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NATIONAL MARINE FISHERIES SERVICE
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F/SER31:JC

Stephanie Madson, Ph.D.
U.S. Department of Homeland Security
FEMA Region IV
Hollins Building
3003 Chamblee Tucker Road
Atlanta, Georgia 30341

NOV 07 2016

Dear Dr. Madson:

This letter responds to your request for consultation with us, the National Marine Fisheries Service (NMFS), pursuant to Section 7 of the Endangered Species Act (ESA) for the following action.

Permit Number	Applicant	SER Number	Project Type
PA-04-MS-4081-PW-00717	Harrison County Sand Beach Department	SER-2016-17812	Hurricane Damage Repairs to Jim Simpson Fishing Pier

Enclosed is NMFS's Biological Opinion, issued in accordance with Section 7 of the ESA of 1973, regarding the Federal Emergency Management Act's (FEMA's) action to fund the Harrison County Sand Beach Department's re-construction of the Jim Simpson Fishing Pier after Hurricane Isaac, located in Long Beach, Harrison County, Mississippi.

The Biological Opinion analyzes the project's effects on 3 species of sea turtles and Gulf sturgeon. This Opinion is based on project-specific information provided by FEMA, the Harrison County Sand Beach Department, their consultants, and NMFS's review of published literature. It is our Opinion that the proposed action is likely to adversely affect green, Kemp's ridley, and loggerhead sea turtles; and may affect, but is not likely to adversely affect, Gulf sturgeon and Gulf sturgeon critical habitat. We believe the project will have no effect on leatherback or hawksbill sea turtles.

No taking of marine mammals, whether listed under the ESA or not, is authorized. Incidental taking of marine mammals must be authorized under Section 101(a)(5)(E) of the Marine Mammal Protection Act (MMPA). If FEMA believes marine mammals may be taken by their proposed action or wishes to discuss requirements for obtaining MMPA take authorization, FEMA should contact the Office of Protected Resources, at (301) 427-8400.

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

Sincerely,

Roy E. Crabtree, Ph.D.
Regional Administrator

Enclosure
File: 1514-22.F-5

Endangered Species Act - Section 7 Consultation
Biological Opinion

Agency: Federal Emergency Management Act, Atlanta, Georgia

Activities: Funding Repairs to the Jim Simpson Fishing Pier, Long Beach, Mississippi Sound, Harrison County, Mississippi (PA-04-MS-4081-PW-00717)

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-2016-17812

Approved By:

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

Date Issued: Nov. 7, 2016

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Acronyms and Abbreviations

CPUE	catch per unit effort
DPS	distinct population segment
DWH	Deepwater Horizon
DTRU	Dry Tortugas Recovery Unit
ESA	Endangered Species Act
FP	Fibropapillomatosis
FWRI	Fish and Wildlife Research Institute
GADNR	Georgia Department of Natural Resources
GCRU	Greater Caribbean Recovery Unit
IMMS	Institute of Marine Mammal Studies
ITS	Incidental Take Statement
LAA	Likely to Adversely Affect
MLLW	Mean Lower Low Water
NLAA	Not Likely to Adversely Affect
NMFS	National Marine Fisheries Service
NCWRC	North Carolina Wildlife Resources Commission
NGMRU	Northern Gulf of Mexico Recovery Unit
NRU	Northern Recovery Unit
NWA	Northwest Atlantic
Opinion	Biological Opinion
PRM	Post-release mortality
RPMs	Reasonable and Prudent Measures
SCDNR	South Carolina Department of Natural Resources
SCL	Straight carapace length
SEFSC	Southeast Fisheries Science Center
STSSN	Sea Turtle Stranding and Salvage Network
TEDs	Turtle Exclusion Devices
TEWG	Turtle Expert Working Group
USACE	U.S. Army Corps of Engineers

USFWS	U.S. Fish and Wildlife Service

Units of Measurement

°C	Degrees Celsius
°F	Degrees Fahrenheit
ft	Feet
ft^2	Square Feet
in	Inch
lb	Pound(s)

Background

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 U.S. Fish and Wildlife Service (USFWS), depending upon the protected species or critical habitat 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 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 document represents NMFS's Opinion based on our review of impacts associated with FEMA's proposed funding of the Harrison County Sand Beach Department's reconstruction of the Jim Simpson Fishing Pier. The U.S. Army Corps of Engineers (USACE) Mobile District permitted the repairs under USACE Nationwide Permit 3, and those repairs were completed on October 29, 2013. FEMA is the action agency for the funding to be provided to the applicant for the completed repairs, which allow for the continued use of the pier. This Opinion analyzes the effects of the repairs to and use of the pier on sea turtles, Gulf sturgeon, and Gulf sturgeon critical habitat in accordance with Section 7 of the ESA. This Opinion is based on project information provided by the FEMA including a Biological Assessment provided by BMI Environmental Services, LLC, for the Harrison County Sand Beach Department. In addition, NMFS utilized published literature as well as sea turtle fishing pier capture data for Mississippi from the NOAA Southeast Fisheries Science Center's Sea Turtle Stranding and Salvage Network (STSSN).

1. CONSULTATION HISTORY

NMFS received a request for a formal consultation along with a Biological Assessment from FEMA on August 19, 2015, regarding its proposed action to fund the re-construction of the Jim Simpson Fishing Pier damaged by Hurricane Isaac (2012) to return the structure to its pre-disaster condition. The Jim Simpson Fishing Pier is located in Mississippi Sound, Harrison County, Mississippi. FEMA and NMFS's effects determinations to species are summarized in Table 1 below. NMFS and FEMA discussed the project over the ensuing months. On April 22 (by telephone) and April 27, 2016 (by email), NMFS requested additional information on the Jim Simpson Pier. NMFS and FEMA held a conference call on July 12, 2016, to discuss how to proceed with NMFS's final consultation and initiated consultation that day. NMFS requested additional information on July 19, 2016, for further clarification on elements of the final pier after repairs were completed. FEMA provided a final response on August 18, 2016.

2. DESCRIPTION OF THE PROPOSED ACTION AND ACTION AREA

2.1 Proposed Action

The Harrison County Sand Beach Department previously repaired an existing pier (Jim Simpson Pier) that was extensively damaged in 2012 during Hurricane Isaac (Figures 1-2). All construction was completed October 29, 2013. Currently, FEMA proposes to fund repairs made by the Harrison County Sand Beach Department for in-water work that included repairing or replacing pier piles and decking to pre-disaster condition including railings, posts, observation/fishing platforms, cross-bracings, and replacement of 1 lost shelter toward the waterward end of the pier. All work was completed using the pier and a work barge(s) as construction platforms. The in-water work was limited to resetting the 20 uplifted wooden piles using a pile driver from a barge, which, based on information received from FEMA, may be less than 8 inches in diameter. The repaired pier is 9 ft wide by 1,100 ft long with two, 10-ft-square fishing platforms and six, 10-ft-wide by 20-ft-long fishing platforms for a total square footage of 11,300 ft^2. All repairs made by the Harrison County Sand Beach Department were limited to returning facilities to previous condition. These repairs allow for continued use and the on-going operation of the fishing pier, which is expected to result in adverse impacts to listed species. We will evaluate the full scope of potential effects of FEMA's action, including potential past effects of construction and the ongoing effects from operation of the repaired structures, such as the present and future effects of recreational fishing to ESA-listed species (sea turtles) from ongoing fishing at the pier.

Figure 1. Image showing the project area (white bracket) (©2016 Google)

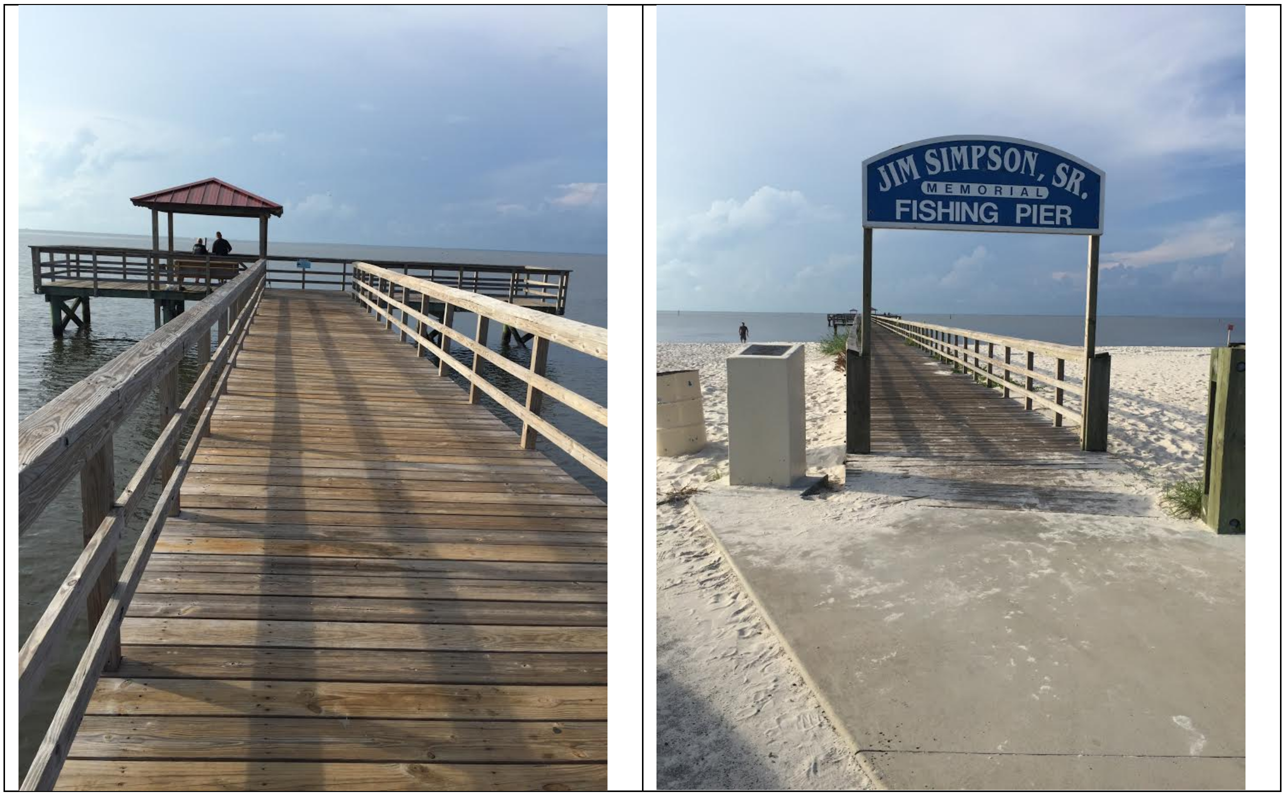

Figure 2. Image showing reconstructed Jim Simpson Pier, rebuild completed 10/29/2013

2.2 Action Area

The action area is defined by regulation as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR 402.02). The project site is located at latitude 30.345343°N, longitude 89.143742°W (North American Datum 1983). For purposes of this consultation, the action area is a radius of 705 feet from the pier, which, based on our noise calculations discussed below, is the distance from the pile driving at which ESA-listed fish have the potential to experience behavioral effects (Figure 4).

The existing Jim Simpson Pier is located along the northern shoreline of the Mississippi Sound within the city limits of Long Beach and was constructed in 1997 (Figure 3). Water depths in the area of the project vary from less than 1-ft-deep at the shoreline of Mississippi Sound where the pier extends from to 3 ft deep in the at the terminus of the pier (A. Collins, FEMA, pers. comm. to J. Cavanaugh, NMFS PRD, August 18, 2016). The average depth in the action area is approximately 2-3 ft deep. Sediment in the vicinity of the Jim Simpson Pier consists of firm clays, clay-sands, and sands. No seagrasses or mangroves were identified in the area.

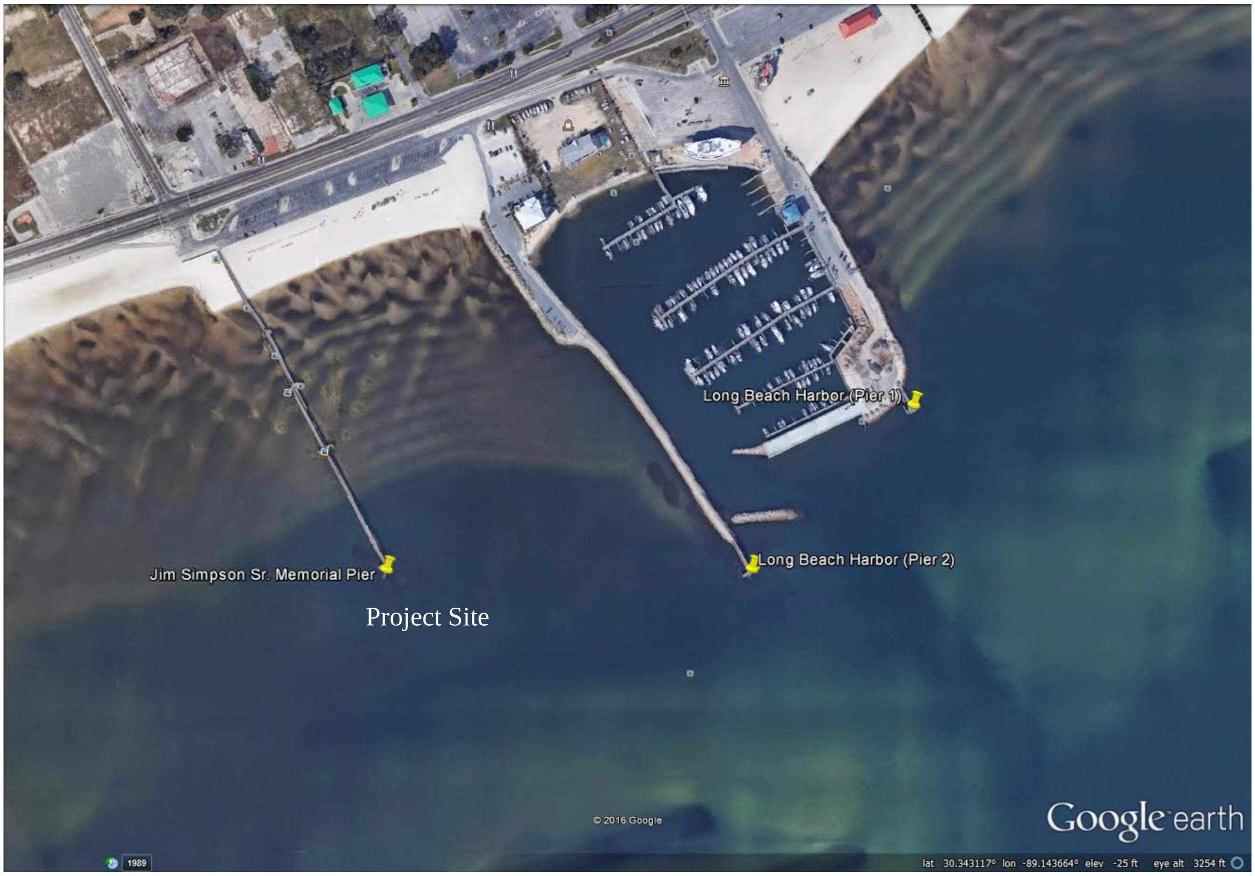

Figure 3. Jim Simpson, Sr. Memorial Fishing Pier location adjacent to the Long Beach Harbor Fishing Piers (©2015 Google)

Figure 4. Image showing Jim Simpson Pier with an approximate noise impact radius of 705 ft extended outward from the pier where behavioral effects to ESA-listed species may have occurred during pile driving when the pier was reconstructed. White box illustrates that Action Area based on the noise impact radius.

3. STATUS OF LISTED SPECIES

The following endangered (E) and threatened (T) species under the jurisdiction of NMFS may occur in or near the action area.

