flipper tagging and/or satellite telemetry. Based on these studies, the majority of adult female Florida green sea turtles are believed to reside in nearshore foraging areas throughout the Florida Keys and in the waters southwest of Cape Sable, and some post-nesting turtles also reside in Bahamian waters as well (NMFS and USFWS 2007).

Status and Population Dynamics

Accurate population estimates for marine turtles do not exist because of the difficulty in sampling turtles over their geographic ranges and within their marine environments. Nonetheless, researchers have used nesting data to study trends in reproducing sea turtles over time. A summary of nesting trends and nester abundance is provided in the most recent status review for the species (Seminoff et al. 2015), with information for each of the DPSs.

North Atlantic DPS

The NA DPS is the largest of the 11 green turtle DPSs, with an estimated nester abundance of over 167,000 adult females from 73 nesting sites. Overall this DPS is also the most data rich. Eight of the sites have high levels of abundance (i.e., <1000 nesters), located in Costa Rica, Cuba, Mexico, and Florida. All major nesting populations demonstrate long-term increases in abundance (Seminoff et al. 2015).

Tortuguero, Costa Rica is by far the predominant nesting site, accounting for an estimated 79% of nesting for the DPS (Seminoff et al. 2015). Nesting at Tortuguero appears to have been increasing since the 1970’s, when monitoring began. For instance, from 1971-1975 there were approximately 41,250 average annual emergences documented and this number increased to an average of 72,200 emergences from 1992-1996 (Bjorndal et al. 1999). 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 nesting females per year (NMFS and USFWS 2007). Modeling by Chaloupka et al. (2008) using data sets of 25 years or more resulted in an estimate of the Tortuguero, Costa Rica population’s growing at 4.9% annually.

In the continental United States, green sea turtle nesting occurs along the Atlantic coast, primarily along the central and southeast coast of Florida (Meylan et al. 1994; Weishampel et al. 2003). Occasional nesting has also been documented along the Gulf Coast of Florida (Meylan et al. 1995). Green sea turtle nesting is documented annually on beaches of North Carolina, South Carolina, and Georgia, though nesting is found in low quantities (up to tens of nests) (nesting databases maintained on www.seaturtle.org).

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, the pattern of green sea turtle nesting has generally shown biennial peaks in abundance with a positive trend during the 10 years of regular monitoring (Figure 6). According to data collected from Florida's index nesting beach survey from 1989-2017, green sea turtle nest counts across Florida have increased dramatically, from a low of 267 in the early 1990s to a high of 38,954 in 2017. Two consecutive years of nesting declines in 2008 and 2009 caused some concern, but this was followed by increases in 2010 and 2011, and a return to the trend of biennial peaks in abundance thereafter (Figure 6). Modeling by Chaloupka et al. (2008) using data sets of 25 years or more resulted in an estimate of the Florida nesting stock at the Archie Carr National Wildlife Refuge growing at an annual rate of 13.9% at that time. Increases have been even more rapid in recent years.

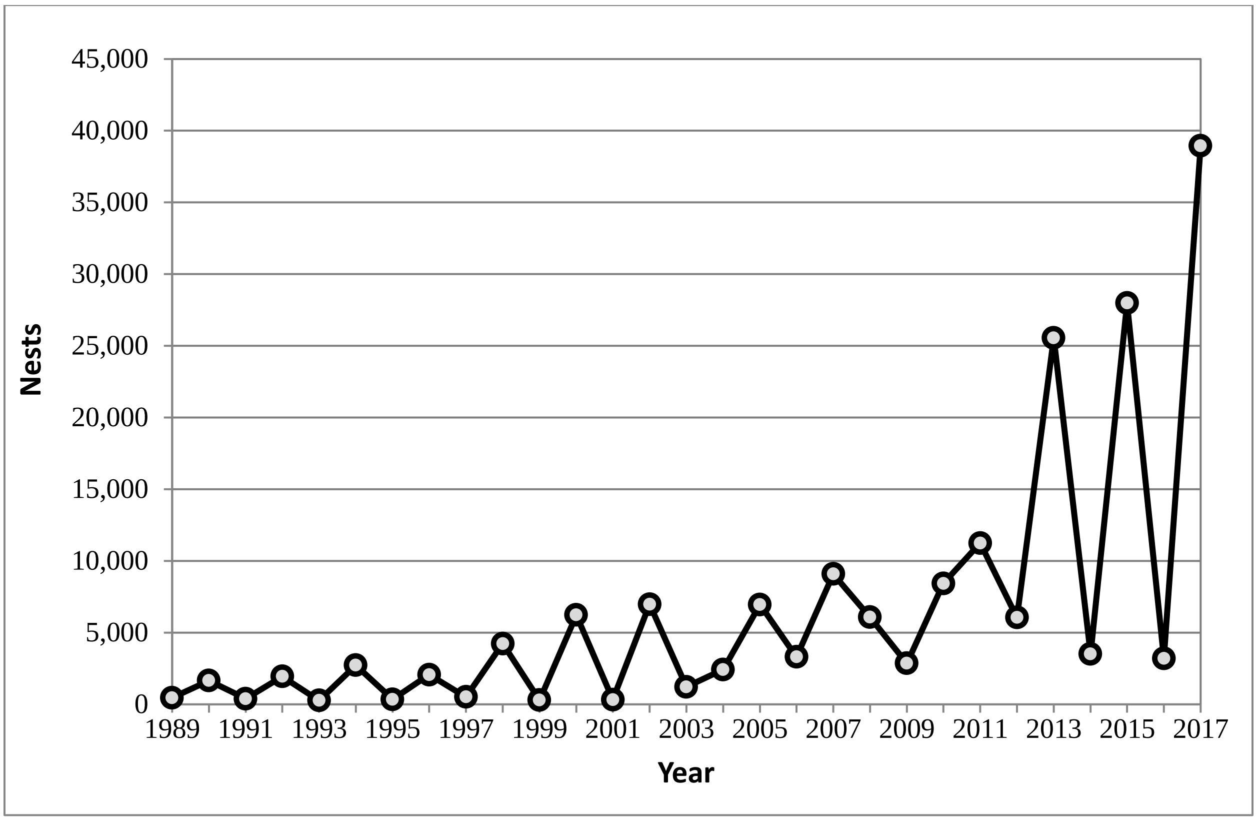

Figure 6. Green sea turtle nesting at Florida index beaches since 1989

Similar to the nesting trend found in Florida, in-water studies in Florida have also recorded increases in green turtle captures at the Indian River Lagoon site, with a 661 percent increase over 24 years (Ehrhart et al. 2007), and the St Lucie Power Plant site, with a significant increase in the annual rate of capture of immature green turtles (SCL<90 cm) from 1977 to 2002 or 26 years (3,557 green turtles total; M. Bressette, Inwater Research Group, unpubl. data; (Witherington et al. 2006).

South Atlantic DPS

The SA DPS is large, estimated at over 63,000 nesters, but data availability is poor. More than half of the 51 identified nesting sites (37) did not have sufficient data to estimate number of nesters or trends (Seminoff et al. 2015). This includes some sites, such as beaches in French Guiana, which are suspected to have large numbers of nesters. Therefore, while the estimated number of nesters may be substantially underestimated, we also do not know the population trends at those data-poor beaches. However, while the lack of data was a concern due to increased uncertainty, the overall trend of the SA DPS was not considered to be a major concern as some of the largest nesting beaches such as Ascension Island, Aves Island (Venezuela), and Galibi (Suriname) appear to be increasing. Others such as Trindade (Brazil), Atol das Rocas (Brazil), and Poilão and the rest of Guinea-Bissau seem to be stable or do not have sufficient data to make a determination. Bioko (Equatorial Guinea) appears to be in decline but has less nesting than the other primary sites (Seminoff et al. 2015).

In the U.S., nesting of SA DPS green turtles occurs on the beaches of the U.S. Virgin Islands, primarily on Buck Island. There is insufficient data to determine a trend for Buck Island nesting, and it is a smaller rookery, with approximately 63 total nesters utilizing the beach (Seminoff et al. 2015).

Threats

The principal cause of past declines and extirpations of green sea turtle assemblages has been the overexploitation of the species 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. Green sea turtles also 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 (e.g., plastics, petroleum products, petrochemicals), ecosystem alterations (e.g., nesting beach development, beach nourishment and shoreline stabilization, vegetation changes), poaching, global climate change, fisheries interactions, natural predation, and disease. A discussion on general sea turtle threats can be found in Section 4.3.

In addition to general threats, green sea turtles are susceptible to natural mortality from Fibropapillomatosis (FP) disease. FP results in the growth of tumors on soft external tissues (flippers, neck, tail, etc.), the carapace, the eyes, the mouth, and internal organs (gastrointestinal tract, heart, lungs, etc.) of turtles (Aguirre et al. 2002; Herbst 1994; Jacobson et al. 1989). These tumors range in size from 0.04 inches (0.1 cm) to greater than 11.81 inches (30 cm) in diameter and may affect swimming, vision, feeding, and organ function (Aguirre et al. 2002; Herbst 1994; Jacobson et al. 1989). Presently, scientists are unsure of the exact mechanism causing this disease, though it is believed to be related to both an infectious agent, such as a virus (Herbst et al. 1995), and environmental conditions (e.g., habitat degradation, pollution, low wave energy, and shallow water (Foley et al. 2005). FP is cosmopolitan, but it has been found to affect large numbers of animals in specific areas, including Hawaii and Florida (Herbst 1994; Jacobson 1990; Jacobson et al. 1991).

Cold-stunning is another natural threat to green sea turtles. Although it is not considered a major source of mortality in most cases, as temperatures fall below 46.4°-50°F (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 1989a). 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, and hundreds found dead or dying. A large cold-stunning event occurred in the western Gulf of Mexico in February 2011, resulting in approximately 1,650 green sea turtles found cold-stunned in Texas. Of these, approximately 620 were found dead or died after stranding, while approximately 1,030 turtles were rehabilitated and released. During this same time frame, approximately 340 green sea turtles were found cold-stunned in Mexico, though approximately 300 of those were subsequently rehabilitated and released.

Whereas oil spill impacts are discussed generally for all species in Section 4.3, specific impacts of the DWH spill on green sea turtles are considered here. Impacts to green sea turtles occurred to offshore small juveniles only. A total of 154,000 small juvenile greens (36.6% of the total small juvenile sea turtle exposures to oil from the spill) were estimated to have been exposed to oil. A large number of small juveniles were removed from the population, as 57,300 small juveniles greens are estimated to have died as a result of the exposure. A total of 4 nests (580 eggs) were also translocated during response efforts, with 455 hatchlings released (the fate of which is unknown) (DWH Trustees 2015). Additional unquantified effects may have included 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, and loss of foraging resources which could lead to compromised growth and/or reproductive potential. There is no information currently available to determine the extent of those impacts, if they occurred.

While green turtles regularly use the northern Gulf of Mexico, they have a widespread distribution throughout the entire Gulf of Mexico, Caribbean, and Atlantic, and the proportion of the population using the northern Gulf of Mexico at any given time is relatively low. Although it is known that adverse impacts occurred and numbers of animals in the Gulf of Mexico were reduced as a result of the Deepwater Horizon oil spill of 2010 (DWH), the relative proportion of the population that is expected to have been exposed to and directly impacted by the DWH event, as well as the impacts being primarily to smaller juveniles (lower reproductive value than adults and large juveniles), reduces the impact to the overall population. It is unclear what impact these losses may have caused on a population level, but it is not expected to have had a large impact on the population trajectory moving forward. However, recovery of green turtle numbers equivalent to what was lost in the northern Gulf of Mexico as a result of the spill will likely take decades of sustained efforts to reduce the existing threats and enhance survivorship of multiple life stages (DWH Trustees 2015).

4.3.2 Loggerhead Sea Turtles

The loggerhead sea turtle was listed as a threatened species throughout its global range on July 28, 1978. NMFS and USFWS published a Final Rule which designated 9 DPSs for loggerhead sea turtles (76 FR 58868, September 22, 2011, and effective October 24, 2011). This rule listed the following DPSs: (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 (NWA) DPS is the only one that occurs within the action area, and therefore it is the only one considered in this Opinion.

Species Description and Distribution

Loggerheads are large sea turtles. Adults in the southeast United States average about 3 ft (92 cm) long, measured as a straight carapace length (SCL), and weigh approximately 255 lb (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, 5 pairs of costals, 5 vertebrals, and a nuchal (precentral) scute that is in contact with the first pair of costal scutes (Dodd Jr. 1988).

The loggerhead sea turtle inhabits continental shelf and estuarine environments throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans (Dodd Jr. 1988). Habitat uses within these areas vary by life stage. Juveniles are omnivorous and forage on crabs, mollusks, jellyfish, and vegetation at or near the surface (Dodd Jr. 1988). Subadult and adult loggerheads are primarily found in coastal waters and eat benthic invertebrates such as mollusks and decapod crustaceans in hard bottom habitats.

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). For the NWA DPS, most nesting occurs along the coast of the United States, from southern Virginia to Alabama. Additional nesting beaches for this DPS are found along the northern and western Gulf of Mexico, eastern Yucatán Peninsula, at Cay Sal Bank in the eastern Bahamas (Addison 1997; Addison and Morford 1996), off the southwestern coast of Cuba (Moncada Gavilan 2001), and along the coasts of Central America, Colombia, Venezuela, and the eastern Caribbean Islands.

Non-nesting, adult female loggerheads are reported throughout the U.S. Atlantic, Gulf of Mexico, and Caribbean Sea. Little is known about the distribution of adult males who are seasonally abundant near nesting beaches. Aerial surveys suggest that loggerheads as a whole are distributed in U.S. waters as follows: 54% off the southeast U.S. coast, 29% off the northeast U.S. coast, 12% in the eastern Gulf of Mexico, and 5% in the western Gulf of Mexico (TEWG 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 5 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 of the state 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 2001).

The recovery plan for the Northwest Atlantic population of loggerhead sea turtles concluded that there is no genetic distinction between loggerheads nesting on adjacent beaches along the Florida Peninsula. It also concluded that specific boundaries for subpopulations could not be designated based on genetic differences alone. Thus, the recovery 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 as follows: (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.

Life History Information

The Northwest Atlantic Loggerhead Recovery Team defined the following 8 life stages for the loggerhead life cycle, which include the ecosystems those stages generally use: (1) egg (terrestrial zone), (2) hatchling stage (terrestrial zone), (3) hatchling swim frenzy and transitional stage (neritic zone[1]), (4) juvenile stage (oceanic zone), (5) juvenile stage (neritic zone), (6) adult stage (oceanic zone), (7) adult stage (neritic zone), and (8) nesting female (terrestrial zone) (NMFS and USFWS 2008). Loggerheads are long-lived animals. They reach sexual maturity between 20-38 years of age, although age of maturity varies widely among populations (Frazer and Ehrhart 1985; NMFS 2001). The annual mating season occurs from late March to early June, and female turtles lay eggs throughout the summer months. Females deposit an average of 4.1 nests within a nesting season (Murphy and Hopkins 1984), but an individual female only nests every 3.7 years on average (Tucker 2010). Each nest contains an average of 100-126 eggs (Dodd Jr. 1988) which incubate for 42-75 days before hatching (NMFS and USFWS 2008). Loggerhead hatchlings are 1.5-2 inches long and weigh about 0.7 oz (20 g).

As post-hatchlings, loggerheads hatched on U.S. beaches enter the "oceanic juvenile" life stage, migrating offshore and becoming associated with *Sargassum* habitats, driftlines, and other convergence zones (Carr 1986; Conant et al. 2009; Witherington 2002). Oceanic juveniles grow at rates of 1-2 inches (2.9-5.4 cm) per year (Bjorndal et al. 2003; Snover 2002) over a period as long as 7-12 years (Bolten et al. 1998) before moving to more coastal habitats. 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 (Bolten and Witherington 2003; Laurent et al. 1998). These studies suggest some turtles may either remain in the oceanic habitat in the North Atlantic longer than hypothesized, or they move back and forth between oceanic and coastal habitats interchangeably (Witzell 2002). Stranding

[1] Neritic refers to the nearshore marine environment from the surface to the sea floor where water depths do not exceed 200 meters.

records indicate that when immature loggerheads reach 15-24 in (40-60 cm) SCL, they begin to reside in coastal inshore waters of the continental shelf throughout the U.S. Atlantic and Gulf of Mexico (Witzell 2002).

After departing the oceanic zone, neritic juvenile loggerheads in the Northwest Atlantic inhabit continental shelf waters from Cape Cod Bay, Massachusetts, south through Florida, The Bahamas, Cuba, and the Gulf of Mexico. Estuarine waters of the United States, including areas such as Long Island Sound, Chesapeake Bay, Pamlico and Core Sounds, Mosquito and Indian River Lagoons, Biscayne Bay, Florida Bay, as well as numerous embayments fringing the Gulf of Mexico, comprise important inshore habitat. Along the Atlantic and Gulf of Mexico shoreline, essentially all shelf waters are inhabited by loggerheads (Conant et al. 2009).

Like juveniles, non-nesting adult loggerheads also use the neritic zone. However, these adult loggerheads do not use the relatively enclosed shallow-water estuarine habitats with limited ocean access as frequently as juveniles. Areas such as Pamlico Sound, North Carolina, and the Indian River Lagoon, Florida, are regularly used by juveniles but not by adult loggerheads. Adult loggerheads do tend to use estuarine areas with more open ocean access, such as the Chesapeake Bay in the U.S. mid-Atlantic. 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 (Conant et al. 2009).

Offshore, adults primarily inhabit continental shelf waters, from New York south through Florida, The Bahamas, Cuba, and the Gulf of Mexico. Seasonal use of mid-Atlantic shelf waters, especially offshore New Jersey, Delaware, and Virginia during summer months, and offshore shelf waters, such as Onslow Bay (off the North Carolina coast), during winter months has also been documented (Hawkes et al. 2007)Georgia Department of Natural Resources, unpublished data; South Carolina Department of Natural Resources, unpublished data). Satellite telemetry has identified the shelf waters along the west Florida coast, The Bahamas, Cuba, and the Yucatán Peninsula as important resident areas for adult female loggerheads that nest in Florida (Foley et al. 2008; Girard et al. 2009; Hart et al. 2012). The southern edge of the Grand Bahama Bank is important habitat for loggerheads nesting on the Cay Sal Bank in The Bahamas, but nesting females are also resident in the bights of Eleuthera, Long Island, and Ragged Islands. They also reside in Florida Bay in the United States, and along the north coast of Cuba (A. Bolten and K. Bjorndal, University of Florida, unpublished data). Moncada et al. (2010) report the recapture of 5 adult female loggerheads in Cuban waters originally flipper-tagged in Quintana Roo, Mexico, which indicates that Cuban shelf waters likely also provide foraging habitat for adult females that nest in Mexico.

