Environmental Assessment
on
the Effects of Issuing Incidental Take Permit No. 16230 to the North Carolina Division of Marine Fisheries for the Incidental Take of Sea Turtles Associated with the Otherwise Lawful Commercial Inshore Gillnet Fishery in North Carolina Inshore State Waters.

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Lead Agency: National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Office of Protected Resources

Responsible Official: Donna S. Wieting
Director, Office of Protected Resources

For Further Information Contact: Office of Protected Resources
National Marine Fisheries Service
1315 East West Highway
Silver Spring, MD 20910
(301) 427-8402

Location: North Carolina Inshore Waters

Abstract: The National Marine Fisheries Service (NMFS) proposes to issue an incidental take permit (ITP) to the North Carolina Division of Marine Fisheries (NCDMF), under Section 10(a)(1)(B) of the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.), and the regulations governing the incidental taking of endangered and threatened species (50 CFR 222.307). The ITP would authorize the incidental capture, with some mortality, of five species of endangered and threatened sea turtles, including green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), Kemp's ridley (*Lepidochelys kempii*), leatherback (*Dermochelys coriacea*) and loggerhead (*Caretta caretta*) sea turtles, in the North Carolina inshore gillnet fishery and would be valid for ten years.

Since 2000, NMFS has issued four separate incidental take permits to NCDMF for the incidental take of sea turtles in inshore gillnet fisheries occurring in Pamlico Sound. Since 2006, incidental take of sea turtles has been documented in areas outside Pamlico Sound, which are not covered under an existing ITP. In 2010, the Duke Environmental Law and Policy Clinic filed suit against NCDMF and the North Carolina Marine Fisheries Commission (NCMFC) on behalf of the Karen Beasley Sea Turtle Rescue and Rehabilitation Center (Beasley Center) for the illegal taking of sea turtles in state regulated inshore gillnet fisheries. As a result of the lawsuit and resulting settlement agreement, NCDMF has amended their commercial fishing regulations for their inshore gillnet fishery to minimize the incidental capture of sea turtles. NCDMF has also submitted a completed application to NMFS for an ESA Section 10(a)(1)(B) ITP, including a conservation plan, for the operation of the state-wide inshore gillnet fishery with measures intended to further monitor, minimize, and mitigate the impacts of incidental take in the fishery to the maximum extent practicable.

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1.0 Purpose of and Need for Action

Proposed Action: The National Marine Fisheries Service (NMFS), Office of Protected Resources (OPR) proposes to issue an incidental take permit to the North Carolina Division of Marine Fisheries (NCDMF), under Section 10(a)(1)(B) of the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.) and the regulations governing the incidental taking of endangered and threatened species (50 CFR 222.307). The incidental take permit, identified as ITP Number 16230, would be valid for ten years and would authorize the lethal and nonlethal take of sea turtles in the North Carolina inshore gillnet fishery, require specific levels of observer monitoring and require specific reporting protocols. An ITP implementing agreement will also be developed to define roles and responsibilities of NMFS and NCDMF to provide a common understanding of actions to be undertaken to minimize and mitigate the effects of anchored gillnet fishing in inshore waters on threatened and endangered sea turtles for the duration of the ITP.

Purpose of and Need for Action: Section 9(a)(1)(B) of the ESA prohibits "take[1]" of threatened and endangered species with only a few specific exceptions. Under ESA Section 10(a)(1)(B), incidental take permits authorize the take of endangered species if the taking is incidental to, not the purpose of, an otherwise lawful activity; those takes will not jeopardize the endangered species; the applicant will to the maximum extent practicable monitor, minimize and mitigate the impacts of the taking; implement additional measures deemed necessary or appropriate by NMFS; and ensure adequate funding to implement its commitments under the conservation plan and ITP.

The purpose of the ITP is to aid in the protection and recovery of endangered and threatened sea turtle species by reducing the level of incidental take and resulting mortalities that occur through the operation of the North Carolina inshore gillnet fishery. The ITP will also provide the applicant with an exemption from the take prohibitions under the ESA for sea turtles, including those listed as endangered, associated with gillnet fisheries in North Carolina's inshore estuarine system consistent with the ESA issuance criteria.

The need for issuance of the ITP is related to the purposes and policies of the ESA. Sea turtles captured in gillnet gear, and data are available documenting sea turtle bycatch specifically in the North Carolina inshore gillnet fishery. NMFS has a responsibility to implement the ESA and to protect, conserve, and recover threatened and endangered species under its jurisdiction. ITPs and associated conservation plans are in place to ensure the conservation and management of endangered and threatened species and minimize the impact of otherwise lawful activities, such as the operation of the North Carolina inshore gillnet fishery. Working with state agencies to develop conservation plans for state managed actions, such as the operation of state fisheries, is a critical effort to reduce impacts from state managed actions and promote the conservation and recovery of species.

[1] The ESA defines "take" as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

Background: North Carolina's inshore estuarine system is created by a chain of barrier islands that run along nearly the entire coast. These waters are described as the internal coastal waters of North Carolina. Inlets within these barrier islands allow saline ocean water to mix with fresh water which is provided by a network of river systems to the west. This estuary provides prime habitat for numerous finfish species that are harvested by residents and visitors to North Carolina in both the commercial and recreational fisheries. Commercial and recreational fishermen deploy gillnets in North Carolina's estuarine and ocean waters. Gillnet fishing in North Carolina is regulated by NCDMF through proclamations issued by the Director of NCDMF. Existing NCDMF proclamation requirements include yardage limits, soak-time restrictions, net shot limits, tie down requirements, closed areas, mesh size restrictions, minimum distance between fishing operations, marking requirements, reporting requirements, monitoring requirements, and mandatory attendance of small mesh gillnets in some areas. Gillnet related restrictions differ throughout the state depending on the season, target species, location, and physical characteristics of the water body being fished. In general, there are three primary gillnet set techniques: anchored set nets, floating drift nets, and strike or runaround nets. Anchored gillnets are the primary concern for sea turtle interactions in North Carolina.

Large mesh (≥4-inch stretched mesh (ISM)) fisheries primarily target five fish species - southern flounder (*Paralichthys lethostigma*), striped bass (*Morone saxatilis*), American shad (*Alosa sapidissima*), hickory shad (*Alosa mediocris*), and catfishes (*Ictalurus sp*). The most common mesh size for all large mesh gillnet fisheries is 5 ½ ISM. Small mesh (<4 ISM) gillnet operations target a more diverse array of species relative to large mesh gillnet fisheries. Mesh sizes generally fall between 3 and 3 ¾ ISM. Small mesh gillnet fisheries primarily target spot (*Leiostomus xanthurus*), striped mullet (*Mugil cephalus*), bluefish (*Pomatomus saltatrix*), spotted seatrout (*Cynoscion nebulosus*), weakfish (*Cynoscion regalis*), Atlantic menhaden (*Brevoortia tyrannus*), Spanish mackerel (*Scomberomorus maculatus*), white perch (*Morone americana*), and kingfishes (*Menticirrhus sp*).

During the fall of 1999, increased sea turtle strandings were noted by the North Carolina Sea Turtle Stranding and Salvage Network (NC STSSN) in the southeastern portion of Pamlico Sound. As a result, initial monitoring of the gillnet fisheries in 1999 identified the large mesh gillnet fishery as the probable source of sea turtle interactions in Pamlico Sound during the fall months. With this information, NMFS issued an emergency 30-day rule closing Pamlico Sound to large mesh gillnet fishing (≥5 ISM) for the end of the 1999 fall season (64 FR 70196, December 16, 1999).

In the fall of 2000, NMFS issued Incidental Take Permit (ITP) 1259 to NCDMF to manage the deep and shallow water gillnet fishery in Pamlico Sound, establishing the Pamlico Sound Gillnet Restricted Area (PSGNRA). The goal of the Habitat Conservation Plan (conservation plan) for ITP 1259 was for NCDMF to monitor sea turtle interactions in the fall gillnet fishery in the PSGNRA and to implement management measures to reduce sea turtle mortality by 50% between September 15 and December 15, 2000, as compared to the levels of take seen in the strandings of 1999. The ITP also set corresponding limits on the allowed levels of observed takes of sea turtles, both lethal and non-lethal takes, and documented strandings.

NCDMF closed the fishery to gillnets ≥5 ISM on October 27, 2000 when sea turtle takes exceeded the levels authorized in ITP 1259. However, from October 28 to December 15, 2000, 59 sea turtles stranded within the PSGNRA. It was determined that some fisherman re-equipped their nets with 4-7/8 ISM, to circumvent the closure and continue fishing, primarily targeting flounder. Fisherman using small-mesh gear to target sea trout or mackerel were unaffected by the closure and continued to fish within the PSGNRA. Due to demonstrated capture and mortality of sea turtles in large-mesh gillnets before the closure, NMFS believed that the continued, unmonitored gillnet fishing in and around the PSGNRA after the closure contributed to most of the subsequent sea turtle strandings.

In the fall of 2001, NMFS issued ITP 1348 to NCDMF which authorized the incidental taking of sea turtles in the fall gillnet fisheries in Pamlico Sound and mandated further restrictions for the 2001 fishing season. The conservation plan for ITP 1348 included the creation of three specified Shallow-water Gillnet Restricted Areas (SGNRAs) around the inside of the Outer Banks in Pamlico Sound and two inlet corridors at Hatteras and Ocracoke Inlets. Large and small mesh gillnet fishing operations in the SGNRAs were required to have a special permit from NCDMF, were required to accept observers, and were required to file weekly reports of fishing catch and effort to NCDMF. On August 22, 2001, NCDMF issued a state fishery proclamation that implemented these management measures, effective September 15, 2001. NMFS published an interim final rule (66 FR 50350, October 3, 2001) restricting fishing with gillnets greater than 4 ¼ ISM in Pamlico Sound from September 28 through December 15, 2001. NCDMF permit holders were exempted from the closure if they complied with the ITP conditions required in the NCDMF proclamation.

The ITP 1348 application and conservation plan only addressed the gillnet fisheries that occur in the SGNRAs and inlet areas. They did not include a requested take authorization or management measures for the large-mesh, deep-water component of the gillnet fishery in Pamlico Sound. This component of the fishery used more net per vessel, soaked the nets longer and had higher sea turtle catch and mortality rates in 2000 than the shallow-water components. This deep-water component of the fishery remained closed for the 2001 season.

NMFS then published a final rule the following year on September 6, 2002 (67 FR 56931, September 6, 2002) closing all waters of Pamlico Sound to fishing with gillnets greater than 4 ¼ ISM from September 1 through December 15 each year. The closed area included all inshore waters of Pamlico Sound, and remains in place.

In the summer of 2002, NMFS issued ITP 1398 to NCDMF which authorized the incidental take of sea turtles in shallow-water, large mesh gillnets in Pamlico Sound for a period of 3 years, including the fall seasons of 2002, 2003 and 2004. ITP 1398 expanded the management area to include waters within 200 yards of the mainland shore of Pamlico and Hyde Counties. The associated conservation plan required intensive sea turtle monitoring and a fishery characterization program throughout the PSGNRA annually from September through December.

In 2005, NMFS issued ITP 1528 to NCDMF which authorized the incidental take of sea turtles in shallow-water, large mesh gillnets in Pamlico Sound for a period of 6 years, including the fall seasons between 2005 and 2010. The conservation plan for ITP 1528 included management

measures, restricted and prohibited areas, and monitoring requirements similar to past management actions, as well as several changes from past ITPs. The changes made to the PSGNRA in 2005 included: establishment of a state closure in addition to the federal closure to provide state jurisdiction and enforcement authority, modification of observer program procedures to better direct resources to times and areas of higher potential for sea turtle interactions, and elimination of the ITP requirements along the mainland side of Pamlico Sound due to the small number of interactions in this area NCDMF has monitored the shallow water gillnet fishery in Pamlico Sound since 2001. From 2002-2004 there were 25 observed turtle interactions throughout the PSGNRA in large mesh gillnets. Of the 25 observed turtle interactions, green turtles were the most common species observed (n=17), followed by loggerheads (n=5) and Kemp's ridleys (n=3). The majority of the interactions (72%) were live individuals that were subsequently tagged and released at or near inlets in good condition. During this period no sea turtle interactions were observed in small mesh gillnet gear.

From 2005-2011 there were 103 observed turtle interactions throughout the PSGNRA in large mesh gillnets. Of the 103 observed turtle interactions, green turtles were the most common species observed (n=83), followed by Kemp's ridleys (n=10), then loggerheads (n=9) and hawksbill turtles (n=1). The majority of interactions (69%) were live individuals that were subsequently tagged and released.

In addition to the PSGNRA observed takes, 16 sea turtle interactions were observed outside of the PSGNRA from 2007-2011 in large mesh gillnet operations in North Carolina estuarine waters. The interactions were comprised of green turtles (n = 5), loggerhead turtles (n = 2), and Kemp's ridley turtles (n = 8), and one unidentified hard-shelled turtle.

NMFS operated an Alternative Platform (AP) observer program in Core Sound, North Carolina from June through November 2009. Through this program, NMFS observers' documented 22 sea turtle takes in large mesh gillnets. Similar to NCDMF observer effort, green turtles were the most common species observed (n = 12), followed by Kemp's ridley (n = 5) and loggerhead (n = 5). The majority of interactions (73%) involved live individuals that were subsequently tagged and released (NMFS unpublished data). As a result of this effort, NMFS notified NCDMF of its concern for these unauthorized takes in Core Sound and potentially other North Carolina inshore waters.

NCDMF began operating an AP observer program in 2010 for both large and small mesh gillnets. In 2010-2011, across all seasons, 55 sea turtle interactions were observed by the AP program. Of these interactions Kemp's ridleys were the most common (n = 29), followed by green turtles (n = 22) and loggerhead turtles (n = 4).

In 2012, 26 sea turtle interactions were observed by NCDMF in the state-wide large mesh gillnet fishery. Green turtles were the most common species observed (n = 19), followed by Kemp's ridley (n = 4), loggerhead (n = 1) and unidentified hard-shell species (n = 2). The majority of interactions (n = 22) involved live individuals that were subsequently tagged and released.

On February 23, 2010, the Duke Environmental Law and Policy Clinic filed suit against NCDMF and the North Carolina Marine Fisheries Commission (NCMFC) on behalf of the Karen

Beasley Sea Turtle Rescue and Rehabilitation Center (Beasley Center) for the illegal taking of sea turtles in state regulated inshore gillnet fisheries. Negotiations between the parties occurred in the spring of 2010 resulting in a final Settlement Agreement between the Beasley Center and NCDMF and the NCMFC. As a result of the Settlement Agreement, NCDMF issued proclamation M-8-2010 effective May 15, 2010, implementing the provisions discussed in the Settlement Agreement. Gillnet restrictions implemented by the proclamation included: a stretch mesh size range of 4 ISM to, and including, 6 ½ ISM for large mesh gillnets; soak times limited to overnight soaks an hour before sunset to an hour after sunrise, Monday evenings through Friday mornings; large mesh gillnets were restricted to a height of no more than 15 meshes, constructed with a lead core or leaded bottom line and without corks or floats other than needed for identification; a maximum of 2,000 yards of large mesh gillnets allowed to be used per vessel; and maximum individual net (shot) length of 100 yards with a 25-yard break between shots. Fishermen in the southern portion of the state were allowed to use floats on nets but were restricted to the use of a maximum of 1,000 yards of large mesh gillnet per fishing operation.

Section 5(a) of the Settlement Agreement specifies: "The restrictions as listed in Paragraph 1, 2(e) and 2(i) are minimum requirements for the 2010 statewide ITP application." Paragraph 1 specifies the restrictions on large mesh gillnets, Section 2(e) pertains to different restrictions in the southern portion of the state as described above, and Section 2(i) specifies that the restrictions apply to standard commercial fishing license holders and recreational commercial gear license holders.

Section 5(d) of the Settlement Agreement states "The restrictions as listed in Paragraphs 1, 2(e) and 2(i) are deemed solely interim measures and will be in effect within internal coastal waters, not otherwise exempt, until NMFS issues NCDMF an ITP for the affected areas." The Settlement Agreement also states that the Agreement shall not foreclose more lenient or more restrictive provisions in future ITPs if warranted by biological data collected through reliable sources including, but not limited to, NMFS and NCDMF.

On June 14, 2010, the NCDMF submitted an application for an ITP to address sea turtle interactions with set gillnets in North Carolina internal coastal waters. Based on comments from NMFS, a revised ITP application was submitted on August 17, 2011. On October 5, 2011 NMFS published a Notice of Receipt of the State's draft application for a Section 10(a)(1)(B) ITP for its commercial inshore gillnet fishery and made available the application and conservation plan for public review and comment for 30 days (76 FR 61670, October 5, 2011). Upon reviewing the public comments, NMFS requested that NCDMF make several modifications to the application.

While the statewide ITP was being processed, the Pamlico Sound Gillnet Restricted Area ITP had expired, and the fishing season for Pamlico Sound was approaching. NCDMF intended to include all inshore gillnet fishing into the statewide ITP. On August 24, 2012, NMFS signed an authorization letter extending the coverage of the expired Pamlico Sound ITP #1528 through the end of the 2012 fishing season while the application for the statewide inshore gillnet ITP that would include Pamlico Sound was being processed.

On September 6, 2012 (updated January 18, 2013), NCDMF submitted an amended application to NMFS for an ITP to incidentally take ESA-listed sea turtles associated with large and small

mesh gillnet fisheries operating in all inshore state waters year round. The ITP application includes the existing provisions of the Settlement Agreement and resulting proclamations, as well as additional management measures as part of a state-wide conservation plan. The application and conservation plan includes take requests for endangered Kemp's ridley, leatherback, green and hawksbill sea turtles and threatened loggerhead sea turtles. On October 31, 2012, NMFS published a second Notice of Receipt of NCDMF's application and a request for public comment in the Federal Register (77 FR 65864, October 31, 2012). The 30-day public comment period ended on November 30, 2012. Subsequent updates to the application were submitted on January 18 and June 13, 2013, in response to requests for revisions and clarifications in the modeling, take estimates, the monitoring program, and inclusion of an Implementing Agreement by NMFS.

Scope of Environmental Assessment (EA): This EA will analyze the effects to the human and natural environment caused by the issuance of ITP 16230 to NCDMF for the incidental take of threatened and endangered sea turtles during management of North Carolina inshore gillnet fisheries. The proposed take is described in the application and associated conservation plan submitted by NCDMF and later modified by NCDMF in consultation with NMFS. As required by regulations implementing Section 10(a)(1)(B) of the ESA, the conservation plan must, based on the best scientific and commercial data available, specify:

- The impact which will likely result from the taking;
- How the applicant will minimize and mitigate those impacts, and the funding available to implement;
- What alternative actions the applicant considered, and why those actions are not being pursued;
- Other measures the Secretary of Commerce may require; and
- All sources of data relied on in preparing the plan.