Table 1. Effects Determinations for Species FEMA Believes May Be Affected by the Proposed Action and NMFS's Effects Determinations

Species	ESA Listing Status	FEMA Effect Determination	NMFS Effect Determination
Sea Turtles			
Green (North Atlantic Distinct Population Segment [DPS])	T	LAA	LAA
Green (South Atlantic DPS)	T	LAA	LAA
Kemp's ridley	E	LAA	LAA
Loggerhead (Northwest Atlantic Ocean [NWA] DPS)	T	LAA	LAA
Fish			
Gulf sturgeon (Atlantic sturgeon, Gulf subspecies)	T	NLAA	NLAA
Critical Habitat			

Species	ESA Listing Status	FEMA Effect Determination	NMFS Effect Determination
Gulf Sturgeon Critical Habitat		NLAA	NLAA
E = endangered; T = threatened; LAA = likely to adversely affect; NLAA = may affect, not likely to adversely affect			

We believe the project will have no effect on hawksbill and leatherback sea turtles, due to the species' very specific life history strategies, which are not supported at the project site. Leatherback sea turtles have a pelagic, deepwater life history, where they forage primarily on jellyfish. Hawksbill sea turtles typically inhabit inshore reef and hard bottom areas (not present at this site) where they forage primarily on encrusting sponges. The lack of any hawksbill turtle strandings and only a single leatherback stranding in the most recent 7 years of data support our determination that the species are unlikely to be encountered in the action area and will not be affected by the action.

The project site is located in Gulf sturgeon critical habitat (Unit 8, Lake Pontchartrain, Mississippi Sound). FEMA made a NLAA determination for project impacts to Gulf sturgeon critical habitat (GSCH) based on in-water construction work, and we agree with that determination. The continued operation of the Jim Simpson Fishing Pier (post-reconstruction), however, will have no effect on GSCH.

We believe that loggerhead, green, and Kemp's ridley sea turtles and Gulf sturgeon may be present within the action area and may be affected by the proposed action.

3.1 Species Not likely to be Adversely Affected

In-Water Construction Effects
FEMA is funding re-construction of the Jim Simpson Pier, and the completed in-water construction potentially affected ESA-listed species, including sea turtles and Gulf sturgeon. Typical in-water effects from construction of a fishing pier include potential effects to sea turtles or Gulf sturgeon from the risk of interaction with construction equipment and barges. However, we believe this adverse effect would have been discountable because these species are likely to have moved away from the disturbances and exhibited avoidance behavior during construction. Also, Gulf sturgeon are demersal (living on water bottom) and potential impacts from vessel strikes from slow moving barges are extremely unlikely to occur and thus would have been discountable. Sea turtles, although more vulnerable to vessel strikes, would have been able to easily avoid construction barges and the effect of potential vessel strikes were also extremely unlikely to occur and discountable for these species.

Sea turtles and Gulf sturgeon also may have been affected by being temporarily unable to use the site for foraging or refuge due to avoidance of construction activities and related noise. We believe this adverse effect would have been discountable for either Gulf sturgeon or sea turtles for refuge as the project occurred along an existing fishing pier with noise levels from recreational vessels and fishing pier related activities are already elevated above background noise levels in surrounding areas. In other words, the limited reconstruction of the Jim Simpson Pier was extremely unlikely to have added significantly to the noise levels in the action area that would have disrupted refuge. Also, this area is unlikely to be used by Gulf sturgeon for foraging because of the shallow depths along the fishing pier whereas Gulf sturgeon typically feed in deeper waters (< 6 ft deep) due to their feeding morphology (suction feeding on the water bottom with their protrusable mouths). In addition, although Gulf sturgeon could have foraged in the sandy areas that may have appropriate depth within the action area, sturgeon are opportunistic foragers that can use surrounding areas should construction disturbances have prevented the animals from seeking forage in their preferred location. Although there are no standout foraging resources near to the fishing pier for sea turtles such as seagrass beds, sea turtles, Kemp's ridleys and loggerheads in particular, may use the site for foraging. In fact, Kemp's ridleys are known to frequent fishing piers in the action area and surrounding areas in search of food from the piers (food sources associated with the fishing including bait and cast away fish parts and offal). During previous pier reconstruction, no fishing would have occurred from the pier and Kemp's ridleys would have presumably foraged on their natural resources during construction and possibly even reduced their chance for incidental capture in the area while the pier was closed due to repairs. Both Kemp's ridley and loggerhead sea turtles, as well as green sea turtles, would have had ample equal-quality habitat areas to forage from while pier construction occurred and we believe it is extremely unlikely that sea turtles would have suffered any adverse effects from exclusion from the foraging habitat adjacent to the pier, and thus any such effect would have been discountable.

Effects to sea turtles or Gulf sturgeon as a result of noise created by pile driving the wooden piles using an impact hammer could have physically injured the animals in the affected areas or changed animal behavior in the affected areas. Physical injurious effects can occur in 2 ways. First, effects could result from a single noise event exceeding the threshold for direct physical injury to animals, and these constitute an immediate adverse effect on these animals. Second, effects could result from prolonged exposure to noise levels that exceed the daily cumulative exposure threshold for the animals, and these constitute adverse effects if animals are exposed to the noise levels for sufficient periods. Behavioral effects can be adverse if they affect the animals' migration, feeding, resting, or reproducing, for example. 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 (i.e., Gulf sturgeon) and sea turtles.

When repairing the pier, the applicant reset 20 uplifted wooden piles using a pile driver. Based on the information provided by FEMA, these piles may have been less than 8 inches in diameter. To be conservative, however, we estimate that the wooden piles may be up to 14 inches in diameter and will assume that they were installed using an impact hammer. Based on our noise calculations, the installation of wood piles by impact hammer would not have caused single-strike or peak-pressure injury to sea turtles or ESA-listed fishes. The cumulative sound exposure level (cSEL) of multiple pile strikes over the course of a day may cause injury to ESA-listed fishes and sea turtles at a radius of up to 30 ft (9 m). Due to the mobility of sea turtles and ESA-listed fish species, we expect that they moved away from noise disturbances. Because we anticipate any animals in the action area moved away, we believe it was extremely unlikely that these species suffered physical injury. Thus, we believe the effect of cumulative exposure to the noise was discountable. An animal's movement away from the injurious impact zone is a behavioral response, with the same effects discussed below.

Based on our noise calculations, impact hammer pile installation could also have caused behavioral effects at radii of 150 ft (46 m) for sea turtles and 705 ft (215 m) for ESA-listed fishes (see previous Figure 4). Due to the mobility of sea turtles and ESA-listed fish species, we expect that they moved away from noise disturbances. Because there is similar habitat nearby, we believe behavioral effects were insignificant. If an individual chose to remain within the behavioral response zone, it could have been exposed to behavioral noise impacts during pile installation. Since the installation only occurred during the day, these species were able to resume normal activities during quiet periods between pile installations and at night. Therefore, we anticipate any behavioral effects were insignificant.

In addition, there is no information indicating that any adverse effects occurred. Therefore, we believe that these effects from the completed construction were either insignificant or discountable.

Post-Construction Potential Effects from Fishing on Gulf Sturgeon
We believe it is extremely unlikely that Gulf sturgeon would be captured via hook-and-line gear and the risk of any adverse effects from fishing at the piers is discountable. Because of their diet and feeding mechanism (bottom feeding via suction), Gulf sturgeon are not likely to feed on baited hooks. Gulf sturgeon have been described as opportunistic and indiscriminate bottom feeders; their guts generally contain benthic marine invertebrates including amphipods, lancelets, polychaetes, gastropods, shrimp, isopods, mollusks, and crustaceans (Carr et al. 1996; Fox et al. 2002; Fox et al. 2000; Huff 1975; Mason and Clugston 1993). These prey generally are burrowing species (e.g., annelids: polychaetes and oligochaetes, amphipods, isopods, and lancelets) that feed on detritus and/or suspended particles, and inhabit sandy substrate. Additionally, no reports of Gulf sturgeon being entangled in single-hook fishing lines have been documented; incidental captures are usually associated with gillnets and shrimp trawls (USFWS and GSMFC 1995).

Gulf Sturgeon Critical Habitat
The project is located within the boundary of Gulf sturgeon critical habitat (Lake Pontchartrain - Mississippi Sound - Unit 8). The following essential features/primary constituent elements (PCEs) are present in Unit 8: (1) abundant food items such as detritus, aquatic insects, worms, and/or mollusks, within riverine habitats for larval and juvenile life stages; and abundant prey items, such as amphipods, lancelets, polychaetes, gastropods, ghost shrimp, isopods, mollusks and/or crustaceans, within estuarine and marine habitats and substrates for subadult and adult life stages; (2) water quality, including temperature, salinity, pH, hardness, turbidity, oxygen content, and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages; (3) sediment quality, including texture and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages; and (4) safe and unobstructed migratory pathways necessary for passage within and between riverine, estuarine, and marine habitats (e.g., an unobstructed river or a dammed river that still allows for passage).

Repairs to the Jim Simpson Pier with all associated in-water construction work were completed in 2013. The construction vessel traffic and pile installation could have impacted the essential features above. Effects to the food abundance essential feature were likely insignificant in the areas in and around the fishing pier with frequent recreational fishing vessel traffic and disturbances. The area currently in and around the fishing pier is unlikely to be a preferred foraging area due to the noise and disturbances from recreational fishing vessel traffic and the shallow depths within most of the action area (<6 ft) that are not within deeper, preferred feeding depths for this species. Gulf sturgeon are suction feeders that tend to forage in deeper (> 6 ft) marine and estuarine waters that support their macroinvertebrate prey including brachiopods, mollusks, worms, and crustaceans (Mason and Clugston 1993). Additionally, Gulf sturgeon forage over large areas and would have been able to locate prey beyond the area surrounding the pier.

Effects to the water quality essential features also were likely insignificant. Water quality would have been temporarily affected by turbidity caused during the placement of piles. However, we believe this effect was insignificant because the pier is in a high wave zone where turbidity will quickly settle out. Also, pile-driving small wooden piles (≤14-in-diameter) would cause very little water quality disturbance, most of which would have been contained by their use of turbidity curtains.

We do not think that sediment quality was adversely affected by the project as sediment disturbance from reconstruction at the Jim Simpson Pier was limited to pile driving (≤14-in-diameter wooden piles) and possible sediment disturbance from construction barges. Both of these sources of sediment disturbances would have been temporary (i.e., several weeks during in-water construction [S. Madson, FEMA, pers. comm. to J. Cavanaugh, NMFS, August 17, 2016]) and, in this ephemeral nearshore area, very small areas of sediments suspended during construction would quickly settle within a tide cycle presumably (24 hours), allowing for a full recovery of sediment quality; therefore we believe adverse effects to sediment quality would have been temporary and insignificant.

Finally, effects to the safe and unobstructed migratory pathway were likely insignificant as sturgeon are able to move around the structure in this open water environment.

3.2 Species Likely to be Adversely Affected

A fishing pier can threaten sea turtles via incidental 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 sea turtles (Kemp's ridley, green, and loggerhead) based on their abundance in the area and their habitat/feeding preferences.

Sea turtles

The STSSN was formally established in 1980 to collect information on and document strandings of marine turtles along the U.S. Gulf of Mexico and Atlantic coasts. A stranding is any dead sea turtle that is found floating or washed ashore or any live sea turtles that are found with life-threatening problems (e.g., sick, injured, or entangled). The location of the stranding when first reported is the point location that appears in this database; it may or may not be the location at the time of injury or death. The species of sea turtles listed in Table 1 have some potential to occur within the action area, but data from the STSSN (Table 2) indicate that leatherback and hawksbill sea turtles are quite rare in the inshore areas along the Mississippi coast (STSSN Zones 11 and 12).

Table 2. Inshore Sea Turtle Strandings from Mississippi, as Reported by STSSN

Year	Sea Turtle Species					Total
	Loggerhead	Green	Leatherback	Hawksbill	Kemp's ridley	
2007	1	0	1	0	4	6
2008	0	0	0	0	3	3
2009	3	0	0	0	27	30
2010	10	5	0	0	290	305
2011	3	7	0	0	255	265
2012	3	2	0	0	144	149
2013*	9	2	0	0	189	200
Total by Species	29	16	1	0	912	958
Percent of Total by Species	3.03%	1.67%	0.1%	0%	95.2%	100%
*STSSN Zones 11 and 12. The 2013 data through August 25, 2013, is the most recent data available on the STSSN as of April 17, 2015 (http://www.sefsc.noaa.gov/species/turtles/strandings.htm)						

We compared the species composition of sea turtles reported to the stranding network along the Mississippi coast (STSSN Zones 11 and 12) to those reported captured by hook-and-line at the fishing piers in Long Beach, Mississippi (including the Jim Simpson Sr. Memorial Pier and the 2 adjacent Long Beach Harbor fishing piers located in Long Beach Harbor).

The fishing pier capture data for all 3 fishing piers from January 2010 to April 27, 2015, indicate that Kemp's ridley, loggerhead, and green sea turtles have been captured on hook-and-line (Table 3). Given that these data are specific to fishing pier interactions, whereas stranding data include sea turtles stranded from any number of different causes besides hook and line caught sea turtles (e.g., cold stunning), we generally consider the fishing pier interaction data to be the best available source of information for estimating the species composition of future sea turtle hook-and-line captures associated with the proposed action. Yet, of the 206 sea turtles reported from 2010-2015 in the pier-specific data, 23 were unidentified (Table 3), and we would have to make some further assumptions to use this data. For example, due to the number of unidentified sea turtles in Table 3 (11% [23/206 x 100%]), and the fact that Kemp's ridley are likely the most prevalent sea turtles in the area based on the stranding network data and the data from the piers, we could assume that 3% of the unidentified sea turtles captured at the piers were either loggerhead and/or green sea turtles (as per the breakdown in the pier specific data in Table 3), and that the other 97% of unidentified turtles may have been Kemp's ridley. Since there were 23 total unidentified turtles, we would assume that 22 were Kemp's ridley (23 turtles x 0.97 = 22.31 Kemp's ridleys, rounded down). For the remaining 3% of the unknowns, 2%, or 1 additional turtle, would be attributed to loggerhead (23 turtles x 0.02 = 0.46 rounded to 1 because we cannot attribute a partial sea turtle for incidental take) and 1%, or 1 additional turtle, a green (23 x .01 = 0.23 also rounded to 1). With this rounding, we would closely mirror the STSSN percentages (we would have 96.6% Kemp's ridley (177 known + 22 attributed = 199/206 [total] = 0.966 x 100%), 3% loggerhead (5 known + 1 attributed = 6/206 [total] = 0.029 x 100%), and

1% green (1 known + 1 attributed = 2/206 [total] = 0.0097 x 100%) – which closely reflects the results from the stranding network data of 95.2% Kemp's ridley, 3.03% loggerhead, and 1.67% green).

However, the larger STSSN database offers a few advantages as a proxy for estimating take at the Jim Simpson Pier, as follows: (1) The identification of species is more certain in the STSSN dataset, which has no reported unknowns in the data from Table 2. This is likely because most strandings are either recovered dead individuals or live rescued/released sea turtles sent to rehabilitation facilities and in both cases they are accurately identified at the species level; and (2) The STSSN data are from a regional scale with a larger dataset than the fishing pier reporting (206 total over 5 years of reporting for the 3 piers in Table 3 vs. 958 sea turtles reported over approximately 6.5 years of reporting from the STSSN database) and percentages of takes in the larger dataset may more accurately reflect the long-term captures anticipated at Jim Simpson Pier in terms of species composition percentages. Thus, if we use the larger STSSN dataset as a proxy for estimating sea turtle takes, we are likely to more accurately estimate the species composition trend in the region and thereby better estimate the species composition of sea turtles captured at the Jim Simpson Pier. In particular, we expect that the larger dataset more accurately reflects the less abundant species and, by relying on the larger dataset, the less abundant greens and loggerhead species would more truly reflect the species composition in the area of the pier. Thus, although the percentages elevate slightly when using the larger dataset—from 1% greens in the pier-specific data to 1.67% greens in the STSSN dataset and 2% loggerheads in the pier-specific data to 3.03% loggerheads in the STSSN dataset—we believe that using the larger dataset will allow us to more accurately account for the possible incidental take of these species over a long-term timeframe.