Status and Population Dynamics

A number of stock assessments and similar reviews (Conant et al. 2009; Heppell et al. 2003; NMFS-SEFSC 2009; NMFS 2001; NMFS and USFWS 2008; TEWG 1998; TEWG 2000; TEWG 2009) 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. Nesting beach surveys, though, can provide a reliable assessment of trends in the adult female population, due to the strong nest site fidelity of female loggerhead sea turtles, as long as such studies are sufficiently long and survey effort and methods are standardized (e.g., NMFS and USFWS 2008). NMFS and USFWS (2008) concluded that the lack of change in 2 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.

Peninsular Florida Recovery Unit

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 an average of 64,513 loggerhead nests per year, representing approximately 15,735 nesting females per year (NMFS and USFWS 2008). The statewide estimated total for 2017 was 96,912 nests (FWRI nesting database).

In addition to the total nest count estimates, the Florida Fish and Wildlife Research Institute (FWRI) uses an index nesting beach survey method. The index survey uses standardized data-collection criteria to measure seasonal nesting and allow accurate comparisons between beaches and between years. This provides a better tool for understanding the nesting trends (Figure 7). FWRI performed a detailed analysis of the long-term loggerhead index nesting data (1989-2016; http://myfwc.com/research/wildlife/sea-turtles/nesting/loggerhead-trend/). Over that time period, 3 distinct trends were identified. From 1989-1998, there was a 24% increase that was followed by a sharp decline over the subsequent 9 years. A large increase in loggerhead nesting has occurred since, as indicated by the 71% increase in nesting over the 10-year period from 2007 and 2016. Nesting in 2016 also represented a new record for loggerheads on the core index beaches. FWRI examined the trend from the 1998 nesting high through 2016 and found that the decade-long post-1998 decline was replaced with a slight but nonsignificant increasing trend. Looking at the data from 1989 through 2016, FWRI concluded that there was an overall positive change in the nest counts although it was not statistically significant due to the wide variability between 2012-2016 resulting in widening confidence intervals (http://myfwc.com/research/wildlife/sea-turtles/nesting/loggerhead-trend/). Nesting at the core index beaches declined in 2017 to 48,033, which is still the 4th highest total since 2001.

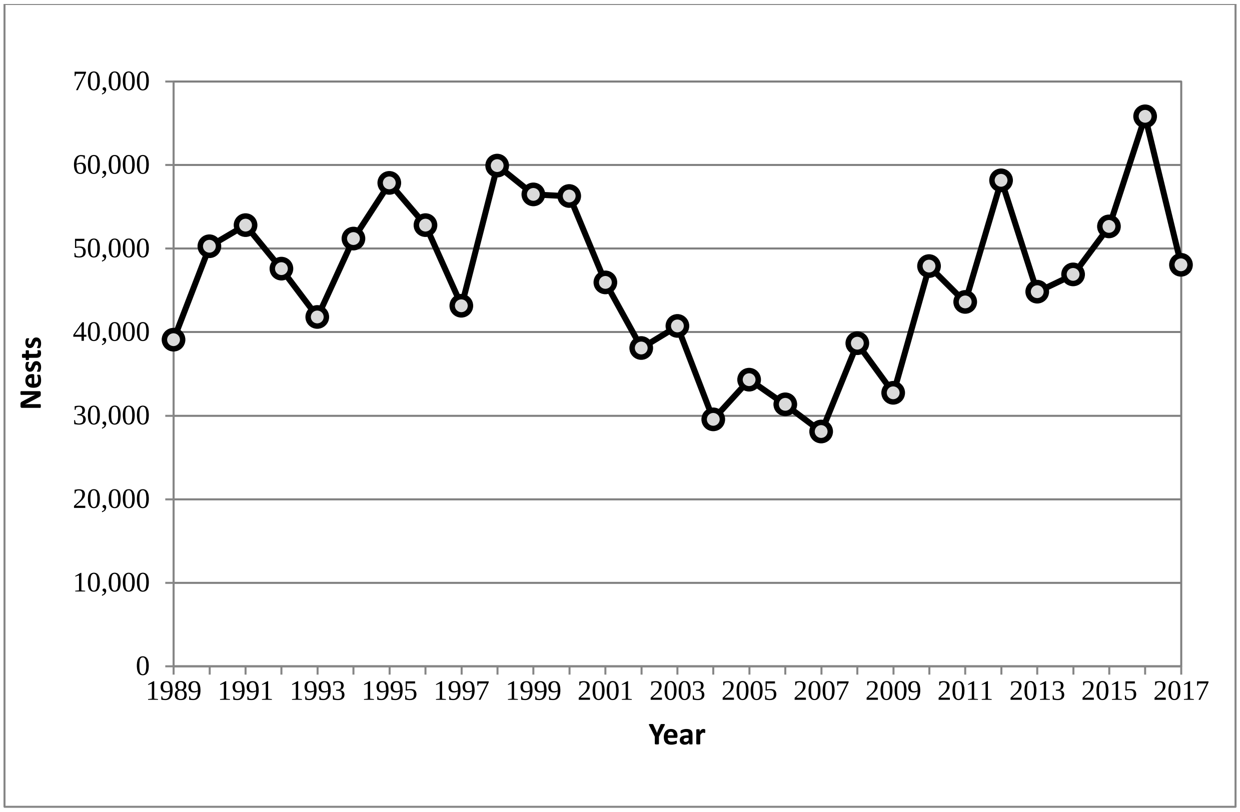

Figure 7. Loggerhead sea turtle nesting at Florida index beaches since 1989

Northern Recovery Unit

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 [GADNR] unpublished data, North Carolina Wildlife Resources Commission [NCWRC] unpublished data, South Carolina Department of Natural Resources [SCDNR] unpublished data), and represent approximately 1,272 nesting females per year, assuming 4.1 nests per female (Murphy and Hopkins 1984). The loggerhead nesting trend from daily beach surveys showed a significant decline of 1.3% annually from 1989-2008. Nest totals from aerial surveys conducted by SCDNR showed a 1.9% annual decline in nesting in South Carolina from 1980-2008. Overall, there are strong statistical data to suggest the NRU had experienced a long-term decline over that period of time.

Data since that analysis (Table 3) are showing improved nesting numbers and a departure from the declining trend. Georgia nesting has rebounded to show the first statistically significant increasing trend since comprehensive nesting surveys began in 1989 (Mark Dodd, GADNR press release, http://www.georgiawildlife.com/node/3139). South Carolina and North Carolina nesting have also begun to shift away from the past declining trend. Loggerhead nesting in Georgia, South Carolina, and North Carolina all broke records in 2015 and then topped those records again in 2016. Nesting in 2017 declined relative to 2016, back to levels seen in 2013 and 2015.

Table 3. Total Number of NRU Loggerhead Nests (GADNR, SCDNR, and NCWRC nesting datasets compiled at Seaturtle.org)

Nests Recorded	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Georgia	1,649	998	1,760	1,992	2,241	2,289	1,196	2,319	3,265	2,155
South Carolina	4,500	2,182	3,141	4,015	4,615	5,193	2,083	5,104	6,443	5,232
North Carolina	841	302	856	950	1,074	1,260	542	1,254	1,612	1,195
Total	**6,990**	**3,472**	**5,757**	**6,957**	**7,930**	**8,742**	**3,821**	**8,677**	**11,320**	**8,582**

South Carolina also conducts an index beach nesting survey similar to the one described for Florida. Although the survey only includes a subset of nesting, the standardized effort and locations allow for a better representation of the nesting trend over time. Increases in nesting were seen for the period from 2009-2013, with a subsequent steep drop in 2014. Nesting then rebounded in 2015 and 2016, setting new highs each of those years. Nesting in 2017 dropped back down from the 2016 high, but was still the second highest on record (Figure 8).

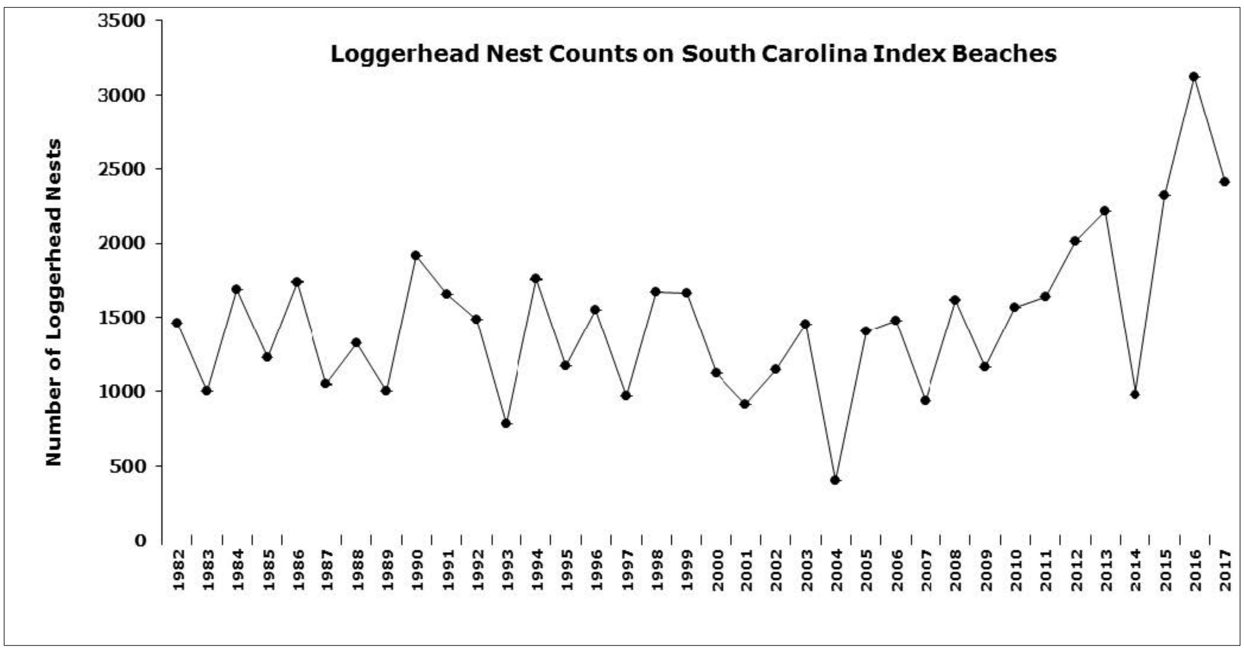

Figure 8. South Carolina index nesting beach counts for loggerhead sea turtles (from the SCDNR website: http://www.dnr.sc.gov/seaturtle/nest.htm)

<u>Other Northwest Atlantic DPS Recovery Units</u>

The remaining 3 recovery units—Dry Tortugas (DTRU), Northern Gulf of Mexico (NGMRU), and Greater Caribbean (GCRU)—are much smaller nesting assemblages, but they are 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 the 2002 year was missed. Nest counts ranged from 168-270, with a mean of 246, but there was 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 statistically significant declining trend of 4.7% annually. 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. Nesting survey effort has been inconsistent among the GCRU nesting beaches, and no trend can be determined for this subpopulation (NMFS and USFWS 2008). Zurita et al. (2003) found a statistically significant increase in the number of nests on 7 of the beaches on Quintana Roo, Mexico, from 1987-2001, where survey effort was consistent during the period. Nonetheless, nesting has declined since 2001, and the previously reported increasing trend appears to not have been sustained (NMFS and USFWS 2008).

<u>In-water Trends</u>

Nesting data are the best current indicator of sea turtle population trends, but in-water data also provide some insight. In-water research suggests the abundance of neritic juvenile loggerheads is steady or increasing. Although Ehrhart et al. (2007) found no significant regression-line trend in a long-term dataset, researchers have observed notable increases in catch per unit effort (CPUE) (Arendt et al. 2009; Ehrhart et al. 2007; Epperly et al. 2007). Researchers believe that this increase in CPUE is likely linked to an increase in juvenile abundance, although it is unclear whether this increase in abundance represents a true population increase among juveniles or merely a shift in spatial occurrence. Bjorndal et al. (2005), cited in NMFS and USFWS (2008), 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 oceanic/neritic juveniles (historically referred to as small benthic juveniles), which could indicate a relatively large number of individuals around the same age may mature in the near future (TEWG 2009). In-water studies throughout the eastern United States, however, indicate a substantial decrease in the abundance of the smallest oceanic/neritic juvenile loggerheads, a pattern corroborated by stranding data (TEWG 2009).

<u>Population Estimate</u>

The NMFS Southeast Fisheries Science Center developed a preliminary stage/age demographic model to help determine the estimated impacts of mortality reductions on loggerhead sea turtle population dynamics (NMFS-SEFSC 2009). 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. Resulting trajectories of model runs for each individual recovery unit, and the western North Atlantic population as a whole, were found to be very similar. The model run estimates from the adult female population size for the western North Atlantic (from the 2004-2008 time frame), suggest the adult female population size is approximately 20,000-40,000 individuals, with a low likelihood of females' numbering up to 70,000 (NMFS-SEFSC 2009). A less robust estimate for total benthic females in the western North Atlantic was also obtained, yielding approximately 30,000-300,000 individuals, up to less than 1 million (NMFS-SEFSC 2009). A preliminary regional abundance survey of loggerheads within the northwestern Atlantic continental shelf for positively identified loggerhead in all strata estimated about 588,000 loggerheads (interquartile range of 382,000-817,000). When correcting for unidentified turtles in proportion to the ratio of identified turtles, the estimate increased to about 801,000 loggerheads (interquartile range of 521,000-1,111,000) (NMFS-NEFSC 2011).

Threats Specific to Loggerhead Sea Turtles

The threats faced by loggerhead sea turtles are well summarized in the general discussion of threats in Section 4.3. Yet the impact of fishery interactions is a point of further emphasis for this species. The joint NMFS and USFWS Loggerhead Biological Review Team determined that the greatest threats to the NWA DPS of loggerheads result from cumulative fishery bycatch in neritic and oceanic habitats (Conant et al. 2009).

Regarding the impacts of pollution, loggerheads may be particularly affected by organochlorine contaminants; they have the highest organochlorine concentrations (Storelli et al. 2008) and metal loads (D'Ilio et al. 2011) in sampled tissues among the sea turtle species. It is thought that dietary preferences were likely to be the main differentiating factor among sea turtle 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).

While oil spill impacts are discussed generally for all species in Section 4.3, specific impacts of the DWH oil spill event on loggerhead sea turtles are considered here. Impacts to loggerhead sea turtles occurred to offshore small juveniles as well as large juveniles and adults. A total of 30,800 small juvenile loggerheads (7.3% of the total small juvenile sea turtle exposures to oil from the spill) were estimated to have been exposed to oil. Of those exposed, 10,700 small juveniles are estimated to have died as a result of the exposure. In contrast to small juveniles, loggerheads represented a large proportion of the adults and large juveniles exposed to and killed by the oil. There were 30,000 exposures (almost 52% of all exposures for those age/size classes) and 3,600 estimated mortalities. A total of 265 nests (27,618 eggs) were also translocated during response efforts, with 14,216 hatchlings released, the fate of which is unknown (DWH Trustees 2015). Additional unquantified effects may have included 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, and loss of foraging resources which could lead to compromised growth and/or reproductive potential. There is no information currently available to determine the extent of those impacts, if they occurred.

Unlike Kemp’s ridleys, the majority of nesting for the Northwest Atlantic Ocean loggerhead DPS occurs on the Atlantic coast, and thus loggerheads were impacted to a relatively lesser degree. However, it is likely that impacts to the NGMRU of the NWA loggerhead DPS would be proportionally much greater than the impacts occurring to other recovery units. Impacts to nesting and oiling effects on a large proportion of the NGMRU recovery unit, especially mating and nesting adults likely had an impact on the NGMRU. Based on the response injury evaluations for Florida Panhandle and Alabama nesting beaches (which fall under the NFMRU), the Trustees estimated that approximately 20,000 loggerhead hatchlings were lost due to DWH oil spill response activities on nesting beaches. Although the long-term effects remain unknown, the DWH oil spill event impacts to the Northern Gulf of Mexico Recovery Unit may result in some nesting declines in the future due to a large reduction of oceanic age classes during the DWH oil spill event. Although adverse impacts occurred to loggerheads, the proportion of the population that is expected to have been exposed to and directly impacted by the DWH oil spill event is relatively low. Thus we do not believe a population-level impact occurred due to the widespread distribution and nesting location outside of the Gulf of Mexico for this species.

Specific information regarding potential climate change impacts on loggerheads is also available. Modeling suggests an increase of 2°C in air temperature would result in a sex ratio of over 80% 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% female offspring. Such highly skewed sex ratios could undermine the reproductive capacity of the species. More ominously, an air temperature increase of 3°C is likely to exceed the thermal threshold of most nests, leading to egg mortality (Hawkes et al. 2007). Warmer sea surface temperatures have also been correlated with an earlier onset of loggerhead nesting in the spring (Hawkes et al. 2007; Weishampel et al. 2004), short inter-nesting intervals (Hays et al. 2002), and shorter nesting seasons (Pike et al. 2006).

4.3.3 Kemp's Ridley Sea Turtles

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).

Species Description and Distribution

The Kemp's ridley sea turtle is the smallest of all sea turtles. Adults generally weigh less than 100 lb (45 kg) and have a carapace length of around 2.1 ft (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.

Kemp's ridley habitat largely consists of sandy and muddy areas in shallow, nearshore waters less than 120 ft (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.

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 Kemp's ridley sea turtles, possibly carried by oceanic currents, have been recorded as far north as Nova Scotia. Historic records indicate a nesting 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 had been exponentially increasing prior to the recent low nesting years, which may indicate that the population had been experiencing a similar increase. Additional nesting data in the coming years will be required to determine what the recent nesting decline means for the population trajectory.

Life History Information
Kemp's ridley sea turtles 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. Hatchlings generally range from 1.65-1.89 in (4.2-4.8 cm) SCL, 1.26-1.73 in (3.2-4.4 cm) in width, and 0.3-0.4 lb (15-20 g) in weight. Their return to nearshore coastal habitats typically occurs around 2 years of age (Ogren 1989a), 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 use these nearshore coastal habitats from April through November, but they move towards more suitable overwintering habitat in deeper offshore waters (or more southern waters along the Atlantic coast) as water temperature drops.

The average rates of growth may vary by location, but generally fall within 2.2-2.9 ± 2.4 in 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 sea turtles nest annually, the weighted mean remigration rate for Kemp's ridley sea turtles is approximately 2 years. Nesting generally occurs from April to July. Females lay approximately 2.5 nests per season with each nest containing approximately 100 eggs (Márquez M. 1994).