The proposed ESA Section 10(a)(1)(B) ITP would authorize the incidental take of green, hawksbill, Kemp's ridley, leatherback and loggerhead sea turtles. In addition to sea turtles, NMFS anticipates that the proposed action may affect Atlantic sturgeon; however NCDMF has submitted a separate application for a section 10(a)(1)(B) ITP to specifically address impacts to Atlantic sturgeon from this fishery. This EA focuses on the environmental concern and effects to the five species of sea turtles resulting from NMFS issuance of the proposed ITP.

The conservation plan prepared by NCDMF describes measures designed to monitor, minimize, and mitigate the incidental take of ESA-listed sea turtles. The conservation plan includes managing inshore gillnet fisheries by dividing estuarine waters into 6 management units (i.e., A, B, C, D1, D2, E). Each of the management units would be monitored seasonally. This ITP applies to the areas defined as follows:

Management Unit A encompasses all estuarine waters north of 35° 46.30'N to the North Carolina/Virginia state line. This includes all of Albemarle, Currituck, Croatan, and Roanoke Sounds as well as the contributing river systems in this area. Most of this area is currently defined as the Albemarle Sound Management Area (ASMA).

Management Unit B encompasses all estuarine waters south of 35° 46.30’N, east of 76° 30.00’W, and north of 34° 48.27’N. This Management Unit includes all of Pamlico Sound and the Northern portion of Core Sound.

1. Shallow Water Gillnet Restricted Area (SGNRA) 1 is the area from Wainwright Island to Ocracoke Inlet bound by the following points: Beginning at a point on Core Banks at 34° 58.7963’N - 76° 10.0013’W, running northwesterly to Marker # 2CS at the mouth of Wainwright Channel at 35° 00.2780’N - 76° 12.1682’W, then running northeasterly to Marker “HL” at 35° 01.5665’N - 76° 11.4277’W, then running northeasterly to Marker #1 at 35° 09.7058’N - 76° 04.7528’W, then running southeasterly to a point at Beacon Island at 35° 05.9352’N - 76° 02.7408’W, then running south to a point on the northeast corner of Portsmouth Island at 35° 03.7014’N - 76° 02.2595’W, then running southwesterly along the shore of Core Banks to the point of beginning.

2. SGNRA 2 is the area from Ocracoke Inlet to Hatteras Inlet bound by the following points: Beginning at a point near Marker #7 at the mouth of Silver Lake at 35° 06.9091’N - 75° 59.3882’W, running north to Marker # 11 near Big Foot Slough Entrance at 35° 08.7890’N - 76° 00.3606’W, then running northeasterly to a point at 35° 13.4489’N’N - 75° 47.5531’W, then running south to a point northwest of the Ocracoke/Hatteras Ferry terminal on the Ocracoke side at 35° 11.5985’N - 75° 47.0768’W, then southwesterly along the shore to a point of beginning.

3. SGNRA 3 is the area from Hatteras to Avon Channel bound by the following points: The area from Hatteras to Avon Channel bound by the following points: Beginning at a point near Marker “HR” at 35° 13.3152’N – 75° 41.6694’W, running northwest near Marker “42 RC” at Hatteras Channel at 35° 16.7617’N – 75° 44.2341’W, then running easterly to a point off Marker #2 at Cape Channel at 35° 19.0380’N – 75° 36.2993’W, then running northeasterly near Marker #1 at the Avon Channel Entrance at 35° 22.8212’N – 75° 33.5984’W, then running southeasterly near Marker #6 on Avon Channel at 35° 20.8224’N - 75° 31.5708’W, then running easterly near Marker #8 at 35° 20.9412’N – 75° 30.9058’W, then running to a point on shore at 35° 20.9562’N - 75° 30.8472’W, then following the shoreline in a southerly and westerly direction to the point of beginning.

4. SGNRA 4 is the area from Avon Channel to Rodanthe bound by the following points: Beginning at a point near Marker #1 at the Avon Channel Entrance at 35° 22.8212’N - 75° 33.5984’W, then running northerly to a Point on Gull Island at 35° 28.4495’N - 75° 31.3247’W, then running north near Marker “ICC” at 35° 35.9891’N – 75° 31.2419’W, then running northwesterly to a point at 35° 41.0000’N – 75° 33.8397’N – 75° 29.3271’W, then following the shoreline in a southerly direction to a point on shore near Avon Harbor at 35° 20.9562’N - 75° 30.8472’W, then running westerly near Marker #8 at 35° 20.9412’N - 75° 30.9058’W, then running westerly near Marker #6 on Avon Channel at 35° 20.8224’N - 75° 31.5708’W, then running northwesterly to the point of beginning.

5. Ocracoke Corridor (OC) is the area in Ocracoke Inlet bound by the following points: Beginning at a point at 35° 07.9390'N - 76° 03.8080'W, then running northeasterly to Marker #9 at Nine Foot Shoal Entrance at 35° 08.4411'N - 76° 02.6848'W, then running northeasterly to Marker "14 BF" at 35° 09.3627'N - 76° 00.6259'W, then running southeast to Marker #7 at the mouth of Silver Lake at 35° 06.9091'N - 75° 59.3882'W, then following the shoreline southwesterly to a point at the north side of Ocracoke Inlet at 35° 04.4200'N - 75° 59.9245'W, then crossing the inlet to a point on Portsmouth Island at 35° 03.7014'N - 76° 02.2595'W, then in a northerly direction to a point on Beacon Island at 35° 05.9352N - 76° 02.7408'W, then running in a northwesterly direction to the point of beginning.

6. Hatteras Corridor (HC) is the area in Hatteras Inlet bound by the following points: Beginning at a point at 35° 13.4489'N - 75° 47.5531'W, running east to the site of an old platform at 35° 14.0100'N - 75° 45.8097'W, then running northeast to Marker "42 RC" at the mouth of Hatteras Channel at 35° 16.7617'N - 75° 44.2341'W, then following the channel to Marker "HR" at 35° 13.3152'N - 75° 41.6694'W, then following the shoreline to a point on the north side of Hatteras Inlet at 35° 11.3408'N - 75° 44.9907'W, then crossing the inlet to the south side to a point on Ocracoke Island at 35° 11.0793'N - 75° 45.9645'W, then following the shoreline northwest to a point northwest of the Ocracoke/Hatteras ferry terminal at 35° 11.5985'N - 75° 47.0768'W, then running in a northerly direction to the point of beginning.

7. Oregon Inlet Corridor (OIC) is the area in Oregon Inlet bound by the following points: Beginning at a point at Marker #12 at Old House Channel at 35° 45.0883'N - 75° 35.9600'W, then following the channel in a northeasterly direction to Marker #53 at 35° 47.2157'N - 75° 34.4264'W, then running easterly to Marker #13 near Oregon Inlet Fishing Center harbor entrance at 35° 47.7076'N - 75° 32.9762'W, then running southerly to a point on the south side of Oregon Inlet at 35° 46.0500'N- 75° 31.6166'W, then running in a southerly direction along the shoreline to a point at 35° 41.0000'N - 75_ 29.3271'W, then running west to a point at 35° 41.0000'N - 75° 33.8397'W, then in a northerly direction to the point of beginning.

8. Mainland Gillnet Restricted Area (MGNRA) is the area on the mainland side of Pamlico Sound, from the shoreline of Hyde and Pamlico Counties out to 200 yards between 76° 30'W and 75° 42'W.

Management Unit C includes the Pamlico, Pungo, and Neuse river drainages west of 76° 30.00'W.

Management Unit D1 encompasses all estuarine waters south of 34° 48.27'N and east of a line running from 34° 40.70'N – 76° 22.50'W to 34° 42.48'N – 76° 36.70'W. Management Unit D-1 includes Southern Core Sound, Back Sound, and North River.

Management Unit D2 encompasses all estuarine waters west of a line running from 34° 40.70’N – 76° 22.50’W to 34° 42.48’N – 76° 36.70’W to the Highway 58 bridge. Management Unit D-2 includes Newport River and Bogue Sound.

Management Unit E encompasses all estuarine waters south and west of the Highway 58 bridge to the North Carolina/South Carolina state line. This includes the Atlantic Intracoastal Waterway (ICW) and adjacent sounds and the New, Cape Fear, Lockwood Folly, White Oak, and Shallotte rivers.

2.0 Alternatives Including the Proposed Action

Alternative 1 - No Action:
Under the no action alternative no ITP would be issued for the incidental take of sea turtles. Under this alternative, the NMFS seasonal closure would remain in effect in Pamlico Sound prohibiting the use of gillnets greater than 4 ¼ ISM from September 1 through December 15 each year (67 FR 56931, September 6, 2002).

While NMFS cannot know for certain what measures the State would implement absent the ITP, we will assume for purposes of analysis in the EA that NCDMF would not likely implement the full suite of specific monitoring, minimization, and mitigation measures included in the proposed conservation plan and ITP. Under this alternative, the conditions of the 2010 Settlement Agreement between the Beasley Center and NCDMF and the NCMFC will remain in effect: and therefore, NCDMF, if they continue to operate the fishery, would be held to the same requirements that have been in place since 2010. It is possible that NCDMF would amend their commercial inshore gillnet fishing regulations to be less restrictive than they are under the existing regulatory structure.

Alternative 2 - Issue ITP as Requested in Application:
Under Alternative 2, an ITP would be issued to exempt NCDMF from the ESA prohibition on taking sea turtles during the otherwise lawful commercial inshore gillnet fishery. As requested in the application, the ITP would be valid for ten years and would require NCDMF to operate the inshore gillnet fishery as described below in the proposed conservation plan. This alternative would include issuing the take levels proposed in the September 6, 2012 (updated January 18. 2013) application and conservation plan.

Summary of Conservation Plan

The conservation plan prepared by NCDMF describes measures designed to monitor, minimize, and mitigate the incidental take of ESA-listed sea turtles. The conservation plan includes managing inshore gillnet fisheries by dividing estuarine waters into 6 management units (i.e., A, B, C, D1, D2, E), as specified above. Each of the management units would be monitored seasonally and by fishery. Management units were delineated on the basis of three primary factors: similarity of fisheries and management, extent of known protected species interactions in commercial gillnet fisheries, and unit size and the ability of NCDMF to monitor fishing effort.

Management measures identified in the proposed conservation plan include:

(1) Restricted soak times for large mesh gillnets from one hour before sunset on Monday through Thursday and one hour after sunrise from Tuesday through Friday (i.e., fishing is prohibited from one hour after sunrise on Friday through one hour before sunset on Monday);
(2) Restrictions on the maximum net length per large mesh fishing operation (i.e., 2,000 yards (1.83 km, 6,000 ft.) per operation except south of the North Carolina Highway 58 bridge and Management Area D2 where 1,000 yards (0.91 km, 3,000 ft.) is maximum;
(3) Restrictions on large mesh net-shot lengths to 100 yards (91.44 m, 300 ft.) with a 25 yard (22.86 m, 75 ft.) separation between each net-shot;
(4) Requirement for large mesh nets to be low profile (e.g., maximum of 15 meshes in depth, tie-downs prohibited, floats or corks prohibited along float lines north of the North Carolina Highway 58 bridge);
(5) Closure of Management Area D1 to unattended large mesh gillnets from May 8 – October 14 annually;
(6) Prohibition on large mesh gillnets in the deep water portions of the PSGNRA and Oregon, Hatteras, and Ocracoke inlets from September 1 – December 15; and
(7) Adaptive fishery management measures and restrictions through state proclamation authority (e.g., gear and/or area restrictions, attendance requirements, increased observer coverage and/or enforcement).
(8) Continuation of North Carolina's regulations for small mesh gillnet attendance requirements.

Monitoring and Bycatch Estimates

NCDMF proposes to monitor sea turtle interactions through the NCDMF sea turtle bycatch monitoring program (traditional observer program) and the NCDMF AP observer program. Together these two programs are referred to as "the observer program." The state will also monitor sea turtle interactions through reports received from fishermen and NCDMF Marine Patrol.

The observer program will maintain statewide gillnet fishery coverage in all Management Units while gillnet fishing efforts are occurring. Weekly observer coverage will be estimated for each Management Unit based upon fisheries effort data (i.e., trips), sea turtle abundance, open Management Units, and in areas where protected species have been reported. With coverage based upon fishing effort, observer coverage will be relative to the fishing effort in each Management Unit, unless protected species reports indicate that an increase in coverage is needed within a Management Unit. Reports of increased numbers of protected species in an area will allow NCDMF to increase observer coverage in areas where high concentrations of protected species populations may potentially interact with fishing gear. Increasing observer coverage will allow for greater precision of bycatch estimates in the areas with higher take. Data collected from the observer programs will be used to estimate sea turtle interactions, and determine if total estimated take levels are within the level authorized. To develop the model used to estimate bycatch, an estimate of total effort for North Carolina's estuarine gillnet fisheries was needed to predict the number of interactions for the entire fishery. Total effort was

estimated by combining information from multiple NCDMF monitoring programs, and effort was measured as soak time (days) multiplied by net length (yards).

A generalized linear model (GLM) framework was used to estimate sea turtle interactions in North Carolina's estuarine gillnet fisheries based on data collected from 2007 through 2011. Estimated numbers of interactions will be calculated based on observed interactions using the same best-fitting GLM for each species and assuming effort levels equivalent to those observed in 2010. Through this model, NCDMF will be able to estimate take based on mesh size, year, season, and Management Unit. Mesh sizes are categorized as large (≥4 ISM) or small (<4 ISM). Seasons are designated as: winter (December–February); spring (March–May); summer (June–August); and fall (September–November). Management Units are defined elsewhere in the ITP (A, B, C, D1, D2, and E, as described above). Estimates will be calculated weekly as well as monthly and will be provided to the NMFS OPR.

Reporting

In the conservation plan, NCDMF has specified that several mechanisms of reporting will be in place. The NC STSSN will be contacted within 24 hours of an observed interaction, and within 48 hours the standard interaction reports will be submitted to the NC STSSN. Additionally, if a take occurs, NMFS will be informed within 24 hours, and summary reports will be provided monthly to the NMFS OPR, the NMFS Southeast Regional Office (SERO), and the North Carolina Sea Turtle Advisory Committee with estimates of total sea turtle takes by Management Unit, season, species, and disposition (alive/dead).

Adaptive Management

NCDMF also proposes to use a variety of adaptive fishery management measures and restrictions through their state proclamation authority to reduce sea turtle mortality and prohibit fishing in management units where incidental take thresholds are approaching authorized take levels. NCDMF will use proclamation authority to implement management measures necessary to reduce sea turtle takes in estuarine gillnet fisheries in North Carolina. Proclamation authority allows NCDMF to implement timely responses (i.e., within 48 hours) that may provide increased protection of sea turtles, for example appropriate restrictions may include gear or area restrictions, attendance requirements, modifications in observer coverage, increased enforcement, or a combination of these and other restrictions. The need for additional management measures or better direction of resources will be determined by NCDMF in consultation with NMFS.

Potential adaptive management restrictions may include gear or area restrictions, attendance requirements, modifications in observer coverage, increased enforcement, or a combination of these and other restrictions. The NCDMF will consult regularly with the NMFS SERO and the NMFS OPR to ensure that monitoring and management programs maintain the flexibility for the NCDMF to monitor, anticipate, respond, and implement needed action. A long-term adaptive approach will provide for the protection and conservation of sea turtles and other protected species.

Another key component of an adaptive monitoring program is the identification of areas of high potential for bycatch of protected species in gillnet fisheries through observed interactions and on the water sightings of sea turtles by the NCDMF observers, biological staff, the NC STSSN, Marine Patrol, reports from commercial and recreational fishermen, and the general public. These areas will be referred to as hotspots and will provide managers the opportunity to address bycatch concerns through timely implementation of conservation measures such as increased observer and Marine Patrol coverage, additional gear restrictions, and temporary and/or seasonal closures. A hotspot will be defined as any area where sea turtle observations and/or sightings are above the previous two-year average for the season and Management Unit and has the potential for increased interactions. Hotspot areas will be identified and handled proactively and reactively. For any given Management Unit during a season that shows high sea turtle abundance, NCDMF may close the Management Unit for the duration of the defined season.

Annual Anticipated Incidental Take

Under Alternative 2, NCDMF has requested a specific level of take by sea turtle species and Management Area. A generalized linear model (GLM) framework was used to predict sea turtle interactions in North Carolina's inshore gillnet fisheries based on data collected from 2007 through 2011. The variables used for the analysis include mesh size, year, season, species, and Management Unit. Additionally an estimate of total effort for North Carolina's inshore gillnet fisheries was needed to predict the number of interactions that might occur in the entire fishery, as well as by Management Unit.

When using the GLM model, a sufficient amount of observed bycatch data was available only to estimate takes of Kemp's ridley sea turtles in Management Units B, D1, D2 and E, and to estimate takes of green sea turtles in Management Units B, D1 and E. For all other species and areas, observed take data are limited and insufficient to model future estimated takes. As such, takes have not been estimated for green sea turtles in Management Unit D2; for loggerhead, leatherback and hawksbill sea turtles in Management Units B, D1, D2, and E; for all sea turtles species in Management Units A and C; and for all small mesh gear. Therefore, for these species and areas, take is expressed as observed, and will not be extrapolated or modeled to determine the total annual estimated take value.

Estimated and Observed Takes

Estimated takes were calculated using a GLM model for the following areas and species.

- Kemp's ridley sea turtles in large mesh gillnet gear in Management Units B, D1, D2, and E (Table 1).
- Green sea turtles in large mesh gillnet gear in Management Units B, D1 and E (Table 1).

Observed takes are expressed for areas and/or species where insufficient data exist to model an annual take estimate. This applies to the following species, areas and gear.

- Green sea turtles in large mesh gillnet gear in Management Unit D2 (Table 2).
- Loggerhead, leatherback and hawksbill sea turtles in large mesh gillnet gear in Management Units B, D1, D2 and E (Table 2).
- All species in small mesh gillnet gear in Management Units B, D1, D2 and E (Table 3).

- All species, both large and small mesh gillnet gear, in Management Units A and C (Table 4).

Table 1. Requested annual *estimated* takes in large mesh (≥4 inch stretched mesh) gillnets in the NCDMF application.

Species	Area								Total Estimated Take	
	B		D1		D2		E			
	Estimated		Estimated		Estimated		Estimated		live	dead
	live	dead	live	dead	live	dead	live	dead		
Green	225	112	9	5	n/a*	n/a*	96	48	330	165
Kemp's Ridley	53	26	15	7	6	3	24	13	98	49
Total Estimated Take	**278**	**138**	**24**	**12**	**6**	**3**	**120**	**61**	**428**	**214**

* Insufficient observer data exists to model an estimated annual take level; therefore, for Management Unit D2, an annual observed take number has been identified and is found in Table 2.