Based on the above discussion, we believe that the STSSN data are the most accurate reflection of what species composition of sea turtles is likely to be incidentally captured at the Jim Simpson Pier. Although both datasets (STSSN and fishing pier reported captures) have very similar species compositions, the STSSN dataset is likely a more accurate representation of the less abundant species (loggerhead and greens). Thus, based on the STSSN data reported in Table 2, we will assume a species composition with 95.2% of the captures at the Jim Simpson Pier as Kemp's ridley, 3.03% will be loggerhead, and 1.67% green (Table 2). Hawksbill sea turtles are absent from reporting from both the STSSN (Table 2) and fishing pier reports (Table 3); therefore, we assume no incidental captures will occur for this species. A single leatherback sea turtle was recorded captured in 2007 in the STSSN dataset, and represents the only stranded individual in the regional data (2007-2013). Given this and the fact that leatherbacks are easy to distinguish from the hard-shelled sea turtles, leatherbacks are unlikely to fall within the "unknown" category of captures at the piers in Table 3. Therefore, we assume no incidental captures of leatherback sea turtles will occur at the Jim Simpson Pier.

Table 3. Hook-and-Line Capture of Sea Turtles at Jim Simpson Pier and Neighboring Long Beach Fishing Piers

Pier	Species	2010	2011	2012	2013	2014	2015	Total
Jim Simpson, Sr. Memorial Pier	Green	0	0	0	0	1	0	1
	Loggerhead	0	0	0	0	0	1	1
	Kemp's ridley	0	0	5	0	11	29	45

	Unknown	0	0	2	0	2	0	4
Long Beach Harbor (Pier 1)	Kemp's ridley	0	0	5	8	6	3	22
	Unknown	0	0	2	1	1	0	4
Long Beach Harbor (Pier 2)	Green	0	0	0	0	0	0	0
	Loggerhead	0	0	0	0	4	0	4
	Kemp's ridley	0	0	9	0	66	35	110
	Unknown	0	0	3	0	9	3	15
							Total	206

Species Composition	**Total**	**Percentage**
Total Kemp's ridley	177	86%
Total loggerhead	5	2%
Total green	1	1%
Total unknown	23	11%
Grand Total	206	100%
Source: STSSN and M. Cook (STSSN-MS Coordinator) from January 2010 to December 31, 2015		

Green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles that travel widely throughout the South Atlantic, Gulf of Mexico and the Caribbean. Section 3.2.1 will address the general threats that confront all sea turtle species. The remainder of Section 3.2 (Sections 3.2.2 – 3.2.3) 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.

3.2.1 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 and USFWS 1991; NMFS and USFWS 1992; NMFS and USFWS 1993; NMFS and USFWS 2008b; NMFS et al. 2011a). 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. Refer to the Environmental Baseline section of this opinion for more specific information regarding federal and state managed fisheries affecting sea turtles within the action area. 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 takes 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. 1997a). 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 [PCB], and perfluorinated chemicals [PFC]), 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 Status of the Species sections for each species.

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 1990b). 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 2008b).

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.

3.2.2 Loggerhead Sea Turtle – NWA DPS

The loggerhead sea turtle was listed as a threatened species throughout its global range on July 28, 1978 (NMFS). NMFS and USFWS published a Final Rule designating 9 DPSs for loggerhead sea turtles (76 FR 58868, September 22, 2011, and effective October 24, 2011). This rule listed the following DPSs: (1) NWA (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 NWA DPS is the only one that occurs within the action area and. therefore, 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 pounds (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 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 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 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 1990a). For the NWA DPS, most nesting occurs along the coast of the United States, from southern Virginia to Alabama. Additional known 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 (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 are known to 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-SEFSC 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 2008a). 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 1985b; 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 1988) which incubate for 42-75 days before hatching (NMFS and USFWS 2008a). Loggerhead hatchlings are 1.5-2 inches long and weigh about 0.7 ounces (20 grams).

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. 2009a; 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 records indicate that when immature loggerheads reach 15-24 inches (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

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

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, and 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. 2009a).

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. 2009a).

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 in Cuban waters of 5 adult female loggerheads originally flipper-tagged in Quintana Roo, Mexico, indicating 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. 2009a; Heppell et al. 2003; NMFS-SEFSC 2001; NMFS-SEFSC 2009; NMFS and USFWS 2008a; 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 2008a). NMFS and USFWS (2008a) 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 is the largest loggerhead nesting assemblage in the Northwest Atlantic. A near-complete nest census (all beaches including index nesting beaches) undertaken from 1989-2007 showed an average of 64,513 loggerhead nests per year, representing approximately 15,735 nesting females per year (NMFS and USFWS 2008a). The statewide estimated total for 2013 was 77,975 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 5). FWRI performed a detailed analysis of the long-term loggerhead index nesting data (1989-2013) (http://myfwc.com/research/wildlife/sea-turtles/nesting/loggerhead-trends/). Over that time period, 3 distinct trends were identified. From 1989-1998 there was a 30% increase that was then followed by a sharp decline over the subsequent decade. Large increases in loggerhead nesting occurred since then. FWRI examined the trend from the 1998 nesting high through 2013 and found the decade-long post-1998 decline had reversed and there was no longer a demonstrable trend. Looking at the data from 1989 through 2014 (an increase of over 32%), FWRI concluded that there was an overall positive change in the nest counts (http://myfwc.com/research/wildlife/sea-turtles/nesting/loggerhead-trends/).

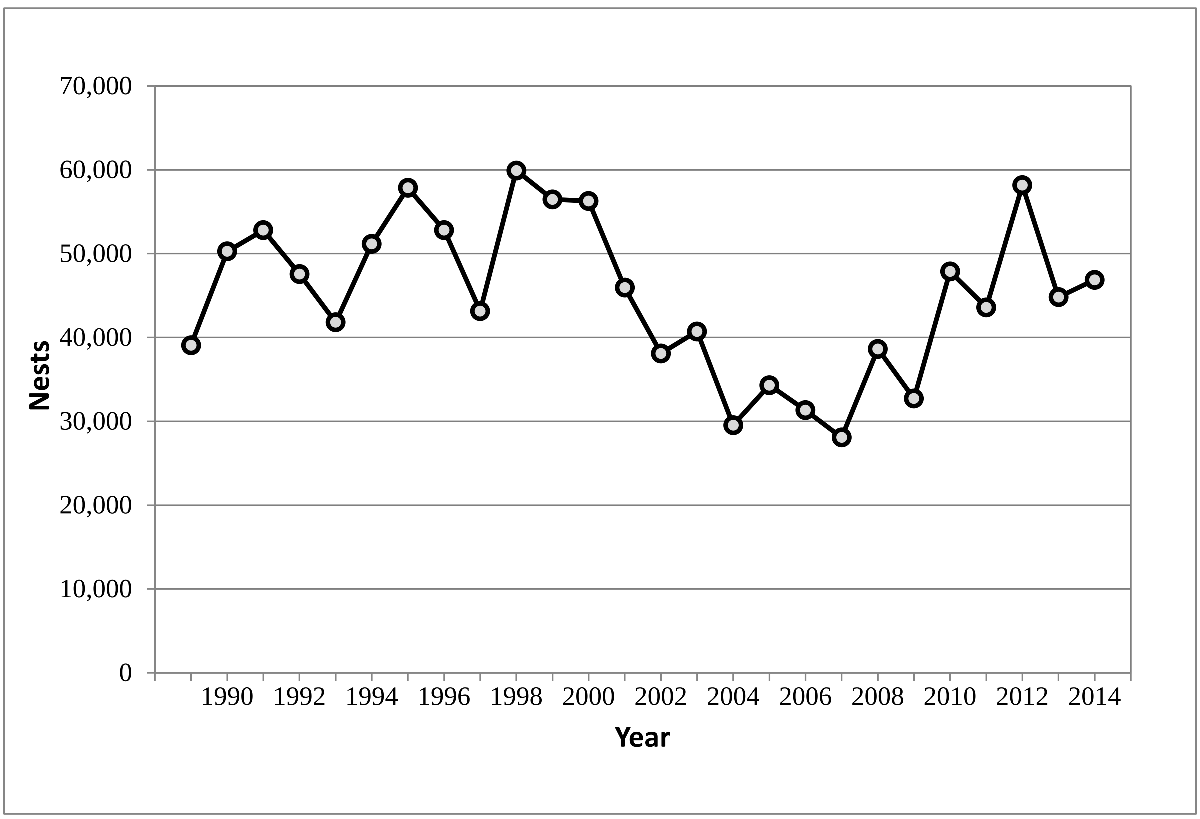

Figure 5. Loggerhead sea turtle nesting at Florida index beaches since 1989

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 4) 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 show a shift away from the declining trend of the past.

Table 4. Total Number of NRU Loggerhead Nests (GADNR, SCDNR, and NCWRC nesting datasets)

Nests Recorded	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Georgia	1,649	998	1,760	1,992	2,241	2,289	1,196
South Carolina	4,500	2,182	3,141	4,015	4,615	5,193	2,083
North Carolina	841	302	856	950	1,074	1,260	542
Total	**6,990**	**3,472**	**5,757**	**6,957**	**7,930**	**8,742**	**3,821**

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 2009-2012, with 2012 showing the highest index nesting total since the start of the program (Figure 6).

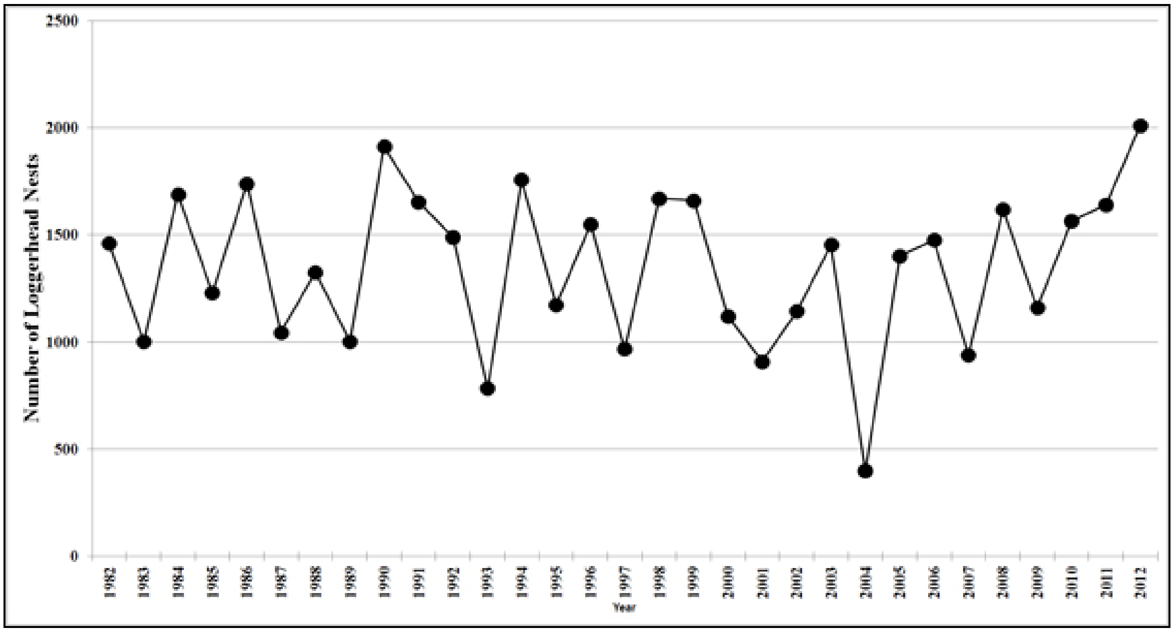

Figure 6. South Carolina index nesting beach counts for loggerhead sea turtles (from the SCDNR website, http://www.dnr.sc.gov/seaturtle/nest.htm)

<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 2008a). 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 2008a). Zurita et al. (2003b) 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 2008a).

<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. (2007a) 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. 2007a; 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 (2008a), 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, though, indicate a substantial decrease in the abundance of the smallest oceanic/neritic juvenile loggerheads, a pattern corroborated by stranding data (TEWG 2009).

Population Estimate

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 to 40,000 individuals, with a low likelihood of being 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 3.2.1. 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. 2009a).

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. 1991a).

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).

3.2.3 Green Sea Turtle

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 (NMFS). On April 6, 2016, the original listing was replaced with the listing of 11 distinct population segments (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 South Atlantic DPS (SA DPS) and North Atlantic DPS (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.

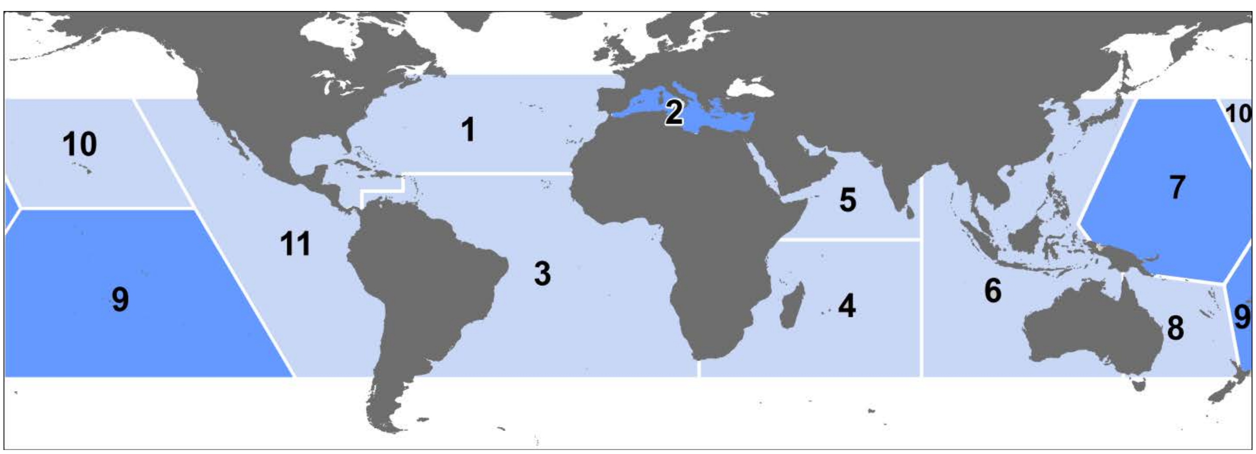

Figure 7.Threatened (light) and endangered (dark) green turtle DPSs: 1. North Atlantic, 2. Mediterranean, 3. South Atlantic, 4. Southwest Indian, 5. North Indian, 6. East Indian-West Pacific, 7. Central West Pacific, 8. Southwest Pacific, 9. Central South Pacific, 10. Central North Pacific, and 11. East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

<u>North Atlantic DPS Distribution</u>
The NA DPS boundary is illustrated in Figure 5. 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 5, 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 1985a) 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 2007a). 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 1997a; 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 2007a).

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.

<u>North Atlantic DPS</u>

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 2007a). Modeling by Chaloupka et al. (2008) using data sets of 25 years or more resulted in an estimate of the Tortuguero, Costa Rica population'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 where an estimated 200-1,100 females nest each year (Meylan et al. 1994; Weishampel et al. 2003). Occasional nesting has also been documented along the Gulf Coast of Florida (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 (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 8). According to data collected from Florida's index nesting beach survey from 1989-2015, green sea turtle nest counts across Florida have increased approximately ten-fold from a low of 267 in the early 1990s to a high of 27,975 in 2015. 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 7). Modeling by Chaloupka et al. (2008) using data sets of 25 years or more has resulted in an estimate of the Florida nesting stock at the Archie Carr National Wildlife Refuge growing at an annual rate of 13.9%.