Population Dynamics
Of the 7 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. Yet, nesting steadily increased through the 1990s, and then accelerated during the first decade of the twenty-first century (Figure 9), which indicates 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, nesting 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% of all recorded Kemp's ridley nests in Mexico. Following a significant, unexplained 1-year decline in 2010, Kemp's ridley nests in Mexico increased to 21,797 in 2012 (Gladys Porter Zoo 2013). From 2013 through 2014, there was a second significant decline, as only 16,385 and 11,279 nests were recorded, respectively. Recent data, however, indicates an increase in nesting. In 2015 there were 14,006 recorded nests, and in 2016 overall numbers increased to 18,354 recorded nests (Gladys Porter Zoo 2016). The 2017 season reached an all-time high, with at least 24,500 nests recorded (J. Peña, Gladys Porter Zoo, pers.

comm. to M. Barnette, NMFS Protected Resources Division [PRD], October 20, 2017). At this time, it is unclear if future nesting will steadily and continuously increase, similar to what occurred from 1990-2009, or if nesting will continue to exhibit sporadic declines and increases as recorded in the past 8 years.

A small nesting population is also emerging in the United States, primarily in Texas, rising from 6 nests in 1996 to 42 in 2004, to a record high of 353 nests in 2017 (National Park Service data, http://www.nps.gov/pais/naturescience/strp.htm, http://www.nps.gov/pais/naturescience/current-season.htm). It is worth noting that nesting in Texas has paralleled the trends observed in Mexico, characterized by a significant decline in 2010, followed by a second decline in 2013-2014, but with a rebound in 2015, 2016, and 2017.

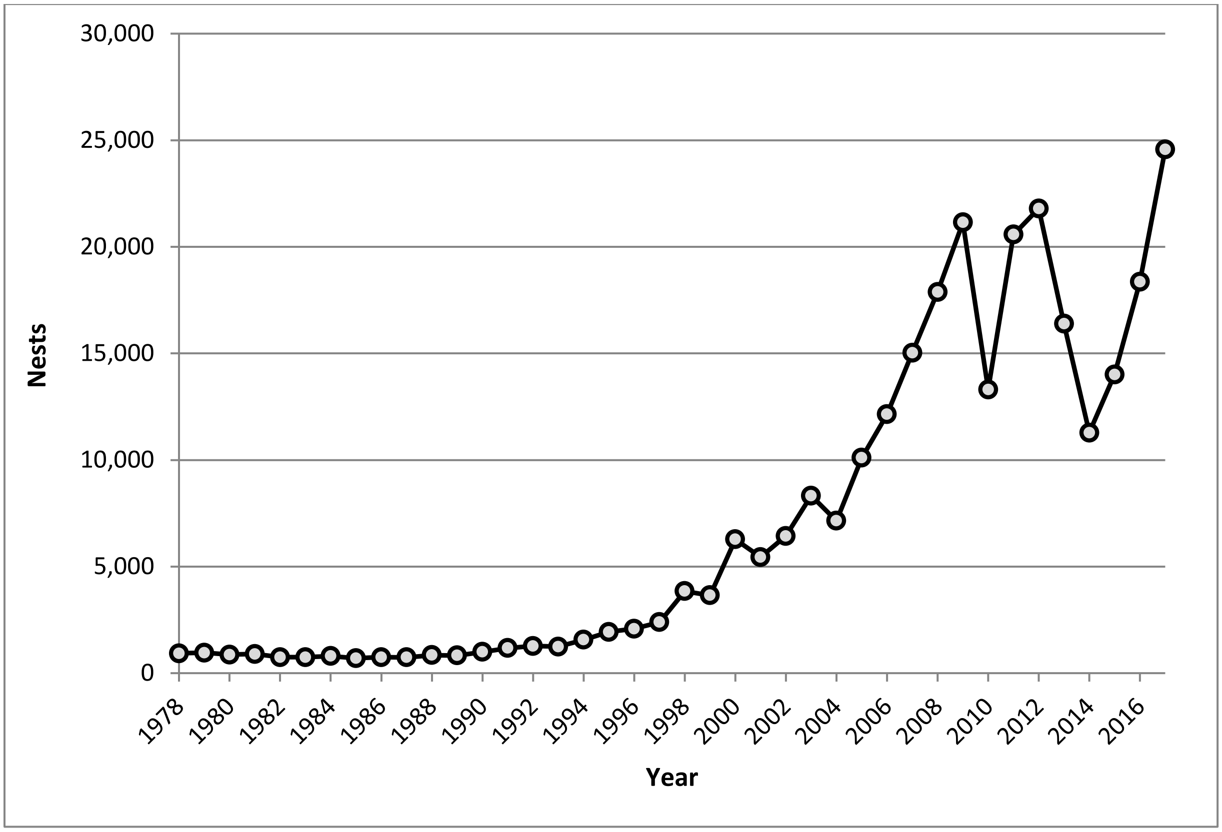

Figure 9. Kemp's ridley nest totals from Mexican beaches (Gladys Porter Zoo nesting database 2017)

Through modelling, Heppell et al. (2005) predicted the population is expected to increase at least 12-16% per year and could reach at least 10,000 females nesting on Mexico beaches by 2015. NMFS et al. (2011) produced an updated model that predicted the population to increase 19% per year and to 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. While counts did not reach 25,000 nests by 2015, it is clear that the population has increased over the long term. The increases in Kemp's ridley sea turtle nesting over the last 2 decades is likely due to a combination of management measures including elimination of direct harvest, nest protection, the use of Turtle Excluder Devices

(TEDs), reduced trawling effort in Mexico and the United States, 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 factors which are often difficult to predict with any certainty. Additionally, the significant nesting declines observed in 2010 and 2013-2014 potentially indicate a serious population-level impact, and there is cause for concern regarding the ongoing recovery trajectory.

Threats

Kemp's ridley sea turtles 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 general sea turtle threats can be found in Section 4.3; 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[2] 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 sea turtle 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% (Mo 1988). As the Kemp's ridley nest density at Rancho Nuevo and adjacent beaches continues to increase, appropriate monitoring of emergence success will be necessary to determine if there are any density-dependent effects.

Over the past 6 years, NMFS has documented (via the Sea Turtle Stranding and Salvage Network data, http://www.sefsc.noaa.gov/species/turtles/strandings.htm) elevated sea turtle strandings in the Northern Gulf of Mexico, particularly throughout the Mississippi Sound area. In the first 3 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%) 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) having occurred from March through July, 390 (86%) of which were Kemp's ridley sea turtles. During 2012, a total of 384 sea turtle strandings were reported from Louisiana, Mississippi, and Alabama waters. Of these reported strandings, 343 (89%) were Kemp's ridley sea turtles. During 2014, a total of 285 sea turtle strandings were reported from Louisiana, Mississippi, and Alabama waters, though the data is incomplete. Of these reported strandings, 229 (80%) 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,

[2] Arribada is the Spanish word for "arrival" and is the term used for massive synchronized nesting within the genus *Lepidochelys.*

respectively. It should be noted that stranding coverage has increased considerably due to the DWH oil spill event.

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 (B. Stacy, NMFS, pers. comm. to M. Barnette, NMFS PRD, March 2012). Yet, available information indicates fishery effort was extremely limited during the stranding events. The fact that 80% or more of all Louisiana, Mississippi, and Alabama stranded sea turtles in the past 5 years 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 cause, fishery observer effort was shifted to evaluate the inshore skimmer trawl fishery during the summer of 2012. During May-July of that year, observers reported 24 sea turtle interactions in the skimmer trawl fishery. All but a single sea turtle were identified as Kemp's ridleys (1 sea turtle was an unidentified hardshell turtle). Encountered sea turtles were all very small juvenile specimens, ranging from 7.6-19.0 in (19.4-48.3 cm) curved carapace length. All sea turtles were released alive. The small average size of encountered Kemp's ridleys introduces a potential conservation issue, as over 50% of these reported sea turtles could potentially pass through the maximum 4-in 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.

While oil spill impacts are discussed generally for all species in Section 4.3, specific impacts of the DWH oil spill event on Kemp's ridley sea turtles are considered here. Kemp's ridleys experienced the greatest negative impact stemming from the DWH oil spill event of any sea turtle species. Impacts to Kemp's ridley sea turtles occurred to offshore small juveniles, as well as large juveniles and adults. Loss of hatchling production resulting from injury to adult turtles was also estimated for this species. Injuries to adult turtles of other species, such as loggerheads, certainly would have resulted in unrealized nests and hatchlings to those species as well. Yet, the calculation of unrealized nests and hatchlings was limited to Kemp's ridleys for several reasons. All Kemp's ridleys in the Gulf belong to the same population (NMFS et al. 2011), so total population abundance could be calculated based on numbers of hatchlings because all individuals that enter the population could reasonably be expected to inhabit the northern Gulf of Mexico throughout their lives (DWH Trustees 2015).

A total of 217,000 small juvenile Kemp's ridleys (51.5% of the total small juvenile sea turtle exposures to oil from the spill) were estimated to have been exposed to oil. That means approximately half of all small juvenile Kemp's ridleys from the total population estimate of 430,000 oceanic small juveniles were exposed to oil. Furthermore, a large number of small juveniles were removed from the population, as up to 90,300 small juveniles Kemp's ridleys are estimated to have died as a direct result of the exposure. Therefore, as much as 20% of the small oceanic juveniles of this species were killed during that year. Impacts to large juveniles (>3 years old) and adults were also high. An estimated 21,990 such individuals were exposed to oil (about 22% of the total estimated population for those age classes); of those, 3,110 mortalities were estimated (or 3% of the population for those age classes). The loss of near-reproductive and reproductive-stage females would have contributed to some extent to the decline in total nesting abundance observed between 2011 and 2014. The estimated number of unrealized Kemp's ridley nests is between 1,300 and 2,000, which translates to between approximately 65,000 and 95,000 unrealized hatchlings (DWH Trustees 2015). This is a minimum estimate, however, because the sublethal effects of the DWH oil spill event on turtles, their prey, and their habitats might have delayed or reduced reproduction in subsequent years, which may have contributed substantially to additional nesting deficits observed following the DWH oil spill event. These sublethal effects could have slowed growth and maturation rates, increased remigration intervals, and decreased clutch frequency (number of nests per female per nesting season). The nature of the DWH oil spill event effect on reduced Kemp's ridley nesting abundance and associated hatchling production after 2010 requires further evaluation. It is clear that the DWH oil spill event resulted in large losses to the Kemp's ridley population across various age classes, and likely had an important population-level effect on the species. Still, we do not have a clear understanding of those impacts on the population trajectory for the species into the future.

4.4 Smalltooth Sawfish

The U.S. DPS of smalltooth sawfish was listed as endangered under the ESA effective May 1, 2003 (68 FR 15674; April 1, 2003).

Species Description and Distribution

The smalltooth sawfish is a tropical marine and estuarine elasmobranch. It has an extended snout with a long, narrow, flattened, rostral blade (rostrum) with a series of transverse teeth along either edge. In general, smalltooth sawfish inhabit shallow coastal waters of warm seas throughout the world and feed on a variety of small fish (e.g., mullet, jacks, and ladyfish) (Simpfendorfer 2001), and crustaceans (e.g., shrimp and crabs) (Bigelow and Schroeder 1953; Norman and Fraser 1937).

Although this species is reported throughout the tropical Atlantic, NMFS identified smalltooth sawfish from the Southeast United States as a distinct population segment (DPS), due to the physical isolation of this population from others, the differences in international management of the species, and the significance of the U.S. population in relation to the global range of the species (see 68 FR15674). Within the United States, smalltooth sawfish have been captured in estuarine and coastal waters from New York southward through Texas, although peninsular Florida has historically been the region of the United States with the largest number of recorded captures (NMFS 2000). Recent records indicate there is a resident reproducing population of smalltooth sawfish in south and southwest Florida from Charlotte Harbor through the Dry

Tortugas, which is also the last U.S. stronghold for the species (Poulakis and Seitz 2004; Seitz and Poulakis 2002; Simpfendorfer and Wiley 2005). Water temperatures (no lower than 16-18°C) and the availability of appropriate coastal habitat (shallow, euryhaline waters and red mangroves) are the major environmental constraints limiting the northern movements of smalltooth sawfish in the western North Atlantic. Most specimens captured along the Atlantic coast north of Florida are large adults (over 10 ft) that likely represent seasonal migrants, wanderers, or colonizers from a historic Florida core population(s) to the south, rather than being members of a continuous, even-density population (Bigelow and Schroeder 1953).

Life History Information

Smalltooth sawfish fertilization is internal and females give birth to live young. The brood size, gestation period, and frequency of reproduction are unknown for smalltooth sawfish. Therefore, data from the closely related (in terms of size and body morphology) largetooth sawfish represent our best estimates of these parameters. The largetooth sawfish likely reproduces every other year, has a gestation period of approximately 5 months, and produces a mean of 7.3 offspring per brood, with a range of 1-13 offspring (Thorson 1976). Smalltooth sawfish are approximately 31 in (80 cm) at birth and may grow to a length of 18 ft (548 cm) or greater during their lifetime (Bigelow and Schroeder 1953; Simpfendorfer 2002). Simpfendorfer et al. (2008) report rapid juvenile growth for smalltooth sawfish for the first 2 years after birth, with stretched total length increasing by an average of 25-33 in (65-85 cm) in the first year and an average of 19-27 in (48-68 cm) in the second year. By contrast, very little information exists on size classes other than juveniles, which make up the majority of sawfish encounters; therefore, much uncertainty remains in estimating life history parameters for smalltooth sawfish, especially as it relates to age at maturity and post-juvenile growth rates. Based on age and growth studies of the largetooth sawfish (Thorson 1982) and research by Simpfendorfer (2000), the smalltooth sawfish is likely a slow-growing (with the exception of early juveniles), late-maturing (10-20 years) species with a long lifespan (30-60 years). Juvenile growth rates presented by Simpfendorfer et al. (2008) suggest smalltooth sawfish are growing faster than previously thought and therefore may reach sexual maturity at an earlier age.

There are distinct differences in habitat use based on life history stage. Juvenile smalltooth sawfish, those up to 3 years of age or approximately 8 ft in length (Simpfendorfer et al. 2008), inhabit the shallow waters of estuaries and can be found in sheltered bays, dredged canals, along banks and sandbars, and in rivers (NMFS 2000). Juvenile smalltooth sawfish occur in euryhaline waters (i.e., waters with a wide range of salinities) and are often closely associated with muddy or sandy substrates, and shorelines containing red mangroves, *Rhizophora mangle* (Simpfendorfer 2001; Simpfendorfer 2003). Tracking data from the Caloosahatchee River in Florida indicate very shallow depths and salinity are important abiotic factors influencing juvenile smalltooth sawfish movement patterns, habitat use, and distribution (Simpfendorfer et al. 2011). Another recent acoustic tagging study in a developed region of Charlotte Harbor, Florida, identified the importance of mangroves in close proximity to shallow water habitat for juvenile smalltooth sawfish, stating that juveniles generally occur in shallow water within 328 ft (100 m) of mangrove shorelines, generally red mangroves (Simpfendorfer et al. 2010). Juvenile smalltooth sawfish spend the majority of their time in waters less than 13 ft (4 m) in depth (Simpfendorfer et al. 2010) and are seldom found in depths greater than 32 ft (10 m) (Poulakis and Seitz 2004). Simpfendorfer et al. (2010) also indicated developmental differences in habitat use: the smallest juveniles (young-of-the-year juveniles measuring < 100 cm in length) generally used water depths less than 0.5 m (1.64 ft), had small home ranges (4,264-4,557 square meters [m^2]), and exhibited high levels of site fidelity. Although small juveniles exhibit high levels of site fidelity for specific nursery habitats for periods of time lasting up to 3 months (Wiley and Simpfendorfer 2007), they do undergo small movements coinciding with changing tidal stages. These movements often involve moving from shallow sandbars at low tide to within red mangrove prop roots at higher tides (Simpfendorfer et al. 2010), behavior likely to reduce the risk of predation (Simpfendorfer 2006). As juveniles increase in size, they begin to expand their home ranges (Simpfendorfer et al. 2010; Simpfendorfer et al. 2011), eventually moving to more offshore habitats where they likely feed on larger prey and eventually reach sexual maturity.

Researchers have identified several areas within the Charlotte Harbor Estuary that are disproportionately more important to juvenile smalltooth sawfish, based on intra- or inter-annual (within or between year) capture rates during random sampling events within the estuary (Poulakis 2012; Poulakis et al. 2011). These areas were termed “hotspots” and also correspond with areas where public encounters are most frequently reported. Use of these “hotspots” can vary within and among years based on the amount and timing of freshwater inflow. Smalltooth sawfish use hotspots further upriver during high salinity conditions (drought) and areas closer to the mouth of the Caloosahatchee River during times of high freshwater inflow (Poulakis et al. 2011). At this time, researchers are unsure what specific biotic or abiotic factors influence this habitat use, but they believe a variety of conditions in addition to salinity, such as temperature, dissolved oxygen, water depth, shoreline vegetation, and food availability, may influence habitat selection (Poulakis et al. 2011).

While adult smalltooth sawfish may also use the estuarine habitats used by juveniles, they are commonly observed in deeper waters along the coasts. Poulakis and Seitz (2004) noted that nearly half of the encounters with adult-sized smalltooth sawfish in Florida Bay and the Florida Keys occurred in depths from 200-400 ft (70-122 m) of water. Similarly, Simpfendorfer and Wiley (2005) reported encounters in deeper waters off the Florida Keys, and observations from both commercial longline fishing vessels and fishery-independent sampling in the Florida Straits report large smalltooth sawfish in depths up to 130 ft (~40 m) (ISED 2014). Even so, NMFS believes adult smalltooth sawfish use shallow estuarine habitats during parturition (when adult females return to shallow estuaries to pup) because very young juveniles still containing rostral sheaths are captured in these areas. Since very young juveniles have high site fidelities, we hypothesize that they are birthed nearby or in their nursery habitats.

Status and Population Dynamics
Few long-term abundance data exist for the smalltooth sawfish, making it very difficult to estimate the current population size. Simpfendorfer (2001) estimated that the U.S. population may number less than 5% of historic levels, based on anecdotal data and the fact that the species’ range has contracted by nearly 90%, with south and southwest Florida the only areas known to support a reproducing population. Since actual abundance data are limited, researchers have begun to compile capture and sightings data (collectively referred to as encounter data) in the ISED that was developed in 2000. Although this data cannot be used to assess the population because of the opportunistic nature in which they are collected (i.e., encounter data are a series of random occurrences rather than an evenly distributed search over a defined period of time),

researchers can use this database to assess the spatial and temporal distribution of smalltooth sawfish. We expect that as the population grows, the geographic range of encounters will also increase. Since the conception of the ISED, over 3,000 smalltooth sawfish encounters have been reported and compiled in the encounter database (ISED 2014).