Table 2. Requested annual *observed* (not estimated) takes in large mesh (≥4 inch stretched mesh) gillnets in the NCDMF application.

Species	Area				Total Observed Take
	B	D1	D2	E	
	Observed (live/dead)	Observed (live/dead)	Observed (live/dead)	Observed (live/dead)	
Green	2	2	6	2	12
Kemp's ridley	n/a**	n/a**	n/a**	n/a**	n/a**
Hawksbill	1	1	1	1	4
Leatherback	1	1	1	1	4
Loggerhead	6	4	6	6	22
Total Observed Take	**10**	**8**	**14**	**10**	**42**

** Sufficient observer data exists to model an estimated annual take level for Kemp's ridley sea turtles in Management Units B, D1, D2 and E. The annual estimated take number is found in Table 1.

Table 3. Requested annual *observed* (not estimated) takes in small mesh (<4 inch stretched mesh) gillnets in the NCDMF application.

Species	Area				Total Observed Take
	B	D1	D2	E	
	Observed (live/dead)	Observed (live/dead)	Observed (live/dead)	Observed (live/dead)	
Green	6	4	6	6	22
Hawksbill	1	1	1	1	4
Kemp's Ridley	6	4	6	6	22
Leatherback	1	1	1	1	4
Loggerhead	6	4	6	6	22
Total Observed Take	**20**	**14**	**20**	**20**	**74**

Table 4. Requested annual *observed* (not estimated) takes in large mesh (≥4 inch stretched mesh) and small mesh (<4 inch stretched mesh) gillnets combined in the NCDMF application.

Species	Area		Total Observed Take
	A	C	
	Observed (live/dead)	Observed (live/dead)	
Green, Hawksbill, Kemp's Ridley, Leatherback, Loggerhead	8 turtles of any species	8 turtles of any species	16
Total Observed Take	**8**	**8**	**16**

Table 5. Total annual requested take (estimated and observed) by species and condition in the NCDMF application.

	Total Annual Takes Requested		
	Observed live/dead	Estimated live	Estimated dead
Green	34	330	165
Hawksbill	8	n/a*	n/a*
Kemp's Ridley	22	98	49
Leatherback	8	n/a*	n/a*
Loggerhead	44	n/a*	n/a*
Any Species	16	n/a*	n/a*
Total Annual Take	**132**	**428**	**214**

Alternative 3 - Issue ITP as Requested in the Application, with Modifications and Additional Requirements (Preferred Alternative):

Under Alternative 3, an ITP would be issued as described below. This alternative includes the Conservation Plan as described in Alternative 2, but with modifications and additional requirements.

Under Alternative 3, an ITP would be issued to exempt NCDMF from the ESA prohibition on taking sea turtles during the otherwise lawful commercial inshore gillnet fishery. As requested in the application, the ITP would be valid for ten years and would require NCDMF to operate the inshore gillnet fishery as described below in the proposed conservation plan.

Summary of Conservation Plan

The conservation plan prepared by NCDMF describes measures designed to monitor, minimize, and mitigate the incidental take of ESA-listed sea turtles. The conservation plan includes managing inshore gillnet fisheries by dividing estuarine waters into 6 management units (i.e., A, B, C, D1, D2, E), as specified above. Each of the management units would be monitored seasonally and by fishery. Management units were delineated on the basis of three primary factors: similarity of fisheries and management, extent of known protected species interactions in commercial gillnet fisheries, and unit size and the ability of NCDMF to monitor fishing effort.

Management measures identified in the proposed conservation plan include:

(1) Restricted soak times for large mesh gillnets from one hour before sunset on Monday through Thursday and one hour after sunrise from Tuesday through Friday (i.e., fishing is prohibited from one hour after sunrise on Friday through one hour before sunset on Monday);
(2) Restrictions on the maximum net length per large mesh fishing operation (i.e., 2,000 yards (1.83 km, 6,000 ft.) per operation except south of the North Carolina Highway 58 bridge and Management Area D2 where 1,000 yards (0.91 km, 3,000 ft.) is maximum;
(3) Restrictions on large mesh net-shot lengths to 100 yards (91.44 m, 300 ft.) with a 25 yard (22.86 m, 75 ft.) separation between each net-shot;
(4) Requirement for large mesh nets to be low profile (e.g., maximum of 15 meshes in depth, tie-downs prohibited, floats or corks prohibited along float lines north of the North Carolina Highway 58 bridge);
(5) Closure of Management Area D1 to unattended large mesh gillnets from May 8 – October 14 annually;
(6) Prohibition on large mesh gillnets in the deep water portions of the PSGNRA and Oregon, Hatteras, and Ocracoke inlets from September 1 – December 15; and
(7) Adaptive fishery management measures and restrictions through state proclamation authority (e.g., gear and/or area restrictions, attendance requirements, increased observer coverage and/or enforcement).
(8) Continuation of North Carolina’s regulations for small mesh gillnet attendance requirements.

Monitoring Requirements

The monitoring plan submitted by NCDMF in their original application and described in Alternative 2 has been modified by NCDMF during consultations with NMFS to develop a more comprehensive and specific monitoring plan as an alternative.

Under Alternative 3, NCDMF will maintain a monitoring program that consists of a combination of onboard and AP observers, trip ticket program, and marine patrol officer activities (when needed). NCDMF will monitor six primary management units in inshore waters as described in the conservation plan (see Figure 10). NCDMF will monitor at least 7% (with a goal of 10%) of large mesh (≥4.0 ISM) gillnet trips in each area during each of 3 seasons (i.e., spring, summer, and fall). Turtles are most likely to occur in NC waters during spring, summer, and fall seasons; therefore, Alternative 3 seeks to ensure that adequate observer coverage is provided for those three seasons. As sea turtle distribution is influenced by water temperature (Braun-McNeill et al. 2008), during mild winters sea turtles may still be present in North Carolina inshore waters for at least a portion of the season. As such, while a specific level of monitoring is not required in the winter through this Alternative, if a turtle is observed or reported by a fisherman, NCDMF must collect the take data and report the take to NMFS and the NC STSSN within 24 hours.

NCDMF will monitor at least 1% (with a goal of 2%) of small mesh (<4.0 ISM) gillnet trips in each area during each of 3 seasons (i.e., spring, summer, fall). Small mesh observer coverage will be maintained at a lower level than large mesh gillnet coverage due to existing small mesh gillnet attendance requirements, which requires fishermen to stay onsite with their nets while fishing. The attendance requirement was put in place to minimize undersized red drum bycatch, and would apply to approximately 95% of the small mesh gillnets in operation between May and November each year, and therefore occur in areas and times where sea turtles are most commonly found. It is expected that a lower level of observer coverage will be necessary, as fisherman are required to tend their nets and report any interactions to NCDMF.

NCDMF will use data collected through the Observer Program using the methodologies outlined in the conservation plan to conduct annual analyses to better understand bycatch estimates for Kemp's ridley and green turtles. Weekly and seasonal estimated sea turtle takes will be calculated by NCDMF to ensure authorized estimated and/or observed take levels are not being approached. After the first three years, NCDMF will use data collected through the Observer Program using the methodologies outlined in the conservation plan to conduct analyses to determine whether bycatch may be estimated for loggerhead turtles in each area. Observer data collected prior to the issuance of the ITP will also be used to create a more robust data set. If it is possible to conduct this analysis, NCDMF will provide those estimates to NMFS and discuss whether adaptive management is necessary.

NCDMF will monitor data collected and identify, in a timely manner, whether unusually high sea turtle bycatch occurred within a management unit or subunit, such that NCDMF determines that closure and evaluation is necessary to (1) avoid approaching a take limit, or (2) provide adequate protection for sea turtles, or (3) to allow sea turtles to complete a seasonal migration and minimize interactions. NCDMF will confer with the NMFS on the identification of hotspots.

Reporting Requirements

The reporting requirements submitted by NCDMF in their original application, and described in Alternative 2, have been modified by NMFS and NCDMF during consultations to develop a more comprehensive and specific reporting plan under this alternative.

Under Alternative 3, NCDMF will provide progress reports and annual reports to NMFS on a regular basis to monitor implementation of the original conservation plan and ITP and determine whether adaptive management is necessary.

<u>Take Reports:</u> NCDMF will report all incidental sea turtle takes to NMFS OPR via email within 24 hours of their occurrence in any season of the year (spring, summer, fall and winter), whether documented by an observer or reported by a fisherman. Reports of incidental take should include the date of the take, the condition of the turtle, the species (if known), photographs, and any other pertinent details of the circumstances of the taking (e.g., location, gear description, etc.). NCDMF will also provide copies of all take reports to the NC STSSN within 24 hours of the take.

<u>Weekly Progress Reports</u>: For those weeks in which sea turtle interactions are documented, a weekly report must be submitted to the NMFS OPR by Friday of the following week. The weekly reports must include the weekly take estimates and cumulative totals, including: observed takes with species, location, condition, and photos; and the total number of observed trips in that area.

<u>Seasonal Progress Reports:</u> Progress reports must be submitted to the NMFS OPR within 30 days after the end of the spring, summer, and fall seasons (*i.e.*, June 30, September 30, and December 31). The reports must include:

a) A summary of the weekly reporting information previously submitted;
b) Descriptions of any additional management measures taken by NCDMF;
c) One or more maps or graphical displays illustrating the geographic distribution of all observed large and small mesh gillnet trips and the locations of all observed incidental takes of sea turtles;
d) The number of law enforcement contacts made with gillnet vessels the nature of these contacts;
e) Any violations detected by NCDMF of the proclamations implementing the requirements of this ITP, and the status of all resulting enforcement actions; and
f) A description of any adaptive management actions taken.

<u>Annual Reports</u>: NCDMF will prepare annual written reports for each year during which the Plan is in effect. A year is defined as beginning September 1 and ending the following August 31 (e.g., September 1, 2013 through August 31, 2014). NCDMF will submit annual reports for September 1 through August 31 to NMFS by the following January 31 (i.e., 5 months after the year ends). A summary of the key contents of each annual report is provided below:

a) Actual and estimated incidental takes (including mortality) and the level of uncertainty of the estimates (e.g., confidence intervals) of Covered Species by management units as described in the conservation plan;
b) Size composition, disposition (alive/dead), location, and dates of incidental take of Covered Species recorded during monitoring program as described in the conservation plan and conservation plan Appendix;
c) One or more maps or graphical representations illustrating the geographic distribution of all observed large and small mesh gillnet hauls and the locations of all observed incidental sea turtle takes; and
d) A description of the mitigation activities, adaptive management actions, and enforcement activities conducted.

Additionally, within 2 years of ITP implementation, NCDMF will obtain certifications from each fisherman intending to use anchored gillnets in inshore waters as defined in the conservation plan that the fisherman acknowledges the ITP requirements and wishes to be included under that ITP. NCDMF will periodically compare trip ticket data to the certifications to ensure that any new entrants into the fishery are certified. NCDMF will annually notify certified fishermen of the ITP requirements. Alternatively, NCDMF will implement a permit or license system, whereby the permit or license would serve as a certificate of inclusion, for fishermen using anchored gillnets in inshore waters to ensure compliance with the conservation plan, ITP, and this Agreement.

Adaptive Management

Under Alternative 3, Adaptive Management would be conducted as described in the application and in Alternative 2. NCDMF proposes to use a variety of adaptive fishery management measures and restrictions through their state proclamation authority to reduce sea turtle mortality and prohibit fishing in management units where incidental take thresholds are approaching authorized take levels. NCDMF will use proclamation authority to implement management measures necessary to reduce sea turtle takes in estuarine gillnet fisheries in North Carolina. Proclamation authority allows NCDMF to implement timely responses (i.e., within 48 hours) that may provide increased protection of sea turtles. For example, appropriate restrictions may include gear or area restrictions, attendance requirements, modifications in observer coverage, increased enforcement, or a combination of these and other restrictions. The need for additional management measures or better direction of resources will be determined by NCDMF in consultation with NMFS OPR. NCDMF and NMFS consultations must include analyses of relevant data, including but not limited to at-sea monitoring, NC Trip Ticket Program, fish house checks, enforcement, and strandings. Consultations will be among staff from NCDMF and NMFS OPR. If there is a disagreement about any changes to management not specified within the permit, NMFS will convene, at NCDMF's request, a consultation with the Assistant Administrator for Fisheries for resolution final decision on the disagreement.

Potential adaptive management restrictions may include gear or area restrictions, attendance requirements, modifications in observer coverage, increased enforcement, or a combination of these and other restrictions. The NCDMF will consult regularly with the NMFS SERO and the NMFS OPR to ensure that monitoring and management programs maintain the flexibility for the

NCDMF to monitor, anticipate, respond, and implement needed action. A long-term adaptive approach will provide for the protection and conservation of sea turtles and other protected species.

Another key component of an adaptive monitoring program is the identification of areas of high potential for bycatch of protected species in gillnet fisheries through observed interactions and on the water sightings of sea turtles by the NCDMF observers, biological staff, the NC STSSN, Marine Patrol, reports from commercial and recreational fishermen, and the general public. These areas will be referred to as "hotspots" and will provide managers the opportunity to address bycatch concerns through timely implementation of conservation measures such as increased observer and Marine Patrol coverage, additional gear restrictions, and temporary and/or seasonal closures. A "hotspot" will be defined as any area where sea turtle observations and/or sightings are above the previous two-year average for the season and Management Unit and has the potential for increased interactions. Hotspot areas will be identified and handled proactively and reactively. For any given Management Unit during a season that shows high sea turtle abundance, NCDMF may close the Management Unit for the duration of the defined season.

Mitigation Activities

NCDMF must ensure (i.e., issue a proclamation) that all commercial and recreational fishermen report all incidental captures of sea turtle to NCDMF and require that fishermen follow the requirements listed below for the safe handling, resuscitation and disposition of any incidentally captured turtles. Human safety is paramount and will supersede these requirements as necessary.

<u>Sea Turtle Handling and Resuscitation Requirements:</u>

a) Fishermen must bring captured turtles aboard immediately upon detecting them in their net and remove them from the net with all due care to avoid further injury to the turtle.
b) Resuscitation must be attempted on sea turtles that are inactive or comatose by placing the turtle in its normal position on its breastplate (plastron) and elevating its hindquarters several inches for a period of 4 to 24 hours. The amount of the elevation depends on the size of the turtle; greater elevations are needed for larger turtles. Sea turtles being resuscitated must be kept moist and protected from excessive heat and cold.
c) Sea turtles that are actively moving or begin actively moving following resuscitation must be held aboard the vessel in an open container (e.g. a fish box) that allows the turtle to rest normally on its breastplate, while restricting its movement and preventing the possibility of injury from any fishing operations. Turtles that are too large to fit inside a holding container must be otherwise confined to an area of the vessel that is free of sharp objects or harmful materials and where chance of injury from fishing operations is minimal.
d) For all comatose or revived turtles, the NC STSSN must be contacted immediately so the animal can be transferred to rehabilitation for evaluation.

<u>Incidentally Taken Sea Turtle Specimens:</u>

a) Release of active and uninjured sea turtles: Live uninjured turtles should be released immediately following capture. The release location should be far enough from the nets

to avoid immediate recapture but within the vicinity of where they were captured. Turtles must be released over the stern or side of the boat with the engine out of gear, in an area where they are unlikely to be recaptured by other nets or injured by vessels.

b) For sea turtles that are injured, lethargic, or dead, fishermen must immediately contact the NCDMF Marine Patrol and transfer the turtle to an NCDMF patrol vessel. If no NCDMF patrol vessel is in the vicinity, fishermen must transport the turtle immediately to the nearest U.S. Coast Guard Station and contact the NC STSSN immediately to arrange for transfer of the turtle to a rehabilitation facility.

Tagging of Incidentally Taken Sea Turtle Specimens:
Observers must tag all live, active turtles prior to release with two flipper tags and one passive integrated transponder (PIT) tag, provided the turtle meets the minimum size criteria for tagging. Tagging procedures must be coordinated with and tag data must be submitted to the Cooperative Marine Turtle Tagging Program of the University of Florida. NCDMF must coordinate with NMFS on observer training programs. NMFS will provide, based on available staff, training for observers on handling and tagging sea turtles.

Stranding Monitoring:
Independent from this ITP, the NC STSSN, operated by the North Carolina Wildlife Resources Commission (NCWRC), monitors the strandings of sea turtles in inshore areas. NCDMF must provide copies of all take reports to the NC STSSN within 24 hours of the take, to facilitate information exchange necessary to compare stranding and incidental take locations for analysis, such as identifying hot spots.

Annual Anticipated Incidental Take

In consultation with NCDMF, NMFS determined that adjustments were warranted to the incidental take request included in the NCDMF ITP application dated January 18, 2013. NCDMF modeled fishing effort and potential interactions by season and by management area. After consultation with NMFS, NCDMF modified the take request to an annual request by area rather than 4 specific seasonal requests by area. This approach reduces the number of observed takes requested by approximately 59%, from 132 to 78 observed takes across all areas and species. This also increases flexibility for NCDMF to manage gillnet fishing throughout the year by allowing them to implement seasonal restrictions in particular areas, as necessary, through proclamation.

The amount of incidental take is expressed as either estimated or observed depending on the amount of data available for modeling the predicted takes.

The estimated take levels for Kemp's ridley and green sea turtles under Alternative 3 are the same as Alternative 2; and, therefore, estimates were derived using the same GLM framework based on data collected from 2007 through 2011. As in Alternative 2, a sufficient amount of observed bycatch data was available only to estimate takes of Kemp's ridley sea turtles in Management Units B, D1, D2 and E, and to estimate take of green sea turtles in Management Units B, D1 and E. For all other species and areas, observed take data are limited and

insufficient to model future estimated takes. As such, takes have not been estimated for green sea turtles in Management Unit D2; for loggerhead, leatherback and hawksbill sea turtles in Management Units B, D1, D2, and E; for all sea turtles species in Management Units A and C; and for all small mesh gear. Therefore, for these species and areas, take is expressed as observed, and will not be extrapolated or modeled to determine the total annual estimated take value. The observed takes have been reduced significantly from what is requested in Alternative 2.

Estimated and Observed Takes

Estimated takes were calculated using a GLM model for the following areas and species.

- Kemp's ridley sea turtles in large mesh gillnet gear in Management Units B, D1, D2, and E (Table 6).
- Green sea turtles in large mesh gillnet gear in Management Units B, D1 and E (Table 6).

Observed takes were calculated for areas and/or species where insufficient data exists to model an annual take estimate. This applies to the following species, areas and gear.

- Green sea turtles in large mesh gillnet gear in Management Unit D2 (Table 7).
- Loggerhead, leatherback and hawksbill sea turtles in large mesh gillnet gear in Management Units B, D1, D2 and E (Table 7).
- All species in small mesh gillnet gear in Management Units B, D1, D2 and E (Table 8).
- All species, both large and small mesh gillnet gear, in Management Units A and C (Table 9).