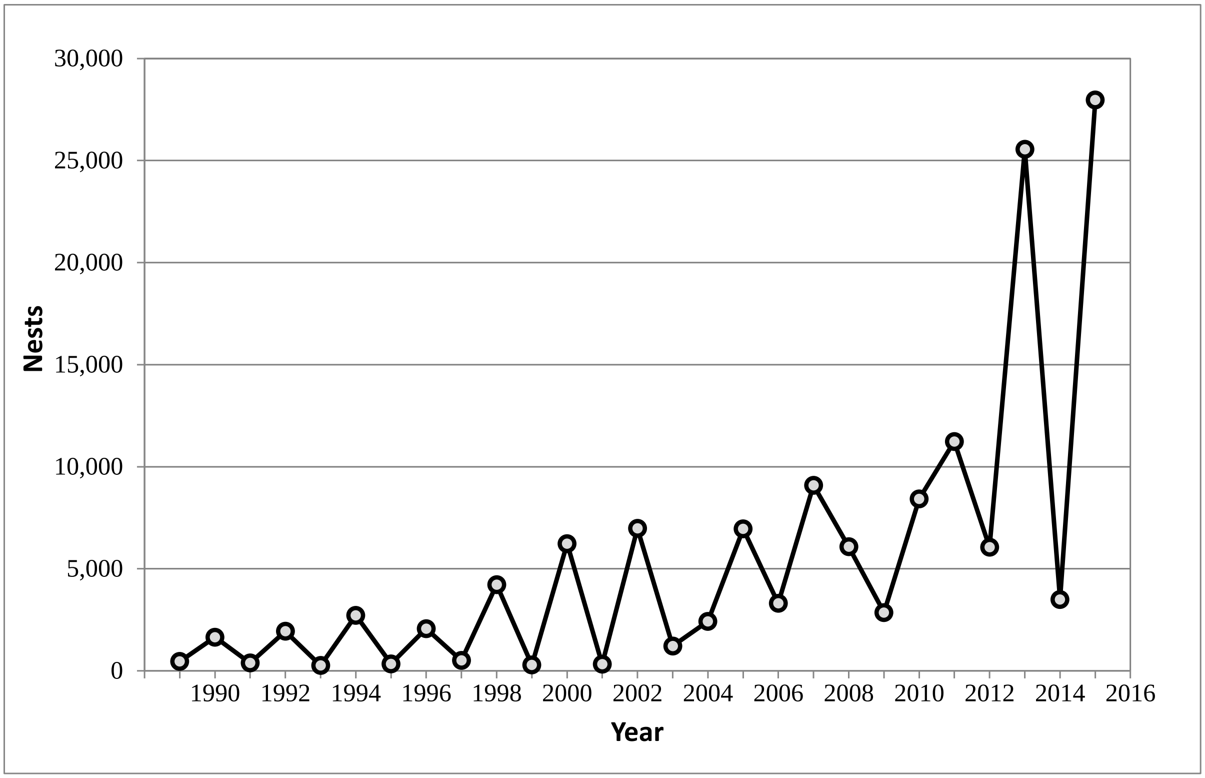

Figure 8. Green sea turtle nesting at Florida index beaches since 1989

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. 2007b), 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 3.2.1.

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 3.2.1, 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).

3.2.4 Kemp's Ridley

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 (42-48 mm) SCL, 1.26-1.73 in (32-44 mm) 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 1989), although the time spent in the oceanic zone may vary from 1-4 years or perhaps more (TEWG 2000). Juvenile Kemp's ridley sea turtles use these nearshore coastal habitats from April through November, but move towards more suitable overwintering habitat in deeper offshore waters (or more southern waters along the Atlantic coast) as water temperature drops.

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. (2011b) 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 and 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 reached a record high of 21,797 in 2012 (Gladys Porter Zoo 2013). In 2013 through 2014, there was a second significant decline, with only 16,385 and 11,279 nests recorded, respectively. 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 209 nests in 2012 (National Park Service data, http://www.nps.gov/pais/naturescience/strp.htm, http://www.nps.gov/pais/naturescience/current-season.htm).

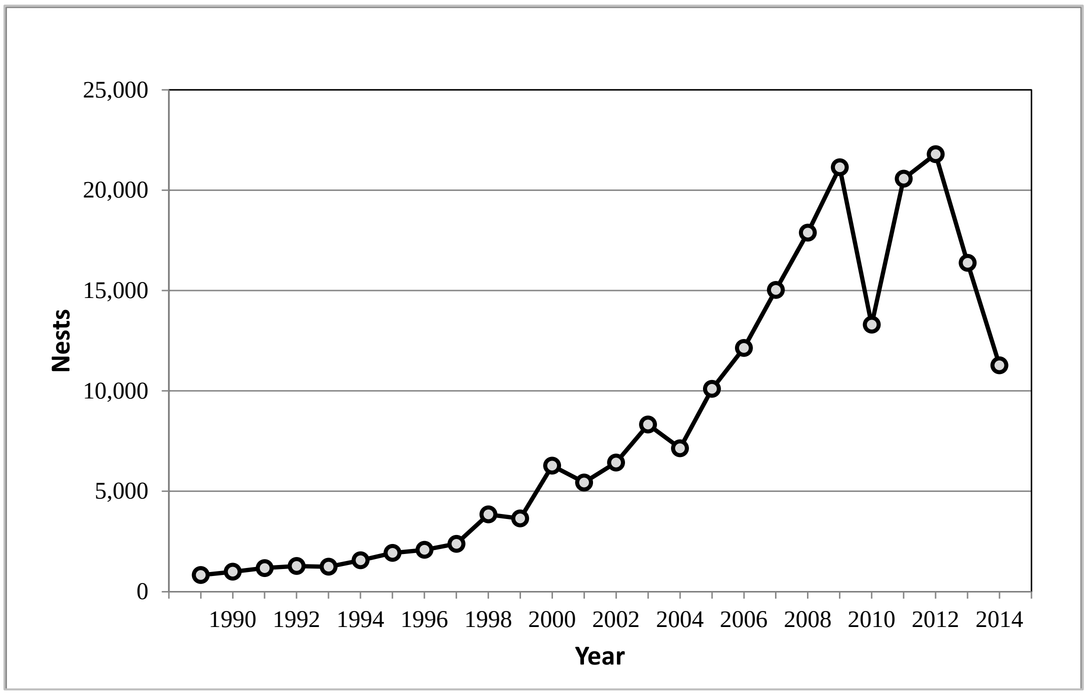

Figure 9. Kemp's ridley nest totals from Mexican beaches (Gladys Porter Zoo nesting database 2014)

Heppell et al. (2005b) predicted in a population model that the population is 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. NMFS et al. (2011b) produced an updated model that predicted the population to increase 19% per year and 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 2012, it is clear that the population had been steadily increasing over the long term. The recent increases in Kemp's ridley sea turtle nesting seen in the last 2 decades is likely due to a combination of management measures including elimination of direct harvest, nest protection, the use of turtle exclusion 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 of 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 3.2.1; 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 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 3 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 Deepwater Horizon (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) occurring from March through July, 390 (86%) of which were Kemp's ridley sea turtles. During 2012, a total of 428 sea turtles were reported from Louisiana, Mississippi, and Alabama waters, though the data is incomplete. Of these reported strandings, 301 (70%) were Kemp's ridley sea turtles. These stranding numbers are significantly greater than reported in past years; Louisiana, Mississippi, and Alabama waters reported 42 and 73 sea turtle strandings for 2008 and 2009, respectively. It should be noted that stranding coverage has increased considerably due to the DWH oil spill event.

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

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 in both 2010 and 2011 approximately 85% of all Louisiana, Mississippi, and Alabama stranded sea turtles were Kemp's ridleys is notable; however, this could simply be a function of the species' preference for shallow, inshore waters coupled with increased population abundance as reflected in recent Kemp's ridley nesting increases.

In response to these strandings, and due to speculation that fishery interactions may be the 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 one of which 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 (CCL), and 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-inch bar spacing of TEDs currently required in the shrimp fishery. Due to this issue, a proposed 2012 rule to require TEDs in the skimmer trawl fishery (77 FR 27411) was not implemented. Based on anecdotal information, these interactions were a relatively new issue for the inshore skimmer trawl fishery. Given the nesting trends and habitat utilization of Kemp's ridley sea turtles, it is likely that fishery interactions in the Northern Gulf of Mexico may continue to be an issue of concern for the species, and one that may potentially slow the rate of recovery for Kemp's ridley sea turtles.

4. ENVIRONMENTAL BASELINE

This section 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 a species' and habitat's health based on information available at the time of this consultation.

By regulation (50 CFR 402.02), the environmental baseline for Biological Opinions include the past and present impacts of all state, federal, or private actions and other human activities 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.

4.1 Status of Sea Turtles within the Action Area

Sea Turtles

Loggerhead, green, and Kemp's ridley sea turtles may be located in the action area and be affected by the proposed action. These species are migratory, traveling to forage or for reproductive purposes. We believe that no individual sea turtle is likely to be a permanent resident of Mississippi inshore waters, although some individuals may be present at any given time. These same individuals will migrate into offshore waters, as well as other areas of the Gulf of Mexico, Caribbean Sea, and North Atlantic Ocean at certain times of the year, and thus may be impacted by activities occurring there. As such, threats to sea turtles in the action area are considered to be the same as those discussed in Section 3.2.1 to 3.2.4.

4.2 Factors Affecting the Species and Environment within the Action Area

4.2.1 Federal Actions

While NMFS has completed many consultations on federal actions occurring within the coastal Mississippi waters, we only know of 2 projects occurring within Long Beach Harbor, the area immediately adjacent (< 0.25 mi NE from Jim Simpson Pier) to the Jim Simpson Pier. Recently, FEMA consulted with NMFS on its proposed funding of repairs to the City of Long Beach's small craft harbor, which was damaged during Hurricane Issac, including reinforcing riprap along the perimeter of Long Beach Harbor and maintenance dredging the entrance channel to the harbor (NMFS Tracking Number SER-2014-15599). NMFS issued a letter of concurrence concluding that the funded activity was not likely to adversely affect green, Kemp's ridley, and loggerhead sea turtles, and Gulf sturgeon. More recently, FEMA and the U.S. Army Corps of Engineers (USACE) consulted with the NMFS on FEMA's proposed funding of projects within Long Beach Harbor, including rebuilding 2 existing fishing piers also damaged by Hurricane Isaac and reconfiguring the Long Beach Harbor, and the USACE's permitting of the reconfiguration. NMFS issued a batched Biological Opinion (SER-2014-15952) on September 9, 2016, which concluded that the projects were not likely to adversely affect Gulf sturgeon or its critical habitat and would not jeopardize the continued existence of loggerhead sea turtles (NWA DPS), green sea turtles (NA and SA DPSs),or Kemp's ridley sea turtles. We estimated that the project would take 227 of those species of sea turtles over a 3-year period, including 52 lethal and 159 nonlethal takes of Kemp's ridley sea turtles, 1 lethal and 7 nonlethal takes of the NA DPS of green sea turtles, 1 nonlethal take of the SA DPS of green sea turtles, and 2 lethal and 5 nonlethal takes of the NWA DPS of loggerhead sea turtles.

Other fishing piers in Mississippi (outside of the action area) that also require federal permits have been subject to formal consultation, resulting in Biological Opinions and measures to minimize the impact of associated take. Those consultations generally found fishing piers adversely affect sea turtles via incidental hooking and entanglement by actively fished lines, discarded, remnant, or broken-off fishing lines, and/or other debris. Because sea turtles are highly migratory, these piers may affect species that may be found in the action area.

In addition, docks, marinas, seawalls, and dredged channels located in close proximity to the action area may have been constructed or maintained under federal permits at some point in the past. The development of marinas and docks in inshore waters can negatively impact species' habitats. Coastal runoff, marina and dock construction, dredging, and increased under water noise and boat traffic can degrade marine habitats used by sea turtles (Colburn et al. 1996). An increase in the number of docks built increases vessel traffic. Further, marinas and fueling facilities at marinas can sometimes discharge oil, gas, and sewage into sensitive estuarine and coastal habitats. The combined effects described above may affect the species' habitat in action area and may influence the relative abundance of sea turtles near to the Jim Simpson Pier.

4.2.2 State or Private Actions

Recreational fishing as regulated by the state of Mississippi can affect protected species or their habitats within the action area. Pressure from recreational fishing around the action areas is likely to continue, and at levels that are hard to quantify.

A number of activities that may indirectly affect listed species in the action area include discharges from wastewater systems, dredging, ocean pumping and disposal, commercial and recreational fishing, and aquaculture facilities. Although the impacts from these activities are difficult to measure, where possible, conservation actions through the ESA Section 7 process (where the state or private actions have a federal nexus), ESA Section 10 permitting, and state permitting programs are implemented to monitor or study impacts from these sources.

4.2.3 Other Potential Sources of Impacts in the Environmental Baseline

Marine Pollution

Sources of pollutants along the Gulf of Mexico include atmospheric loading of pollutants such as PCBs (polychlorinated biphenyl compounds), stormwater runoff from coastal towns and cities into rivers and canals emptying into bays and the ocean (e.g., Mississippi River), and groundwater and other discharges. Nutrient loading from land-based sources, such as coastal communities and agricultural operations, are known to stimulate plankton blooms in closed or semi-closed estuarine systems; the effects on larger embayments are unknown. An example is the large area of the Louisiana continental shelf with seasonally depleted oxygen levels (< 2 mg/Liter) is caused by eutrophication from both point and non-point sources. Most aquatic species cannot survive at such low oxygen levels and these areas are known as "dead zones." The oxygen depletion, referred to as hypoxia, begins in late spring, reaches a maximum in mid-summer, and disappears in the fall. Since 1993, the average extent of mid-summer, bottom-water hypoxia in the northern Gulf of Mexico has been approximately 16,000 km^2, approximately twice the average size measured between 1985 and 1992. The hypoxic zone attained a maximum measured extent in 2002, when it was about 22,000 km^2, which is larger than the state of Massachusetts (USGS 2005). This zone was predicted to reach its largest area in 2011 (Rabalais 2010), between 22,253-26,515 km^2 (average 24,400 km^2; 9,421 mi^2) of the bottom of the continental shelf off Louisiana and Texas. Data on the 2011 season is still being collated. The hypoxic zone negatively impacts sea turtles' habitats, prey availability, and survival and reproductive fitness. Tracking data reported by Shaver et al. (2013) indicate Kemp's ridley appear to prefer foraging areas off the Louisiana coasts; areas likely affected by both hypoxia and the DWH oil spill. Each of these marine pollution events may impact sea turtle distribution and abundance in the action area by affecting migratory routes to foraging areas, mating areas, and nesting beaches – all of which may influence the potential for encounters between sea turtles and fishers on the Jim Simpson Pier.

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). The development of marinas and docks in inshore waters can negatively impact nearshore habitats. Fueling facilities at marinas can sometimes discharge oil, gas, and sewage into sensitive estuarine and coastal habitats. Although these contaminant concentrations do not likely affect the more pelagic waters, the species of sea turtles occurring in the action area and analyzed in this Biological Opinion travel between near shore and offshore habitats and may be exposed to and accumulate these contaminants during their life cycles.