Despite the lack of scientific data on abundance, recent encounters with young-of-the-year, older juveniles, and sexually mature smalltooth sawfish indicate that the U.S. population is currently reproducing (Seitz and Poulakis 2002; Simpfendorfer 2003). The abundance of juveniles encountered, including very small individuals, suggests that the population remains viable (Simpfendorfer and Wiley 2004), and data analyzed from Everglades National Park as part of an established fisheries-dependent monitoring program (angler interviews) indicate a slightly increasing trend in juvenile abundance within the park over the past decade (Carlson and Osborne 2012; Carlson et al. 2007). Using a demographic approach and life history data for smalltooth sawfish and similar species from the literature, Simpfendorfer (2000) estimated intrinsic rates of natural population increase for the species at 0.08-0.13 per year and population doubling times from 5.4-8.5 years. These low intrinsic rates[3] of population increase, suggest that the species is particularly vulnerable to excessive mortality and rapid population declines, after which recovery may take decades.

Threats

Past literature indicates smalltooth sawfish were once abundant along both coasts of Florida and quite common along the shores of Texas and the northern Gulf coast ((NMFS 2010) and citations therein). Based on recent comparisons with these historical reports, the U.S. DPS of smalltooth sawfish has declined over the past century (Simpfendorfer 2001; Simpfendorfer 2002). The decline in smalltooth sawfish abundance has been attributed to several factors including bycatch mortality in fisheries, habitat loss, and life history limitations of the species (NMFS 2010).

<u>Bycatch Mortality</u>

Bycatch mortality is cited as the primary cause for the decline in smalltooth sawfish in the United States (NMFS 2010). While there has never been a large-scale directed fishery, smalltooth sawfish easily become entangled in fishing gears (gill nets, otter trawls, trammel nets, and seines) directed at other commercial species, often resulting in serious injury or death (NMFS 2009). This has historically been reported in Florida (Snelson and Williams 1981), Louisiana (Simpfendorfer 2002), and Texas (Baughman 1943). For instance, one fisherman interviewed by Evermann and Bean (1897) reported taking an estimated 300 smalltooth sawfish in just one netting season in the Indian River Lagoon, Florida. In another example, smalltooth sawfish landings data gathered by Louisiana shrimp trawlers from 1945-1978, which contained both landings data and crude information on effort (number of vessels, vessel tonnage, number of gear units), indicated declines in smalltooth sawfish landings from a high of 34,900 lbs in 1949 to less than 1,500 lbs in most years after 1967. The Florida net ban passed in 1995 has led to a reduction in the number of smalltooth sawfish incidentally captured, "…by prohibiting the use of gill and other entangling nets in all Florida waters, and prohibiting the use of other nets larger than 500 square feet in mesh area in nearshore and inshore Florida waters"[4] (Florida Constitution

[3] The rate at which a population increases in size if there are no density-dependent forces regulating the population
[4] "nearshore and inshore Florida waters" means all Florida waters inside a line 3 mi seaward of the coastline along the Gulf of Mexico and inside a line 1 mi seaward of the coastline along the Atlantic Ocean

Article X § 16). However, the threat of bycatch currently remains in commercial fisheries (e.g., South Atlantic shrimp fishery, Gulf of Mexico shrimp fishery, federal shark fisheries of the South Atlantic, and the Gulf of Mexico reef fish fishery), though anecdotal information collected by NMFS port agents suggest smalltooth sawfish captures are now rare.

In addition to incidental bycatch in commercial fisheries, smalltooth sawfish have historically been and continue to be captured by recreational fishers. Encounter data (ISED 2014) and past research (Caldwell 1990) document that rostrums are sometimes removed from smalltooth sawfish caught by recreational fishers, thereby reducing their chances of survival. While the current threat of mortality associated with recreational fisheries is expected to be low given that possession of the species in Florida has been prohibited since 1992, bycatch in recreational fisheries remains a potential threat to the species.

Habitat Loss

Modification and loss of smalltooth sawfish habitat, especially nursery habitat, is another contributing factor in the decline of the species. Activities such as agricultural and urban development, commercial activities, dredge-and-fill operations, boating, erosion, and diversions of freshwater runoff contribute to these losses (SAFMC 1998). Large areas of coastal habitat were modified or lost between the mid-1970s and mid-1980s within the United States (Dahl and Johnson 1991). Since then, rates of loss have decreased, but habitat loss continues. From 1998-2004, approximately 64,560 acres of coastal wetlands were lost along the Atlantic and Gulf coasts of the United States, of which approximately 2,450 acres were intertidal wetlands consisting of mangroves or other estuarine shrubs (Stedman and Dahl 2008). Further, Orlando et al. (1994) analyzed 18 major southeastern estuaries and recorded over 703 mi of navigation channels and 9,844 mi of shoreline with modifications. In Florida, coastal development often involves the removal of mangroves and the armoring of shorelines through seawall construction. Changes to the natural freshwater flows into estuarine and marine waters through construction of canals and other water control devices have had other impacts: altered the temperature, salinity, and nutrient regimes; reduced both wetlands and submerged aquatic vegetation; and degraded vast areas of coastal habitat utilized by smalltooth sawfish (Gilmore 1995; Reddering 1988; Whitfield and Bruton 1989). While these modifications of habitat are not the primary reason for the decline of smalltooth sawfish abundance, it is likely a contributing factor and almost certainly hampers the recovery of the species. Juvenile sawfish and their nursery habitats are particularly likely to be affected by these kinds of habitat losses or alternations, due to their affinity for shallow, estuarine systems. Although many forms of habitat modification are currently regulated, some permitted direct and/or indirect damage to habitat from increased urbanization still occurs and is expected to continue to threaten survival and recovery of the species in the future.

Life History Limitations

The smalltooth sawfish is also limited by its life history characteristics as a slow-growing, relatively late-maturing, and long-lived species. Animals using this life history strategy are usually successful in maintaining small, persistent population sizes in constant environments, but are particularly vulnerable to increases in mortality or rapid environmental change (NMFS 2000). The combined characteristics of this life history strategy result in a very low intrinsic rate of population increase (Musick 1999) that make it slow to recover from any significant population decline (Simpfendorfer 2000). More recent data suggest smalltooth sawfish may mature earlier than previously thought, meaning rates of population increase could be higher and recovery times shorter than those currently reported (Simpfendorfer et al. 2008).

Current Threats

The 3 major factors that led to the current status of the U.S. DPS of smalltooth sawfish – bycatch mortality, habitat loss, and life history limitations – continue to be the greatest threats today. All the same, other threats such as the illegal commercial trade of smalltooth sawfish or their body parts, predation, and marine pollution and debris may also affect the population and recovery of smalltooth sawfish on smaller scales (NMFS 2010). We anticipate that all of these threats will continue to affect the rate of recovery for the U.S. DPS of smalltooth sawfish.

In addition to the anthropogenic effects mentioned previously, changes to the global climate are likely to be a threat to smalltooth sawfish and the habitats they use. The Intergovernmental Panel on Climate Change has stated that global climate change is unequivocal (IPCC 2007) and its impacts to coastal resources may be significant. Some of the likely effects commonly mentioned are sea level rise, increased frequency of severe weather events, changes in the amount and timing of precipitation, and changes in air and water temperatures (EPA 2012; NOAA 2012). The impacts to smalltooth sawfish cannot, for the most part, currently be predicted with any degree of certainty, but we can project some effects to the coastal habitats where they reside. We know that the coastal habitats that contain red mangroves and shallow, euryhaline waters will be directly impacted by climate change through sea level rise, which is expected to exceed 1 meter globally by 2100 according to Meehl et al. (2007), Pfeffer et al. (2008), and Vermeer and Rahmstorf (2009). Sea level rise will impact mangrove resources, as sediment surface elevations for mangroves will not keep pace with conservative projected rates of elevation in sea level (Gilman et al. 2008). Sea level increases will also affect the amount of shallow water available for juvenile smalltooth sawfish nursery habitat, especially in areas where there is shoreline armoring (e.g., seawalls). Further, the changes in precipitation coupled with sea level rise may also alter salinities of coastal habitats, reducing the amount of available smalltooth sawfish nursery habitat.

5. ENVIRONMENTAL BASELINE

This section describes the effects of past and ongoing human and natural factors contributing to the current status of the species, its habitat (including designated critical habitat), and ecosystem within the action area, without the additional effects of the proposed action. In the case of ongoing actions, this section includes the effects that may contribute to the projected future status of the species, its habitat, and ecosystem. The environmental baseline describes the species' and habitat's health based on information available at the time of this consultation.

By regulation (50 CFR 402.02), environmental baselines for Biological Opinions include the past and present impacts of all state, federal, or private actions and other human activities or natural phenomena in, or having effects 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 defined in 50 CFR 402.11), as well as the impact of state or private actions, or the impacts of natural phenomena, which are concurrent with the consultation in process (50 CFR 402.02).

Focusing on the impacts of the activities in the action area specifically allows us to assess the prior experience and state (or condition) of the endangered and threatened individuals. In addition, we can focus on areas of designated critical habitat that occur in an action area that may be exposed to effects from the action under consultation. This consideration is important because in some states or life history stages, or areas of their ranges, listed individuals or critical habitat features 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. These localized stress responses or stressed baseline conditions may increase the severity of the adverse effects expected from the proposed action.

5.1 Status of the Species within the Action Area

As stated in Section 3, the proposed action would occur on Anna Maria Island near the mouth of Tampa Bay, in the footprint of the old CAMP.

5.1.1 Sea Turtles

Based on the information discussed above, and their habitat and foraging preferences, green (NA and SA DPS), Kemp's ridley, and loggerhead (NWA DPS) sea turtles may be located in the action area and may be affected by the recreational fishing activities that will occur as a result of the proposed action. All of these sea turtle species are migratory, traveling for foraging or reproduction purposes. NMFS believes that no individual sea turtles are likely to be permanent residents of the nearshore waters of this 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 affected by activities occurring there; therefore, the status of these sea turtles in the action area, including the threats, are the same as those discussed in Section 4.3.

Based on data from the SEFSC, incidental hook-and-line captures of sea turtles have been reported at the CAMP. Two sea turtles – both loggerheads – were reported captured in 2010 at fishing piers in Anna Maria. One was reported captured at the nearby Rod-and-Reel fishing pier (geographic coordinates were from Rod-and-Reel, but fisher described it as Anna Maria fishing pier), and the other was captured at the CAMP. Due to lack of more data, and to err in favor of protecting the species, we will include the data from the nearby Rod & Reel Pier in our analysis.

5.1.2 Smalltooth Sawfish

As discussed in Section 4.4, smalltooth sawfish have been documented throughout the state of Florida with the majority of them occurring in Lee, Charlotte, and Monroe Counties, just south of the proposed action area. Critical habitat was designated in several southwest Florida counties as a means of protecting juvenile sawfish nursery habitats. Although this project is outside of critical habitat, the ISED has documented approximately 40 smalltooth sawfish encounters within and just outside the action area and surrounding vicinity (Tampa Bay), including all age-size classes (very small juvenile [<100 cm], small juvenile [100-200 cm], large juvenile [201-340 cm], adult [>340 cm]), and it is possible that juvenile or adult sawfish could use the nearshore waters around the project area. Therefore, the status of smalltooth sawfish in the action area, including the threats, are the same as those discussed in Section 4.4.

Based on data from ISED, three captures of smalltooth sawfish were recorded at the CAMP between 2008 and 2014. Two captures were of large juveniles, in 2008, and one capture was of a small juvenile, in 2013 (ISED data, last published May 2014).

5.2 Factors Affecting the Species and Environment within the Action Area

The following analysis examines actions that may affect these species or their environments specifically within the action area. Sea turtles found in the immediate project area may travel widely throughout the Atlantic, Gulf of Mexico, and Caribbean Sea, and individuals found in the action area can potentially be affected by activities anywhere within this wide range. Smalltooth sawfish may move up and down the Florida coast and may also be affected by activities within that range. These impacts outside of the action area are discussed and incorporated as part of the overall status of the species as detailed in Status of Species section, above. The activities that shape the environmental baseline for sea turtles and smalltooth sawfish in the action area (which is relatively small) of this consultation are primarily state authorized fishing, vessel operations, stochastic events, marine pollution, and climate change.

5.2.1 Federal Actions

A search of NMFS records found one project in the action area that has undergone Section 7 consultation. SER-2008-07808 evaluated the continued maintenance dredging of an existing navigational entrance channel less than 400 ft away from the CAMP, and depositing the dredged material (sand) on the beach adjacent to the CAMP. In that consultation, NMFS found the project was not likely to adversely affect listed species. Other fishing piers (outside of the action area) have been subject to formal consultation, resulting in Biological Opinions and measures to minimize the impact of associated negative interactions. Those consultations generally found fishing piers could adversely affect sea turtles and smalltooth sawfish via incidental hooking and entanglement by actively fished lines, discarded remnant, or broken-off fishing lines, and/or other debris.

5.2.2 State or Private Actions

Recreational Fishing

Recreational fishing as regulated by the state of Florida can affect protected species or their habitats within the action area. Pressure from recreational fishing in and adjacent to the action area is likely to continue and will increase with the restoration, improvement, and operation of, the proposed fishing pier reconstruction. Recreational fishing from private vessels may occur in the action area. Furthermore, as previously stated, another recreational public fishing pier (the Rod-and-Reel Pier) exists less than half a mile away from the CAMP. Observations of state recreational fisheries have shown that loggerhead sea turtles are known to bite baited hooks and frequently ingest the hooks. Hooked turtles have been reported by the public fishing from boats, piers, and beach, banks, and jetties and from commercial anglers fishing for reef fish and for sharks with both single rigs and bottom longlines. 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 reports from the SEFSC Turtle Expert Working Group (TEWG) (TEWG 1998; TEWG 2000).

Private and Commercial Vessel Operations
Private and commercial vessels, including fishing vessels, operating in or near the action area of this consultation also have the potential to interact with ESA-listed species. As previously mentioned, the CAMP is approximately half a mile away from the primary point of entry and exit to Tampa Bay, so vessel traffic in the vicinity of the CAMP is high. Additionally, the old CAMP, and the proposed new CAMP, have a landing/temporary tie-off dock, which likely causes more vessel traffic and activity than normally occurs at a pier without a landing for vessels. The effects of fishing vessels, recreational vessels, or other types of commercial vessels on listed species may involve disturbance or injury/mortality due to collisions or entanglement in anchor lines. Watercraft have the potential to interact with sea turtles though direct impacts or propellers. Vessels operating at high speeds have the potential to strike sea turtles. The STSSN includes many records of vessel interaction (propeller injury) with sea turtles in coastal states such as Florida, where there are high levels of vessel traffic. The extent of the problem is difficult to assess because of not knowing whether the majority of sea turtles are struck pre- or post-mortem. It is important to note that although minor vessel collisions may not kill an animal directly, they may weaken or otherwise affect an animal, which makes it more likely to become vulnerable to effects such as entanglements.

5.2.3 Other Potential Sources of Impacts in the Environmental Baseline
Stochastic events
Stochastic (i.e., random) events, such as hurricanes, occur in Florida and can affect sea turtles and smalltooth sawfish in the action area. These events are by nature unpredictable, and their effect on the recovery of the species is unknown; yet, they have the potential to directly impede recovery if animals die as a result or indirectly if important habitats are damaged. Other stochastic events, such as cold snaps like the one that occurred in January 2010, can kill smalltooth sawfish (Poulakis et al. 2011) and also sea turtles.

Marine Pollution and Environmental Contamination
Coastal runoff, marina and dock construction, dredging, aquaculture, oil and gas exploration and extraction, increased under water noise and boat traffic can degrade marine habitats used by sea turtles (Colburn et al. 1996) and smalltooth sawfish. Fueling facilities at marinas can sometimes discharge oil, gas, and sewage into sensitive estuarine and coastal habitats. Sea turtles and smalltooth sawfish analyzed in this Biological Opinion travel within nearshore and offshore habitats and may be exposed to, and accumulate, these contaminants during their life cycles. For example, during Hurricane Hermine in September 2016, Tampa Bay utility companies released partially-treated sewage into Tampa Bay. According to reports in the *Tampa Bay Times*, an estimated 150-200 million gallons of raw or partially-treated sewage was released into Tampa Bay and Boca Ciega Bay, and the surrounding waterways. The sewage release was investigated by the Florida Department of Environmental Protection and FWC, and resulted in the city of St. Petersburg and the state of Florida entering into a consent order and agreeing to pay $326 million to improve the sewage system.

Some sources of marine pollution that indirectly affect sea turtles in the action area are difficult to attribute to a specific federal, state, local or private action. Sources of pollutants include atmospheric loading of pollutants such as PCBs and storm water runoff from coastal towns and cities into rivers and canals emptying into bays and the ocean. The Gulf of Mexico is an area of high-density offshore oil extraction with chronic, low-level spills and occasional massive spills (such as the current DWH oil spill, Ixtoc I oil well blowout and fire in the Bay of Campeche in 1979, and the explosion and destruction of a loaded supertanker, the Mega Borg, near Galveston in 1990). When large quantities of oil enter a body of water, chronic effects such as cancer, and direct mortality of wildlife becomes more likely (Lutcavage et al. 1997). Oil spills in the vicinity of nesting beaches just prior to or during the nesting season could place nesting females, incubating egg clutches, and hatchlings at significant risk (Fritts and McGehee 1982; Lutcavage et al. 1997; Witherington 1999).

The accumulation of organic contaminants and trace metals has been studied in loggerhead, green, and leatherback sea turtles (Aguirre et al. 1994; Caurant et al. 1999; Corsolini et al. 2000) (McKenzie et al. 1999). Omnivorous loggerhead sea turtles had the highest organochlorine contaminant concentrations in all the tissues sampled, including those from green and leatherback turtles (Storelli et al. 2008). It is thought that dietary preferences were likely to be the main differentiating factor among species. (Sakai et al. 1995) found the presence of metal residues occurring in loggerhead sea turtle organs and eggs. Storelli et al. (1998) analyzed tissues from 12 loggerhead sea turtles stranded along the Adriatic Sea (Italy) and found that characteristically, 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). No information on detrimental threshold concentrations is available, and little is known about the consequences of exposure of organochlorine compounds to sea turtles. Research is needed into how chlorobiphenyl, organochlorine, and heavy-metal accumulation effect the short- and long-term health of sea turtles and what effect those chemicals have on the number of eggs laid by females. More information is needed to understand the potential impacts of marine pollution in the action area.

Nutrient loading from land-based sources, such as coastal communities, stimulate plankton blooms in closed or semi-closed estuarine systems. For example, oxygen depletion, referred to as hypoxia, can negatively impact sea turtles' habitats, prey availability, and survival and reproductive fitness.

Climate Change

As discussed earlier in this Opinion, there is a large and growing body of literature on past, present, and future impacts of global climate change. Potential effects commonly mentioned include changes in sea temperatures and salinity (due to melting ice and increased rainfall), ocean currents, storm frequency and weather patterns, and ocean acidification. These changes have the potential to affect species behavior and ecology including migration, foraging, reproduction (e.g., success), and distribution. For example, sea turtles currently range from temperate to tropical waters. A change in water temperature could result in a shift or modification of range. Climate change may also affect marine forage species, either negatively or positively (the exact effects for the marine food web upon which sea turtles rely is unclear, and may vary between species). It may also affect migratory behavior (e.g., timing, length of stay at certain locations). These types of changes could have implications for sea turtle and sawfish recovery.