Table 6. Requested annual *estimated* takes in large mesh (≥4 inch stretched mesh) gillnets in *Revised Application, June 13, 2013*

Species	Area								Total Estimated Take	
	B		D1		D2		E			
	Estimated		Estimated		Estimated		Estimated		live	dead
	live	dead	live	dead	live	dead	live	dead		
Green	225	112	9	5	n/a*	n/a*	96	48	330	165
Kemp's Ridley	53	26	15	7	6	3	24	13	98	49
Total Estimated Take	**278**	**138**	**24**	**12**	**6**	**3**	**120**	**61**	**428**	**214**

* Insufficient observer data exist to model an estimated annual take level; therefore, for Management Unit D2, an annual observed take number has been identified and is found in Table 7.

Table 7. Requested annual *observed* (not estimated) takes in large mesh (≥4 inch stretched mesh) gillnets in *Revised Application, June 13, 2013*

Species	Area				Total Observed Take
	B	D1	D2	E	
	Observed (live/dead)	Observed (live/dead)	Observed (live/dead)	Observed (live/dead)	
Green	n/a**	n/a**	6	n/a**	6
Kemp's ridley	n/a**	n/a**	n/a**	n/a**	n/a**
Hawksbill	1	1	1	1	4
Leatherback	1	1	1	1	4
Loggerhead	3	3	3	3	12
Total Observed Take	**5**	**5**	**11**	**5**	**26**

** Sufficient observer data exist to model an estimated annual take level for sea turtles in Management Units B, D1, D2 and E. The annual estimated take number is found in Table 6.

Table 8. Requested annual *observed* (not estimated) takes in small mesh (<4 inch stretched mesh) gillnets in *Revised Application, June 13, 2013*

Species	Area				Total Observed Take
	B	D1	D2	E	
	Observed (live/dead)	Observed (live/dead)	Observed (live/dead)	Observed (live/dead)	
Green	3	3	3	3	12
Hawksbill	1	1	1	1	4
Kemp's Ridley	3	3	3	3	12
Leatherback	1	1	1	1	4
Loggerhead	3	3	3	3	12
Total Observed Take	**11**	**11**	**11**	**11**	**44**

Table 9. Requested annual *observed* (not estimated) takes in large mesh (≥4 inch stretched mesh) and small mesh (<4 inch stretched mesh) gillnets combined in *Revised Application, June 13, 2013*

Species	Area		Total Observed Take
	A	C	
	Observed (live/dead)	Observed (live/dead)	
Green, Hawksbill, Kemp's Ridley, Leatherback, Loggerhead	4 turtles of any species	4 turtles of any species	8
Total Observed Take	**4**	**4**	**8**

Table 10. Total annual requested take (estimated and observed) by species and condition in *Revised Application, June 13, 2013*

Species	**Observed live/dead**	**Estimated live**	**Estimated dead**
Green	18	330	165
Hawksbill	8	n/a*	n/a*
Kemp's Ridley	12	98	49
Leatherback	8	n/a*	n/a*
Loggerhead	24	n/a*	n/a*
Any Species	8	n/a*	n/a*
Total Annual Take	**78**	**428**	**214**

* Insufficient observer data exist to model an estimated annual take level; therefore, takes are expressed as observed.

3.0 Affected Environment

This section present baseline information necessary for consideration of the alternatives, and describes the resources that would be affected by the alternatives, as well as environmental components that would affect the alternatives if they were to be implemented. The effects of the alternatives on the environment are discussed in Section 4.

Physical Environment

The affected environment is described as all portions of the North Carolina internal coastal waters (inshore waters) that are open to commercial small mesh and large mesh gillnet fishing. The North Carolina inshore waters are separated from offshore waters by a chain of barrier islands that run along nearly the entire coast.

The North Carolina inshore waters include the following 6 management areas (also described in more detail above):

Management Unit A: This includes all of Albemarle, Currituck, Croatan, and Roanoke sounds as well as the contributing river systems in this area. Most of this area is currently defined as the Albemarle Sound Management Area (ASMA).

Management Unit B: This includes all of Pamlico Sound and the Northern portion of Core Sound, broken into 8 individual sections.

1. Shallow Water Gillnet Restricted Areas (SGNRA) 1: The area from Wainwright Island to Ocracoke Inlet.
2. SGNRA 2: The area from Ocracoke Inlet to Hatteras Inlet.
3. SGNRA 3: The area from Hatteras to Avon Channel.
4. SGNRA 4: The area from Avon Channel to Rodanthe.

5. Ocracoke Corridor (OC): The area in Ocracoke Inlet.
6. Hatteras Corridor (HC): The area in Hatteras Inlet.
7. Oregon Inlet Corridor (OIC): The area in Oregon Inlet.
8. Mainland Gillnet Restricted Area (MGNRA): The area on the mainland side of Pamlico Sound, from the shoreline of Hyde and Pamlico Counties out to 200 yards.

Management Unit C: This includes the Pamlico, Pungo, and Neuse river drainages west of 76° 30.00'W.

Management Unit D1: This includes Southern Core Sound, Back Sound, and North River.

Management Unit D2: This includes Newport River and Bogue Sound.

Management Unit E: This includes all estuarine waters south and west of the Highway 58 bridge to the North Carolina/South Carolina state line. This includes the Atlantic Intracoastal Waterway (ICW) and adjacent sounds and the New, Cape Fear, Lockwood Folly, White Oak, and Shallotte rivers.

Biological Environment - Status of Affected Species

<u>Endangered</u>	
Green turtle	*Chelonia mydas*[*]
Kemp's ridley turtle	*Lepidochelys kempii*
Hawksbill turtle	*Eretmochelys imbricata*
Leatherback turtle	*Dermochelys coriacea*
<u>Threatened</u>	
Loggerhead turtle	*Caretta caretta*

[*] *Green turtles in U.S. waters are listed as threatened except for the Florida breeding population, which is listed as endangered. Due to the inability to distinguish between these populations away from the nesting beach, green turtles are considered endangered wherever they occur in U.S. waters.*

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

Additional background information on the status of sea turtle species can be found in a number of published documents, including: recovery plans for the Atlantic green sea turtle (NMFS and USFWS 1991), hawksbill sea turtle (NMFS and USFWS 1993), Kemp's ridley sea turtle (NMFS and USFWS 1992b), leatherback sea turtle (NMFS and USFWS 1992a), and loggerhead sea turtle (NMFS and USFWS 2008a); Pacific sea turtle recovery plans (NMFS and USFWS 1998a; NMFS and USFWS 1998b; NMFS and USFWS 1998c; NMFS and USFWS 1998b); and sea

turtle five-year and status reviews, stock assessments, and biological reports (Conant et al. 2009; NMFS-SEFSC 2001; NMFS-SEFSC 2009; NMFS and USFWS 1995; NMFS and USFWS 2007a; NMFS and USFWS 2007b; NMFS and USFWS 2007c; NMFS and USFWS 2007d; NMFS and USFWS 2007e; NMFS and USFWS 2013; TEWG 1998; TEWG 2000a; TEWG 2007; TEWG 2009).

Green sea turtle

The green sea turtle was listed as threatened under the ESA on July 28, 1978, except for the Florida and Pacific coast of Mexico breeding populations, which were listed as endangered. On September 2, 1998, critical habitat for green sea turtles was designated in coastal waters surrounding Culebra Island, Puerto Rico (63 FR 46693).

Species Description and Distribution

The green sea turtle is the largest of the hardshell marine turtles, growing to a weight of 350 lbs. (159 kg) and a straight carapace length of greater than 3.3 ft. (1 m). Green sea turtles have a smooth carapace with four pairs of lateral (or costal) scutes and a single pair of elongated prefrontal scales between the eyes. They typically have a black dorsal surface and a white ventral surface, although the carapace of green sea turtles in the Atlantic Ocean has been known to change in color from solid black to a variety of shades of grey, green, 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 and USFWS 1997). The two largest nesting populations are found at Tortuguero, on the Caribbean coast of Costa Rica, 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. However, such mixing occurs at extremely low levels in Hawaiian foraging areas, perhaps making this central Pacific population the most isolated of all green sea turtle populations occurring worldwide (Dutton et al. 2008).

In U.S. Atlantic and Gulf of Mexico waters, green sea turtles are distributed in inshore and nearshore waters from Texas to Massachusetts. Principal benthic foraging areas in the southeastern United States include Aransas Bay, Matagorda Bay, Laguna Madre, and the Gulf inlets of Texas (Doughty 1984; Hildebrand 1982; Shaver 1994), the Gulf of Mexico off Florida from Yankeetown to Tarpon Springs (Caldwell and Carr 1957; Carr 1984), Florida Bay and the Florida Keys (Schroeder and Foley 1995), the Indian River Lagoon system in Florida (Ehrhart 1983), and the Atlantic Ocean off Florida from Brevard through Broward Counties (Guseman and Ehrhart 1992; Wershoven and Wershoven 1992). The summer developmental habitat for green 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 Yucatan Peninsula.

The complete nesting range of green sea turtles within the Southeastern United States includes sandy beaches between Texas and North Carolina, as well as the USVI and Puerto Rico (Dow et al. 2007; NMFS and USFWS 1991). However, the vast majority of green sea turtle nesting within the Southeastern United States occurs in Florida (Johnson and Ehrhart 1994; Meylan et al. 1995). Principal U.S. nesting areas for green sea turtles are in eastern Florida, predominantly Brevard through Broward counties. For more information on green sea turtle nesting in other ocean basins, refer to the 1991 Recovery Plan for the Atlantic Green Turtle (NMFS and USFWS 1991) or the 2007 Green Sea Turtle 5-Year Status Review (NMFS and USFWS 2007a).

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

After emerging from the nest, hatchlings swim to offshore areas and go through a 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 2007b). Green sea turtles exhibit particularly slow growth rates of about 1-5 centimeters per year (Green 1993; McDonald-Dutton and Dutton 1998), which may be attributed to their largely herbivorous, low-net energy diet (Bjorndal 1982). At approximately 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 and Ingle 1974). However, some populations are known to also feed heavily on invertebrates (Carballo et al. 2002). Green sea turtles reach sexual

maturity at 20-50 years of age (Chaloupka and Musick 1997; Hirth and USFWS 1997), which is considered one of the longest ages to maturity of any sea turtle species.

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, with some post-nesting turtles also residing in Bahamian waters as well (NMFS and USFWS 2007b).

Status and Population Dynamics
Population estimates for marine turtles do not exist because of the difficulty in sampling turtles over their geographic ranges and within their marine environments. However, researchers have used nesting data to study trends in reproducing sea turtles over time. A summary of nesting trends is provided in the most recent 5-year status review for the species (NMFS and USFWS 2007b) organized by ocean region (i.e., Western Atlantic Ocean, Central Atlantic Ocean, Eastern Atlantic Ocean, Mediterranean Sea, Western Indian Ocean, Northern Indian Ocean, Eastern Indian Ocean, Southeast Asia, Western Pacific Ocean, Central Pacific Ocean, and Eastern Pacific Ocean). Trends at 23 of the 46 nesting sites and found that 10 appeared to be increasing, 9 appeared to be stable, and 4 appeared to be decreasing. With respect to regional trends, the Pacific, the Western Atlantic, and the Central Atlantic regions appeared to show more positive trends (i.e., more nesting sites increasing than decreasing) while the Southeast Asia, Eastern Indian Ocean, and possibly the Mediterranean Sea regions appeared to show more negative trends (i.e., more nesting sites decreasing than increasing). These regional determinations should be viewed with caution since trend data was only available for about half of the total nesting concentration sites examined in the review and that site specific data availability appeared to vary across all regions.

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

status of the species in the Atlantic (NMFS and USFWS 2007a). More information about site specific trends for the other major ocean regions can be found in the most recent 5-year status review for the species (see NMFS and USFWS (2007a)).

By far, the largest known nesting assemblage in the Western Atlantic region occurs at Tortuguero, Costa Rica. According to monitoring data on nest counts, as well as documented emergences (both nesting and non-nesting events), there appears to be an increasing trend in this nesting assemblage since monitoring began in the early 1970s. For instance, from 1971-1975 there were approximately 41,250 average annual emergences documented and this number increased to an average of 72,200 emergences from 1992-1996 (Bjorndal et al. 1999). Troëng and Rankin (Troëng and Rankin 2005) collected nest counts from 1999-2003 and also reported increasing trends in the population consistent with the earlier studies, with nest count data suggesting 17,402-37,290 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 growing at 4.9 percent 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). More recently, green sea turtle nesting has occurred in North Carolina on Bald Head Island, just east of the mouth of the Cape Fear River, on Onslow Island, and on Cape Hatteras National Seashore. In 2010, a total of 18 nests were found in North Carolina, 6 nests in South Carolina, and 6 nests in Georgia (nesting databases maintained on www.seaturtle.org).

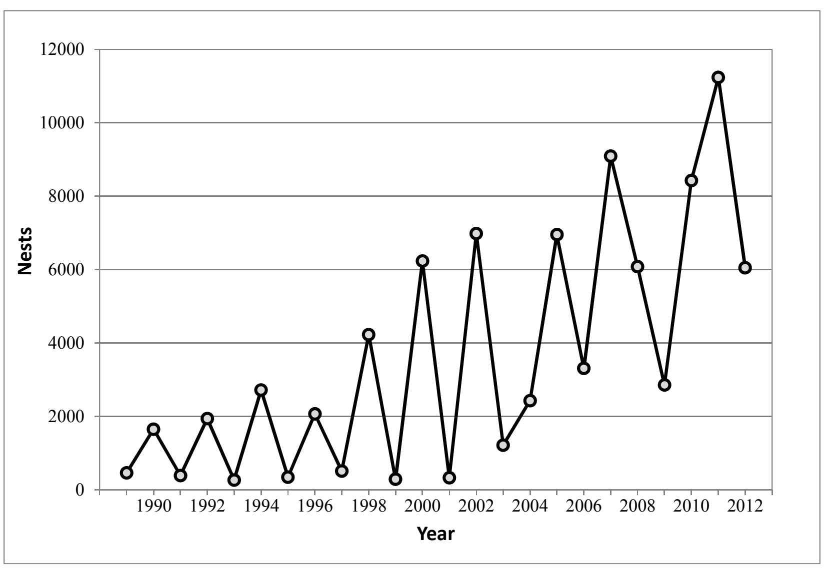

Figure 1. Green sea turtle nesting at Florida index beaches since 1989.

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

ten years of regular monitoring (Figure 1). According to data collected from Florida's index nesting beach survey from 1989-2012, green sea turtle nest counts across Florida have increased approximately tenfold from a low of 267 in the early 1990s to a high of 10,701 in 2011. Two consecutive years of nesting declines in 2008 and 2009 caused some concern, but this was followed by increases in both 2010 and 2011 (Figure 1). Modeling by Chaloupka et al. (2008) using data sets of 25 years or more reported an estimate of the green turtle nesting assemblage at the Archie Carr National Wildlife Refuge growing at an annual rate of 13.9 percent.

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 in some areas. Green sea turtles also face many of the same threats as other sea turtle species, including ecosystem alterations (e.g., nesting beach development, beach nourishment and shoreline stabilization, vegetation changes, etc.), cold-stunning, pollution (e.g., plastics, petroleum products, petrochemicals, etc.), poaching, global climate change, fisheries bycatch and disease. A discussion on general sea turtle threats can be found in the Cumulative Effects section of this EA.

In addition to general threats, green sea turtles are susceptible to 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 0.1 cm to greater than 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)]. Presently, FP is cosmopolitan, but 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 8°-10°C, turtles may lose their ability to swim and dive, often floating to the surface. The rate of cooling that precipitates cold-stunning appears to be the primary threat, rather than the water temperature itself (Milton and Lutz 2003). Sea turtles that overwinter in inshore waters are most susceptible to cold-stunning because temperature changes are most rapid in shallow water (Witherington and Ehrhart 1989). During January 2010, an unusually large cold-stunning event in the southeastern United States resulted in around 4,600 sea turtles, mostly greens, found cold-stunned, with hundreds found dead or dying. A large cold-stunning event occurred in the western Gulf of Mexico in February 2011, resulting in approximately 1,650 green sea turtles being found cold-stunned in Texas. Of these, approximately 620 were found dead or died after stranding, and approximately 1,030 were rehabilitated and released. Additionally, 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.

Hawksbill sea turtle
The hawksbill sea turtle was listed as endangered throughout its entire range on June 2, 1970 (35 FR 8491) under the Endangered Species Conservation Act of 1969, a precursor to the ESA. On June 24, 1982, USFWS designated critical habitat for hawksbill sea turtles in the terrestrial environment and nearshore waters of Isla Mona, Culebra Island, Cayo Norte and Island Culebrita, Puerto Rico (47 FR 27295). On September 2, 1998, NMFS designated critical habitat for hawksbill sea turtles in the coastal waters of Mona and Monito Islands, Puerto Rico (63 FR 46693).

Species Description and Distribution
The hawksbill sea turtle was listed as endangered throughout its entire range on June 2, 1970 (35 FR 8491) under the Endangered Species Conservation Act of 1969, a precursor to the ESA. Hawksbill sea turtles are small to medium-sized (99 to 150 lbs. on average [45 to 68 kg]) although nesting females are known to weigh up to 176 lbs. (80 kgs) in the Caribbean (Pritchard et al. 1983). The carapace is usually serrated and has a "tortoise-shell" coloring, ranging from dark to golden brown, with streaks of orange, red, and/or black. The plastron of a hawksbill turtle is typically yellow. The head is elongated and tapers to a point, with a beak-like mouth that gives the species its name. The shape of the mouth allows the hawksbill turtle to reach into holes and crevices of coral reefs to find sponges, their primary food source as adults, and other invertebrates. The shells of hatchlings are 1.7 in (42 mm) long, are mostly brown, and somewhat heart-shaped (Eckert 1995; Hillis and Mackay 1989; Van Dam and Sarti 1989).

Hawksbill sea turtles have a circumtropical distribution and usually occur between latitudes 30°N and 30°S in the Atlantic, Pacific, and Indian Oceans. In the western Atlantic, hawksbills are widely distributed throughout the Caribbean Sea, off the coasts of Florida and Texas in the continental United States, in the Greater and Lesser Antilles, and along the mainland of Central America south to Brazil (Amos 1989; Groombridge and Luxmoore 1989; Lund 1985; Meylan and Donnelly 1999; NMFS and USFWS 1998b; Plotkin and Amos 1988; Plotkin and Amos 1990). They are highly migratory and use a wide range of habitats during their lifetimes (Musick and Limpus 1997; Plotkin 2003). Adult hawksbill sea turtles are capable of migrating long distances between nesting beaches and foraging areas. For instance, a female hawksbill sea turtle tagged at Buck Island Reef National Monument (BIRNM) was later identified 1,160 miles (1,866 km) away in the Miskito Cays in Nicaragua (Spotila 2004).