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 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, become more likely (Lutcavage et al. 1997b). 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 et al. 1982; Lutcavage et al. 1997b; 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. 1991b). 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 on the short- and long-term health and fecundity effects of chlorobiphenyl, organochlorine, and heavy metal accumulation in sea turtles. Accumulating organic compounds in sea turtles may impact sea turtle distribution and abundance in the action area by disorienting sea turtles and disrupting their ability to navigate that could impact migratory routes to foraging areas, mating areas, and nesting beaches – all of which may influence the potential for encounters between sea turtles and fishers on the Jim Simpson Pier. Long-term effects of accumulated organic compounds may also increase encounter rates of Kemp's ridleys because they may become more prone to feed at fishing piers like the Jim Simpson Pier when they are significantly weakened by toxic overloads that render them less effective at foraging on their natural foraging grounds.

4.3 Conservation and Recovery Actions Shaping the Environmental Baseline

Under Section 6 of the ESA, NMFS may enter into cooperative research and conservation agreements with states to assist in recovery actions of listed species. NMFS has established partnerships for cooperative research on incidental captures of sea turtles at fishing piers along the Mississippi coastline, and currently has an agreement with the State of Mississippi. Prior to issuance of this agreement, the proposal was reviewed for compliance with Section 7 of the ESA. Following consultation, the State of Mississippi agreed to post conservation signage that describes the ESA-listed species of sea turtles that may be found along the coast and encourages reporting of interactions to the 24-hour hotline in addition to the proper ways to safely lift sea turtles while cutting the fishing line near to the hook, etc. Conservation signage that encourages reporting ESA-listed species (e.g., sea turtles) by fishers when they incidentally capture these species reduces mortalities when these animals are subsequently taken to rehabilitation facilities. Increased reporting gathers critically important data indicating the numbers and species captured by fishing piers in Mississippi, data that leads to more effective management and conservation measures that benefit species.

NMFS and cooperating states have established an extensive network of STSSN participants along the Atlantic and Gulf of Mexico coasts that not only collect data on dead sea turtles, but also rescue and rehabilitate any live stranded sea turtles. These interagency cooperative agreements across the region have led to more conservation signage and, in many cases, pier monitors/attendants that significantly reduce sea turtle mortalities at fishing piers and reduce the potential encounters in the first place with actions such as removing fish cleaning station drainage from draining directly into the water therebu attracting sea turtles to those piers, for instance.

5. EFFECTS OF THE ACTION

Effects of the action include direct and indirect effects of the action under consultation. Indirect effects are those that result from the proposed action, occur later in time (i.e., after the proposed action is complete), but are still reasonably certain to occur (40 CFR 402.02). Restoration of the Jim Simpson Fishing Pier has already occurred (completed in the fall of 2013); in Section 3.1 above, NMFS conducted a review and analysis of potential physical effects to sea turtles from previously completed construction, including injury from interactions with mechanical equipment, loss of foraging habitat, and injury from in-water construction noise. Below, we discuss potential effects to sea turtles from the continued recreational fishing expected to occur at the Jim Simpson Fishing Pier.

5.1 General Discussion of Hook-and-Line Captures of Sea Turtles

Loggerheads, green, and Kemp's ridley sea turtles are known to bite baited fishing hooks or become entangled in fishing lines and these interactions have been reported by the public fishing from boats, piers, beaches, banks, and jetties. Most sea turtle captures on rod-and-reel, as reported to the STSSN, have occurred during pier fishing. Fishing piers are suspected to attract sea turtles that learn to forage there for discarded bait and fish carcasses.

Hook-and-line gear commonly used by recreational anglers fishing from fishing piers—like the Jim Simpson Fishing Pier at issue here—can adversely affect sea turtles via entanglement, hooking, and trailing line. Sea turtles 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, entangled, or otherwise still attached when they were released. Of the sea turtles 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.

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 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.

Entanglement

Sea turtles are particularly prone to entanglement as a result of their body configuration and behavior. Records of stranded or entangled sea turtles reveal that hook-and-line gear can wrap around the neck, flipper, or body of a sea turtle and severely restrict swimming or feeding. If the sea turtle is entangled when young, the fishing line becomes tighter and more constricting as the sea turtle grows, cutting off blood flow and causing deep gashes, some severe enough to remove an appendage. Sea turtles have been found entangled in many different types of hook-and-line gear. Entangling gear can interfere with a sea turtle's ability to swim or impair its feeding, breeding, or migration. Entanglement may even prevent surfacing and cause drowning.

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 entanglement and foul-hooking are the primary forms of gear interactions with leatherback sea turtles, whereas internal hooking is much more prevalent in hardshell sea turtles, especially loggerheads (NMFS unpublished data). Internal hooking of leatherback sea turtles is much rarer. 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. 1995; 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 53-285 days (average 118 days) (Aguilar et al. 1995). 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.

5.2 Estimating Injury and Post-Release Mortality Rates for Anticipated Future Takes

To determine the number of turtles anticipated to be captured at a fishing pier and the expected mortality rate from these encounters, we break our analysis into the following categories:

1. Sea turtles captured and reported

    a. Sea turtle captured, reported, and released at the pier
        i. Nonlethal captured and released turtles
        ii. Estimated post release mortality (PRM) of those released from pier
    b. Sea turtles captured at the pier and sent to rehabilitation
        i. Die in rehabilitation center
        ii. Not released (still recovering or cannot be released due to injuries)
        iii. Rehabilitated and later released alive
        iv. Rehabilitated, released alive, and later found stranded dead
2. Sea turtles captured and not reported
    a. Sea turtles captured at the pier, but not reported
        i. Nonlethal captured and released turtles
        ii. Estimated PRM of unreported turtles

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.

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.

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 Southeast Fisheries Science Center (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 sea turtles and leatherback sea turtles, with slightly higher rates of PRM assigned to leatherbacks. No specific criteria for recreational hook-and-line gear are currently available (Table 5).

Table 5. Criteria for Assessing PRM, With Mortality Rates Shown as Percentages for Hardshell Sea Turtles and Leatherbacks (in Parentheses) (NMFS and SEFSC 2012)

Injury Category		Release Condition			
		(A) Released entangled (line is trailing or not trailing, turtle is entangled[3])	**(B) Released with hook and with trailing line greater than or equal to half the length of the carapace (line is trailing, turtle is not entangled)**	**(C) Released with hook and with trailing line less than half the length of the carapace (line is trailing, turtle is not entangled)**	**(D) Released with all gear removed**
		Hardshell (Leatherback)	Hardshell (Leatherback)	Hardshell (Leatherback)	Hardshell (Leatherback)
I	Hooked externally with or without entanglement	55% (65%)	20% (30%)	10% (15%)	5% (10%)
II	Hooked in upper or lower jaw with or without entanglement—includes ramphotheca (i.e., beak), but not any other jaw/mouth tissue parts (see Category III)	65% (75%)	30% (40%)	20% (30%)	10% (15%)
III	Hooked in cervical esophagus, glottis, jaw joint, soft palate, tongue, and/or other jaw/mouth tissue parts not categorized elsewhere, with or without entanglement—includes all events where the insertion point of the hook is visible when viewed through the mouth.	75% (85%)	45% (55%)	35% (45%)	25% (35%)
IV	Hooked in esophagus at or below level of the heart with or without entanglement—includes all events where the insertion point of the hook is not visible when viewed through the mouth	85% (95%)	60% (70%)	50% (60%)	75% (85%)[4]
V	Entangled only, no hook involved	Released Entangled 50% (60%)	n/a		Fully Disentangled 1% (2%)
VI	Comatose/resuscitated	n/a[5]		70% (80%)	60% (70%)

[3] Length of line, as well as the presence or absence of the hook, is not relevant as turtle remains entangled at release.

[4] Although per veterinary recommendations, hooks would not be removed if the insertion point of the hook is not visible when viewed through the open mouth, this has occurred and must be accounted for. We have interpolated the table's value to insert a value for this cell base on veterinary and expert opinion. Also, there are times when the hook location is unknown, but the hook and line are retrieved. Because these are coded in this row, we must also allow for the removal of all gear.

[5] Assumes that the resuscitated turtle will always have the line cut to a length less than half the length of the carapace, even if the hook remains and that the turtle is not released entangled in the remaining line.

To estimate future PRM, we used the revised estimates in NMFS and SEFSC (2012). Post-release mortality varies based on the initial injury the animal sustained and the amount of gear left on the animal at the time of release. At this time, the best available information that we have for the NMFS Southeast Region is reported by the Mississippi STSSN. According to the STSSN, Mississippi has approximately 44 miles of tidal shoreline with nearly 200 public fishing access points including fishing piers, fishing bridges, boat launches, and marinas. In cooperation with the Institute of Marine Mammal Studies (IMMS), the STSSN have compiled extensive data on the hook-and-line captures of 924 sea turtles at fishing piers in Mississippi from 2010 to mid-2015. These data include the location of the sea turtle where it was hooked (e.g., flipper, shell, internal). We looked at these data to determine the types of hooking injuries and potential post-release mortality for sea turtles captured at fishing piers. Since data are available for fishing piers across the state of Mississippi, we applied the trends observed for the entire state as a more accurate representation of turtle interactions than a smaller subset of data from a specific pier. The data provided includes 24.24% of turtle interactions that did not report the specific sea turtle hooking location. We believe that it is more accurate to estimate the future injury and post-release mortality by only analyzing the reported hook-and-line captures that also reported the hooking location since the hooking location is necessary to determine potential PRM (Table 6). Using these data, we estimate that 7% of turtles hooked at fishing piers will suffer a Category I injury defined in Table 5 above, followed by 4% of turtles that will suffer a Category II injury, 85% of turtles that will suffer a Category III injury, and 4% of turtles that will suffer a Category IV injury (Table 6).

Table 6. Category of Injury from Hook-and-Line Captures at Fishing Piers in Mississippi (January 1, 2010-June 10, 2013)

All Reporting Hook-and-Line Captures	**I**	**II**	**III**	**IV**	**Unknown Hooking Location**	**Total – All Captures**
Records	52	26	596	26	224	924
Percent of Total	5.63%	2.81%	64.50%	2.81%	24.24%	100.00%

Hook-and-Line Captures with Hooking Location Reported	**I**	**II**	**III**	**IV**	**Total – Known Hooking Location**
Records	52	26	596	26	700
Percent of Total	7.43%	3.71%	85.14%	3.71%	100.00%

5.3 Estimated Reporting of Hook-and-Line Captures at Fishing Piers

In 2013, NMFS conducted a fishing pier survey in Mississippi that indicated 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 40% of incidental captures are currently going unreported. While we believe the best available information for estimating future interactions at fishing piers is the documented incidental captures at a specific pier and/or in the surrounding area, we also recognize the need to account for underreporting. In the following sections, we describe how we derived our estimates for potential future takes. In those calculations, we will address underreporting by increasing our estimates by 40% to account for those sea turtle captures that are believed to be unreported.

According to STSSN (M. Cook, STSSN, per comm. to N. Bonine, NMFS, Protected Resources Division, April 17, 2015), there are a few reasons for the variability of reported hook-and-line captures at Mississippi fishing piers by year. There were no reports made for Long Beach Harbor in 2010 or 2011, with the first reports made in 2012. STSSN believes that this is due to the 2012 initiative to install educational signs at all fishing piers in Mississippi alerting fishers to report accidental hook-and-line captures of sea turtles. This is a reasonable explanation for the increase in reported captures after 2012, highlighting the importance of educational signs on fishing piers.

The STSSN also indicated that inconsistency in reporting of captures may be due to fishers concern over their personal liability or consequences from turtle captures. Because 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.

The numbers of captures in any given year are influenced by sea temperatures, species abundances in a given year, and other factors that cannot be predicted. The number of captures that are known to NMFS is dependent upon reporting and observations (as discussed above). For these reasons, we believe basing our future incidental take estimate on a 1-year estimated take level is largely impractical. Based on our experience monitoring other fishing, we believe a 3-year time period is appropriate for meaningful monitoring. The triennial takes are set as 3-year running sums (total for any consecutive 3-year period) and not for static 3-year periods (i.e., 2015-2017, 2016-2018, 2017-2019 and so on, as opposed to 2017-2019, 2020-2022). This approach reduces the likelihood that reinitiation of ESA consultation will be required unnecessarily due to the inherent variability in take levels. Yet, this approach still allows for an accurate assessment of how the proposed actions are actually performing relative to our predictions.

5.4 Estimating Total Sea Turtle Takes at the Jim Simpson Fishing Pier

For the last 3 years (2013-2015), there have been 42 reported turtle captures at Jim Simpson Fishing Pier, with 71% (30 turtles [2015])/42 total = 0.71) of those captured in 2015 alone (previous Table 4). If we assume that 40% of sea turtles are not reported, this will mean that the 70 turtles reported were actually captured at this pier over the past 3 years (2013-2015). Hence, we would estimate that 70 total sea turtles were actually captured (the 42 reported captures represent 60% of the captures (because we assume 40% are unreported), and 42 x 100/60 [60%] = 70 total turtles. Alternatively, 100(%)/60(%) = 1.67 x 42 = 70.14 total sea turtles). Based on the estimated underreporting, the variability in reporting at Mississippi piers, and the potential for increases in reporting with increased education and outreach, using these estimated take numbers is prudent. Therefore, we estimate:

- Future 3-year reported captures: 42

- Future 3-year unreported captures: 28
- Future 3-year total: 70

5.5 Future Sea Turtle Captures and Mortalities at Jim Simpson Pier

In the previous section, we estimated the future sea turtle takes based on captures reported in 2013-2015. However, we believe using the data from this timeframe (2013-2015) will help us determine future takes more accurately. Yet, this reasoning does not apply to considering the type/severity of the interactions reported across years. We have no reason to believe that the type/severity of the captures that occurred across all years will be different going forward. Therefore, we will consider all the injuries previously documented as we go through our analysis evaluating the type of future interactions and possible mortalities.

Sea turtles that are captured and reported by accidentally being captured in fishing gear in Mississippi's waters are evaluated by IMMS to determine if they can immediately be released or require rehabilitation. According to IMMS data provided by the STSSN, 1,078 turtles were accidentally captured at Mississippi fishing piers between 2010 and 2015 (Table 7). Table 7 provides IMMS breakdown of the number and percent of reported captures that were released alive at the pier (12.5%) verses those sent to rehabilitation (87.5%). This is further divided into the fate of those sent to rehabilitation as shown in Table 7 (columns 3-7 below).

Table 7. Disposition of Sea Turtles Captured at Mississippi Fishing Piers (January 1, 2010-January 31, 2015)

Final Disposition	Released immediately alive	At IMMS	Died in rehabilitation facility	Non-releasable (from rehab facility)	Rehabilitated and released alive	Released and later stranded dead*
Total Number*	135	18	22	6	859	38
Percent	12.5%	1.7%	2.0%	0.6%	79.7%	3.5%

*Turtles released and later stranded dead often died months to year(s) later and death may not have been a result of incidental capture; unknown final disposition of sea turtle accounts for small number of sea turtles, percentages above based on total of 1,078 where categorical data is certain.

Estimated Future Captures Released at the Jim Simpson Pier (not sent to rehabilitation)
Sea turtles released immediately from the piers (i.e., not sent to a rehabilitation facility) may be because the animals breaks the line of their own volition or the angler cut the line. We divide the turtles released at the pier into 2 categories: those reported and those not reported.

- Reported: According to IMMS (Table 7), 12.5% of the reported captures are released alive at the piers collectively for all fishing piers (combined) reporting in Mississippi. So if 42 sea turtles are reported captured (Section 5.4, above), 5.25 would be reported and released immediately from the pier (42 total reported x 0.125 = 5.25).

- Not reported: Captured sea turtles are also expected to be released from the pier that are not reported. As previously discussed (Section 5.4, above), we expected 28 sea turtles to be captured and not reported. We assume that all 28 of these turtles fall into this category of released alive from the pier, because while the interactions were not reported, we do not expect that the individuals unlawfully retained the hooked turtle.