Additional discussion of climate change can be found in Sections 4.3 and 4.4. However, to summarize with regards to the action area, global climate change may affect the timing and extent of population movements and their range, distribution, species composition of prey, and the range and abundance of competitors and predators. Changes in distribution including displacement from ideal habitats, decline in fitness of individuals, population size due to the potential loss of foraging opportunities, abundance, migration, community structure, susceptibility to disease and contaminants, and reproductive success are all possible impacts that may occur as the result of climate change. Still, more information is needed to better determine the full and entire suite of impacts of climate change on sea turtles and sawfish and specific predictions regarding impacts in the action area are not currently possible.

Conservation and Recovery Actions Shaping the Environmental Baseline
As discussed in Section 4, NMFS and cooperating states have established an extensive network of STSSN participants along the Atlantic and Gulf of Mexico coasts that not only collects data on dead sea turtles, but also rescues and rehabilitates any live stranded sea turtles.

In response to the growing awareness of recreational fishery impacts on sea turtles, in 2006 the Marine Recreational Fishery Statistics Survey added a survey question regarding sea turtle interactions within recreational fisheries. NMFS is exploring potential revisions to the Marine Recreational Information Program to quantify recreational encounters with sea turtles on a permanent basis. Similarly, the Florida Program for Shark Research at the Florida Museum of Natural History operates and maintains a sawfish encounter database that monitors the population of smalltooth sawfish in the southeastern United States.

In 2001, NMFS published a Final Rule (66 FR 67495) 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 hardshell 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 USCG, 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 capture endangered sea turtles encountered in the marine environment if such capture 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. The same protection is afforded to sea turtles listed as threatened under the ESA (50 CFR 223.206(b)).

NMFS, with the Smalltooth Sawfish Recovery Team, developed guidelines to fishermen telling them how to safely handle and release any sawfish they catch. Some states have also taken steps to protect this species. Florida, Louisiana, and Texas have prohibited the capture, injury, or killing of sawfish. Florida's existing ban on the use of gill nets in state waters is an important conservation tool. Three National Wildlife Refuges in Florida also protect their habitat.

6. EFFECTS OF THE ACTION

This section includes an analysis of the direct and indirect effects of the proposed action on the species, as well as the effects of the proposed action's interrelated and interdependent activities. 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 (50 CFR 402.02).

Conservative Decisions – Providing the Benefit of the Doubt to the Species
The analysis in this section is based upon the best available commercial and scientific data on sea turtle biology, smalltooth sawfish biology, and the effects of the proposed action. However, there can be instances where there is limited information upon which to make a determination. In those cases, in keeping with the direction from the U.S. Congress to provide the "benefit of the doubt" to threatened and endangered species (House of Representatives Conference Report No. 697, 96th Congress, Second Session, 12 (1979)), we will generally make determinations which provide the most conservative (conservation-oriented) outcome for listed species.

6.1 Effects of Recreational Fishing from a Fishing Pier

Sea turtles and smalltooth sawfish may be adversely affected by recreational fishing activity through incidental hooking or entanglement in actively fished or discarded fishing line. Sea turtles and sawfish have historically been captured in both recreational and commercial fisheries and are known to become entangled in fishing debris. Most sea turtle captures on rod-and-reel, as reported to the STSSN, have occurred during pier fishing. Fishing piers may attract sea turtles that learn to forage there for discarded bait and fish carcasses. Sea turtles and smalltooth sawfish are particularly prone to entanglement as a result of their body morphologies and behaviors. Records of stranded or entangled sea turtles reveal that fishing gear can wrap around the neck, flipper, or body of a sea turtle and severely restrict swimming or feeding. The configuration of the smalltooth sawfish rostrum is particularly prone to entanglement, possibly affecting the ability of the fish to function. If an individual sea turtle or sawfish is entangled when young, the fishing line can become tighter and more constricting as the individual grows, cutting off blood flow and causing deep gashes, some severe enough to remove an appendage.

Hook-and-line gear commonly used by recreational anglers fishing from fishing piers can adversely affect sea turtles and smalltooth sawfish via entanglement, hooking, and trailing line. Sea turtles and smalltooth sawfish released alive may later succumb to injuries sustained at the time of capture or from exacerbated trauma from fishing hooks or lines that were ingested, were entangling, or were otherwise still attached when the animals were released. Of the sea turtles and smalltooth sawfish hooked or entangled that do not die from their wounds, some may suffer impaired swimming or foraging abilities, altered migratory behavior, and altered breeding or reproductive patterns.

6.1.1 Effects to Sea Turtles

The current understanding of the effects of hook-and-line gear on sea turtles is related primarily to the effects observed in association with commercial fisheries (particularly longline fisheries); few data exist on the effects of recreational fishing captures on sea turtles. Dead sea turtles found stranded with hooks in their digestive tract have been reported, though it is assumed that most sea turtles hooked by recreational fishers are released alive (Thompson 1991). Little information exists on the frequency of recreational fishing captures and the status of the sea turtles after they are caught. Regardless, effects sea turtles are likely to experience as a result of interactions with recreational hook-and-line gear (i.e., entanglement, hooking, and trailing line) are expected to be the same as those that might occur in commercial fisheries. The following discussion summarizes in greater detail the available information on how individual sea turtles may be affected by interactions with hook-and-line gear.

Hooking

In addition to being entangled in hook-and-line gear, sea turtles are also injured and killed by being hooked. Hooking can occur as a result of a variety of scenarios, some depend on the foraging strategies and diving and swimming behavior of the various species of sea turtles. Sea turtles are either hooked externally in the flippers, head, shoulders, armpits, or beak, or internally inside the mouth or when the animal has swallowed the bait (Balazs et al. 1995). Observer data (not specific to recreational fishing) indicate that internal hooking is much more prevalent in hardshell sea turtles, especially loggerheads (NMFS unpublished data) than entanglement and foul-hooking. Almost all interactions with loggerheads result from the turtle taking the bait and hook; only a very small percentage of loggerheads are foul-hooked externally or entangled.

Swallowed hooks are of the greatest concern. A sea turtle's esophagus (throat) is lined with strong conical papillae directed towards the stomach (White 1994). The presence of these papillae in combination with an S-shaped bend in the esophagus make it difficult to see hooks when looking through a sea turtle's mouth, especially if the hooks have been deeply ingested. Because of a sea turtle's digestive structure, deeply ingested hooks are also very difficult to remove without seriously injuring the turtle. A sea turtle's esophagus is also firmly attached to underlying tissue; thus if a sea turtle swallows a hook and tries to free itself or is hauled on board a vessel, the hook can pierce the sea turtle's esophagus or stomach and can pull organs from its connective tissue. These injuries can cause the sea turtle to bleed internally or can result in infections, both of which can kill the sea turtle.

If a hook does not lodge into, or pierce, a sea turtle's digestive organs, it can pass through the sea turtle entirely (Aguilar et al. 1994; Balazs et al. 1995) with little damage (Work 2000). For example, a study of loggerheads deeply hooked by the Spanish Mediterranean pelagic longline fleet found ingested hooks could be expelled after 53 to 285 days (average 118 days) (Aguilar et al. 1994). If a hook passes through a sea turtle's digestive tract without getting lodged, the hook probably has not harmed the turtle.

Trailing Line

Trailing line (i.e., line left on a sea turtle after it has been captured and released), particularly line trailing from a swallowed hook, poses a serious risk to sea turtles. Line trailing from a swallowed hook is also likely to be swallowed, which may irritate the lining of the digestive system. The line may cause the intestine to twist upon itself until it twists closed, creating a blockage ("torsion") or may cause a part of the intestine to slide into another part of intestine like a telescopic rod ("intussusception") which also leads to blockage. In both cases, death is a likely outcome (Watson et al. 2005). The line may also prevent or hamper foraging, eventually leading to death. Trailing line may also become snagged on a floating or fixed object, further entangling a turtle and potentially slicing its appendages and affecting its ability to swim, feed, avoid predators, or reproduce. Sea turtles have been found trailing gear that has been snagged on the sea floor, or has the potential to snag, thus anchoring them in place (Balazs 1985). Long lengths of trailing gear are likely to entangle the sea turtle, eventually, leading to impaired movement, constriction wounds, and potentially death.

6.1.2 Reporting Hook-and-Line Captures of Sea Turtles and Smalltooth Sawfish at Fishing Piers

While we believe the best available information for estimating future interactions at fishing piers are the documented incidental captures at a specific pier and/or in the surrounding area, we also recognize the need to account for underreporting, especially in areas where educational signs are not present. In the following sections, we describe how we derived our estimates for potential future negative interactions.

In 2013, a fishing pier survey was completed at 26 fishing piers in Charlotte Harbor on the west coast of Florida in smalltooth sawfish critical habitat (Hill 2013), approximately 64 mi south of the CAMP. During the survey, 93 fishers were asked a series of questions regarding captures of sea turtles, smalltooth sawfish, and dolphins, including whether or not they knew these encounters were required to be reported and if they did report the encounter. The interviewer also noted conditions about the pier including if educational signs regarding reporting of hook-and-line captures were present at the pier. Of the 26 piers visited, only 4% had sea turtle educational signs and 19% had smalltooth sawfish educational signs. Interviewed fishers were asked open-ended questions about what they would do if they were to accidently capture a sea turtle or sawfish. Of those interviewed, 46% responded they would cut the line, while 28% would either cut the line or remove the hook depending on the situation, and 22% would try to remove the hook. It was reported that: 88% did not know of requirements to report incidental captures of either sea turtles or sawfish; only 12% would report an accidently-hooked sawfish; and only 8% would report an accidently-hooked sea turtle. We interpret this as meaning that 88% of sawfish captures, and 92% of sea turtle captures, respectively, go unreported. This demonstrates the high level of underreporting likely occurring at fishing piers lacking sufficient educational signs regarding reporting incidental captures of sea turtles and smalltooth sawfish.

In 2013, NMFS conducted a fishing pier survey in Mississippi that interviewed 382 fishers. This survey indicated that approximately 60% of anglers that had captured a sea turtle actually reported it. Many anglers indicated they were unaware of the requirements to report a captured sea turtle (Cook et al. 2014). Interestingly, Cook et al. (2014) report that, following the survey, an increase in the number of sea turtle incidental captures reported was noted. Regardless, the study clearly indicates that as many as 40% of incidental captures were going unreported. It is important to note that in 2012 educational signs were installed at all fishing piers in Mississippi alerting fishers to report accidental hook-and-line captures of sea turtles. After the signs were installed, there was a dramatic increase in the number of reported sea turtle captures. Although there were only 24 reported hook-and-line captures in 2011, the number of reported captures at fishing piers in Mississippi in 2012 rose to 198. This number continued to rise with a total of 299 reported captures in 2014. Though this increase in reported captures may not solely be related to outreach efforts, it does highlight the importance of educational signs on fishing piers, which will be installed at the CAMP.

The Mississippi STSSN (M. Cook, STSSN, per comm. to N. Bonine, NMFS PRD, April 17, 2015) indicated that inconsistency in reporting of captures may also be due to fishers' concern over their personal liability or consequences from turtle captures. Since it is illegal to harm an endangered species, fishers are often afraid to admit the accidental capture of a sea turtle. Educational signs at piers and outreach materials are aimed at encouraging fishers to report these encounters so that injured sea turtles can be helped. However, news outlets in Mississippi have alleged that reporting sea turtle captures at fishing piers may lead NMFS to no longer authorize the construction of fishing piers in Mississippi.

Similarly, it was noted in a study of smalltooth sawfish that many people became reluctant to report sawfish encounters once the species was listed under the ESA. Some fishers were apprehensive to continue to report sawfish encounters, fearing their favorite fishing hole would be closed or restricted due to the known presence of sawfish (Wiley and Simpfendorfer 2010). This shows that public perception at the time of capture can affect whether the capture is reported and that reporting at piers can wax and wane from year to year based on this perception.

We believe that the Charlotte Harbor (Hill 2013) study is the most applicable study to determine underreporting at the CAMP, because both piers are located in southwest Florida on the Gulf coast, only 64 mi apart. Of those interviewed in the Charlotte Harbor study, 12% stated that they would report an accidentally-hooked sawfish, and only 8% stated they would report an accidentally-hooked sea turtle. To be conservative, **we will assume 88% underreporting of smalltooth sawfish captures and 92% underreporting of sea turtle captures**, even though signs will be posted providing information on reporting captures of sea turtles and smalltooth sawfish. We will supplement the data from the Charlotte Harbor study with data from Mississippi fishing piers, when necessary, to fill in missing information regarding the potential outcomes of hook-and-line injuries to sea turtles captured at fishing piers.

6.2 Calculating the Effects of Hook-and-Line Capture

In this section, we will estimate the numbers of sea turtles and smalltooth sawfish anticipated to be captured at the proposed project based on available data regarding the number that have been recreationally captured in the past at this and other nearby locations, the number of fishers estimated to report hook-and-line captures, and the estimated survival rate of each species post capture. If an animal is captured and then released back into the water, but later dies as a result of injuries sustained during the capture, we call this post-release mortality (PRM).

6.2.1 Handling Species

All sea turtles and sawfish captured would be exposed to handling to remove them from gear and return them to the water. Handling can result in raised levels of stressor hormones. However, NMFS does not expect that individual animals would normally experience more than short-term stresses as a result of these activities. No injury is expected from these activities, and the more gear that is removed, the lower the probability of PRM.

NMFS's preferred method of hooked smalltooth sawfish release is to cut the line as close as possible to the sawfish's mouth or hooking site. Based on observations of stranded sawfish and anecdotal reports, this is the preferred approach of fishers to deal with hooked smalltooth sawfish. This form of release will result in the escape of sawfish with embedded hooks and varying amounts of monofilament fishing line which may cause post-release injury or death.

The preferred method to release a hooked sea turtle safely is to bring it ashore and de-hook/disentangle it there and release it immediately. If that cannot be accomplished, the next preferred technique is to cut the line as close as possible to the sea turtle's mouth or hooking site, rather than attempt to pull the sea turtle up to the pier. Some incidentally captured sea turtles are likely to break free on their own and escape with embedded/ingested hooks and/or trailing line. We have no way of estimating how many will break free with trailing line and/or ingested or embedded hooks. Because of considerations such as the tide, weather, and the weight and size of the captured sea turtle, some will not be able to be de-hooked (when applicable), and will be cut free by fishers, and intentionally released. These sea turtles will escape with embedded or swallowed hooks, or trailing varying amounts of monofilament fishing line which may cause post-release injury or death.

6.2.2 Sea Turtles

Calculating Capture

We believe that there is probably underreporting at fishing piers in Tampa Bay (discussed in Section 6.1.2). Looking at all fishing piers in Tampa Bay still does not accurately reflect the number of turtles likely being captured at these locations, since reporting is known to be so low. Below we discuss the available information regarding hook-and-line captures of sea turtles at fishing piers and how we can use this information to estimate the number of sea turtles likely to be captured at the CAMP.

From 2008 to 2016, 2 sea turtles were reported captured by hook-and-line fishing gear at the two fishing piers on Anna Maria Island (Table 4). Using the 2 reported captures on Anna Maria Island (we include both captures, even if one was at the nearby Rod and Reel fishing pier, to be conservative), and the study indicating the 92% rate of underreporting for sea turtle captures at fishing piers, we can estimate the relative risk of hook-and-line capture for sea turtles at the CAMP (Equation 1).

Equation 1. Calculating estimated annual sea turtle captures at the CAMP

$$\frac{2\ sea\ turtles}{9\ years} = 0.22\ reported\ sea\ turtles\ per\ year$$

<u>Accounting for underreporting (assuming 8% reported, 92% unreported):</u>

$$8\% \times (real\ number\ of\ captures\ per\ year) = 0.22\ sea\ turtle\ captures\ per\ year$$

$$0.08 \times (real\ number\ of\ captures\ per\ year) = 0.22\ sea\ turtle\ captures\ per\ year$$

$$(real\ number\ of\ captures\ per\ year) = 0.22 \div 0.08$$

$$(real\ number\ of\ captures\ per\ year) = 3.125$$

$$\text{Estimated captures per year at CAMP} = 2.778\ \text{sea turtles}$$

Using the best available data, we estimate 2.778 sea turtles to be captured each year at the CAMP.

We can then use the STSSN data in Table 4 to determine the relative risk of capture for each sea turtle species.

Table 4. Sea turtle captures by hook-and-line within FL STSSN Zone 5, 2008-2016, from closest to the CAMP to furthest away (each row is an individual incident)

Location	**Date of Capture**	**Species Captured**
Anna Maria Island	05/27/2010	Loggerhead
Anna Maria Island	05/20/2010	Loggerhead
Bradenton Beach	04/16/2016	Green
Fort De Soto	06/14/2008	Loggerhead
Longboat Key	2011	Green
Terra Ceia Bay	09/20/2014	Kemp's ridley
Treasure Island	04/08/2009	Kemp's ridley
John's Pass, Madeira Beach	03/22/2016	Green
St. Petersburg	2011	Kemp's ridley
Redington	2011	Kemp's ridley
Redington	2012	Kemp's ridley
Indian Rocks Beach	07/26/2014	Kemp's ridley
Clearwater	2012	Kemp's ridley
Clearwater	09/06/2016	Kemp's ridley
Safety Harbor	09/18/2016	Green
Clearwater Beach	09/17/2014	Kemp's ridley
Clearwater Beach	01/09/2013	Kemp's ridley
Clearwater Beach	05/06/2013	Kemp's ridley
Clearwater Beach	05/26/2016	Kemp's ridley
Davis Island, Tampa	2012	Kemp's ridley

Venice	10/07/2010	Loggerhead
Venice	2011	Loggerhead
Venice	*06/26/2014*	*Unidentified*
Venice	08/12/2014	Loggerhead

Because the species was unidentified in one incident, and we need to be able to determine the likelihood of each sea turtle species being captured, we disregard that record during the calculation of species composition, and thus look at a total of 23 captures. Of 23 captures which identified species, 4 captures were green sea turtles, 6 captures were of loggerhead sea turtles, and 13 captures were of Kemp's ridley sea turtles (Table 4). Using the below percentages (Table 5), we can then calculate approximately how many of each sea turtle species could be captured.