Hawksbill sea turtles nest on sandy beaches throughout the tropics and subtropics. Nesting occurs in at least 70 countries, although much of it now only occurs at low densities compared to other sea turtle species (NMFS and USFWS 2007b). (Meylan and Donnelly 1999) believe that the widely dispersed nesting areas and low nest densities is likely a result of overexploitation of previously large colonies that have since been depleted over time. The most significant nesting within the United States occurs in Puerto Rico and the U.S. Virgin Islands, specifically on Mona Island and BIRNM, respectively. Although nesting within the continental United States is typically rare, it can also occur along the southeast coast of Florida and the Florida Keys. The largest hawksbill nesting population in the Western Atlantic occurs in the Yucatán Península of Mexico, where several thousand nests are recorded annually in the states of Campeche, Yucatán, and Quintana Roo (Garduno-Andrade et al. 1999; Spotila 2004). In the U.S. Pacific, hawksbills nest on main island beaches in Hawaii, primarily along the east coast of the island. Hawksbill

nesting has also been documented in American Samoa and Guam. More information on nesting in other ocean basins may be found in the 5-year status review for the species (NMFS and USFWS 2007b).

Mitochondrial DNA studies show that reproductive populations are effectively isolated over ecological time scales (Bass et al. 1996). Substantial efforts have been made to determine the nesting population origins of hawksbill sea turtles assembled in foraging grounds, and genetic research has shown that hawksbills of multiple nesting origins commonly mix in foraging areas (Bowen et al. 1996). Since hawksbill sea turtles nest primarily on the beaches where they were born, if a nesting population is wiped out it might not be replenished by sea turtles from other nesting rookeries (Bass et al. 1996).

Life History Information
Hawksbill sea turtles exhibit slow growth rates although they are known to vary within and among populations from a low of 0.4-1.2 in (1-3 cm) per year measured in the Indo-Pacific (Chaloupka and Limpus 1997; Mortimer et al. 2003; Mortimer et al. 2002; Whiting 2000) to a high of 2 in (5 cm) or more per year measured at some sites in the Caribbean (Díez and Dam 2002; León and Díez 1999). Differences in growth rates are likely due to differences in diet and/or density of sea turtles at foraging sites and overall time spent foraging (Bjorndal et al. 2000; Chaloupka et al. 2004). Consistent with slow growth, age to maturity for the species is also long, taking between 20 and 40 years depending on the region (Chaloupka and Musick 1997; Limpus and Miller 2000). Hawksbills in the western Atlantic are known to mature faster (i.e. 20 or more years) than sea turtles found in the Indo-Pacific (i.e. 30-40 years) (Boulan 1983; Boulon 1994; Díez and Dam 2002; Limpus and Miller 2000). Males are typically mature when their length reaches 27 in (69 cm) while females are typically mature at 30 in (75 cm) (Eckert et al. 1992; Limpus 1992). Female hawksbills return to their natal (site of their birth) beaches every 2-3 years to nest (Van Dam et al. 1991; Witzell 1983) and generally lay 3-5 nests per season (Richardson et al. 1999). Compared with other sea turtles, the number of eggs per nest (clutch) for hawksbills can be quite high. The largest clutches recorded for any sea turtle belong to hawksbills (approximately 250 eggs per nest) (Hirth and Abdel Latif 1980), though nests in the U.S. Caribbean and Florida more typically contain approximately 140 eggs (USFWS hawksbill fact sheet, http://www.fws.gov/northflorida/SeaTurtles/Turtle%20Factsheets/hawksbill-sea-turtle.htm). Eggs incubate for approximately 60 days before hatching (USFWS hawksbill fact sheet).

Hawksbills may undertake developmental migrations (migrations as immatures) and reproductive migrations that involve travel over many tens to thousands of miles (Meylan 1999a). Post-hatchlings (oceanic stage juveniles) are believed to live in the open ocean, taking shelter in floating algal mats and drift lines of flotsam and jetsam in the Atlantic and Pacific oceans (Musick and Limpus 1997) before returning to more coastal foraging grounds. In the Caribbean, hawksbills are known to almost exclusively feed on sponges (Meylan 1988; van Dam and Díez 1997) although at times they have been seen foraging on other food items, notably corallimorphs and zooanthids (León and Díez 2000; Mayor et al. 1998; van Dam and Díez 1997).

Reproductive females undertake periodic (usually non-annual) migrations to their natal beach to nest and exhibit a high degree of fidelity to their nest sites. Movements of reproductive males are less certain, but are presumed to involve migrations to nesting beaches or to courtship stations along the migratory corridor. Hawksbills show a high fidelity to their foraging areas as well (van Dam and Díez 1998). Foraging sites are typically areas associated with coral reefs although hawksbills are also found around rocky outcrops and high energy shoals which are optimum sites for sponge growth. They can also inhabit seagrass pastures in mangrove-fringed bays and estuaries, particularly along the eastern shore of continents where coral reefs are absent (Bjorndal 1997; van Dam and Díez 1998).

Status and Population Dynamics
There are currently no reliable estimates of population abundance and trends for non-nesting hawksbills at the time of this consultation; therefore, nesting beach data is currently the primary information source for evaluating trends in global abundance. Most hawksbill populations around the globe are either declining, depleted, and/or remnants of larger aggregations (NMFS and USFWS 2007b). The largest nesting population of hawksbills occurs in Australia where approximately 2,000 hawksbills nest off the northwest coast and about 6,000 to 8,000 nest off the Great Barrier Reef each year (Spotila 2004). Additionally, about 2,000 hawksbills nest each year in Indonesia and 1,000 nest in the Republic of Seychelles (Spotila 2004). In the United States, about 500-1,000 hawksbill nests were typically laid on Mona Island, Puerto Rico in the past (Diez and van Dam 2007), but the numbers appear to be increasing, as nearly 1,600 nests were counted by Puerto Rico Department of Natural and Environmental Resources in 2010 (PRDNER nesting data). Another 56-150 nests are typically laid on Buck Island off St. Croix (Meylan 1999b; Mortimer and Donnelly 2008). Nesting also occurs to a lesser extent on beaches on Culebra Island and Vieques Island in Puerto Rico, the mainland of Puerto Rico, and additional beaches on St. Croix, St. John, and St. Thomas.

Mortimer and Donnelly (2008) reviewed nesting data for 83 nesting concentrations organized among 10 different ocean regions (i.e. Insular Caribbean, Western Caribbean Mainland, Southwestern Atlantic Ocean, Eastern Atlantic Ocean, Southwestern Indian Ocean, Northwestern Indian Ocean, Central Indian Ocean, Eastern Indian Ocean, Western Pacific Ocean, Central Pacific Ocean, and Eastern Pacific Ocean). Historic trends (i.e., 20-100 years ago) were determined for 58 of the 83 sites while recent abundance trends (i.e., within the past 20 years) were also determined for 42 of the 83 sites. Among the 58 sites where historic trends could be determined, all showed a declining trend during the long term period. Among the 42 sites where recent trend data were available, 10 appeared to be increasing, 3 appeared to be stable, and 29 appeared to be decreasing. With respect to regional trends, nesting populations in the Atlantic (especially in the Insular Caribbean and Western Caribbean Mainland) are generally doing better than those in the Indo-Pacific regions. For instance, 9 of the 10 sites that showed recent increases are located in the Caribbean. Buck Island and St. Croix's East End beaches support two remnant populations of between 17-30 nesting females per season (Hillis and Mackay 1989; Mackay 2006). While the proportion of hawksbills nesting on Buck Island represents a small proportion of the total hawksbill nesting occurring in the greater Caribbean region, Mortimer and Donnelly (2008) report an increasing trend in nesting at that site based on data collected from 2001-2006. This increase is likely due to the conservation measures implemented when BIRNM was expanded in 2001.

Nesting concentrations in the Pacific Ocean appear to be performing the worst of all regions despite the fact that the region currently supports more nesting hawksbills than either the Atlantic or Indian Oceans (Mortimer and Donnelly 2008). However, while still critically low in numbers, sightings of hawksbills in the eastern Pacific appear to have been increasing since 2007, though some of that increase may be attributable to better observations (Gaos et al. 2010). More information about site specific trends can be found in the most recent five year status review for the species [see (NMFS and USFWS 2007b)].

Threats

Hawksbills are currently subjected to the same suite of threats on both nesting beaches and in the marine environment that affect other sea turtles (e.g. interaction with fisheries, coastal construction, oil spills, climate change affecting sex ratios, etc.) as discussed in Cumulative Effects section of this EA. There are also specific threats that are of special emphasis, or are unique, for hawksbill sea turtles discussed in further detail below.

The historical decline of the species is primarily attributed to centuries of exploitation for the beautifully patterned shell, which made it a highly attractive species to target (Parsons 1972). The fact that reproductive females exhibit a high fidelity for nest sites and the tendency of hawksbills to nest at regular intervals within a season made them an easy target for capture on nesting beaches. The shells from hundreds of thousands of sea turtles in the western Caribbean region were imported into the United Kingdom and France during the 19th and early 20th centuries (Parsons 1972) and additional hundreds of thousands of sea turtles contributed to the region's trade with Japan prior to 1993 when a zero quota was imposed [(Milliken and Tokunaga 1987) as cited in (Brautigram and Eckert 2006)].

The continuing demand for the hawksbill's shell, as well as other products (leather, oil, perfume, and cosmetics), represents an ongoing threat to recovery of the species. The British Virgin Islands, Cayman Islands, , Haiti, and the Turks and Caicos Islands (U.K.) all permit some form of legal take of hawksbill sea turtles. In the northern Caribbean, hawksbills continue to be illegally harvested for their shells, which are often carved into hair clips, combs, jewelry, and other trinkets (Márquez M 1990; Stapleton and Stapleton 2006). Additionally, hawksbills are harvested for their eggs and meat while whole, stuffed sea turtles are sold as curios in the tourist trade. Also, hawksbill sea turtle products are openly available in the Dominican Republic and Jamaica despite a prohibition on harvesting hawksbills and their eggs (Fleming 2001). International trade in the shell of this species is prohibited between countries that have signed the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), but illegal trade is still occurring and remains an ongoing threat to hawksbill survival and recovery throughout its range.

Due to their preference to feed on sponges associated with coral reefs, hawksbill sea turtles are particularly sensitive to losses of coral reef communities. Coral reefs are vulnerable to destruction and degradation caused by human activities (e.g., nutrient pollution, sedimentation, contaminant spills, vessel groundings and anchoring, recreational uses, etc.) and are also highly sensitive to the effects of climate change (e.g., higher incidences of disease and coral bleaching) (Crabbe 2008; Wilkinson 2004). Continued loss of coral reef communities (especially in the

greater Caribbean region) is expected to impact foraging and represents a major threat to the recovery of the species.

Kemp's ridley sea turtle
The Kemp's ridley sea turtle was listed as endangered on December 2, 1970, under the Endangered Species Conservation Act of 1969, a precursor to the ESA. Critical habitat has not been designated for Kemp's ridley sea turtles.

Species Description
The Kemp's ridley sea turtle is the smallest of all sea turtles. Hatchlings generally range from 1.65-1.89 in (42-48 mm) in straight-line carapace length (SCL), 1.26-1.73 in (32-44 mm) in width, and 0.3-0.4 lbs. (15-20 g) in weight. Adults generally weigh less than 100 lbs. (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 four 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, with substantial numbers also inhabiting 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 nesting records range from Mustang Island, Texas, in the north, to Veracruz, Mexico, in the south. As the population has grown, a few Kemp's ridley nests have been discovered along the Atlantic Coast of the United States, with a few nests recorded from beaches in Florida, Georgia, and the Carolinas. In 2012, the first Kemp's ridley sea turtle nest was recorded in Virginia.

Life History Information
Kemp's ridleys share a general life history pattern similar to other sea turtles. Females lay their eggs on coastal beaches where the eggs incubate in sandy nests. After 45-58 days of embryonic development, the hatchlings emerge and swim offshore into deeper, ocean water where they feed and grow until recruiting to neritic waters at or near 20cm in carapace length. The 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).

Growth rates generally fall within 5.5-7.5 $\pm$ 6.2 cm/year (Schmid and Barichivich 2006; Schmid and Woodhead 2000). Estimates of age to sexual maturity range from 5-16 years; NMFS et al. (2011) determined the best estimate of age to maturity for Kemp's ridley sea turtles was 12

years. It is unlikely that most adults grow very much after maturity. While some sea turtles nest annually, the weighted mean remigration rate for Kemp's ridley sea turtles is approximately two 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

Most of the population nests 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). Since then, nesting began to gradually increase through the 1990s, and then accelerated during the first decade of the 21st century (Figure 2).From 1978 to 1988, 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 percent of all recorded Kemp's ridley nests in Mexico. Kemp's ridley nests in Mexico reached a record high of 21,797 in 2012 (Gladys Porter Zoo nesting database 2013). Small numbers of Kemp's ridleys also nest in Texas, and the number of nests laid in Texas has risen similarly to the gradual increase in nests at the primary nesting beaches in Mexico. A record high of 209 nests were recorded in Texas in 2012 (National Park Service data http://www.nps.gov/pais/naturescience/strp.htm, http://www.nps.gov/pais/naturescience/current-season.htm).

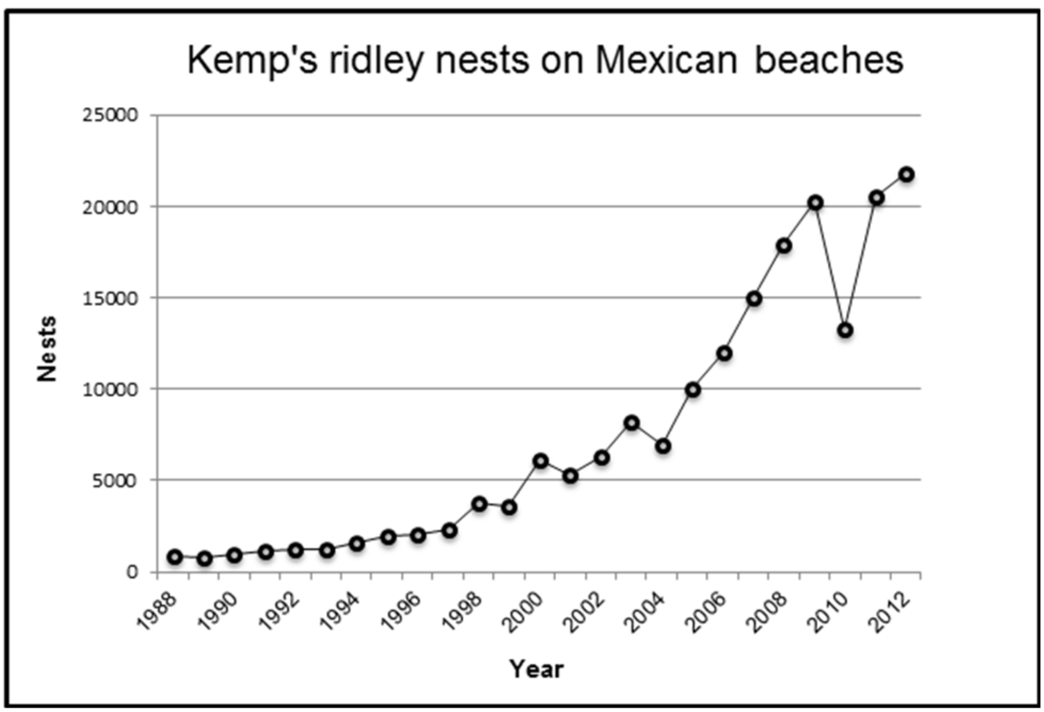

Figure 2. Kemp's ridley nest totals from Mexican beaches (Gladys Porter Zoo nesting database 2013).

The increases in Kemp's ridley sea turtle nesting over the last two decades is likely due to the implementation of TEDs in the U.S. and Mexico and the near complete nest and nesting female protection at the main nesting beaches. 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.

Threats
Kemp's ridleys face many of the same threats as other sea turtle species, including fisheries bycatch, , 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.), and global climate change, A discussion on general sea turtle threats can be found in the Cumulative Effects section of this EA; 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.

Over the past three 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 three weeks of June 2010, over 120 sea turtle strandings were reported from Mississippi and Alabama waters, none of which exhibited any signs of external oiling to indicate effects associated with the DWH oil spill event. A total of 644 sea turtle strandings were reported in 2010 from Louisiana, Mississippi, and Alabama waters, 561 (87 percent) of which were Kemp's ridley sea turtles. During March through May of 2011, 267 sea turtle strandings were reported from Mississippi and Alabama waters alone. A total of 525 sea turtle strandings were reported in 2011 from Louisiana, Mississippi, and Alabama waters, with the majority (455) occurring from March through July, 390 (86 percent) of which were Kemp's ridley sea turtles. During 2012, a total of 428 sea turtles were reported from Louisiana, Mississippi, and Alabama waters, though the data is incomplete. Of these reported strandings, 301 (70 percent) were Kemp's ridley sea turtles. These stranding numbers are significantly greater than reported in past years; Louisiana, Mississippi, and Alabama waters reported 42 and 73 sea turtle strandings for 2008 and 2009, respectively; however, it should be noted that stranding coverage has increased considerably since the DWH oil spill in 2010. Nonetheless, considering that strandings typically represent only a small fraction of actual mortality, these mortalities represent a serious impediment to the recovery and survival of the species. 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, 2012). Given the nesting trends and habitat use 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.

Leatherback sea turtle

The leatherback sea turtle was listed as endangered throughout its entire range on June 2, 1970 (35 FR 8491) under the Endangered Species Conservation Act of 1969. On September 26, 1978,

USFWS designated critical habitat for leatherback sea turtles in the terrestrial environment of Sandy Point, St. Croix, U.S. V.I. (43 FR 43688). On March 23, 1979, NMFS designated critical habitat for leatherback sea turtles in the waters adjacent to Sandy Point, St. Croix, U.S.V.I. from the 183 m isobath to mean high tide level between 17° 42'12" N and 65°50'00" W (44 FR 17710). Then on January 26, 2012, NMFS revised the critical habitat designation for leatherback sea turtles to include coastal and open water areas along the U.S. West Coast (77 FR 4170).

Species Description and Distribution
The leatherback is the largest sea turtle in the world, with a curved carapace length (CCL) often exceeding 5 ft. (150 cm) and front flippers that can span almost 9 ft. (270 cm) (NMFS and USFWS 1998b). Mature males and females can reach lengths of over 6 ft. (2 m) and weigh close to 2,000 lbs. (900 kg). Leatherbacks do not have an outer bony shell. A leatherback's shell is approximately 1.5 inches (4 cm) thick and consists of a leathery, oil-saturated connective tissue overlaying loosely interlocking dermal bones. The ridged shell and large flippers help the leatherback during long-distance trips in search of food.