Estimating Post-Release Mortality Rates for Sea Turtles Released Immediately from a Pier
To determine the fate of captured and reported sea turtle that were released immediately from the pier, we need to consider PRM. Calculating PRM requires 2 steps: (1) determining where the animal was hooked or entangled ("Injury Category"; Table 5), and (2) assessing how much gear remains on the animal at the time of release ("Release Condition"; Table 5). Based on the information in Table 6, we estimated that 7% of turtles hooked at fishing piers will suffer a Category I injury defined in Table 5 above, 4% will suffer a Category II injury, 85% will suffer a Category III injury, and 4% will suffer a Category IV injury.

Since piers are elevated structures, we believe it is reasonable (and conservative) to conclude that fishers will choose not to or not be able to cut the line at the hook and thus that turtles will be released with trailing line likely longer than half the length of its carapace. This assumption would put the turtle in Release Condition B (defined in Table 5). Assuming Release Condition B is a reasonably conservative assumption that errs on the side of protecting the species and allows us to identify the likely PRM rate for each Injury Category. For example, the information in Table 5 indicates an animal with a Category I injury that is returned to the water in Release Condition B is likely to suffer 20% PRM (hardshell sea turtles). Likewise, a hardshell sea turtle with a Category II injury that is returned to the water in Release Condition B is likely to suffer 30% PRM, and so on. To estimate PRM for turtles released immediately from a pier, we took our estimates of the number of captures that fall into each Injury Category (see previous paragraph) and multiplied them by the corresponding PRM rates associated with Release Condition B. Table 8 summarizes those results.

Since the hooking location of the injury affects the likelihood of survival and the hooking location varies greatly, it is difficult to determine which PRM rate we should use regarding anticipated future takes released immediately from a pier. We address this issue by calculating weighted mortality rates and an overall mortality rate. For example, we anticipate 7% of our future captures are likely to have Category I injuries, and only 20% of those animals are likely to suffer PRM as a result of that injury. Therefore, of *all* future anticipate captures, we expect 1.4% of them (7% x 20%) would suffer PRM as a result of a Category I injury. By following this same approach for each injury category and its corresponding mortality rate, we establish the weighted mortality rates. By summing the weighted mortality rates, we can estimate the overall mortality rate that we can apply to all future turtles captures released immediately from a pier. This overall rate helps us account for the varying severity of future injuries and varying PRM rates associated with them.

Table 8. Estimated Overall PRM Rate for Turtles Released Immediately from the Pier, Potentially with Trailing Line

Injury Category	Percent of Total Captures in Each Injury Category from Table 6	PRM Rate per Category from Table 5	Weighted Mortality Rate*
I	7%	20%	1.4%
II	4%	30%	1.2%
III	85%	45%	38.3%

Injury Category	Percent of Total Captures in Each Injury Category from Table 6	PRM Rate per Category from Table 5	Weighted Mortality Rate*
IV	4%	60%	2.4%
Overall Post-Release Mortality Rate**			**43.3%**
Weighted Mortality Rate* = Percent of Total Captures in Each Injury Category x PRM Rate per Category Overall Post-Release Mortality Rate**= Weighted Mortality Rate for Injury Category I + Weighted Mortality Rate for Injury Category II + Weighted Mortality Rate for Injury Category III + Weighted Mortality Rate for Injury Category IV			

Based on the assumptions we have made about the likely location of future sea turtle captures and the amount of fishing gear likely to remain on animals released immediately at a pier, we estimate a PRM rate of 43.3% for sea turtles released at the pier (not sent to rehabilitation).

As discussed above, we divided the sea turtles released immediately at the pier into the 2 categories of reported and non-reported captures. Here we apply the PRM rate of 43.3% to those estimated pier releases:

- Reported Turtles Released at the Jim Simpson Pier: We estimated that 5.25 sea turtles would be captured, reported, and released at the pier. This is multiplied by 43.3% to estimate that 2.27 released turtles are expected to die as a result on these injuries (5.25 turtles x 0.433 = 2.27).

- Not Reported Turtles Released at the Piers: We estimated that 28 sea turtles would be captured, not reported, and released at the piers. This is multiplied by 43.3% to estimate that 12.12 released turtles are expected to die as a result on these injuries (28 turtles x 0.433 = 12.12).

Estimating Future Mortalities of Turtles Reported, Captured, and Sent to Rehabilitation
Above, we determined that 87.5% of the known captures are sent to rehabilitation. This means that 87.5% of the estimated 42 reported captures will be sent to rehabilitation resulting in a total of 36.75 turtles being sent to rehabilitation (42 turtles x 0.875 = 36.75). The total number of sea turtles sent to IMMS is further divided to estimate their fate. To calculate the estimated outcomes from the total number of turtles reported, we look to the estimated percentages from Table 7 and compare them to the total estimated reported turtles.

- Die in Rehabilitation: According to the information provided by IMMS in Table 7 approximately 2% of the total reported captures will die at the rehabilitation facility. Therefore, we estimate 0.84 turtle will die in rehabilitation (42 total reported turtles x 0.02 mortality = 0.84).

- Not Released: According to the information provided by IMMS in Table 7, approximately 2.3% of the turtles sent to rehabilitation are not released (i.e., 1.7% are still at IMMS likely recovering + 0.6% cannot be released likely due to injuries). We estimate that 0.6% will never be released and we count these as lethal takes since they no longer are able to contribute to the wild population. The other 1.7% are assumed to be nonlethal. Therefore, we estimate that the 0.97 not released turtles (2.3% of 42 = 0.023 x 42 = 0.97) will include 0.71 turtles that will ultimately be released alive (1.7% of 42 = 0.017 x 42 = 0.71) and 0.25 will remain in the rehabilitation center and be considered a lethal take (0.6% of 42 = 0.006 x 42 = 0.25) (0.96 sea turtles total = 0.71 [released alive] + 0.25 [considered lethal]).

- Released Alive: According to the information provided by IMMS in Table 7, approximately 79.7% of the turtles sent to rehabilitation are later released alive. Therefore, we estimate 33.5 turtles will be released alive after rehabilitation (42 total reported turtles x 0.797 rehabilitated and released alive = 33.5).

- Released Alive and Later Die: According to the information provided by IMMS in Table 7, approximately 3.5% of the turtles sent to rehabilitation are ultimately released alive, but later die. Therefore, we estimate 1.5 turtles will ultimately die after being released alive from rehabilitation (42 total reported turtles x 0.035 released and later stranded dead = 1.5 turtles).

Summary of Total Estimated Captures and Mortalities
As discussed at the beginning of Section 5.2, we divided the estimated captures and mortalities into different categories. These were then described in detail and PRM was calculated. The result of this analysis discussed in Sections 5.2-5.5 is summarized in Table 9, below.

Table 9. Summary of Estimated Nonlethal and Lethal Take

	Total Calculated	**Nonlethal Take**	**Lethal Take**
1. Turtles Captured and Reported = 42			
a. Sea turtle captured and released at the pier	5.25		
i. Estimated post release mortality (PMR) of those released from pier			2.27
ii. Nonlethal released at pier (5.25 total released – 2 PRM)		2.98	
b. Sea turtles captured at the pier and rehabilitation contacted	36.75		
i. Die in rehabilitation center			0.84
ii. Not released (still recovering or cannot be released due to injuries)		0.71	0.25
iii. Rehabilitated and later released alive		33.5	
iv. Released alive and later stranded dead			1.5
2. Sea turtles captured and not reported = 28			
a. Sea turtles captured at the pier, but not reported	28		
i. Estimated PMR of unreported turtles (28 total released x 43.3% PRM = 12.12)			12.12
ii. Nonlethal released (28 total released – 12.12 PRM)		15.88	
3. Total Captures = 70	**70**	**53.07**	**16.98**

Sea Turtle Species Expected at the Jim Simpson Fishing Pier
Now that we have determined the numbers of estimated nonlethal and lethal takes for successive 3-year periods for assessment, we need to determine the number of each sea turtle species that will be affected. According to the hook-and-line capture data for Jim Simpson pier in Long Beach, Mississippi and two nearby piers, discussed in Section 3.2 (Table 3), Kemp's ridley sea turtles are clearly the most common sea turtle captured (86% Kemp's ridley, 2% loggerhead, 1% green, and 11% unidentified). As discussed earlier, stranding data for inshore areas along the Mississippi coast (STSSN Zones 11 and 12) closely matches with data from the Jim Simpson Pier and neighboring piers (Table 2; 95.2% Kemp's ridley, 1.67% green, and 3.03% loggerhead), assuming similar percentage breakdown by species for the unidentified category (11%) for the Jim Simpson Pier, as explained below.

For this Opinion, we will estimate incidental captures at the Jim Simpson Pier based on the larger regional data from the stranding network, which also include the Jim Simpson and neighboring Long Beach Harbor piers (data shown in Table 2), as described in Section 3.2 above. These percent ratios by species are then applied to each category of mortality shown in Table 10 below. Note that all of lethal and nonlethal take numbers are rounded up to err on the side of the species and because we cannot assume a partial take.

Table 10. Anticipated Nonlethal and Lethal Take by Species

Sea Turtles	Mortality Estimate	Formula	Nonlethal Take	Lethal Take	
Kemp's ridley (95.2% of captures)	Nonlethal	53.07 x 0.952 = 50.5 rounded to 51	**51**		
	Lethal	16.98 x 0.952 = 16.16 rounded to 16		**16**	
Green (1.67% of captures)	Nonlethal	53.07 x 0.0167 = 0.89 rounded to 1	1		
	Lethal	16.98 x 0.0167 = 0.28 rounded to 1		1	
Loggerhead (3.03% of captures)	Nonlethal	53.07 x 0.0303 = 1.61 rounded to 2	2		
	Lethal	16.98 x 0.0303 = 0.51 rounded to 1		1	
		Total*	**54**	**18**	**72**
The formulas above are calculated by multiplying the total number of lethal or nonlethal take by the percent of sea turtles estimated for each species (Table 9, above). For example, 53.07 nonlethal take x 0.952 (from Table 2 STSSN) Kemp's ridley = 50.5 nonlethal estimated take of Kemp's ridley sea turtles; 16.98 x 0.952 (from Table 2 STSSN) Total Lethal = 16.16 Kemp's ridley.					
*As explained in Section 3.2, above, by using the STSSN percentages for species composition we also slightly elevate green and loggerhead percentages from 1% (Table 3, Section 3.2) fishing pier data to 1.67% (STSSN Data Table 2) and similarly from 2% to 3.03% for loggerheads. We believe this gives us a more conservative estimate of potential green and loggerhead captures over time at the Jim Simpson Pier and consequently elevates our total take to 72 for all 3 species combined.					

Although the mortality rates could be used individually for each injury category (i.e., Categories I-IV) in conjunction with the expected take of sea turtles at the fishing pier (rather than using the weighted mortality rate and expected take), mathematically the calculations would be the same, and the final results would be identical.

6. CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, or local private actions that are reasonably certain to occur in the action area considered in this Opinion (50 CFR 402.02). Future federal actions that are unrelated to the proposed action are not considered in this section.

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

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

In addition to fisheries, we are not aware of any proposed or anticipated changes in other human-related actions (e.g., poaching, habitat degradation, or activities that affect water quality and quantity such as farming) or natural conditions (e.g., over-abundance of land or sea predators, changes in oceanic conditions) that would substantially change the impacts that each threat has on the sea turtles. Therefore, we expect that the number of interactions between sea turtles and the actions described in Section 4 will continue at similar levels into the foreseeable future.

7. 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 loggerhead, green, and Kemp's ridley sea turtles, by identifying the nature and extent of adverse effects (take) expected to impact each species. 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 will jeopardize the continued existence of the species when considered in the context of the status of the species and their habitat (Section 3), the environmental baseline (Section 4), and cumulative effects (Section 6).

To "jeopardize the continued existence of," is defined as "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02). 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.

The NMFS and USFWS's *ESA Section 7 Handbook* [(USFWS and NMFS 1998); pg 4-36] defines survival and recovery, as those terms apply to the ESA's jeopardy standard. Survival means "the species' persistence … beyond the conditions leading to its endangerment, with sufficient resilience to allow recovery from endangerment." Survival is the condition in which a species continues to exist into the future while retaining the potential for recovery. This condition is characterized by a sufficiently large population, represented by all necessary age classes, genetic heterogeneity, and number of sexually mature individuals producing viable offspring, which exists in an environment providing all requirements for completion of the species' entire life cycle, including reproduction, sustenance, and shelter. Recovery means "improvement in the status of a listed species to the point at which listing is no longer appropriate under the criteria set out in Section 4(a)(1) of the Act." Recovery is the process by which species' ecosystems are restored and/or threats to the species are removed so self-sustaining and self-regulating populations of listed species can be supported as persistent members of native biotic communities. To determine the impacts of the action on the affected species' likelihood of recovery, we evaluate whether the action will appreciably interfere with achieving recovery objectives 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 take of male juveniles may affect survivorship and recruitment rates into the reproductive population in any given year, and yet not significantly reduce the reproductive potential of the population. By contrast, the death of mature, breeding females can have an immediate effect on the reproductive rate of a species. Sublethal effects on adult females may also reduce reproduction by hindering foraging success, as sufficient energy reserves are probably necessary for producing 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 subject to take from any aspect of proposed action. Nonetheless, later stage juveniles and adults of these species are more likely to be subject to incidental take as a result of foraging in the area of increased fishing activity which would occur as a result of the proposed project.

7.1 NWA DPS of Loggerhead Sea Turtles

We anticipate up to 3 loggerhead sea turtles may be taken at the Jim Simpson Pier (Table 10, above) during any consecutive 3-year period (2 non-lethal + 1 lethal). We believe the fishing activities or entanglement in fishing gear associated with the subject fishing piers may result in up to 1 lethal and 2 nonlethal loggerhead sea turtle captures during any consecutive 3-year period. The 2 nonlethal takes are not expected to have any measurable impact on the numbers, reproduction, or distribution of loggerhead sea turtles. Injuries resulting from nonlethal take are unlikely to affect the reproductive potential, fitness, growth, or distribution of the captured sea turtles because sea turtles will (1) be released unharmed in the same general area shortly after capture, (2) be released in the same general area with only minor injuries from which they are expected to recover, or (3) strand alive as a result of injuries, subjecting them to rescue, rehabilitation, and eventual release as viable members of their respective sea turtle populations.

This lethal take of 1 turtle will result in a reduction in both numbers (the individual lethally taken) and reproduction as a result of lost reproductive potential, as the individual could be a female who could have survived other threats and reproduced in the future, thus eliminating the female's individual contribution to future generations. For example, an adult female loggerhead sea turtle can lay 3 or 4 clutches of eggs every 2-4 years, with 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 a small percentage would be expected to survive to sexual maturity. Because the potential fishing capture and lethal take could occur anywhere through the action area, and the NWA DPS of loggerhead sea turtles have large ranges in which they disperse, including along the coast of the United States, from southern Virginia to Alabama, where nesting may occur, the distribution of loggerhead sea turtles is expected to be unaffected by the lethal take.[6]

Whether the reduction of 1 loggerhead sea turtle per 3-year period would appreciably reduce the likelihood of survival for loggerheads depends on what effect this reduction in numbers and reproduction would have on overall population sizes and trends. For example, we will consider whether the reduction would be of such magnitude that adverse effects on population dynamics would be appreciable when viewed within the context of the environmental baseline and status of the species. In Section 3.2.2, we reviewed the status of the species in terms of nesting and female population trends and several recent assessments based on population modeling (e.g., (Conant et al. 2009b; NMFS-SEFSC 2009). Below, we synthesize what that information means in general terms and also in the more specific context of the proposed action and the environmental baseline.

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. (2009b) concluded 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 1997b; Crouse et al. 1987; Crowder et al. 1994; Heppell et al. 1995).