Table 5. Hook-and-line capture data from FL STSSN Zone 5, 2008-2016

Species	**Number Captured**	**% of Total* Captures**
Green sea turtles	4	17.39%
Loggerhead sea turtles	6	26.09%
Kemp's ridley sea turtles	13	56.52%
Total	**23***	**100%**
*Original total number captured was 24, but one was disregarded because the species was unidentified		

Since sea turtle captures cannot be measured in less-than-whole numbers, and to account for any fluctuations in patterns from year to year, we look at periods of time that will allow us to more accurately calculate the amount of each species that may be captured. For this Opinion, we will estimate all species of sea turtle captures based on 4-year periods. These 4-year estimates are set as running sums (total for any consecutive 4-year period i.e., 2018-2021, 2019-2022, 2020-2023, and so on) and not for static 4-year periods (2018-2021, 2022-2025, 2026-2029, and so on). This approach reduces the likelihood of reinitiation of the ESA consultation process because of inherent variability in captures, while still allowing for an accurate assessment of how the proposed action is performing versus our expectations. Using the above equations, the total estimated interactions with sea turtles, and the estimate for each of the sea turtle species, over a 4-year period is:

Equation 2. Calculating sea turtle captures at the CAMP, per species, per 4-year period

$$\text{Green sea turtles} = 17.39\% \text{ of total captures}$$
$$17.39\%\ of\ 2.778 = 0.1739 \times 2.778 = 0.4831\ captures\ per\ year$$
$$0.4831\ green\ sea\ turtle\ captures\ per\ year \times 4\ years = 1.932$$
$$\mathbf{1.932\ \text{rounded up} = 2\ \text{Green sea turtle captures per 4-year period}}$$

$$\text{Loggerhead sea turtles} = 26.09\% \text{ of total captures}$$
$$26.09\%\ of\ 2.778 = 0.2609 \times 2.778 = 0.7248\ captures\ per\ year$$
$$0.7248\ loggerhead\ sea\ turtle\ captures\ per\ year \times 4\ years = 2.899$$
$$\mathbf{2.899\ \text{rounded up} = 3\ \text{Loggerhead sea turtle captures per 4-year period}}$$

$$\text{Kemp's ridley sea turtles} = 56.52\% \text{ of total captures}$$
$$56.52\%\ of\ 2.778 = 0.5652 \times 2.778 = 1.5701\ captures\ per\ year$$
$$1.5701\ Kemp's\ ridley\ sea\ turtle\ captures\ per\ year \times 4\ years = 6.280$$
$$\mathbf{6.280 \text{rounded up} = 7 \text{ Kemp's ridley sea turtle captures per 4-year period}}$$

$$2\ Green\ sea\ turtles + 3\ Loggerhead\ sea\ turtles + 7\ Kemp's\ ridley\ sea\ turtles = \mathbf{12 \text{ sea turtles per 4-year period}}$$

To err in favor of protecting the species, we round each number up to the next whole number. This means we estimate, for every 4-year period, **12 total** sea turtle hook-and-line captures at the CAMP. The 12 turtles captured will be made up of **2 green sea turtles**, **3 loggerhead sea turtles**, and **7 Kemp's ridley sea turtles**.

Calculating Post-Release Mortality (PRM)

The injury to sea turtles from hook-and-line captures, and ultimately the PRM, will depend on numerous factors including how deeply the hook is embedded, whether it was swallowed or was an external hooking, whether the sea turtle was released with trailing line, how soon and how effectively the hooked sea turtle was de-hooked or otherwise cut loose and released, and other factors which are discussed in more detail below.

In January 2004, NMFS convened a workshop of experts to develop criteria for estimating PRM of sea turtles caught in the pelagic longline fishery. In 2006, those criteria were revised and finalized (Ryder et al. 2006). In February 2012, the SEFSC updated the 2006 criteria by adding 3 additional hooking scenarios. Overall mortality ratios are dependent upon the type of interaction (i.e., hooking, entanglement), the location of hooking if applicable (i.e., hooked externally, hooked in the mouth), and the amount/type of gear remaining on the animal at the time of release (i.e., hook remaining, amount of line remaining, entangled or not). Therefore, the experience, ability, and willingness of anglers to remove the gear, and the availability of gear-removal equipment, are very important factors that influence PRM. The new criteria also take into account differences in PRM between hardshell (loggerhead, green, Kemp's ridley, and hawksbill) sea turtles and leatherback sea turtles, with slightly higher rates of PRM assigned to leatherbacks. No specific criteria for recreational hook-and-line gear at the CAMP are currently available.

To anticipate future PRM, we used the revised NMFS and SEFSC (2012) criteria. In a recent ESA Section 7 consultation (NMFS 2017), we used data from hook and line captures at fishing piers in Mississippi to determine categories of injury from fishing pier interactions. This information was used with the revised PRM criteria to calculate an estimated PRM rate for sea turtles released immediately from a pier. Since the location of the hooking injury on the animal affects the likelihood of survival, and since the hooking location on the animal varies greatly, it is difficult to determine which PRM rate we should use regarding anticipated future interactions. In the previous consultation (NMFS 2017), we addressed this issue by calculating weighted mortality rates, and found an overall PRM rate of **43.2%** for sea turtles released from piers. Since this is an unattended pier, we are assuming that any hooked sea turtles will likely be released directly from the pier without being sent to rehabilitation facilities. We applied the

PRM rate estimated for turtles released at piers (43.2%) to the number of turtles anticipated to be captured, by species (Table 4), in order to calculate expected sea turtle PRM at the CAMP.

Equation 3. Calculating sea turtle PRM at the CAMP, per species, per 4-year period

Species	Estimated Captures per 4-Year Period *(see Equation 2)*	PRM *(43.2% [0.432] × Estimated Captures)*	**PRM (*Rounded up*)**
Green	1.932	$0.432 \times 1.932 = 0.835$	**1**
Loggerhead	2.899	$0.432 \times 2.899 = 1.252$	**2**
Kemp's ridley	6.280	$0.432 \times 6.280 = 2.713$	**3**

Using the PRM rate of 43.2%, and rounding up to whole numbers, we believe that in a 4-year period, **6 sea turtles (1 green, 2 loggerhead, and 3 Kemp's ridley)** will suffer from PRM as a result of fishing (thus hook-and-line interactions) from the CAMP. Again, it is important to remember that these 4-year estimates are set as running sums and not as static 4-year periods.

Because we cannot measure the capture of sea turtles in less-than-whole numbers, we round the estimated PRM for green sea turtles up to 1. We must also consider that two different green sea turtle DPSs could be impacted. As discussed in Section 4.3.1 of this Opinion, on April 6, 2016, the single species listing was replaced with the listing of 11 DPSs. Individuals from both the NA and SA DPSs can be found in waters where the proposed action would occur. While there are currently no in-depth studies available to determine the percent of NA and SA DPS individuals in any given location, as mentioned in Section 4.3.1, an analysis of cold-stunned green turtles in St. Joseph Bay, Florida (northern Gulf of Mexico) found that approximately 4% of individuals came from nesting stocks in the SA DPS, and the remaining individuals were from the NA DPS. All of the individuals in the study were benthic juveniles.

This information suggests that the vast majority of the anticipated captures in the Gulf of Mexico and South Atlantic regions are likely to come from the NA DPS. Therefore, we believe that the 2 green sea turtles anticipated to be captured in a 4-year period will likely be from the NA DPS. However, it is possible that animals from the SA DPS could be captured during the proposed action. For these reasons, we will act conservatively and assume that green sea turtles captured at the CAMP could come from either the NA DPS or the SA DPS; this means that in our Jeopardy analysis of green sea turtles (Section 8.1 of this Opinion), we will analyze the proposed action's likelihood to jeopardize the continued existence of each DPS, assuming 1 nonlethal and 1 lethal (PRM) capture could be from either the NA or SA DPS.

6.2.3 Smalltooth Sawfish

Calculating Capture

The ISED was created during the smalltooth sawfish listing process and is now maintained by the Florida Program for Shark Research at the Florida Museum of Natural History. This database tracks sawfish encounters reported by fishers, boaters, and researchers. Collected data includes the date of the encounter, type of encounter (sighting or capture), location and habitat of encounter, estimated total length, condition of the sawfish, and a variety of other information. The database includes both recent and historical information. As discussed above, it is expected that this database represents only a portion of actual encounters and that a large number go unreported.

NMFS believes the ISED capture data reported is the best data available concerning the incidental capture of smalltooth sawfish at the proposed project, though this number likely represents only a portion of the number of incidental captures due to underreporting. Based on the reported encounter data in Section 5.1.2, 3 smalltooth sawfish were reported captured by hook-and-line at the CAMP from 2008 to 2014. Therefore we estimated the potential risk of hook-and-line capture at the CAMP based on the 3 captures in 6 years, as shown below:

Equation 4. Calculating estimated annual capture of smalltooth sawfish by hook-and-line at the CAMP

$$\frac{3\ smalltooth\ sawfish}{6\ years} = 0.5\ reported\ smalltooth\ sawfish\ captures/year$$

Accounting for underreporting (assuming 12% reported, 88% unreported):

$$12\% \times (real\ number\ of\ \ captures/year) = 0.5\ sawfish\ captures/year$$
$$0.12 \times (real\ number\ of\ captures/year) = 0.5\ sawfish\ captures/year$$
$$(real\ number\ of\ captures/year) = 0.5 \div 0.12$$
$$(real\ number\ of\ captures/year) = 4.17$$
$$4.17\ sawfish\ captures\ per\ year \times 4\ years = 16.68$$

16.68 rounded up = 17 smalltooth sawfish captures per 4-year period

Since smalltooth sawfish captures cannot be measured in less-than-whole numbers, and to account for any fluctuations in patterns from year to year, we look at periods of time that will allow us to more accurately calculate the amount of each species that may be captured. For this Opinion, we will estimate smalltooth sawfish captures based on 4-year periods. These 4-year estimates are set as running sums (total for any consecutive 4-year period i.e., 2018-2021, 2019-2022, 2020-2023, and so on) and not for static 4-year periods (2018-2021, 2022-2025, 2026-2029, and so on). This approach reduces the likelihood of reinitiation of the ESA consultation process because of inherent variability in captures, while still allowing for an accurate assessment of how the proposed action is performing versus our expectations. Using the best available data, we estimate 4.17 smalltooth sawfish are captured each year, or 16.68 smalltooth sawfish captured each 4-year period, at the CAMP. To err in favor of protecting the species, we round this number up, for a total of
17 estimated captures of smalltooth sawfish per 4-year period.

Calculating Post-Release Mortality (PRM)
PRM is unknown at this time, but is believed to be very low based on the few stranding reports of sawfish. According to a study, only 0.6% of reported sightings to the ISED between 1998 and 2008 were reported stranded dead, indicating a very low rate of mortality from captures (Wiley

and Simpfendorfer 2010). In addition, the applicant proposes to install educational signs to inform fishers of how to handle an accidentally captured smalltooth sawfish. Therefore, we calculate the PRM rate as follows:

Equation 5. Calculating post-release mortality (PRM) rate for smalltooth sawfish released after being captured by hook-and-line at the CAMP

$$(17\ smalltooth\ sawfish\ captures\ per\ 4\text{-}year\ period) \times (0.6\%\ estimated\ PRM) =$$

$$(17 \times 0.006) = \mathbf{0.102}\ \boldsymbol{estimated\ PRM\ of\ smalltooth\ sawfish\ per\ 4\text{-}year\ period}$$

The estimated PRM for smalltooth sawfish is 0.102 per 4-year period, which translates to **1 smalltooth sawfish PRM approximately every 40 years** as a result of capture and release at the CAMP. Because this PRM estimate is so low, **we do not believe the proposed action will cause a smalltooth sawfish mortality**. Therefore, any sawfish mortality as a result of the proposed action would require reinitiation of consultation.

6.3 Summary

Based on the data and calculations presented in this section of the Opinion, we believe that smalltooth sawfish and green, loggerhead, and Kemp's ridley sea turtles, could suffer from entanglement, hooking, ingestion, and other types of injuries, from trailing line, hooks, or other hook-and-line gear, as a result of the proposed action. These interactions could cause any of these species death from the wounds, impaired swimming or foraging, and altered migratory, breeding, and/or reproductive patterns. We believe that approximately 88% of all smalltooth sawfish, and 92% of all sea turtle interactions (captures) at fishing piers do not get reported. Taking this into account, we estimate that 12 sea turtles (2 green, 3 loggerhead, and 7 Kemp's ridley) and 17 smalltooth sawfish could be captured per 4-year period as a result of hook-and-line interactions from recreational fishing at the CAMP. Additionally, we estimate that 6 sea turtles (1 green, 2 loggerhead, and 3 Kemp's ridley) will suffer from post-release mortality every 4-year period, as a result of hook-and-line interactions from recreational fishing at the CAMP. There is a 96% likelihood that the green sea turtles captured will come from the NA DPS, and a 4% likelihood that they will be from the SA DPS. However, we assume that the 1 nonlethal and 1 lethal (PRM) capture could be from either the NA or SA DPS.

7. CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this Opinion (50 CFR 402.02). Section 7 regulations require NMFS to consider cumulative effects in formulating our Opinions (50 CFR 402.14(g)(3) and (4)). Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA.

The plans for rebuilding the CAMP include rebuilding the restaurant and bait shop at the T-head of the pier. The presence of a restaurant likely creates a higher volume of people visiting the pier, and a bait shop provides fishers the opportunity to replace any lost or broken gear, and thus continue fishing, without having to leave the pier. While the restaurant and bait shop could increase the volume of people (thereby increasing fishing pressure) on the pier, these institutions already existed on the old pier, so the new buildings are not likely to cause major changes to the volume of human activity anticipated at the new pier.

At this time, we are not aware of any other non-federal actions being planned or under development in the action area. While we do not know of any specific actions other than the above-mentioned restaurant and bait shop and the actions discussed in Section 5, there may be other projects under consideration, planned, or developed within or in the vicinity of the action area (e.g., marinas, hotels, other property development) that may add to, or compound, existing issues for sea turtles or smalltooth sawfish.

Human-induced effects from vessel interactions, ingestion of marine debris, pollution, and global climate change are likely to continue into the future. While the combination of these activities may impede or slow the recovery of populations of sea turtles and smalltooth sawfish, the magnitude of these effects is currently unknown.

The present and reasonably certain to occur human uses of the action area, such as recreational fishing, are expected to continue at similar or slightly elevated levels into the foreseeable future.

8. JEOPARDY ANALYSIS

The analyses conducted in the previous sections of this Opinion provide a basis to determine whether the proposed action is likely to jeopardize the continued existence of green, loggerhead, or Kemp's ridley sea turtles, or smalltooth sawfish. In Section 6, Effects of the Action, we outlined how the proposed action would affect these species at the individual level, and the extent of those effects in terms of the numbers of associated interactions, captures, and mortalities of each species (to the extent possible, using the best available data). Next, we consider how these species will be impacted by the proposed action in terms of overall population effects, and whether those effects of the proposed action, when considered in the context of the status of the species (Section 4), the environmental baseline (Section 5), and the cumulative effects (Section 7), are likely to jeopardize the continued existence of the species.

To "jeopardize the continued existence of" a species means "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). 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 species. 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.

All life stages are important to the survival and recovery of a 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 capture, injury or killing 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. Yet, the death of mature, breeding females can have an immediate effect on the reproductive potential of a species. Sub-lethal effects on adult females may also reduce reproduction if, for example, foraging success is impacted, thus reducing energy reserves to the point that the female is unable to produce multiple clutches of eggs in a breeding year. Different age classes may be subject to relative rates of mortality, resilience, and overall effects of population dynamics. Ontogenetic shifts, or changes in location and habitat, have a major impact on where sea turtles occur and what human hazards they may encounter. Young juvenile sea turtles are generally not subject to hook-and-line capture because of their pelagic oceanic stage of life. Still, a shift in diet for all sea turtles occurs when juvenile sea turtles shift to a neritic habitat and benthic feeding, at which time they would become more susceptible to fishing impacts. For the proposed action, we would not expect early juvenile-stage sea turtles of any of these species to be directly impacted by any aspect of pier construction or continued use of the piers. However, later-stage juveniles and adults of these species are more likely to be subject to incidental capture, injury, or mortality, as these life stages are more likely to be foraging in the areas of fishing activity, which would occur as a result of the proposed action.

The status of each listed species likely to be adversely affected by the proposed action was reviewed in Section 4. For any species listed globally, our jeopardy analysis must determine whether the proposed action will appreciably reduce the likelihood of survival and recovery at the global species range. For any species listed as a DPS, our jeopardy analysis must determine whether the proposed action will appreciably reduce the likelihood of survival and recovery of that DPS.

8.1 Green Sea Turtles (NA and SA DPSs)

As discussed in Sections 4.3.1 and 6.2.2 of this Opinion, individuals from both the NA and SA DPSs can be found on foraging grounds within U.S. waters, and we expect individuals from both DPSs to found within the action area of the proposed project. As calculated in Section 6.2.2, we anticipate up to 2 green sea turtles may be captured or injured at the pier during any consecutive 4-year period. Even though we believe 96% of green sea turtles in the action area are from the NA DPS, and only 4% are from the SA DPS, in order to err in favor of protecting the species, we will act conservatively and conduct jeopardy analyses under the assumption that either the NA DPS or the SA DPS will be captured as a result of the proposed action.

The proposed action is anticipated to result in the capture or injury of 2 green sea turtles during any consecutive 4-year period due to fishing activities or entanglement in fishing gear associated with the proposed pier. In order to err in favor of protecting the species, estimated interactions are rounded up to the nearest whole number (i.e., 1.932 green sea turtle captures is rounded to 2 green sea turtle captures). In this case, it was determined that 1 (0.835 rounded up to the next whole number) green sea turtle capture could result in post-release mortality over a 4-year period.

8.1.1 NA DPS of Green Sea Turtles

Nonlethal Capture

The potential nonlethal capture of 1 green sea turtle from the NA DPS over a 4-year period is not expected to have any measurable impact on the reproduction, numbers, or distribution of the species. The individuals suffering nonlethal injuries or stresses are expected to fully recover such that no reductions in reproduction or numbers of green sea turtles from the NA DPS are anticipated. Though the captures may occur anywhere in the action area, the action area encompasses only a tiny portion of the species' overall range/distribution. Since any incidentally-caught animal would be released within the general area where it was caught, we do not anticipate a change in the distribution of the NA DPS.

Lethal Capture

The potential lethal capture of 1 green sea turtle from the NA DPS over a 4-year period may have an impact on the reproduction, numbers, or distribution of the species.

Reproduction

The proposed action could reduce the reproductive capacity of the species, assuming some of the mortalities are of females that would have otherwise survived and reproduced. As mentioned earlier in this Opinion, an adult green sea turtle can lay up to 7 clutches (usually 2-3) of eggs every 2-4 years, with approximately 115 eggs per nest, of which only a small percentage are expected to survive to sexual maturity.

Numbers

The potential lethal capture of 1 green sea turtle over 4 years would reduce the number of green sea turtles in the NA DPS, compared to their numbers in the absence of the proposed action, assuming all other variables remained the same.

Distribution

The anticipated lethal interactions are expected to occur anywhere in the action area and only affect a small portion of the DPS, and sea turtles generally have large ranges in which they disperse; thus, the anticipated lethal capture of 1 green sea turtle in the action area is not expected to reduce the distribution of the NA DPS of green sea turtles.