Leatherbacks are circumglobally distributed and are found in tropical, subtropical, and temperate waters. Leatherbacks have several unique traits that enable them to live in cold water, unlike other sea turtles. For example, leatherbacks have a countercurrent circulatory system (Greer et al. 1973),[2] a thick layer of insulating fat (Davenport et al. 1990; Goff and Lien 1988), gigantothermy (Paladino et al. 1990),[3] and they can increase their body temperature through increased metabolic activity (Bostrom and Jones 2007; Southwood et al. 2005). In the Atlantic Ocean, leatherbacks have been recorded as far north as Newfoundland, Canada, and Norway, and as far south as Uruguay, Argentina, and South Africa (NMFS-SEFSC 2001). Leatherbacks have pointed tooth-like cusps and sharp-edged jaws that are adapted for a diet of soft-bodied prey, such as jellyfish and salps. A leatherback's mouth and throat also have backward-pointing spines that help retain jelly-like prey. Primary prey (e.g., medusae, siphonophores, and salps), occur commonly in temperate and boreal latitudes and prey distribution likely has a strong influence on leatherback distribution in these areas (Plotkin 1995). Leatherbacks are known to be deep divers, with recorded depths in excess of a half mile (Eckert et al. 1989), but the species also regularly inhabits shallow waters to locate prey items.

Genetic analyses using microsatellite markers along with mitochondrial DNA and tagging data indicate there are seven groups or breeding populations in the Atlantic Ocean: Florida, Northern Caribbean, Western Caribbean, Southern Caribbean/Guianas, West Africa, South Africa, and Brazil (TEWG 2007). General differences in migration patterns and foraging grounds may occur between the seven nesting assemblages, although data to support this is limited in most cases.

Life History Information

[2] Countercurrent circulation is a highly efficient means of minimizing heat loss through the skin's surface because heat is recycled. For example, a countercurrent circulation system often has an artery containing warm blood from the heart surrounded by a bundle of veins containing cool blood from the body surface. As the warm blood flows away from the heart it passes much of its heat to the colder blood returning to the heart via the veins. This conserves heat by recirculating it back to the body core

[3] "Gigantothermy" refers to a condition when an animal has relatively high volume compared to its surface area, and as a result, it losses less heat.

Leatherback life history follows the same general patterns as do all sea turtles – long-lived, late—maturing, with low annual survival during the early life stages and high annual survival in the latter life stages. While a robust estimate of the leatherback sea turtle's life span does not exist, the current best estimate for the maximum age is approximately 43 (Avens et al. 2009). Using skeletochronological data, Avens et al. (2009) estimated that leatherbacks in the western North Atlantic may not reach maturity until 29 years of age, which is longer than earlier estimates by Pritchard and Trebbau (1984): 2-3 years; Rhodin (1985): 3-6 years; Zug and Parham (1996): 13-14 years for females; and Dutton et al. (2005): 12-14 years for leatherbacks nesting in the U.S. Virgin Islands).

The average size of reproductively active females in the Atlantic is generally 5-5.5 ft. (150-162 cm) CCL (Benson et al. 2007a; Hirth et al. 1993; Starbird and Suarez 1994). However, females as small as 3.5-4 ft. (105-125 cm) CCL have been observed nesting at various sites (Stewart et al. 2007).

Female leatherbacks typically nest on sandy, tropical beaches at intervals of 2 to 4 years (Garcia M. and Sarti 2000; McDonald and Dutton 1996; Spotila et al. 2000). Females usually lay up to 10 nests during the 3-6 month nesting season (March through July in the United States), typically 8 to 12 days apart, with 100 eggs or more per nest (Eckert et al. 2012; Eckert et al. 1989; Maharaj 2004; Matos ; Stewart and Johnson 2006; Tucker 1988). Individual female leatherbacks have been observed to reproduce as long as 25 years (Hughes 1996), D. Dutton, Ocean Planet Research, Inc., August 2009, pers. comm., in NMFS 2012). Apparently unique to leatherbacks, up to approximately 30 percent of the eggs within a clutch may be infertile (Eckert et al. 1989; Maharaj 2004; Matos ; Stewart and Johnson 2006; Tucker 1988). Hatchling emergence success is approximately 50 percent worldwide (Eckert et al. 2012) but is between 54-72 percent in the United States (Eckert and Eckert 1990; Stewart and Johnson 2006; Tucker 1988). Eggs hatch after 60-65 days, and the hatchlings have white striping along the ridges of their backs and on the edges of the flippers. Leatherback hatchlings are approximately 20-30 inches (50-77 cm) in length, with fore flippers as long as their bodies, and weigh approximately 1.5-2 ounces (40-50 g). Unlike other sea turtle species, female leatherbacks do not always nest at the same beach year after year, some females may even nest at different beaches during the same year (Dutton et al. 2005; Eckert et al. 1989; Keinath and Musick 1993; Steyermark et al. 1996).

In the Atlantic Basin, the sex ratio appears to be skewed toward females. TEWG (2007) reports that stranding data from the U.S. Atlantic and Gulf of Mexico indicate that 60 percent of strandings were females. Those data also show that the proportion of females among adults (57 percent) and juveniles (61 percent) was also skewed toward females in these areas (TEWG 2007). James et al. (2007) collected size and sex data from large sub-adult and adult leatherbacks off Nova Scotia and also concluded a bias toward females at a rate of 1.86:1.

The survival and mortality rates for leatherbacks are difficult to estimate and vary by location. For example, the annual mortality rate for leatherbacks that nested at Playa Grande, Costa Rica, was estimated to be 34.6 percent in 1993-1994 and 34.0 percent in 1994-1995 (Spotila et al. 2000). In contrast leatherbacks nesting in French Guiana and St. Croix had estimated annual survival rates of 91 percent (Rivalan et al. 2005) and 89 percent (Dutton et al. 2005), respectively. For the St. Croix population, the average annual juvenile survival rate was

estimated to be approximately 63 percent, and the total survival rate from hatchling to first year of reproduction for a female was estimated to be between 0.4 and 2 percent [assuming age at first reproduction is between 9 and 13 years (Eguchi et al. 2006)]. Spotila et al. (1996a) estimated first year survival rates for leatherbacks at 6.25 percent.

Migratory routes of leatherbacks are not entirely known. However, recent information from satellite tags have documented long travels between nesting beaches and foraging areas in the Atlantic and Pacific Ocean basins (Benson et al. 2007a; Benson et al. 2011; Eckert 2006a; Eckert et al. 2006; Ferraroli et al. 2004; Hays et al. 2004; James et al. 2005). Leatherbacks nesting in Central America and Mexico travel thousands of miles into tropical and temperate waters of the South Pacific (Eckert and Sarti 1997; Shillinger et al. 2008). Data from satellite tagged leatherbacks suggest that they may be traveling in search of seasonal aggregations of jellyfish (Benson et al. 2007b; Bowlby et al. 1994; Graham 2009; Shenker 1984; Starbird et al. 1993; Suchman and Brodeur 2005).

Status and Population Dynamics

The status of the Atlantic leatherback population has been less clear than the Pacific population, which has shown dramatic declines at many nesting sites (Santidrián-Tomillo et al. 2007; Sarti Martínez et al. 2007; Spotila et al. 2000). This uncertainty has been a result of inconsistent beach and aerial surveys, cycles of erosion and reformation of nesting beaches in the Guianas (representing the largest nesting area). Leatherbacks also show a lesser degree of nest-site fidelity than occurs with the hardshell sea turtle species. However, coordinated efforts of data collection and analyses by the Leatherback Turtle Expert Working Group have helped to clarify the understanding of the Atlantic population status (TEWG 2007).

The Southern Caribbean/Guianas stock is the largest known Atlantic leatherback nesting aggregation (TEWG 2007). This area includes the Guianas (Guyana, Suriname, and French Guiana), Trinidad, Dominica, and Venezuela, with most of the nesting occurring in the Guianas and Trinidad. The Southern Caribbean/Guianas stock of leatherbacks was designated after genetics studies indicated that animals from the Guianas (and possibly Trinidad) should be viewed as one population. Using nesting females as a proxy for population, the TEWG (2007) determined that the Southern Caribbean/Guianas stock had demonstrated a long-term, positive population growth rate. This positive growth was seen within major nesting areas for the stock, including Trinidad, Guyana, and the combined beaches of Suriname and French Guiana (TEWG 2007).

Researchers believe the cyclical pattern of beach erosion and then reformation has affected leatherback nesting patterns in the Guianas. For example, between 1979 and 1986 the number of leatherback nests in French Guiana had increased by about 15 percent annually(NMFS-SEFSC 2001). This was then followed by a nesting decline of about 15 percent annually. This decline corresponded with the erosion of beaches in French Guiana and increased nesting in Suriname. This pattern suggests that the declines observed since 1987 might actually be a part of a nesting cycle that coincides with cyclic beach erosion in Guiana (Schultz 1975). Researchers think that the cycle of erosion and reformation of beaches may have changed where leatherbacks nest throughout this region. The idea of shifting nesting beach locations was supported by increased

nesting in Suriname.[4] These increases were happening at the same time the number of nests was declining at beaches that had previously shown large increases in nesting (Hilterman et al. 2003) thought this information suggested the long-term trend for the overall Suriname and French Guiana population was increasing.

The Western Caribbean stock includes nesting beaches from Honduras to Colombia. Across the Western Caribbean, nesting here is most prevalent in Costa Rica, Panama, and the Gulf of Uraba in Colombia (Duque et al. 2000). The Caribbean coast of Costa Rica and extending through Chiriquí Beach, Panama, represents the fourth largest known leatherback rookery in the world (Troëng et al. 2004). Examination of data from index nesting beaches in Tortuguero, Gandoca, and Pacuaré in Costa Rica indicate that the nesting population likely was not growing over the 1995-2005 time series (TEWG 2007). Other modeling of the nesting data for Tortuguero indicates a possible 67.8 percent decline between 1995 and 2006 (Troëng et al. 2007).

Nesting data for the Northern Caribbean stock is available from Puerto Rico, St. Croix (USVI), and the British Virgin Islands (Tortola). In Puerto Rico, the primary nesting beaches are at Fajardo and on the island of Culebra. Nesting between 1978 and 2005 has ranged between 469-882 nests, and the population has been growing since 1978, with an overall annual growth rate of 1.1 percent (TEWG 2007). At the primary nesting beach on St. Croix, the Sandy Point National Wildlife Refuge, nesting has varied from a few hundred nests to a high of 1,008 in 2001, and the average annual growth rate has been approximately 1.1 percent from 1986-2004 (TEWG 2007). Nesting in Tortola is limited, but has been increasing from 0-6 nests per year in the late 1980s to 35-65 per year in the 2000s, with an annual growth rate of approximately 1.2 percent between 1994 and 2004 (TEWG 2007).

The Florida nesting stock nests primarily along the east coast of Florida. This stock is of growing importance, with total nests between 800-900 per year in the 2000s following nesting totals fewer than 100 nests per year in the 1980s (Florida Fish and Wildlife Conservation Commission, unpublished data). Using data from the index nesting beach surveys, the TEWG (TEWG 2007) estimated a significant annual nesting growth rate of 1.17 percent between 1989 and 2005. FWC Index Nesting Beach Survey Data indicates biennial peaks in nesting abundance beginning in 2007 (Figure 3 and Table 11). This up-and-down pattern is thought to be a result of the cyclical nature of leatherback nesting, similar to the biennial cycle of green turtle nesting. Overall, the trend shows growth on Florida's east coast beaches.

Table 11 Number of Leatherback Sea Turtle Nests in Florida

Nests Recorded	2007	2008	2009	2010	2011	2012
Index Nesting Beaches	517	265	615	552	625	515
Statewide	1,442	728	1,747	1,334	1,652	1,712

The West African nesting stock of leatherbacks is large and important, but is a mostly unstudied aggregation. Nesting occurs in various countries along Africa's Atlantic coast, but much of the

[4] Leatherback nesting in Suriname increased by more than 10,000 nests per year since 1999 and a peak of 30,000 nests in 2001.

nesting is undocumented and the data are inconsistent. Gabon has a very large amount of leatherback nesting, with at least 30,000 nests laid along its coast in one season (Fretey et al. 2007). Fretey et al. (2007) also provide detailed information about other known nesting beaches and survey efforts along the Atlantic African coast. Because of the lack of consistent effort and minimal available data, trend analyses were not possible for this stock (TEWG 2007).

Two other small but growing stocks nest on the beaches of Brazil and South Africa. Based on the data available, TEWG (2007) determined that between 1988 and 2003 there was a positive annual average growth rate between 1.07 and 1.08 percent for the Brazilian stock. TEWG (2007) estimated an annual average growth rate between 1.04 and 1.06 percent for the South African stock.

Because the available nesting information is inconsistent it is difficult to estimate the total population size for Atlantic leatherbacks. Spotila et al. (1996b) characterized the entire Western Atlantic population as stable at best. They estimated the numbers of nesting females was likely around 18,800 (Spotila et al. 1996b). A subsequent analysis by Spotila (pers. comm.) indicated that by 2000, the Western Atlantic nesting levels had decreased to about 15,000 females. Spotila et al. (1996b) estimated that the adult female leatherback population for the entire Atlantic basin, including all nesting beaches in the Americas, the Caribbean, and West Africa, was about 27,600 (considering both nesting and interesting females), with an estimated range of 20,082-35,133. This is consistent with the estimate of 34,000-95,000 total adults (20,000-56,000 adult females; 10,000-21,000 nesting females) determined by the TEWG (2007).

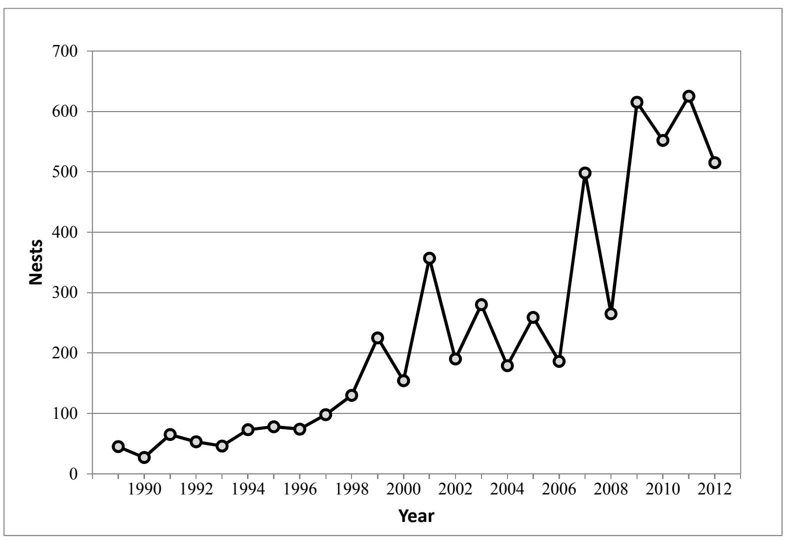

Figure 3 Leatherback sea turtle nesting at Florida index beaches since 1989.

Threats

Leatherbacks face many of the same threats as other sea turtle species including, fisheries bycatch, ecosystem alterations (nesting beach development, beach nourishment and shoreline stabilization, vegetation changes, etc.), poaching, global climate change, A discussion on general sea turtle threats can be found in the Cumulative Effects section of this EA, the remainder of this section will expand on a few of the aforementioned threats and how they may specifically impact leatherback sea turtles.

Of all sea turtle species, leatherbacks seem to be the most vulnerable to entanglement in fishing gear, especially gillnet and pot/trap lines. This may be because of their body type (large size, long pectoral flippers, and lack of a hard shell) and/or their attraction to gelatinous organisms and algae that collect on buoys and buoy lines at or near the surface. From 1990-2000, 92 entangled leatherbacks were reported from New York through Maine and many other stranded individuals exhibited evidence of prior entanglement (Dwyer et al. 2002). Zug and Parham (1996) point out that a combination of the loss of long-lived adults in fishery-related mortalities and a lack of recruitment from intense egg harvesting in some areas has caused a sharp decline in leatherback sea turtle populations and represents a significant threat to survival and recovery of the species worldwide.

Leatherback sea turtles may also be more susceptible to marine debris ingestion than other sea turtle species due to their predominantly oceanic existence and the tendency of floating debris to concentrate in convergence zones that adults and juveniles use for feeding and migratory purposes (Lutcavage et al. 1997; Shoop and Kenney 1992). The stomach contents of leatherback sea turtles revealed that a substantial percentage (33.8 percent; 138 of 408 cases examined) contained some form of plastic debris (Mrosovsky et al. 2009). Plastic blocking the gut to an extent that could have caused death was evident in 8.7 percent of all leatherbacks that ingested plastic (Mrosovsky et al. 2009). Mrosovsky et al. (2009) also note that in a number of cases, the ingestion of plastic may not cause death outright, but could cause the animal to absorb fewer nutrients from food, eat less in general, etc., all of which could cause other adverse effects. The presence of plastic in the digestive tract suggests that leatherbacks might not be able to distinguish between prey items and forms of debris such a plastic bags (Mrosovsky et al. 2009). Balazs (1985) speculated that the object might resemble a food item by its shape, color, size or even movement as it drifts about, and induce a feeding response in leatherbacks
Global climate change can be expected to have various impacts on all sea turtles, including leatherbacks. Global climate change is likely to also influence the distribution and abundance of jellyfish, the primary prey item of leatherbacks (NMFS and USFWS 2007d). Several studies have shown leatherback distribution is influenced by jellyfish abundance (e.g., (Houghton et al. 2006; Witt et al. 2007; Witt et al. 2006).

Loggerhead sea turtle – Northwest Atlantic Ocean DPS

The loggerhead sea turtle was listed as a threatened species throughout its global range on July 28, 1978. NMFS and USFWS published a final rule designating nine DPSs for loggerhead sea turtles (76 FR 58868, September 22, 2011; effective October 24, 2011). The DPSs established by this rule are: (1) Northwest Atlantic Ocean (threatened); (2) Northeast Atlantic Ocean (endangered); (3) South Atlantic Ocean (threatened); (4) Mediterranean Sea (endangered); (5) North Pacific Ocean (endangered); (6) South Pacific Ocean (endangered); (7) North Indian Ocean (endangered); (8) Southeast Indo-Pacific Ocean (endangered); and (9) Southwest Indian Ocean (threatened). The Northwest Atlantic (NWA) DPS is the only one that regularly occurs within the action area and therefore is the only one to be considered in EA.

On March 25, 2013 USFWS published a proposed critical habitat designation for the Northwest Atlantic Ocean Loggerhead Sea Turtle DPS (78 FR 17999), and on July 18, 2013 NMFS published a proposed critical habitat designation for the same DPS (78 FR 43005). Specific

areas proposed for designation include 36 occupied marine areas within the range of the Northwest Atlantic Ocean DPS. These areas contain one or a combination of nearshore reproductive habitat, winter area, breeding areas, and migratory corridors. The proposed critical habitat does not specifically overlap with the proposed action area.