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[6] NWA DPS loggerhead takes are anticipated from the action area at the Jim Simpson Pier but we expand outward within Mississippi in the Gulf of Mexico because post-release mortalities may occur somewhere further away from the action area from the time of release until the time of death. Usually, the time between release and mortality occurs over a period of hours to days, so we would not expect a sea turtle to range too far outside the action area before dying.

NOAA's Southeast Fisheries Science Center (SEFSC (2009)) estimates the adult female population size for the NWA DPS is likely between approximately 20,000-40,000 individuals, with a low likelihood of being up to 70,000 individuals. A more recent conservative 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. Further insight into the numbers of loggerhead sea turtles along the U.S. coast is available in (NMFS 2011), which reported a conservative estimate of 588,000 juvenile and adult loggerhead sea turtles present on the continental shelf from the mouth of the Gulf of St. Lawrence to Cape Canaveral, Florida. Researchers in this study used only positively identified loggerhead sightings from an aerial survey. A less conservative analysis from the same study resulted in an estimate of 801,000 loggerheads in the same geographic area when a proportion of the unidentified hardshell turtles were categorized as loggerheads. This study did not include Florida's east coast south of Cape Canaveral or the Gulf of Mexico, areas where large numbers of loggerheads are also expected.

A detailed analysis of Florida's long-term loggerhead nesting data (1989-2014) revealed 3 distinct annual trends (Figure 3). From 1989-1998, there was a 30% increase that was then followed by a sharp decline over the subsequent decade. Large increases in loggerhead nesting have occurred since then. FWRI examined the trend from the 1998 nesting high through 2013 and found the decade-long post-1998 decline had reversed, and there was no longer a demonstrable trend. Looking at the data from 1989 through 2014 (an increase of over 32%), FWRI concluded that there was an overall positive change in the nest counts (http://myfwc.com/research/wildlife/sea-turtles/nesting/loggerhead-trends/).

We believe that the incidental take and resulting mortality of 1 loggerhead sea turtle associated with the proposed action is not reasonably expected to cause an appreciable reduction in the likelihood of survival of the NWA DPS of loggerhead sea turtles. We believe the current population is large (i.e., several hundred thousand individuals) and is showing encouraging signs of stabilizing and possibly increasing. We also expect that the proposed action will not cause the population to lose genetic heterogeneity, broad demographic representation, or successful reproduction, nor affect loggerheads' ability to meet their lifecycle requirements, including reproduction, sustenance, and shelter.

Furthermore, with respect to whether the proposed action would to reduce appreciably the likelihood of the species' recovery, the Services' recovery plan for the Northwest Atlantic population of the loggerhead sea turtle (NMFS and USFWS 2008a), which is the same population of sea turtles as the NWA DPS, anticipates that, with implementation of the plan, the western North Atlantic population will recover within 50-150 years, but notes that reaching recovery in only 50 years would require a rapid reversal of the then declining trends of the Northern, Peninsular Florida, and Northern Gulf of Mexico Recovery Units. The recovery plan includes 8 different recovery actions directly related to the proposed actions of this Opinion.

The recovery plan also provides additional explanation of the goals and vision for recovery for this population. The objectives of the recovery plan most pertinent to the threats posed by the proposed actions are Objectives Nos. 1 and 2 (listed below):

1. Ensure that the number of nests in each recovery unit are increasing and that this increase corresponds to an increase in the number of nesting females.
2. 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 No. 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 in what might be an already declining population can affect the potential for population growth, we believe the effects of the proposed action 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 to determine if this objective is being met. The nesting trends of the NWA DPS of loggerhead sea turtles remains slightly negative, although as mentioned above the trend has likely stabilized. Overall, loggerhead populations have a long way to go before the population decline is reversed and numerical increases in population meet the goals of the recovery plan. As with Recovery Objective No. 1 above, continuing mortality in what might still be a declining population combined with the single potential mortality from the proposed action would not 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 a single NWA DPS loggerhead over the 3 year periods for the proposed action would not impede recovery or significantly add to any negative recovery trend for this DPS.

The potential lethal interaction of a single loggerhead sea turtle during consecutive 3-year periods is not reasonably expected to cause an appreciable reduction in the likelihood of recovery of the NWA DPS of loggerheads. Recovery is the process of removing threats so self-sustaining populations persist in the wild. The potential lethal interaction associated with the proposed action would not impede progress on achieving the identified relevant recovery objectives or achieving the overall recovery strategy. Nonlethal takes of sea turtles would not affect the adult female nesting population or number of nests per nesting season. Thus, the proposed action is not expected to impede the recovery objectives above and will not result in an appreciable reduction in the likelihood of the loggerhead NWA DPS sea turtles' recovery in the wild. Over at least the next several decades, we expect the NWA DPS of loggerheads to remain large (i.e., hundreds of thousands of individuals) and to retain the potential for recovery.

Conclusion
The lethal takes of the NWA DPS of loggerhead sea turtles associated with the proposed action are not expected to cause an appreciable reduction in the likelihood of either the survival or recovery of the species in the wild.

7.2 Green Sea Turtles (North Atlantic and South Atlantic DPSs)

Mixed-stock analyses of foraging grounds show that green sea turtles from multiple nesting beaches commonly mix at feeding areas across the Caribbean and Gulf of Mexico, with higher contributions from nearby large nesting sites and some contribution estimated from nesting populations outside the DPS (Bass et al. 1998; Bass and Witzell 2000; Bjorndal and Bolten 2008; Bolker et al. 2007). In other words, the proportion of animals on the foraging grounds from a given nesting beach is proportional to the overall importance of that nesting beach to the entire DPS. For example, Tortuguero, Costa Rica, is by far the largest nesting beach in the NA DPS and the number of animals from that nesting beach on foraging grounds in the same area was much higher than from any other nesting beach within the NA DPS. However, in some nesting locations within the NA DPS closer to the border of the SA DPS, there may be significant mixing between the DPSs. More specifically, Lahanas et al. (1998) showed through genetic sampling that juvenile green sea turtles in The Bahamas originate mainly from the western Caribbean (Tortuguero, Costa Rica) (79.5%) (NA DPS) but that a significant proportion may be coming from the eastern Caribbean (Aves Island/Suriname; 12.9%) (SA DPS). In general, the proportion of individuals on a given foraging ground is roughly proportional to the numbers of individuals on nearby nesting beaches.

Flipper tagging studies provide additional information on the co-mingling of turtles from the NA DPS and SA DPS. Flipper tagging studies on foraging grounds and/or nesting beaches have been conducted in Bermuda (Meylan et al. 2011), Costa Rica (Troeng et al. 2005), Cuba (Moncada et al. 2006), Florida (Johnson and Ehrhart 1996; Kubis et al. 2009), Mexico (Zurita et al. 2003a; Zurita et al. 1994), Panama (Meylan et al. 2011), Puerto Rico (Collazo et al. 1992; Patricio et al. 2011), and Texas (Shaver 1994; Shaver 2002). Nesters have been satellite tracked from Florida, Cuba, Cayman Islands, Mexico, and Costa Rica. Troeng et al. (2005) report that while there is some crossover of adult female nesters from the NA DPS into the SA DPS, particularly in the equatorial region where the DPS boundaries are in closer proximity to each other, NA DPS nesters primarily use the foraging grounds within the NA DPS.

As discussed in 3.2.3 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, 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 and that the remainder were from the NA DPS (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 SA DPS (Bass and Witzell 2000). All of the individuals in both studies were benthic juveniles.

Taken together, 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. However, it is possible that animals from the SA DPS could be captured during the proposed action. Since the cold-stun study of the northern Gulf of Mexico (above) represents the best available data teasing out the NA and SA DPS distribution for greens in the action area, we will assume that 96% of animals captured during the proposed action are from the NA DPS, and the remaining 4% are from the SA DPS, per the breakdown in the study. For these reasons, we will act conservatively and conduct jeopardy analyses on the assumption that both the NA DPS and the SA DPS will be captured by the proposed action but that the vast majority (96%) will be from the NA DPS.

We anticipate up to 2 green sea turtles may be taken at piers during any consecutive 3-year period. We believe the fishing activities or entanglement in fishing gear associated with the subject fishing piers may result in up to 1 lethal and 1 nonlethal green sea turtle capture during any consecutive 3-year period (Table 10). Because of such a small take (2 individual greens) and in order to conservatively assume the SA DPS may be represented in the take, we will divide the take equally between the NA and SA DPSs, assigning 1 take for each DPS. However, because of the much lower probability that green captures will be from the SA DPS and because we conservatively inflate that probability because we only expect 2 captures, we further anticipate that the take from the SA DPS will be non-lethal (discussed below). The remaining capture from the NA DPS will be attributed as a lethal take.

NA DPS

The proposed action may result in 2 green sea turtle takes over consecutive 3 year periods. We anticipate up to 1 capture would be from the NA DPS (1 lethal as discussed above).

The potential lethal take of 1 green sea turtle from the NA DPS over 3 years would reduce the number of green sea turtles, compared to their numbers in the absence of the proposed action, assuming all other variables remained the same. A lethal interaction would also result in a potential reduction in future reproduction, assuming the individual would be a female and would have survived otherwise to reproduce. For example, an adult green sea turtle can lay 1-7 clutches (usually 2-3) of eggs every 2-4 years, with 110-115 eggs/nest, of which a small percentage is expected to survive to sexual maturity. The anticipated lethal interaction is expected to occur anywhere in the action area the NA DPS of green sea turtles has a large range in which they disperse; thus, no reduction in the distribution of the NA DPS of green sea turtles is expected from this take.[7]

Whether the reduction in numbers and reproduction of this species would appreciably reduce its likelihood of survival depends on the probable effect the changes 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 2003, was approximately 104,411 nests/year, which corresponds to approximately 17,402-37,290 nesting females each year (Troëng and Rankin 2005). The number of nests laid per year increased to an estimated 180,310 nests during 2010, corresponding to 30,052-64,396 nesters. This increase has occurred 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).

[7] NA DPS green takes are anticipated from the action area at the Jim Simpson Pier but we expand outward within Mississippi in the Gulf of Mexico because post-release mortalities may occur somewhere further away from the action area from the time of release until the time of death. Usually, the time between release and mortality occurs over a period of hours to days, so we would not expect a sea turtle to range too far outside the action area before dying.

Nesting locations in Mexico along the Yucatan Peninsula also indicate the number of nests laid each year has increased (Seminoff et al. 2015). In the early 1980s, approximately 875 nests/year were deposited, but by the year 2000 this increased to over 1,500 nests/year (NMFS and USFWS 2007a). By 2012, more than 26,000 nests were counted in Quintana Roo (J. Zurita, CIQROO, unpubl. data, 2013, in Seminoff et al. 2015)

In Florida, most nesting occurs along the Atlantic coast of eastern central Florida, where a mean of 5,055 nests were deposited each year from 2001 to 2005 (Meylan et al. 2006) and 10,377 each year from 2008 to 2012 (B. Witherington, Florida Fish and Wildlife Conservation Commission, pers. comm., 2013). As described in the Section 3.2.3, nesting has increased substantially over the last 20 years and peaked in 2015 with 27,975 nests statewide in 2015. In-water studies conducted over 24 years in the Indian River Lagoon, Florida, suggest similar increasing trends, with green sea turtle captures up 661% (Ehrhart et al. 2007b). Similar in-water work at the St. Lucie Power Plant site revealed a significant increase in the annual rate of capture of immature green sea turtles over 26 years (Witherington et al. 2006).

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).[8] The population viability 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).[9] Seminoff et al. (2015) point out that population viability analysis 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

[8] Not enough information was available to conduct a population viability analysis on the Quintana Roo, Mexico, nesting population.
[9]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).

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 3 year periods attributed to the proposed action will not have any measurable effect on that trend. Therefore, we believe the proposed action is not reasonably expected to cause an appreciable reduction in the likelihood of survival of the NA DPS of green sea turtle in the wild.

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.*

Green sea turtle nesting in Florida between 2001-2006 was documented as follows: 2001 – 581 nests, 2002 – 9,201 nests, 2003 – 2,622, 2004 – 3,577 nests, 2005 – 9,644 nests, 2006 – 4,970 nests. This averages 5,039 nests annually over those 6 years (2001-2006) (NMFS and USFWS 2007a). Subsequent nesting has shown even higher numbers (i.e., 2007 – 12,751 nests, 2008 – 9,228, 2009 – 4,462, 2010 – 13,225 nests, 2011 – 15,352, 2012 – 9,617, 2013 – 25, 553, 2014 – 3,502; 2015 – 27,975 (http://myfwc.com/research/wildlife/sea-turtles/nesting/2015-nesting-trends/). There are currently no estimates available specifically addressing changes in abundance of individuals on foraging grounds. Given the clear increases in nesting, however, it is likely that numbers on foraging grounds will also have increased.

The potential lethal take of up to 1 green sea turtle from the NA DPS over consecutive 3 year periods will result in a reduction in numbers when takes occur, but it is unlikely to have any detectable influence on the recovery objective and trends noted above. In addition, because of the relatively small number of lethal takes (1 green sea turtle every 3 years) 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. Additionally, our estimate of future take is based on our belief that the same level of take occurred in the past. It is worth noting that this level of take has already likely occurred at the pier in the past, yet we have still seen positive trends in the status of this species. In other words, the pier has been operational since 1997 and we assume that takes have occurred each year consistent with our analysis above, however, those assumed takes have not appreciably impacted the positive trends in status for green sea turtles.

Conclusion
The lethal take of green sea turtles associated with the proposed action are not expected to cause an appreciable reduction in the likelihood of either the survival or recovery of the NA DPS of green sea turtle in the wild.

SA DPS
Again, the proposed action may result in 2 green sea turtle takes over consecutive 3 year periods split between the 2 DPSs with 1 lethal take per 3-year period attributed to the NA DPS and 1 non-lethal take per 3-year period attributed to the SA DPS. As discussed in the introduction to this section, we anticipate up to 4% of the takes could come from the SA DPS, which conservatively we estimate would result in 1 non-lethal green sea turtle from the SA DPS.

The potential nonlethal take of 1 green sea turtle from the SA DPS over consecutive 3 year periods is not expected to have any measurable impact on the reproduction, numbers, or distribution of this species. The individual suffering nonlethal injury is expected to fully recover such that no reductions in reproduction or numbers of green sea turtles are anticipated. The take may occur anywhere in the action area and the action area encompasses a tiny portion of the SA DPS of green sea turtles' overall range/distribution. Since any incidentally caught animal would be released within the general area where caught, and the animal is expected to survive post-release, no change in the distribution of SA DPS green sea turtles is anticipated. Therefore, we do not expect the proposed action will impede the SA DPSs likelihood of survival or recovery.

7.3 Kemp's Ridley Sea Turtles

We anticipate up to 67 Kemp's ridley sea turtles may be taken at the Jim Simpson Pier over the consecutive 3-year periods. We believe the fishing activities or entanglement in fishing gear associated with the subject fishing piers may result in up to 16 lethal and 51 nonlethal Kemp's ridley sea turtle captures during each consecutive 3-year period. If the injuries resulting from the captures are nonlethal, the effects are not expected to have any measurable impact on the numbers, reproduction, or distribution of green sea turtles. Injuries resulting from nonlethal take are unlikely to affect the reproductive potential, fitness, or growth of the captured sea turtles because sea turtles (1) will be released unharmed in the same general area shortly after capture, (2) be released in the same general area with only minor injuries from which they are expected to recover, or (3) strand alive as a result of injuries, subjecting them to rescue, rehabilitation, and eventual release as viable members of their respective sea turtle populations

The potential lethal take of 16 Kemp's ridley sea turtle during the consecutive 3 years period would reduce the species' population compared to the number that would have been present in the absence of the proposed action, assuming all other variables remained the same. The Turtle Expert Working Group (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/nest, with an average of 2.5 nests/female/season. Lethal takes could also result in a potential reduction in future reproduction, assuming at least one of these individuals would be female and would have survived to reproduce in the future. The loss of 38 Kemp's ridley sea turtles could preclude the production of thousands of eggs and hatchlings, of which a fractional 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. The anticipated lethal takes are expected to occur anywhere in Mississippi or the Gulf of Mexico[10] and Kemp's ridleys generally have large ranges; thus, no reduction in the distribution of Kemp's ridley sea turtles is expected from the take of these individuals.