Survival

In order to determine whether the potential reduction in numbers and reproduction would appreciably reduce the likelihood of survival for the NA DPS, we must consider what effect the change in numbers and reproduction would have, relative to current population sizes and trends.

Seminoff et al. (2015) estimate there are greater than 167,000 nesting females in the NA DPS. The nesting at Tortuguero, Costa Rica, accounts for approximately 79% of that estimate (approximately 131,000 nesters), with Quintana Roo, Mexico (approximately 18,250 nesters; 11%), and Florida, USA (approximately 8,400 nesters; 5%) also accounting for a large portion of the overall nesting (Seminoff et al. 2015).

At Tortuguero, Costa Rica, the number of nests laid per year from 1999 to 2010 increased despite substantial human impacts to the population at the nesting beach and at foraging areas

(Campell and Lagueux 2005; Troëng 1998; Troëng and Rankin 2005). Nesting locations in Mexico along the Yucatan Peninsula also indicate the number of nests laid each year has increased (Seminoff et al. 2015). In Florida, most nesting occurs along the Atlantic coast of eastern central Florida. As described in Section 4.3.1, nesting has increased substantially over the last 20 years and peaked in 2017 with 38,954 nests statewide.

Seminoff et al. (2015) also conducted a population viability analysis for the Tortuguero, Costa Rica, and Florida, USA nesting sites (as well as 2 others: Isla Aguada, Mexico and Guanahacabibes, Cuba).[5] The analysis evaluated the probabilities of nesting populations declining to 2 separate biological thresholds after 100 years: (1) a trend-based reference point where nesting populations decline by 50% and (2) the number of total adult females falls to 300 or fewer at these sites (Seminoff et al. 2015).[6] Seminoff et al. (2015) point out that population viability analyses do not fully incorporate spatial structure or threats. They also assume all environmental and man-made pressures will remain constant in the forecast period, while also relying solely on nesting data.

The Tortuguero, Costa Rica, population viability analysis indicated a 0.7% probability that this population will fall below the 50% decline threshold at the end of 100 years, and a 0% probability that this population will fall below the absolute abundance reference point of 100 nesting females per year at the end of 100 years (Seminoff et al. 2015). For the Florida, USA, population, the population viability analysis indicated there is a 0.3% probability that this population will fall below the 50% decline threshold at the end of 100 years, and a 0% probability this population falls below the absolute abundance threshold of 100 nesting females per year at the end of 100 years (Seminoff et al. 2015).

Nesting at the primary nesting beaches has been increasing over the course of the decades. Additionally, the population viability analysis for the Florida and Tortuguero, Costa Rica, nesting beaches indicate no more than a 0.7% probability those populations will reach the 50% decline threshold at the end of 100 years, and a 0% probability these populations will fall below the absolute abundance threshold of 100 nesting females per year at the end of 100 years (Seminoff et al. 2015). We believe these nesting trends are indicative of a species with a high number of sexually mature individuals. Since the abundance trend information for green sea turtles is clearly increasing, we believe the potential lethal take of 1 green sea turtle from the NA DPS over consecutive 4-year periods into the future attributed to the proposed action will not have any measurable effect on that trend. After analyzing the magnitude of the effects of the proposed action, in combination with the past, present, and future expected impacts to the species discussed in this Opinion, we believe the proposed action is not reasonably expected to cause an appreciable reduction in the likelihood of survival of the green sea turtle NA DPS in the wild.

[5] Not enough information was available to conduct a population viability analysis on the Quintana Roo, Mexico, nesting population.
[6] Since green sea turtles are believed to nest every 3 years, the analysis evaluated the likelihood that population would fall to 100 or fewer nesters annually (300 adult females ÷ nesting every 3 years = 100 adult female nesters annually).

Recovery

The NA DPS of green sea turtles did not have a recovery plan in place at the time of listing. However, an Atlantic Recovery Plan for the population of Atlantic green sea turtles (NMFS and USFWS 1991) does exist. Since the animals within the NA DPS all occur in the Atlantic Ocean and would have been subject to the recovery actions described in that plan, we believe it is appropriate to continue using that Recovery Plan as a guide until a new plan specific to the NA DPS is developed. The Atlantic Recovery Plan lists the following relevant recovery objectives over a period of 25 continuous years:

> *Objective: The level of nesting in Florida has increased to an average of 5,000 nests per year for at least 6 years.*
>
> *Objective: A reduction in stage class mortality is reflected in higher counts of individuals on foraging grounds.*

There are currently no estimates available specifically addressing changes in abundance of individuals on foraging grounds. Given the clear increases in nesting discussed below, it is likely that numbers on foraging grounds also have increased.

The potential lethal capture of up to 1 green sea turtle from the NA DPS over any consecutive 4-year period will result in a reduction in numbers, but it is unlikely to have any detectable influence on the recovery objectives and trends noted above. In addition, because of the small number of lethal captures as compared to the overall NA DPS population size, we would not anticipate any impact on the species' reproduction described above to have a detectable difference in the first recovery objective for this DPS noted above. Thus, the proposed action will not impede achieving the recovery objectives above and will not result in an appreciable reduction in the likelihood of the NA DPS of green sea turtles' recovery in the wild.

Conclusion

The lethal and nonlethal captures of NA DPS green sea turtles associated with the proposed action are not expected to appreciably reduce the likelihood of either the survival or the recovery of the green sea turtle NA DPS in the wild. Therefore, we believe the proposed action is not likely to jeopardize the continued existence of the species.

8.1.2 SA DPS of Green Sea Turtles

Nonlethal Capture

The potential nonlethal capture of 1 green sea turtle from the SA DPS over a 4-year period is not expected to have any measurable impact on the reproduction, numbers, or distribution of the species. The individuals suffering nonlethal injuries or stresses are expected to fully recover such that no reductions in reproduction or numbers of green sea turtles from the SA DPS are anticipated. Though the captures may occur anywhere in the action area, the action area encompasses only a tiny portion of the species' overall range/distribution. Since any incidentally-caught animal would be released within the general area where it was caught, we do not anticipate a change in the distribution of the SA DPS.

Lethal Capture
The potential lethal capture of 1 green sea turtle from the SA DPS over a 4-year period may have an impact on the reproduction, numbers, or distribution of the species.

Reproduction
The proposed action could reduce the reproductive capacity of the species, assuming some of the mortalities are of females that would have otherwise survived and reproduced. As mentioned earlier in this Opinion, an adult green sea turtle can lay up to 7 clutches (usually 2-3) of eggs every 2-4 years, with approximately 115 eggs per nest, of which only a small percentage are expected to survive to sexual maturity.

Numbers
The potential lethal capture of 1 green sea turtle over 4 years would reduce the number of green sea turtles in the SA DPS, compared to their numbers in the absence of the proposed action, assuming all other variables remained the same.

Distribution
The anticipated lethal interactions are expected to occur anywhere in the action area and only affect a small portion of the DPS, and sea turtles generally have large ranges in which they disperse; thus, the anticipated lethal capture of 1 green sea turtle in the action area is not expected to reduce the distribution of the SA DPS of green sea turtles.

Survival
In order to determine whether this potential reduction in numbers and reproduction would appreciably reduce the likelihood of survival for the SA DPS, we must consider the probable effect that the change in numbers and reproduction would have, relative to current population sizes and trends.

Seminoff et al. (2015) estimated that there are greater than 63,000 nesting females in the SA DPS, though they noted the adult female nesting abundance from 37 beaches could not be quantified. The nesting at Poilão, Guinea-Bissau, accounted for approximately 46% of that estimate (approximately 30,000 nesters), with Ascension Island, United Kingdom, (approximately 13,400 nesters; 21%), and the Galibi Reserve, Suriname (approximately 9,400 nesters; 15%) also accounting for a large portion of the overall nesting (Seminoff et al. 2015).

Seminoff et al. (2015) reported that while trends cannot be estimated for many nesting populations due to the lack of data, they could discuss possible trends at some of the primary nesting sites. Seminoff et al. (2015) indicated that the nesting concentration at Ascension Island (United Kingdom) is one of the largest in the SA DPS, and the population has increased substantially over the last 3 decades (Broderick et al. 2006; Glen et al. 2006). Mortimer and Carr (1987) counted nests and estimated approximately 1,500 females in 1977 (5,257 nests), and approximately 3,000 females (10,764 nests) in 1978. From 1999–2004, a total of about 3,500 females nested each year (Broderick et al. 2006). Since 1977, numbers of nests on 1 of the 2 major nesting beaches, Long Beach, have increased exponentially from around 1,000 to almost 10,000 (Seminoff et al. 2015). From 2010 to 2012, an average of 23,000 nests per year were laid on Ascension Island (Seminoff et al. 2015). Seminoff et al. (2015) caution that while these data are suggestive of an increase, historic data from additional years are needed to fully substantiate this possibility.

Seminoff et al. (2015) reported that the nesting concentration at Galibi Reserve and Matapica in Suriname was stable from the 1970s through the 1980s. From 1975–1979, 1,657 females were counted (Schulz 1982), a number that increased to a mean of 1,740 females from 1983–1987 (Ogren 1989b), and to 1,803 females in 1995 (Weijerman et al. 1998). Since 2000, there appears to be a rapid increase in nest numbers (Seminoff et al. 2015).

In the Bijagos Archipelago (Poilão, Guinea-Bissau), Parris and Agardy (1993 as cited in Fretey 2001) reported approximately 2,000 nesting females per season from 1990 to 1992, and Catry et al. (2002) reported approximately 2,500 females nesting during the 2000 season. Given the typical large annual variability in green sea turtle nesting, Catry et al. (2009) suggested it was premature to consider there to be a positive trend in Poilão nesting, though others have made such a conclusion (Broderick et al. 2006). Despite the seeming increase in nesting, interviews along the coastal areas of Guinea-Bissau generally resulted in the view that sea turtles overall have decreased noticeably in numbers over the past two decades (Catry et al. 2009). In 2011, a record estimated 50,000 green sea turtle clutches were laid throughout the Bijagos Archipelago (Seminoff et al. 2015).

After analyzing the magnitude of the effects of the proposed action, in combination with the past, present, and future expected impacts to the species discussed in this Opinion, we believe the proposed action is not reasonably expected to cause an appreciable reduction in the likelihood of survival of the green sea turtle SA DPS in the wild.

<u>*Recovery*</u>

Like the NA DPS, the SA DPS of green sea turtles does not have a separate recovery plan in place at this time. However, an Atlantic Recovery Plan for the population of Atlantic green sea turtles (NMFS and USFWS 1991) does exist. Since the animals within the SA DPS all occur in the Atlantic Ocean and would have been subject to the recovery actions described in that plan, we believe it is appropriate to continue using that Recovery Plan as a guide until a new plan, specific to the SA DPS, is developed. In our analysis for the NA DPS, we stated that the Atlantic Recovery Plan lists the following relevant recovery objectives over a period of 25 continuous years:

> *Objective: The level of nesting in Florida has increased to an average of 5,000 nests per year for at least 6 years.*

> *Objective: A reduction in stage class mortality is reflected in higher counts of individuals on foraging grounds.*

The nesting recovery objective is specific to the NA DPS, but demonstrates the importance of increases in nesting to recovery. As we will discuss below, nesting at the primary SA DPS nesting beaches has been increasing over the course of the decades. There are currently no estimates available specifically addressing changes in abundance of individuals on foraging grounds. Given the clear increases in nesting and in-water abundance, however, it is likely that numbers on foraging grounds have increased.

The potential lethal capture of up to 1 green sea turtle from the SA DPS over any consecutive 4-year period will result in a reduction in numbers, but it is unlikely to have any detectable influence on the recovery objectives and trends noted above. In addition, because of the small number of lethal captures as compared to the overall SA DPS population size, we would not anticipate any impact on the species' reproduction described above to have a detectable difference in the first recovery objective for this DPS noted above. Thus, the proposed action will not impede achieving the recovery objectives above and will not result in an appreciable reduction in the likelihood of the SA DPS of green sea turtles' recovery in the wild.

Conclusion

The lethal and nonlethal captures of SA DPS green sea turtles associated with the proposed action are not expected to appreciably reduce the likelihood of either the survival or the recovery of the green sea turtle SA DPS in the wild. Therefore, we believe the proposed action is not likely to jeopardize the continued existence of the species.

8.2 Loggerhead Sea Turtles

The proposed action is anticipated to result in the capture or injury of 3 loggerhead sea turtles from the NWA DPS during any consecutive 4-year period due to fishing activities or entanglement in fishing gear associated with the proposed pier. In order to err in favor of protecting the species, estimated interactions are rounded up to the nearest whole number (i.e., 2.899 loggerhead sea turtle captures is rounded to 3 loggerhead sea turtle captures). In this case, it was determined that up to 2 (1.252 rounded up to the next whole number) of the 3 loggerhead sea turtle captures per 4-year period could result in post-release mortality.

8.2.1 NWA DPS of Loggerhead Sea Turtles

Nonlethal Capture

The potential nonlethal capture of 1 loggerhead sea turtle from the NWA DPS over a 4-year period is not expected to have any measurable impact on the reproduction, numbers, or distribution of the species. The individual suffering nonlethal injuries or stresses is expected to fully recover such that no reductions in reproduction or numbers of loggerhead sea turtles from the NWA DPS are anticipated. Though the captures may occur anywhere in the action area, the action area encompasses only a tiny portion of the species' overall range/distribution. Since any incidentally-caught animal would be released within the general area where it was caught, we do not anticipate a change in the distribution of the NWA DPS.

Lethal Capture

The potential lethal capture of 2 loggerhead sea turtles from the NWA DPS over a 4-year period may have an impact on the reproduction, numbers, or distribution of the species.

Reproduction

The proposed action could reduce the reproductive capacity of the species, assuming some of the mortalities are of females that would have otherwise survived and reproduced. As mentioned earlier in this Opinion, an adult loggerhead sea turtle can lay 3 or 4 clutches of eggs every 2-4 years, with approximately 100-130 eggs per clutch. The loss of an adult female sea turtle could preclude the production of thousands of eggs and hatchlings, of which only a small percentage would be expected to survive to sexual maturity.

Numbers

The potential lethal capture of 2 loggerhead sea turtles over 4 years would reduce the number of loggerhead sea turtles in the NWA DPS, compared to their numbers in the absence of the proposed action, assuming all other variables remained the same.

Distribution

Because the NWA DPS of loggerhead sea turtles has a large range in which they disperse, including along the coast of the United States, from southern Virginia to Alabama, where nesting may occur, the distribution of the NWA DPS of loggerhead sea turtles is expected to be unaffected by the lethal take of up to 2 sea turtles in the action area.

Survival

In order to determine whether this potential reduction in numbers and reproduction would appreciably reduce the likelihood of survival for the NWA DPS, we must consider the probable effect that the change in numbers and reproduction would have, relative to current population sizes and trends.

Loggerhead sea turtles are a slow growing, late-maturing species. Because of their longevity, loggerhead sea turtles require high survival rates throughout their life to maintain a population. In other words, late-maturing species cannot tolerate much anthropogenic mortality without going into decline. Conant et al. (2009) concluded that because loggerhead natural growth rates are low, natural survival needs to be high, and even low-to-moderate mortality can drive the population into decline. Because recruitment to the adult population is slow, population-modeling studies suggest even small increases in mortality rates in adults and subadults could substantially impact population numbers and viability (Chaloupka and Musick 1997; Crouse et al. 1987; Crowder et al. 1994; Heppell et al. 1995).

NMFS-SEFSC (2009) estimated the minimum adult female population size for the NWA DPS in the 2004-2008 timeframe to likely be approximately 20,000-40,000 individuals (median 30,050), with a low likelihood of being as many as 70,000 individuals. Another estimate for the entire western North Atlantic population was a mean of 38,334 adult females using data from 2001-2010 (Richards et al. 2011). 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-NEFSC (2011) preliminarily estimated the loggerhead population in the Northwestern Atlantic Ocean along the continental shelf of the Eastern Seaboard during the summer of 2010 at 588,439 individuals (estimate ranged from 381,941 to 817,023) based on positively identified individuals. That point estimate increased to approximately 801,000 individuals when including data on unidentified sea turtles that were likely loggerheads. The data underestimates the total population of loggerheads since it did not include Florida's east coast south of Cape Canaveral or the Gulf of Mexico, which are areas where large numbers of loggerheads are also expected. In other words, it provides an estimate of a subset of the entire population.

Florida accounts for more than 90% of U.S. loggerhead nesting. FWC conducted a detailed analysis of Florida's long-term loggerhead nesting data (1989-2016), which indicated that following a 24% increase in nesting between 1989 and 1998, nest counts declined sharply from 1999 to 2007. A large increase in loggerhead nesting has occurred since, as indicated by the 71% increase in nesting over the 10-year period from 2007 and 2016. Nesting in 2016 also represented a new record for loggerheads on the core index beaches. FWRI examined the trend from the 1998 nesting high through 2016 and found that the decade-long post-1998 decline was replaced with a slight but nonsignificant increasing trend. Looking at the data from 1989 through 2016, FWRI concluded that there was an overall positive change in the nest counts although it was not statistically significant due to the wide variability between 2012-2016 resulting in widening confidence intervals (http://myfwc.com/research/wildlife/sea-turtles/nesting/loggerhead-trend/). Nesting at the core index beaches declined in 2017 to 48,033, which is still the 4th highest total since 2001.

Abundance estimates accounting for only a subset of the entire loggerhead sea turtle population in the western North Atlantic indicate the population is large (i.e., several hundred thousand individuals). Nesting trends have been significantly increasing over several years against the background of the past and ongoing human and natural factors that have contributed to the current status of the species. Additionally, our estimate of future captures is not a new source of impacts on the species. The same or a similar level of captures has occurred in the past, yet we have still seen positive trends in the status of this species.

While the loss of 2 individuals per year is an impact to the population, in the context of the overall population's size and current trend, we do not expect this loss to result in a detectable change to the population numbers or increasing trend. After analyzing the magnitude of the effects of the proposed action, in combination with the past, present, and future expected impacts to the species discussed in this Opinion, we believe the proposed action is not reasonably expected to cause an appreciable reduction in the likelihood of survival of the loggerhead sea turtle NWA DPS in the wild.

Recovery

The loggerhead Recovery Plan for the Northwest Atlantic population of loggerhead sea turtles (NMFS and USFWS 2008) lists the following recovery objectives that are relevant to the effects of the proposed action:

> *Objective: 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*

Objective: Ensure the in-water abundance of juveniles in both neritic and oceanic habitats is increasing and is increasing at a greater rate than strandings of similar age classes

Recovery Objective 1, "Ensure that the number of nests in each recovery unit is increasing…," is the plan's overarching objective and has associated demographic criteria. Currently, none of the plan's criteria are being met, but the plan acknowledges that it will take 50-150 years to do so. Further reduction of multiple threats throughout the North Atlantic, Gulf of Mexico, and Greater Caribbean will be needed for strong, positive population growth, following implementation of more of the plan's actions. Although any continuing mortality can affect the potential for population growth, we believe the very low mortality levels expected from the proposed actions would not impede or prevent achieving this recovery objective over the anticipated 50- to 150-year time frame.