Species Description and Distribution
Loggerheads are large sea turtles with a mean straight carapace length (SCL) of adults in the southeast United States of approximately 3 ft. (92 cm). The corresponding mass is approximately 255 lbs. (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 oceanic and continental shelf waters (including estuarine waters) throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans (Dodd 1988). Habitat use within these areas vary by life stage. Oceanic juveniles are associated with convergence zones and feed primarily at or near the surface. Neritic juveniles primarily feed benthically on mollusks but will also prey on other taxa including crabs and jellyfish. Adult loggerheads are primarily found on the continental shelf and primarily prey on benthic invertebrates such as mollusks and decapod crustaceans in hard bottom habitats.
The majority of loggerhead nesting occurs at the western rims of the Atlantic and Indian Oceans concentrated in the north and south temperate zones and subtropics (NRC 1990). In the western North Atlantic, loggerhead nesting is concentrated along the coasts of the United States from southern North Carolina to the southwest Florida coast. Additional nesting beaches are found along the northern and western Gulf of Mexico, eastern Yucatán Peninsula, at Cay Sal Bank in the eastern Bahamas (Addison 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 United States and Caribbean Sea. Little is known about the distribution of adult males who are seasonally abundant near nesting beaches although aerial surveys in the 1980's suggest that loggerheads in U.S. waters are distributed as a whole in the following proportions: 54 percent in the southeast U.S. Atlantic, 29 percent in the northeast U.S. Atlantic, 12 percent in the eastern Gulf of Mexico, and 5 percent in the western Gulf of Mexico (TEWG 1998).

Within the NWA, most loggerhead sea turtles nest from North Carolina to Florida and along the Gulf coast of Florida. Previous Section 7 analyses have recognized at least five Western Atlantic subpopulations, divided geographically as follows: (1) a northern nesting subpopulation, occurring from North Carolina to Northeast Florida at about 29ºN; (2) a South Florida nesting subpopulation, occurring from 29°N on the east coast 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 2000a); 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 uses a combination of geographic distribution of nesting densities, geographic separation, and geopolitical boundaries, in addition to genetic differences, to identify recovery units. The recovery units are: (1) the Northern Recovery Unit (Florida/Georgia border north through southern Virginia); (2) the Peninsular Florida Recovery Unit (Florida/Georgia border through Pinellas County, Florida); (3) the Dry Tortugas Recovery Unit (islands located west of Key West, Florida); (4) the Northern Gulf of Mexico Recovery Unit (Franklin County, Florida, through Texas); and (5) the Greater Caribbean Recovery Unit (Mexico through French Guiana, the Bahamas, Lesser Antilles, and Greater Antilles) (NMFS and USFWS 2008a). 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 eight life stages for the loggerhead life cycle, including the ecosystems those stages generally use: (1) egg (terrestrial zone), (2) hatchling stage (terrestrial zone), (3) hatchling swim frenzy and transitional stage (neritic zone[5]), (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 organisms that reach sexual maturity between 20 and 38 years of age, although this varies widely among populations (Frazer and Ehrhart 1985; NMFS and SEFSC 2001). Female loggerheads 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). Along the southeastern U.S. coast, loggerheads lay an average of 100 and 126 eggs per nest (Dodd 1988) which incubate for 42 to 75 days before hatching (NMFS and USFWS 2008b).

As post-hatchlings, loggerheads hatched on U.S. beaches migrate offshore and become associated with *Sargassum* habitats, drift lines, and other convergence zones (Carr 1986), (Witherington 2002). Loggerheads originating from the NWA DPS are believed to lead a pelagic existence in the North Atlantic Gyre for a period as long as 7-12 years (Bolten et al. 1998) before moving to more coastal habitats. Recent studies have suggested that not all loggerhead sea turtles follow the model of circumnavigating the North Atlantic Gyre as pelagic juveniles, followed by permanent settlement into benthic environments (Bolten and Witherington 2003; Laurent et al. 1998). These studies suggest some turtles may either remain in the pelagic habitat in the North Atlantic longer than hypothesized or move back and forth between pelagic and coastal habitats interchangeably (Witzell 2002). Stranding records indicate that when immature loggerheads reach 15-24 inches (40-60 cm) SCL, they recruit to coastal inshore waters of the continental shelf throughout the U.S. Atlantic and Gulf of Mexico (Witzell 2002).

After departing the oceanic zone, neritic juvenile loggerheads in the Northwest Atlantic inhabit continental shelf waters from Cape Cod Bay, Massachusetts, south through Florida, The Bahamas, Cuba, and the Gulf of Mexico. Estuarine waters of the United States, including areas such as Long Island Sound, Chesapeake Bay, Pamlico and Core Sounds, Mosquito and Indian

[5] neritic refers to the inshore marine environment from the surface to the sea floor where water depths do not exceed 200 meters

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.

Like juveniles, non-nesting adult loggerheads also use the neritic zone. Adult loggerheads tend to use estuarine areas with more open ocean access, such as 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. 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. 2007a; 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; M. Lamont, Florida Cooperative Fish and Wildlife Research Unit, personal communication, 2009; M. Nicholas, National Park Service, personal communication, 2009). 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 as well as Florida Bay in the United States, and the north coast of Cuba (A. Bolten and K. Bjorndal, University of Florida, unpublished data). Moncada et al. (2009) report the recapture in Cuban waters of five adult female loggerheads originally 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. 2009; Heppell et al. 2003a; NMFS-SEFSC 2009; NMFS and SEFSC 2001; NMFS and USFWS 2008a; TEWG 1998; TEWG 2000a; 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. However, nesting beach surveys 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 effort and methods are standardized [see, e.g., NMFS and USFWS (2008a)]. NMFS and USFWS (2008a) concluded that the lack of change in two important demographic parameters of loggerheads, remigration interval and clutch frequency, indicate that time series on numbers of nests can provide reliable information on trends in the female population.

Peninsular Florida Recovery Unit

The Peninsular Florida Recovery Unit (PFRU) is the largest loggerhead nesting assemblage in the Northwest Atlantic. A near-complete nest census (all beaches including index nesting beaches) undertaken from 1989 to 2007 showed a mean of 64,513 loggerhead nests per year,

representing approximately 15,735 nesting females per year (NMFS and USFWS 2008a). The statewide estimated total for 2012 was 98,601 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 4). FWRI performed a detailed analysis of the long-term loggerhead index nesting data (1989-2012) (http://myfwc.com/research/wildlife/sea-turtles/nesting/loggerhead-trends/). Three distinct trends over that time period were identified. From 1989-1998 there was a 23 percent increase, that was then followed by a sharp decline over the subsequent decade. However, recent large increases in loggerhead nesting occurred since then. FWRI examined the trend from the 1998 nesting high through 2012 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 2012 FWRI concluded that there was an overall positive change in the nest counts.

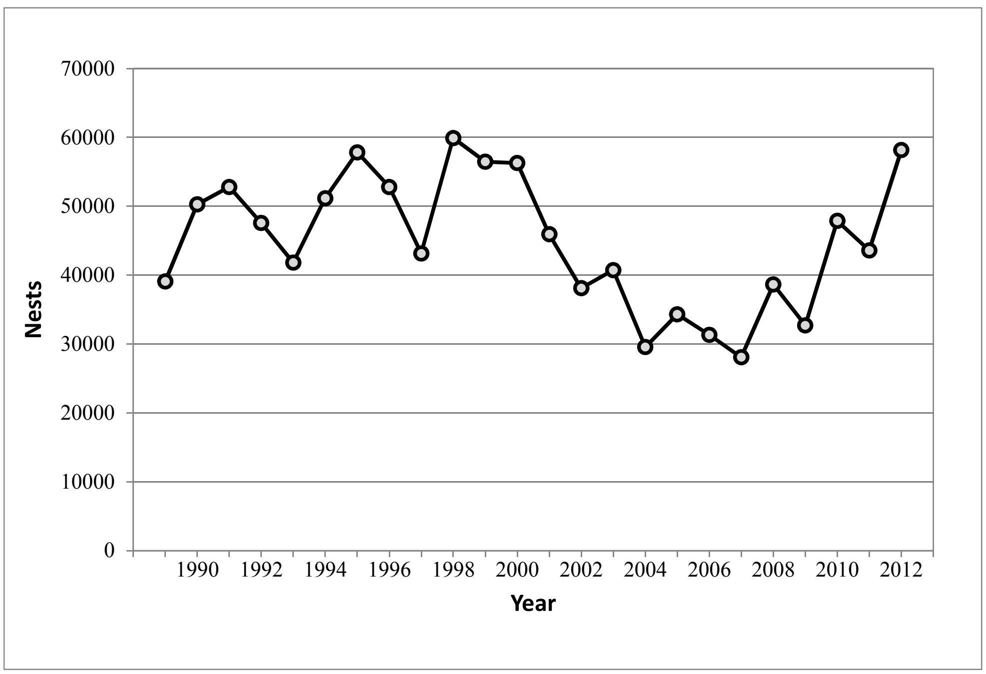

Figure 4. Loggerhead sea turtle nesting at Florida index beaches since 1989.

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 (GDNR) 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 percent annually from 1989-2008. Nest totals from aerial surveys conducted by SCDNR showed a 1.9 percent annual decline in nesting

in South Carolina from 1980 through 2008. Overall, there is strong statistical data to suggest the NRU had experienced a long-term decline over that period of time.

Data since that analysis (Table 12) 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 past declining trend.

Table 12 Total Number of NRU Loggerhead Nests (GADNR, SCDNR, and NCWRC nesting datasets)

Nests Recorded	2008	2009	2010	2011	2012
Georgia	1,649	997	1,761	1,992	2,218
South Carolina	4,500	2,183	3,141	4,015	4,615
North Carolina	841	276	846	948	1,069
Total	6,990	3,456	5,748	6,955	7,902

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 from 2009-2012, with 2012 showing the highest index nesting total since the start of the program (Figure 5)

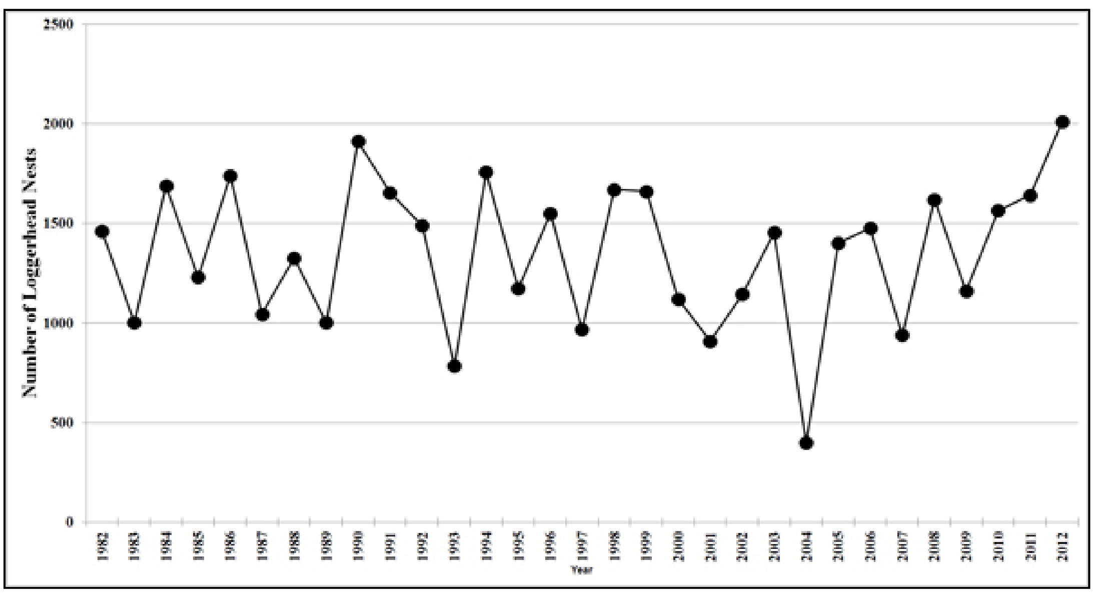

Figure 5. South Carolina Index Nesting Beach Counts for Loggerhead Sea Turtles (from the SCDNR website, http://www.dnr.sc.gov/seaturtle/nest.htm)

Other NW Atlantic DPS Recovery Units

The remaining three recovery units—Dry Tortugas (DTRU), Northern Gulf of Mexico (NGMRU), and Greater Caribbean (GCRU)—are much smaller nesting assemblages but still considered essential to the continued existence of the species. Nesting surveys for the DTRU are conducted as part of Florida's statewide survey program. Survey effort was relatively stable during the 9-year period from 1995-2004 (although the 2002 year was missed). Nest counts

ranged from 168-270, with a mean of 246, but with 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 percent annually (NMFS and USFWS 2008a). 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. Zurita et al. (2003) found a statistically significant increase in the number of nests on 7 of the beaches on Quintana Roo, Mexico, from 1987-2001, where survey effort was consistent during the period. However, nesting has declined since 2001, and the previously reported increasing trend appears to not have been sustained (NMFS and USFWS 2008a).

In-water Trends

Nesting data are the best current indicator of sea turtle population trends; however, in-water data also provide some insight. Such research suggests the abundance of neritic juvenile loggerheads is steady or increasing. Although Ehrhart et al. (2007) found no significant regression-line trend in a long-term dataset, researchers have observed notable increases in catch per unit effort (CPUE) over the past several years (Ehrhart et al. 2007, Epperly et al. 2007, Arendt et al. 2009). Researchers believe that this increase in CPUE is likely linked to an increase in juvenile abundance, though 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). However, in-water studies throughout the eastern United States also 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, as well as 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),suggests the adult female population size 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).

Threats
The threats faced by loggerhead sea turtles are well-summarized in the general discussion of threats in the Cumulative Effects section of this EA. However, the impact of fishery interactions is a point of further emphasis for this species. The Loggerhead Biological Review Team determined that the greatest threats to the NWA DPS of loggerheads result from cumulative fishery bycatch in neritic and oceanic habitats (Conant et al. 2009).

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 percent female offspring for loggerheads nesting near Southport, North Carolina. The same increase in air temperatures at nesting beaches in Cape Canaveral, Florida, would result in close to 100 percent female offspring. 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 clutches, leading to death (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), as well as short inter-nesting intervals (Hays et al. 2002) and shorter nesting season (Pike et al. 2006).

Atlantic sturgeon

Species Description
Atlantic sturgeon are long-lived, late-maturing, estuarine-dependent, anadromous fish distributed along the eastern coast of North America (Waldman and Wirgin 1998). Historically, sightings have been reported from Hamilton Inlet, Labrador, south to the St. Johns River, Florida (Murawski et al. 1977; Smith and Clugston 1997). Atlantic sturgeon may live up to 60 years, reach lengths up to 14 ft., and weigh over 800 lbs. (ASSRT 2007; Collette and Klein-MacPhee 2002). They are distinguished by armor-like plates (called scutes) and a long protruding snout that has four barbels (slender, whisker-like feelers extending from the head used for touch and taste). Atlantic sturgeon spend the majority of their lives in nearshore marine waters, returning to their natal rivers to spawn (Wirgin et al. 2002). Young sturgeon may spend the first few years of life in their natal river estuary before moving out to sea (Wirgin et al. 2002). Sturgeon are omnivorous benthic (bottom) feeders and filter quantities of mud along with their food. Adult sturgeon diets include mollusks, gastropods, amphipods, isopods, and fish. Juvenile sturgeon feed on aquatic insects and other invertebrates (Smith 1985b). Five separate DPSs of Atlantic sturgeon were listed under the ESA by NMFS on February 6, 2012 (77 FR 5880 and 5914). The New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs were listed as endangered. The Gulf of Maine DPS was listed as threatened. Because adult Atlantic sturgeon from all DPSs mix extensively in marine waters, we expect fish from all DPSs to be found in the action area.

Life History Information
Atlantic sturgeon populations show clinal variation, with a general trend of faster growth and earlier age at maturity in more southern systems. Atlantic sturgeon mature between the ages of 5

and 19 years in South Carolina (Smith et al. 1982), between 11 and 21 years in the Hudson River (Young et al. 1988), and between 22 and 34 years in the St. Lawrence River (Scott and Crossman 1973). Atlantic sturgeon likely do not spawn every year. Multiple studies have shown that spawning intervals range from 1 to 5 years for males (Caron et al. 2002; Collins et al. 2000b; Smith 1985a) and 2 to 5 years for females (Stevenson and Secor 1999; Van Eenennaam et al. 1996; Vladykov and Greely 1963). Fecundity of Atlantic sturgeon has been correlated with age and body size, with egg production ranging from 400,000 to 8 million eggs per year (Dadswell 2006; Smith et al. 1982; Van Eenennaam and Doroshov 1998). The average age at which 50 percent of maximum lifetime egg production is achieved is estimated to be 29 years, approximately 3 to 10 times longer than for other bony fish species examined (Boreman 1997).

Spawning adult Atlantic sturgeon generally migrate upriver in spring/early summer, which occurs in February-March in southern systems, April-May in mid-Atlantic systems, and May-July in Canadian systems (Bain 1997; Caron et al. 2002; Murawski et al. 1977; Smith 1985a; Smith and Clugston 1997). In some southern rivers, a fall spawning migration may also occur (Moser et al. 1998; Rogers and Weber 1995; Weber and Jennings 1996). Atlantic sturgeon spawning occurs in fast flowing water between the salt front and fall line of large rivers (Bain et al. 2000; Borodin 1925; Crance 1987; Leland 1968; Scott and Crossman 1973) over hard substrate, such as cobble, gravel, or boulders, which the highly adhesive sturgeon eggs adhere to (Gilbert 1989; Smith and Clugston 1997). Hatching occurs approximately 94-140 hours after egg deposition and larvae assume a demersal existence (Smith et al. 1980). The yolk sac larval stage is completed in about 8-12 days, during which time the larvae move downstream to rearing grounds (Kynard and Horgan 2002). During the first half of their migration downstream, movement is limited to night. During the day, larvae use benthic structure (e.g., gravel matrix) as refugia (Kynard and Horgan 2002). During the latter half of migration when larvae are more fully developed, movement to rearing grounds occurs both day and night. Juvenile sturgeon continue to move further downstream into brackish waters, and eventually become residents in estuarine waters for months or years.

Juvenile and adult Atlantic sturgeon occupy upper estuarine habitat where they frequently congregate around the saltwater/freshwater interface. Estuarine habitats are important for juveniles, serving as nursery areas by providing abundant foraging opportunities, as well as thermal and salinity refuges, for facilitating rapid growth. Some juveniles will take up residency in non-natal rivers that lack active spawning sites (Bain 1997). Residency time of young Atlantic sturgeon in estuarine areas varies between one and six years (Schueller and Peterson 2010; Smith 1985a), after which Atlantic sturgeon start outmigration to the marine environment. Outmigration of adults from the estuaries to the sea is cued by water temperature and velocity. Adult Atlantic sturgeon will reside in the marine habitat during the non-spawning season and forage extensively. Coastal migrations by adult Atlantic sturgeon are extensive and are known to occur over sand and gravel substrate (Greene et al. 2009). Atlantic sturgeon remain in the marine habitat until the waters begin to warm, at which time ripening adults migrate back to their natal rivers to spawn.