In the absence of any total population estimates for Kemp's ridley sea turtles, nesting trends are the best proxy for estimating population changes (Figure 5). Heppell et al. (2005a) predicted in a population model that the Kemp's ridley sea turtle population is 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. (2011b) 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/nesting female. While counts did not reach 25,000 nests by 2012, the population appears to be steadily increasing over the long term. Following a significant, unexplained 1-year decline in 2010, Kemp's ridley nests in Mexico reached a record high of 21,797 in 2012 (Gladys Porter Zoo nesting database 2013). In 2013 through 2014, there was a second significant decline, with only 16,385 and 11,279 nests recorded, respectively. 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 209 nests in 2012 (National Park Service data, http://www.nps.gov/pais/naturescience/strp.htm, http://www.nps.gov/pais/naturescience/current-season.htm). Nesting numbers from 2013 indicate they decreased in 2013 to 153 nests in Texas (Gladys Porter Zoo nesting database 2013). It is important to remember that with sometimes significant inter-annual variation in nesting data, sea turtle population trends necessarily are measured over decades and the long-term trend line better reflects the population increase in Kemp's ridleys, for example. With the recent increase in nesting data (14,006 nests in 2015[11]) and recent declining numbers of nesting females (2013-14), it is too early to tell whether the long-term trend line is impacted. The trend line may change from an asymptotic upward curve to a more leveled increase. Either way, long-term data from 1990 to present support that Kemp's ridleys are increasing in population size.

We believe this long-term increasing trend in nesting is evidence of an increasing population, as well as a population that is maintaining (and potentially increasing) its genetic diversity. We also believe these nesting trends are indicative of a species with a number of sexually mature individuals. Assuming a 50:50 sex ratio, there is only a 50% chance that any given take would actually involve a female. However, 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. We do not believe the anticipated takes of Kemp's ridley associated with the proposed action will have a measurable effect on the generally 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. Because the 16 lethal takes could be individuals from any nesting beach, we do

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[10] Kemp's ridley takes are anticipated from the action area at the Jim Simpson Pier but we expand outward within Mississippi in the Gulf of Mexico because post-release mortalities may occur somewhere further away from the action area from the time of release until the time of death. Usually, the time between release and mortality occurs over a period of hours to days, so we would not expect a sea turtle to range too far outside the action area before dying.

[11] 2015 Report - MEXICO / UNITED STATES OF AMERICA POPULATION RESTORATION PROJECT FOR THE KEMP´S RIDLEY SEA TURTLE, *Lepidochelys kempii*, ON THE COASTS OF TAMAULIPAS, MEXICO

not believe the proposed action will have a measurable effect on the species' overall genetic diversity, particularly in light of the increasing population trends. In general increasing population size equates to increasing genetic diversity over successive generations. The increasing population numbers far outnumber the anticipated loss of 16 Kemp's ridleys. Further, we believe the anticipated takes will cause a change in the number of sexually mature individuals producing viable offspring to an extent that changes in nesting trends will occur.

We do not anticipate the proposed action will have any detectable impact on the population overall, and the action will not cause the population to lose genetic diversity or the capacity to successfully reproduce. Therefore, we do not believe the proposed action will cause an appreciable reduction in the likelihood of survival.

As to whether the proposed action will appreciably reduce the species' likelihood of recovery, the recovery plan for the Kemp's ridley sea turtle (NMFS et al. 2011b) lists the following relevant recovery objectives:

- 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; it sets a recovery goal of 10,000 nesting females associated with 25,000 nests. The 2012 nesting season recorded approximately 22,000 nests. Yet, in 2013 through 2014, there was a second significant decline, with only 16,385 and 11,279 nests recorded, respectively.

The lethal take of up to 16 Kemp's ridley sea turtles by the proposed action will result in reduction in numbers, but it is unlikely to have any detectable influence on the trends noted above. If significant numbers of lethal takes were to occur from the proposed action on a greater magnitude, say hundreds, for instance, than we may expect a discernable dip in the population trend. However, with a nesting population in the tens of thousands, the projected loss of 16 Kemp's ridleys is not expected to have any discernable impact to the species. Nonlethal takes of sea turtles would not affect the adult female nesting population or number of nests per nesting season. Additionally, our estimate of future take is based on our belief that the same level of take occurred in the past since the project involves continued operation of a recently-repaired, previously existing fishing pier and fishing pressure is not expected to increase from this proposed project. Even with the past use of the pier, we have seen a generally positive trend in the status of these species. Thus, we believe the proposed action is not in opposition to the recovery objective above, and it will not result in an appreciable reduction in the likelihood of Kemp's ridley sea turtles' recovery in the wild.

Conclusion

The lethal and nonlethal takes of Kemp's ridley sea turtles associated with the proposed action are not expected to cause an appreciable reduction in the likelihood of either the survival or recovery of the species in the wild.

8. CONCLUSION

Using the best available data, we analyzed the effects of the proposed action in the context of the status of the species, the environmental baseline, and cumulative effects, and determined that the proposed action is not likely to jeopardize the continued existence of the loggerhead (NWA DPS), green (North Atlantic and South Atlantic DPSs), or Kemp's ridley sea turtles. Because the proposed action will not reduce the likelihood of survival and recovery of either of the loggerhead (NWA DPS), green (NA and SA DPSs), or Kemp's ridley sea turtles, it is our Opinion that the proposed action is not likely to jeopardize the continued existence of these species. These analyses focused on the impacts to, and population responses of, sea turtles in the Atlantic basin; however, the impact of the effects of the proposed actions on Atlantic sea turtle populations must be extrapolated to impacts to sea turtles throughout its global range, as the species are listed. Because the take of up to 72 loggerhead, green, and Kemp's ridley sea turtles associated with the proposed project will not reduce the likelihood of survival and recovery of any Atlantic populations of sea turtles, it is our Opinion that the proposed actions are also not likely to jeopardize the continued existence of loggerhead, green, or Kemp's ridley sea turtles.

9. INCIDENTAL TAKE STATEMENT (ITS)

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. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. 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.

9.1 Anticipated Amount or Extent of Incidental Take

Based on the above information and analyses, NMFS believes that the proposed action will adversely affect loggerhead, green, and Kemp's ridley sea turtles. 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 re-construction. We anticipate these takes will occur over consecutive 3-calendar-year periods (e.g, 2016-2018). Table 11 reports these takes.

Table 11. Anticipated 3-Year Lethal and Nonlethal Take for Jim Simpson Fishing Pier

Sea Turtle	Lethal Take	Nonlethal Take	Total
Kemp's ridley	16	51	67
Green NA DPS	1	-	1
Green SA DPS	-	1	1
Loggerhead	1	2	3
Total	**18**	**54**	**72**

Kemp's Ridley Sea Turtle Captures
Our best estimate is that up to 67 Kemp's ridley sea turtles may be captured during consecutive 3-year periods by recreational anglers, or remnant fishing gear at the piers subject to consultation. We anticipate that during that 3-year period up to 16 of those captures may result in mortality and 51 will not. It is possible that more than 51 nonlethal captures could occur. For the purposes of authorizing incidental take, we will not consider our take estimates exceeded if more than 51 nonlethal take occurs, so long as the total number of lethal captures does not exceed 16 and the total number of takes does not exceed 67.

Green Sea Turtle Captures
Our best estimate is that up to 2 green sea turtles may be captured during consecutive 3-year periods by recreational anglers or remnant fishing gear at the piers subject to consultation. We anticipate that during that 3-year period, up to 1 of those captures may result in mortality and 1 will not. We attribute the 1 lethal take to the NA DPS and the 1 non-lethal take to the SA DPS for green sea turtles. It is possible that more than 1 nonlethal capture could occur. For the purposes of authorizing incidental take, we will not consider our take estimates exceeded if more than 1 nonlethal take occurs, so long as the total number of lethal captures does not exceed 1 total across both DPSs, and the total number of takes does not exceed 2 total across both DPSs.

Loggerhead Sea Turtle Captures
Our best estimate is that up to 3 loggerhead sea turtles may be captured during consecutive 3-year periods by recreational anglers or remnant fishing gear at the piers subject to consultation. We anticipate that during that 3-year period, up to 2 of those captures may be lethal and 1 will be nonlethal. It is possible that more than 1 nonlethal capture could occur. For the purposes of authorizing incidental take, we will not consider our take estimates exceeded if more than 1 nonlethal take occurs, so long as the total number of lethal captures does not exceed 2, and the total number of takes does not exceed 3.

9.2 Effect of the Take

NMFS has determined the anticipated incidental take specified in Section 9.1 is not likely to jeopardize the continued existence of green sea turtles (North Atlantic and South Atlantic DPSs), the NWA DPS of loggerhead sea turtles, or Kemp's ridley sea turtles.

9.3 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 the RPMs necessary to minimize the impacts of take and the terms and conditions to implement those measures must be provided and must be followed to minimize those impacts. Only incidental taking by the federal agency or applicant that complies with the specified terms and conditions is authorized.

The RPMs and terms and conditions are specified as required by 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 sea turtles. These measures and terms and conditions are nondiscretionary, and must be implemented by the federal action agency or the applicant in order for the protection of Section

7(a)(2) to apply. FEMA, as the federal action agency, has a continuing duty to regulate the activity covered by this incidental take statement. If FEMA or the applicant fails to adhere to the terms and conditions of the incidental take statement (ITS), and/or fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of Section 7(o)(2) may lapse. To monitor the impact of the incidental take and compliance with the Biological Opinion, FEMA or the applicant must report the progress of the action and its impact on the species to NMFS as specified in the ITS [50 CFR 402.14(i)(3)].

NMFS has determined that the following RPMs are necessary and appropriate to minimize impacts of the incidental take of sea turtles related to the proposed action. The following RPMs and associated terms and conditions are established to implement these measures, and to document incidental takes. Only incidental takes that occur while these measures are in full implementation are authorized. These restrictions remain valid until reinitiation and conclusion of any subsequent Section 7 consultation.

1. FEMA must make it a mandatory condition of its funding document that the applicant (Harrison County Sand Beach) comply with the RPMs and terms and conditions of this Opinion, including the duty to monitor and report the impacts of its activities on listed species. FEMA's funding document should include a special condition requiring the applicant to submit reports regarding all interactions with protected species at the proposed fishing pier to FEMA and NMFS.

2. FEMA must ensure the applicant reduces the likelihood of injury or mortality resulting from hook-and-line capture or entanglement by activities at the proposed fishing pier, by including a special condition in its funding document requiring the applicant to install educational signage at the pier. The signage should be placed at the beginning, middle, and end of the fishing pier and in areas where the view of these signs is unobstructed. These signs should contain information on the possibility of sea turtle captures by hook-and-line and what to do in the event of a capture.

3. FEMA must ensure that the applicant reduces the impacts to incidentally captured sea turtles, by including a special condition in its funding document requiring the applicant to ensure that incidentally captured sea turtles are sent to rehabilitation facilities.

9.4 Terms and Conditions

In order to be exempt from liability for take prohibited by Section 9 of the ESA, FEMA or the applicant, as applicable, must comply with the following terms and conditions, which implement the RPMs described above. These terms and conditions are nondiscretionary.

The following terms and conditions (T&Cs) implement the above RPMs:

1. To implement RPM No. 1, FEMA shall include a special condition in its funding document that directs the applicant to report all hook-and-line captures of sea turtles at the proposed pier to the NMFS's Southeast Regional Office and to FEMA, as follows:

a. Within 24 hours, notify NMFS by email (takereport.nmfsser@noaa.gov) that the capture has occurred. Emails must reference this Opinion by the respective identifier number SER-2016-17812 (Jim Simpson Fishing Pier) and date of issuance. 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 (i.e., alive, dead, 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's Southeast Regional Office (takereport.nmfsser@noaa.gov) with the following information: the total number of sea turtle captures, entanglements, and strandings that occurred at or adjacent to the Jim Simpson Fishing Pier. The report must include the same details listed in T&C No. 1 above.

c. Copies of reports as described in (b) above also must be submitted to FEMA at: U.S. Department of Homeland Security, FEMA Region IV, 3003 Chamblee Tucker Rd., Hollins Bldg., Atlanta, GA 30341.

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 injuries and who to notify in the event a dead, injured, or entangled sea turtle is located (see Section 2.1). To implement RPM No. 2, FEMA shall include a special condition in its funding document that directs the applicant to coordinate with NMFS SERO's Protected Resources Division on the content of the educational materials displayed on the pier. Sign examples can be found on the NMFS Protected Resources Division website:

http://sero.nmfs.noaa.gov/protected_resources/section_7/protected_species_educational_signs/index.html.

The signs must display the information detailed in the below points a-e (vi):

a. While fishing, help save sea turtles and dolphins.

b. Never cast in the direction of a sea turtle or dolphin.

c. Report injured, hooked, entangled, or stranded dolphins and sea turtles to the 24-hour hotline: 1-877-942-5343.

d. If you hook a sea turtle, call the hotline immediately!

e. While you wait for the response team:

    i. Lift the turtle to the pier using a net.

    ii. Do not lift it by the hook or pull on the line.

    iii. If the turtle is too large to net/lift, try to walk it to the beach.

    iv. Leave the hook in place as removing it could harm the turtle.

    v. Keep the turtle out of direct sunlight and cover the turtle with a damp towel.

vi. If you cannot reach the response team and are unable to bring the turtle to shore, cut the line as short as possible to release the turtle.

The applicant shall send a photo of the installed signs to the action agency and to NMFS's Southeast Regional Office (takereport.nmfsser@noaa.gov) to confirm installation.

3. The applicant has agreed to maintain existing monofilament recycling bins on the fishing pier. To implement RPM No. 2, FEMA must ensure that the applicant maintains both monofilament recycling bins and trash receptacles at the piers to reduce the probability of trash and debris entering the water.
4. The applicant has agreed to conduct annual underwater fishing debris cleanups around the fishing pier (see Section 2.1). To implement RPM No. 2, FEMA must ensure that the applicant performs the annual underwater fishing debris cleanup around the subject fishing pier.
5. The applicant has an ongoing agreement with IMMS to send captured sea turtles to rehabilitation. To implement RPM No. 3, the applicant must ensure that incidentally captured sea turtles are sent to a rehabilitation facility that holds an appropriate U.S. Fish and Wildlif**e** Native Endangered and Threatened Species Recovery permit. The applicant shall send an annual report to FEMA and to NMFS's Southeast Regional Office (takereport.nmfsser@noaa.gov) documenting captures and results of capture (e.g., released alive, sent to rehabilitation, died).

10. 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 conservation recommendations further the conservation of listed species. NMFS strongly recommends that these measures be considered and implemented by FEMA and/or the Harrison County Sand Beach Department:

1. Perform pier surveys to determine the percent of captured sea turtles that are reported so they can be treated at a rehabilitation facility.
2. FEMA encourages IMMS to work with other state sea turtle rehabilitation facilities on the best handling techniques, data collection and reporting, and public outreach.
3. FEMA encourages research to develop deterrents to discourage turtles from using fishing piers as a habitualized food source.
4. Report injured, entangled, hooked, or stranded marine mammals to the Southeast Region Stranding Network 24-hour hotline at 1-877-WHALE HELP (1-877-942-5353)

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.

11. 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 incidental take statement 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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