Recovery Objective No. 2 states, "Ensure the in-water abundance of juveniles in both neritic and oceanic habitats is increasing and is increasing at a greater rate than strandings of similar age classes." Currently, there are not enough data on the population trends of juvenile loggerhead sea turtles to determine if this objective is being met. More information is available on loggerhead sea turtle nesting since nests are easier to accurately identify, count, and track annually. In Section 3.2.2 (Figure 4) and discussed above, the nesting trend of loggerhead sea turtles has had 3 distinct population trends with a sharp decline between 1998-2007 followed by a general population increase for the last decade from 2007-2016, with a few biannual decreases in 2009, 2011, and 2013. Stranding data also fluctuates annually depending on a number of factors including stochastic events such as cold snaps, reporting effort, and population fluctuations. We are currently working with the stranding networks to tease out the data comparing juvenile and adult stranding for loggerhead sea turtles. As with Recovery Objective No. 1 above, the mortality of a single sea turtle in the action area combined with the fluctuating population trends discussed above is not expected to impede or prevent achieving this recovery objective over the anticipated 50- to 150-year time frame. Because of high inter-annual variation in nesting and stranding data, and due to the relatively long-term lens needed to discern species recovery for the NWA population of loggerheads, recovery trends are assessed over decades. The loss of 2 NWA DPS loggerhead sea turtles over the 4-year periods for the proposed action would not impede recovery or significantly add to any negative recovery trend for this DPS.

The potential lethal capture of up to 2 loggerhead sea turtles from the NWA DPS over any consecutive 4-year period will result in a reduction in numbers, but it is unlikely to have any detectable influence on the recovery objectives and trends noted above. In addition, because of the small number of lethal captures as compared to the overall NWA DPS population size, we would not anticipate any impact on the species' reproduction described above to have a detectable difference in the first recovery objective for this DPS noted above. Thus, the proposed action will not impede achieving the recovery objectives above and will not result in an appreciable reduction in the likelihood of the NWA DPS of loggerhead sea turtles' recovery in the wild.

Conclusion
The lethal and nonlethal captures of NWA DPS loggerhead sea turtles associated with the proposed action are not expected to appreciably reduce the likelihood of either the survival or the recovery of the species in the wild. Therefore, we believe the proposed action is not likely to jeopardize the continued existence of the species.

8.3 Kemp's Ridley Sea Turtles

The proposed action is anticipated to result in the capture or injury of 7 Kemp's ridley sea turtles during any consecutive 4-year period due to fishing activities or entanglement in fishing gear associated with the proposed pier. In order to err in favor of protecting the species, estimated interactions are rounded up to the nearest whole number (i.e., 6.280 Kemp's ridley sea turtle captures is rounded to 7 Kemp's ridley sea turtle captures). In this case, it was determined that 3 (2.713 rounded up to the next whole number) of the 7 captures over a 4-year period could result in post-release mortality.

Nonlethal Capture
The potential nonlethal capture of 4 Kemp's ridley sea turtles over a 4-year period is not expected to have any measurable impact on the reproduction, numbers, or distribution of the species. The individuals suffering nonlethal injuries or stresses are expected to fully recover such that no reductions in reproduction or numbers of Kemp's ridley sea turtles are anticipated. Though the captures may occur anywhere in the action area, the action area encompasses only a tiny portion of the species' overall range/distribution. Since any incidentally-caught animal would be released within the general area where it was caught, we do not anticipate a change in the distribution of the species.

Lethal Capture
The potential lethal capture of 3 Kemp's ridley sea turtles over a 4-year period may have an impact on the reproduction, numbers, or distribution of the species.

Reproduction
The TEWG (TEWG 1998) estimates age at maturity from 7-15 years. Females return to their nesting beach about every 2 years (TEWG 1998). The mean clutch size for Kemp's ridleys is 100 eggs per nest, with an average of 2.5 nests per female, per season. Thus, the loss of 1 adult female Kemp's ridley sea turtle could preclude the production of thousands of eggs and hatchlings, of which only a small percentage are expected to survive to sexual maturity. Thus, the death of any females would eliminate their contribution to future generations, and result in a reduction in sea turtle reproduction.

Numbers
The potential lethal capture of 3 Kemp's ridley sea turtles over 4 years would reduce the number of individuals in the species, compared to their numbers in the absence of the proposed action, assuming all other variables remained the same.

Distribution

Because Kemp's ridley sea turtles have a large range in which they disperse, including throughout the Gulf of Mexico, along the east coast of the United States, and along the east coast of Mexico, the distribution of Kemp's ridley sea turtles is expected to be unaffected by the lethal capture of up to 3 sea turtles in the action area.

Survival

In order to determine whether this potential reduction in numbers and reproduction would appreciably reduce the likelihood of survival for the species, we must consider the probable effect that the change in numbers and reproduction would have, relative to current population sizes and trends.

Heppell et al. (2005) predicted in a population model that the Kemp's ridley sea turtle population was expected to increase at least 12-16% per year and that the population could attain at least 10,000 females nesting on Mexico beaches by 2015. Research by NMFS et al. (2011) included an updated model, which predicted that the population was expected to increase 19% per year and that the population could attain at least 10,000 females nesting on Mexican beaches by 2011. Approximately 25,000 nests would be needed for an estimate of 10,000 nesting females on the beach, based on an average 2.5 nests per nesting female.

The 2012 nesting season recorded approximately 22,000 nests. However, in 2013 through 2014, there was a second significant decline, with only 16,385 and 11,279 nests recorded, respectively. In 2016, the number of recorded nests was 14,006, and in 2017, the number of recorded nests was approximately 24,500 – the highest number of recorded nests in a season (J. Peña, Gladys Porter Zoo, pers. comm. to M. Barnette, NMFS PRD, October 20, 2017). That amount of nests would equate to approximately 9,800 nesting females (24,500 nests ÷ 2.5 females per nest = 9,800 females).

It is important to remember that with sea turtle species that exhibit normal inter-annual variation in nesting levels, sea turtle population trends necessarily are measured over decades, and the long-term trend line better reflects the population trends for the species. Long-term data from 1990 to present shows that the population of Kemp's ridley sea turtles is increasing. It is too early to know whether the fluctuating data from 2012-2017 (the 2012, 2015, and 2017 nesting booms, and the 2013 and 2014 nesting declines) will impact the long-term trend line for the species.

We do not believe the lethal capture of up to 3 Kemp's ridley sea turtles in a 4-year period associated with the proposed action will have a measurable effect on the increasing nesting trends seen over the last several years. Furthermore, we have no reason to believe that the proposed action would disproportionately affect females from one nesting beach over another. Nor do we believe the anticipated captures will cause a change in the number of sexually mature individuals producing viable offspring to an extent that changes in nesting trends will occur. Therefore, we do not believe the proposed action will cause an appreciable reduction in the likelihood Kemp's ridley sea turtles' survival in the wild.

Recovery

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

> *Objective: A population of at least 10,000 nesting females in a season (as measured by clutch frequency/female/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 the average number of nests per female is 2.5. Achieving the recovery goal of at least 10,000 nesting females would equate to approximately 25,000 nests. As mentioned above, the 2012 season recorded approximately 22,000 nests (estimated 8,800 nesting females), and the 2017 season recorded approximately 24,500 nests (estimated 9,800 nesting females). Although the recovery goal has not been met, these recent trends suggest the population is increasing.

Assuming an even sex ratio, there is only a 50% chance that any given captured turtle would be female, and therefore have an impact on the nesting female recovery objective. The loss of approximately 2 females (50% of the 3 mortalities is 1.5 females, rounded up) in consecutive 4-year periods would result in the loss of up to 5 nests per year (2 females laying 2.5 nests per season). Using the 2017 estimate of 24,500 nests, the loss of 5 nests would represent 0.02% of that year's reproductive effort. This small impact is not likely to impede achieving the recovery objective of 10,000 nesting females in a season.

The lethal capture of up to 3 Kemp's ridley sea turtles in consecutive 4-year periods will result in a reduction in numbers and may result in a reduction in reproduction, but these are unlikely to have any detectable influence on the trends noted above due to the thousands of adult Kemp's ridley sea turtles nesting each year. Thus, we believe the proposed action will not impede achieving the recovery objective for Kemp's ridley sea turtles listed above, and will not result in an appreciable reduction in the likelihood of the species' recovery in the wild.

Conclusion

The lethal and nonlethal captures of Kemp's ridley sea turtles associated with the proposed action are not expected to appreciably reduce the likelihood of either the survival or the recovery of the species in the wild. Therefore, we believe the proposed action is not likely to jeopardize the continued existence of the species.

8.4 Smalltooth Sawfish

The proposed action is anticipated to result in the capture or injury of 17 smalltooth sawfish per 4-year period due to fishing activities or entanglement in fishing gear associated with the proposed pier. In order to err in favor of protecting the species, estimated interactions are rounded up to the nearest whole number (i.e., 16.68 smalltooth sawfish captures is rounded to 17 smalltooth sawfish captures). No post-release mortality is anticipated from these interactions.

8.4.1 U.S. DPS of Smalltooth Sawfish

The potential nonlethal capture of 17 U.S. DPS smalltooth sawfish per 4-year period is not expected to have any measurable impact on the reproduction, numbers, or distribution of the species. The individuals suffering nonlethal injuries or stresses are expected to fully recover such that no reductions in reproduction or numbers of the U.S. DPS of smalltooth sawfish are anticipated. Though the captures may occur anywhere in the action area, the action area encompasses only a tiny portion of the species' overall range/distribution. Since any incidentally-caught animal would be released within the general area where it was caught, we do not anticipate a change in the distribution of the species.

Because we do not anticipate any lethal capture of U.S. DPS smalltooth sawfish as a result of the proposed action, we do not believe the proposed action will lead to a reduction in reproduction, numbers, or distribution of the species.

Survival

As indicated above, we do not anticipate a reduction in reproduction, numbers, or distribution. Therefore, after analyzing the magnitude of the effects of the proposed action, in combination with the past, present, and future expected impacts to the U.S. DPS of smalltooth sawfish discussed in this Opinion, we believe the proposed action is not reasonably expected to cause an appreciable reduction in the likelihood of survival of the species in the wild.

Recovery

As indicated above, we do not anticipate a reduction in reproduction, numbers, or distribution. Therefore, we believe the proposed action will not result in an appreciable reduction in the likelihood of the smalltooth sawfish U.S. DPS's recovery in the wild.

Conclusion

The nonlethal captures of U.S. DPS smalltooth sawfish associated with the proposed action are not expected to appreciably reduce the likelihood of either the survival or the recovery of the species in the wild. Therefore, we believe the proposed action is not likely to jeopardize the continued existence of the species.

9. CONCLUSION

After reviewing the current status of the species, the environmental baseline, the effects of the proposed action, and cumulative effects using the best available data, it is NMFS's biological opinion that the proposed action is not likely to jeopardize the continued existence of the NA DPS green sea turtle, SA DPS green sea turtle, NWA DPS loggerhead sea turtle, Kemp's ridley sea turtle, or U.S. DPS smalltooth sawfish.

10. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and federal regulation pursuant to Section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption.

The definition of "take" is: to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to 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. Section 7(b)(4) and Section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA, if that action is performed in compliance with the terms and conditions of this incidental take statement (ITS).

10.1 Anticipated Amount or Extent of Incidental Take

Based on the above information and analyses, NMFS believes that the proposed action is likely to adversely affect green, loggerhead, and Kemp's ridley sea turtles, and smalltooth sawfish. These effects will result from capture on hook-and-line and entanglement in fishing line or debris. NMFS anticipates the following incidental takes may occur in the future as a result of the proposed fishing pier (Table 6). We anticipate sea turtle and smalltooth sawfish takes will occur over consecutive 4-calendar-year periods (e.g., 2018-2021; 2019-2022, etc.).

Table 6. Summary of Anticipated Take*

Species	Anticipated Take	Timeframe
Sea Turtles		
Green sea turtle	2 (NA or SA DPS)	Every 4-year period
Loggerhead sea turtle	3 (NWA DPS)	Every 4-year period
Kemp's ridley sea turtle	6	Every 4-year period
Fish		
Smalltooth sawfish	17 (U.S. DPS)	Every 4-year period
*PRM is expected but will not be observed. Take is tracked by estimated captures.		

As we explained above, we do not expect any immediate mortalities at the pier and thus the only take authorized is the total estimated captures listed above (Table 6). Take will be tracked with respect to these numbers. If there are any immediate mortalities, the applicant or the action agency must inform us, and reinitiation will be required. We do expect some post-release mortalities, but since these mortalities will occur after the individual is released, they are unlikely to be observed, so we cannot reliably track these occurrences. Therefore, for purposes of this Incidental Take Statement, post-release mortalities will not be tracked.

10.2 Effect of Take

NMFS has determined the level of anticipated incidental take associated with the proposed action and summarized in Table 6 is not likely to jeopardize the continued existence of the NA DPS of green sea turtle, the SA DPS of green sea turtles, the NWA DPS of loggerhead sea turtles, Kemp's ridley sea turtles, or the U.S. DPS of smalltooth sawfish.

10.3 Reasonable and Prudent Measures (RPMs)

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 that NMFS shall identify reasonable and prudent measures (RPMs) necessary to minimize the impacts of take, and the terms and conditions (T&Cs) to implement the RPMs. Only incidental taking by the federal agency or applicant that complies with the specified T&Cs is authorized.

The RPMs and T&Cs are required, per 50 CFR 402.14 (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 RPMs and T&Cs are nondiscretionary, and must be implemented by USACE or the applicant in order for the protection of Section 7(o)(2) to apply. USACE has a continuing duty to regulate the activity covered by this ITS. If it fails to adhere to (or fails to require the applicant to adhere to) the T&Cs of the ITS through enforceable terms of permits or other documents, and/or fails to retain oversight to ensure compliance with these T&Cs, the protective coverage of Section 7(o)(2) for prohibited take may lapse. To monitor the impact of the incidental take, the Corps must report the progress of the action and its impact on the species to NMFS (F/SER3), as specified in the ITS (50 CFR 402.14(i)(3)).

NMFS has determined that the following RPMs and associated T&Cs are necessary and appropriate to minimize impacts of the incidental take of sea turtles and smalltooth sawfish related to the proposed action.

1. The USACE shall include a special permit condition that requires the applicant to monitor and report the impacts of its activities on sea turtles and smalltooth sawfish. Reports shall be forwarded to the USACE and NMFS.

2. The USACE shall include a special permit condition that requires the applicant to minimize the likelihood of injury or mortality resulting from hook-and-line capture or entanglement by activities at this fishing pier by installing educational signage at the pier, and by installing monofilament recycling bins. The signage should be placed at both the entrance and terminal platform of the pier where the view of these signs is unobstructed. These signs should contain information on the possibility of sea turtle and smalltooth sawfish captures by hook-and-line or entanglement, and what to do in the event of a capture.

3. The USACE shall include a special permit condition that requires the applicant to reduce the impacts to incidentally captured sea turtles and smalltooth sawfish by ensuring that incidentally captured sea turtles and smalltooth sawfish are appropriately handled and released, or that injured sea turtles are sent to rehabilitation facilities.

10.4 Terms and Conditions (T&Cs)

The following T&Cs implement the above RPMs. Note that for all T&Cs requiring emails to NMFS, the email address is takereport.nmfsser@noaa.gov, and every email must reference this Opinion by the respective identifier number SER-2018-19167 (Anna Maria Pier Reconstruction) and date of issuance, as well as any additional requirements specified below.

1. To implement RPM No. 1, USACE must make it a condition of their permit that the applicant shall report all hook-and-line captures of sea turtles and smalltooth sawfish at the proposed pier to NMFS's Southeast Regional Office.

    a. Within 24 hours, the applicant must notify NMFS by email that the capture has occurred. The email shall also state the type of species captured, date and time of capture, location and activity resulting in capture (i.e., fishing from the pier by hook-and-line), condition of the sea turtle or smalltooth sawfish (i.e., alive, dead, turtle sent to rehabilitation), size of the individual, behavior, identifying features (i.e., presence of tags, scars, or distinguishing marks), and any photos that may have been taken.

    b. Reports must also be provided on an annual basis. These reports shall be emailed to NMFS with the following information: the total number of sea turtle and smalltooth sawfish captures, entanglements, and strandings that occurred at or adjacent to the pier included in this Opinion. The report must also include the same details listed in T&C 1(a), above.

2. The applicant stated that informational signs will be displayed on the pier, educating the public on safe fishing practices that will reduce or prevent sea turtle and smalltooth sawfish injuries, as well as who to notify in the event a dead, injured, or entangled sea turtle or smalltooth sawfish is found. To implement RPM No. 2, USACE must ensure that the applicant installs NMFS Protected Species educational signs, including the "Save the Sea Turtles, Sawfish, and Dolphins" sign, at the entrance and terminal platform of the fishing pier, before the pier is opened. The applicant shall send a photo of the installed signs to USACE and to NMFS to confirm installation is complete prior to the opening of the new pier. Sign designs and installation methods are provided on our website at: http://sero.nmfs.noaa.gov/protected_resources/section_7/protected_species_educational_signs/index.html.

3. The applicant stated that monofilament recycling bins would be installed at the pier. To implement RPM No. 2, USACE must ensure that the applicant installs and maintains both monofilament recycling bins and trash receptacles at the pier to reduce the probability of trash and debris entering the water. The applicant shall email photographs of the installed bins and receptacles to USACE and to NMFS.

4. To implement RPM No. 2, USACE must ensure that the applicant conducts, or arranges for, annual underwater fishing debris cleanup around the fishing pier. The applicant shall send confirmation of cleanup to the USACE and to NMFS, including the dates of cleanup efforts and the results of those efforts.

5. To implement RPM No. 3, USACE must make it a condition of their permit that the applicant ensures that incidentally captured sea turtles are sent to a rehabilitation facility that holds an appropriate U.S. Fish and Wildlife Native Endangered and Threatened Species Recovery permit. The applicant shall send an annual report to USACE and to NMFS, documenting captures and results of captures (e.g., released alive, sent to rehabilitation, died).

11. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are designed 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.

NMFS believes the following recommendations further the conservation of the listed species that will be affected by the proposed action. NMFS strongly recommends that these measures be considered and implemented:

1. NMFS recommends that USACE encourage the Florida sea turtle rehabilitation centers to work with other state sea turtle rehabilitation facilities on the best handling techniques, data collection and reporting, and public outreach.
2. NMFS recommends that USACE encourage research and development of deterrents to discourage turtles from using fishing piers as a habitual food source.
3. NMFS recommends that USACE or the applicant perform pier surveys to determine the percent of captured sea turtles and smalltooth sawfish that are captured and/or reported.

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

12. REINITIATION OF CONSULTATION

As provided in 50 CFR Section 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 that 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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