Upstream migration to the spawning grounds is cued primarily by water temperature and velocity. Therefore, fish in the southern portion of the range migrate earlier than those to the north (Kieffer and Kynard 1993; Smith 1985a). In Georgia and South Carolina, this begins in

February or March (Collins et al. 2000a). Males commence upstream migration to the spawning sites when waters reach around 6°C (Dovel and Berggren 1983; Smith 1985a; Smith et al. 1982) with females following a few weeks later when water temperatures are closer to 12° or 13°C (Collins et al. 2000a; Dovel and Berggren 1983; Smith 1985a). In some rivers, predominantly in the south, a fall spawning migration may also occur (Moser et al. 1998; Rogers and Weber 1995), with running ripe males found August through October and post-spawning females captured in late September and October (Collins et al. 2000b).

Status, Distribution, and Population Dynamics

<u>South Atlantic DPS</u>

The South Atlantic DPS includes all Atlantic sturgeon that spawn or are spawned in the watersheds (including all rivers and tributaries) of the Ashepoo, Combahee, and Edisto Rivers (ACE) Basin southward along the South Carolina, Georgia, and Florida coastal areas to the St. Johns River, Florida. The marine range of Atlantic sturgeon from the South Atlantic DPS extends from the Hamilton Inlet, Labrador, Canada, to Cape Canaveral, Florida. Rivers known to have current spawning populations within the range of the South Atlantic DPS include the Combahee, Edisto, Savannah, Ogeechee, Altamaha, and Satilla Rivers. We determined spawning was occurring if young-of-the-year (YOY) were observed, or mature adults were present, in freshwater portions of a system. However, in some rivers, spawning by Atlantic sturgeon may not be contributing to population growth because of lack of suitable habitat and the presence of other stressors on juvenile survival and development.

Historically, both the Broad-Coosawatchie and St. Marys Rivers were documented to have spawning populations; there is also evidence that spawning may have occurred in the St. Johns River or one of its tributaries. However, the spawning population in the St. Marys River, as well as any historical spawning population in the St. Johns, is believed to be extirpated, and the status of the spawning population in the Broad-Coosawatchie is unknown. Both the St. Marys and St. Johns Rivers are used as nursery habitat by young Atlantic sturgeon originating from other spawning populations. The use of the Broad-Coosawatchie by sturgeon from other spawning populations is unknown at this time. The presence of historical and current spawning populations in the Ashepoo River has not been documented; however, this river may currently be used for nursery habitat by young Atlantic sturgeon originating from other spawning populations. This represents our current knowledge of the river systems utilized by the South Atlantic DPS for specific life functions, such as spawning, nursery habitat, and foraging. However, fish from the South Atlantic DPS likely use other river systems than those listed here for their specific life functions.

Secor (2002) estimates that 8,000 adult females were present in South Carolina prior to 1890. Prior to the collapse of the fishery in the late 1800s, the sturgeon fishery was the third largest fishery in Georgia. Secor (2002) estimated from U.S. Fish Commission landing reports that approximately 11,000 spawning females were likely present in Georgia prior to 1890. Currently, the Altamaha River population of Atlantic sturgeon, with an estimated 343 adults spawning annually, is believed to be the largest population in the Southeast, yet is estimated to be only 6 percent of its historical population size. The abundances of the remaining river populations

within the South Atlantic DPS, each estimated to have fewer than 300 annually spawning adults, are estimated to be less than 1 percent of what they were historically (ASSRT 2007).

Carolina DPS

The Carolina DPS includes all Atlantic sturgeon that are spawned in the watersheds (including all rivers and tributaries) from Albemarle Sound southward along the southern Virginia, North Carolina, and South Carolina coastal areas to Charleston Harbor. The marine range of Atlantic sturgeon from the Carolina DPS extends from the Hamilton Inlet, Labrador, Canada, to Cape Canaveral, Florida. Rivers known to have current spawning populations within the range of the Carolina DPS include the Roanoke, Tar-Pamlico, Cape Fear, Waccamaw, and Yadkin-Pee Dee River. We determined spawning was occurring if YOY were observed, or mature adults were present, in freshwater portions of a system. However, in some rivers, spawning by Atlantic sturgeon may not be contributing to population growth because of lack of suitable habitat and the presence of other stressors on juvenile survival and development. There may also be spawning populations in the Neuse, Santee and Cooper Rivers, though it is uncertain.

Historically, both the Sampit and Ashley Rivers in South Carolina were documented to have spawning populations at one time. However, the spawning population in the Sampit River is believed to be extirpated and the current status of the spawning population in the Ashley River is unknown. Both rivers may be used as nursery habitat by young Atlantic sturgeon originating from other spawning populations. This represents our current knowledge of the river systems utilized by the Carolina DPS for specific life functions, such as spawning, nursery habitat, and foraging. However, fish from the Carolina DPS likely use other river systems than those listed here for their specific life functions.

Historical landings data indicate that between 7,000 and 10,500 adult female Atlantic sturgeon were present in North Carolina prior to 1890 (Armstrong and Hightower 2002; Secor 2002). Secor (2002) estimates that 8,000 adult females were present in South Carolina during that same time-frame. The Atlantic sturgeon spawning population in at least one river system (the Sampit River) within the Carolina DPS has been extirpated, and the statuses of four additional spawning populations are uncertain. There are believed to be only 5 of 7-10 historical spawning populations remaining in the Carolina DPS. In some rivers, spawning by Atlantic sturgeon may not be contributing to population growth because of lack of suitable habitat and the presence of other stressors on juvenile survival and development. The abundances of the remaining river populations within the DPS, each estimated to have fewer than 300 spawning adults, are estimated to be less than 3 percent of what they were historically (ASSRT 2007).

Chesapeake Bay DPS

The Chesapeake Bay DPS includes all anadromous Atlantic sturgeons that are spawned in the watersheds that drain into the Chesapeake Bay and into coastal waters from the Delaware-Maryland border on Fenwick Island to Cape Henry, Virginia. The marine range of Atlantic sturgeon from the Chesapeake Bay DPS extends from the Hamilton Inlet, Labrador, Canada, to Cape Canaveral, Florida. Within this range, Atlantic sturgeon historically spawned in the Susquehanna, Potomac, James, York, Rappahannock, and Nottoway Rivers (ASSRT 2007). Spawning still occurs in the James River, and the presence of juvenile and adult sturgeon in the York River suggests that spawning may occur there as well (ASSRT 2007; Greene et al. 2009;

Musick et al. 1994). However, conclusive evidence of current spawning is available for the James River, only. Atlantic sturgeon that are spawned elsewhere are known to use waters of the Chesapeake Bay for other life functions, such as foraging and as juvenile nursery habitat, before entering the marine system as subadults (ASSRT 2007; Grunwald et al. 2008; Vladykov and Greely 1963; Wirgin et al. 2007).

Historically, the Chesapeake DPS likely supported more than 10,000 spawning adults (ASSRT 2007; KRRMP 1993; Secor 2002). However, there are no current abundance estimates for the Chesapeake Bay DPS. The best available data support that the current number of spawning adults is one to two orders of magnitude smaller than historical levels (*e.g.,* hundreds to low thousands (ASSRT 2007; Kahnle et al. 2007). Based on information available from Atlantic sturgeon populations of other DPSs, there may be less than 300 spawning adults per year for the Chesapeake Bay DPS.

New York Bight DPS

The New York Bight DPS includes all anadromous Atlantic sturgeon that spawn in the watersheds that drain into coastal waters from Chatham, Massachusetts, to the Delaware-Maryland border on Fenwick Island. The marine range of Atlantic sturgeon from the New York Bight DPS extends from the Hamilton Inlet, Labrador, Canada, to Cape Canaveral, Florida. Within this range, Atlantic sturgeon historically spawned in the Connecticut, Delaware, Hudson, and Taunton Rivers (ASSRT 2007; Murawski et al. 1977; Secor 2002). Spawning still occurs in the Delaware and Hudson Rivers, but there is no recent evidence (within the last 15 years) of spawning in the Connecticut and Taunton Rivers (ASSRT 2007). Atlantic sturgeon that are spawned elsewhere continue to use habitats within the Connecticut and Taunton Rivers for other life functions (ASSRT 2007; Savoy 2007; Wirgin and King 2011).

The only abundance estimate for Atlantic sturgeon belonging to the New York Bight DPS is for the Hudson River population. Prior to the onset of expanded fisheries exploitation of sturgeon in the 1800's, a conservative historical estimate for the Hudson River Atlantic sturgeon population was 10,000 adult females (Secor 2002). Current population abundance is likely at least one order of magnitude smaller than historical levels (ASSRT 2007; Kahnle et al. 2007; Secor 2002). Based on data collected from 1985–1995, there are 870 spawning adults per year in the Hudson River (Kahnle et al. 2007). Kahnle (2007; 1998) also showed that the level of fishing mortality from the Hudson River Atlantic sturgeon fishery during the period of 1985-1995 exceeded the estimated sustainable level of fishing mortality for the riverine population, and may have led to reduced recruitment. All available data on abundance of juvenile Atlantic sturgeon in the Hudson River Estuary indicate a substantial drop in production of young since the mid 1970's (Kahnle et al. 1998). A decline appeared to occur in the mid to late 1970's followed by a secondary drop in the late 1980's (ASMFC 2010; Kahnle et al. 1998; Sweka et al. 2007). Catch-per-unit-effort (CPUE) data suggest that recruitment has remained depressed relative to catches of juvenile Atlantic sturgeon in the estuary during the mid-late 1980's (ASMFC 2010; Sweka et al. 2007). From 1985-2007, there were significant fluctuations in CPUE. The number of juveniles appears to have declined between the late 1980s and early 1990s. While the CPUE is generally higher in the 2000s as compared to the 1990s, significant annual fluctuations make it difficult to discern any trend. The CPUEs from 2000-2007 are generally higher than those from 1990-1999. However, they remain lower than the CPUEs observed in the late 1980s. There is

currently not enough information regarding any life stage to establish a trend for the Hudson River population (ASMFC 2010; Sweka et al. 2007).

There is no abundance estimate for the Delaware River population of Atlantic sturgeon. Harvest records from the 1800s indicate that this was historically a large population, with an estimated 180,000 adult females prior to 1890 (Secor 2002; Secor and Waldman 1999). Fisher (2009) sampled the Delaware River in 2009 to target YOY Atlantic sturgeon. The effort captured 34 young-of-the-year (YOY). Brundage and O'Herron (2003) also collected 32 YOY Atlantic sturgeon from the Delaware River in a separate study. Fisher (2011) reports that genetics information collected from 33 of the 2009 year class YOY indicates that at least 3 females successfully contributed to the 2009 year class. The capture of YOY in 2009 shows that successful spawning is still occurring in the Delaware River, but the relatively low numbers suggest the existing riverine population is limited in size. Similar to the Hudson River, there is currently not enough information to determine a trend for the Delaware River population. The ASSRT (2007) suggested that there may be less than 300 spawning adults per year for the Delaware population of the New York Bight DPS.

Gulf of Maine DPS

The Gulf of Maine DPS includes all anadromous Atlantic sturgeons that are spawned in the watersheds from the Maine/Canadian border and, extending southward, all watersheds draining into the Gulf of Maine as far south as Chatham, Massachusetts. Within this range, Atlantic sturgeon historically spawned in the Androscoggin, Kennebec, Merrimack, Penobscot, and Sheepscot Rivers (ASSRT 2007). Spawning still occurs in the Kennebec and Androscoggin Rivers, and may still occur in the Penobscot River. Atlantic sturgeon continue to be present in the Kennebec River; in addition, they are captured in directed research projects in the Penobscot River. They are also observed in the Saco, Presumpscot, and Charles Rivers where they were unknown to occur before or had not been observed to occur for many years. These observations suggest that the abundance of the Gulf of Maine DPS of Atlantic sturgeon is large enough that recolonization to rivers historically suitable for spawning may be occurring.

There are no current abundance estimates for the Gulf of Maine DPS of Atlantic sturgeon. Historically, the DPS likely supported more than 10,000 spawning adults (ASSRT 2007; KRRMP 1993; Secor 2002). The best available data support that current numbers of spawning adults for each DPS are one to two orders of magnitude smaller than historical levels (*e.g.,* hundreds to low thousands (ASSRT 2007; Kahnle et al. 2007). Based on information available from Atlantic sturgeon populations of other DPSs, the ASSRT (2007) suggested that there may be less than 300 spawning adults per year for the Kennebec River subpopulation in the Gulf of Maine DPS. The CPUE of subadult Atlantic sturgeon in a multifilament gillnet survey conducted on the Kennebec River was considerably greater for the period of 1998–2000 (CPUE=7.43) compared to the CPUE for the period 1977–1981 (CPUE = 0.30). The CPUE of adult Atlantic sturgeon showed a slight increase over the same time period (1977–1981 CPUE = 0.12 versus 1998–2000 CPUE = 0.21) (Squiers 2004). There is also new evidence of Atlantic sturgeon presence in rivers (*e.g.,* the Saco River) where they have not been observed for many years. However, there is not enough information to establish a trend for this DPS.

Concurrent to the application process for ITP #16320, NMFS has also received a separate ITP application requesting incidental take of Atlantic sturgeon in the same inshore gillnet fisheries. As such, this EA and associated ITP documents do not specifically consider the impacts to Atlantic sturgeon, as this species will be considered fully in the separate ITP process and corresponding ESA consultation.

Essential Fish Habitat

Congress defined Essential Fish Habitat (EFH) as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802 et seq.) The EFH provisions of the Magnuson-Stevens Fishery Conservation and Management Act offer fishery resource managers a means to conserve fish habitat.
North Carolina inshore waters are characterized as estuarine waters, and are considered EFH for various life stages of bluefish, summer flounder, gag grouper, gray snapper, cobia, king mackerel, Spanish mackerel, black sea bass, spiny dogfish, and various shrimp species. The following EFH types can be found within inshore waters of North Carolina: state designated nursery and overwintering areas, tidal freshwater and estuarine emergent wetlands, submerged aquatic vegetation, unconsolidated bottom, hardbottom, inter- and subtidal non-vegetated flats, and oyster reefs.

Social and Economic Environment

A variety of human activities may occur in the action area such as commercial fishing, recreational fishing, recreational boating, ecotourism, and other commercial uses, such as shipping. For the purposes of this EA, the inshore gillnet fishery is likely the most affected resource. The number of annual estuarine gillnet trips averaged 39,000 from 1994 through 2011. Estuarine gillnet trips declined from a high of 51,000 in 1997 to 25,000 trips in 2011. Estuarine gillnets were responsible for landings valued at 5.1 million dollars in 2011 and averaged 6.1 million dollars per year in value from 1994 to 2011. The top ten valued species in 2011 from NC estuarine gillnets were southern flounder, striped mullet, Spanish mackerel, striped bass, spot, bluefish, white perch, American shad, red drum, and kingfishes. These species made up 92% of the total ex-vessel value for estuarine gillnets in NC for 2011. Gillnet landings are responsible for 50% of the total NC estuarine landings for all of the top ten species in 2011. In addition, for six of the top ten species landed from gillnets in estuarine waters in 2011, gillnets were responsible for more than 80% of the total NC estuarine landings for each species. Large mesh (≥5 ISM) gillnet fisheries (e.g., southern flounder, red drum, striped bass, American shad) account for 48% of the total estuarine gillnet value and 55% of the total estuarine gillnet number of trips for 2011.

The socioeconomic characteristic of commercial fishing varies by county and region along the coast of North Carolina. The commercial fishing industry was a significant economic factor for some of the more prominent coastal fishing counties including Dare, Carteret, Pamlico, Hyde, and Tyrrell counties (Bianchi 2003). In these counties, 4% (greater than 8% in Hyde County) of the workforce participated in commercial fishing. Also in these counties, the average income of commercial fishermen was greater than the average annual wage per employee. In Albemarle and Pamlico Sounds, 40% of commercial fishermen made more than $15,000 per year and 59%

had annual household incomes greater than $30,000 (Crosson 2007a). In the Core Sound region, commercial fishing accounted for 70% of the income on average of surveyed fishermen; however, only 53% made more than $5,000 from commercial fishing (Crosson 2007b). The median household income for those surveyed was approximately $40,000 (Crosson 2007b). In the southern part of the state, 5% of the commercial fishermen made $30,000 or more from commercial fishing; however, less than 20% of these fishermen reported annual household incomes of more than $50,000 (Crosson 2010).

Ex-vessel value is a measure of payment a fishermen receives from a fish dealer for landed product and provides an indicator of the value of a fishery. Total landings (all finfish and shellfish) throughout North Carolina were valued (ex-vessel) at approximately $70 million in 2011. Inshore landings accounted for 64% of the total and were valued at $44 million in 2011. From 1994 to 2011, the mean value of commercial fishing operations in North Carolina inshore waters was $58 million per year. Inshore gill nets were responsible for landings valued at $5.1 million in 2011 and averaged $6.1 million per year from 1994 to 2011.

As fishermen spend their earnings in community stores, shipyards, offices, and other businesses, additional economic impacts are generated. NCDMF estimates that each $1 spent generates approximately $1.50 in economic impact within North Carolina. Inshore gill net landed species contribute to the businesses of primary dealers and processors and are estimated to have an economic impact of $255 million per year to the state economy (Hadley and Crosson 2010). These estimates do not include impacts of locally caught seafood that support ancillary businesses (e.g., restaurants, shipping and refrigeration companies).

Historic Places, Scientific, Cultural, and Historical Resources

Numerous historic scientific, cultural and historical resources are found throughout the action area [http://gis.ncdcr.gov/hpoweb/]. Four sites established under the National Estuarine Reserve System occur in the area: Currituck Banks, Beaufort (Rachel Carson), and Masonboro and Zeke's Islands [http://nerrs.noaa.gov/Reserve.aspx?ResID=NOC]. Six sites established under the North Carolina Coastal Reserve occur in the area: Buxton Woods, Kitty Hawk Woods, Permuda Island, Bald Head Island, Bird Island, and Emily and Richardson Preyer Buckridge [http://www.nccoastalreserve.net/]. These ten sites were established for long-term research, education, and stewardship of inshore resources.

4.0 Environmental Consequences of Alternatives

This section presents the scientific and analytic basis for comparison of the direct, indirect, and cumulative effects of the alternatives. Regulations for implementing the provisions of NEPA require considerations of both the context and intensity of a proposed action (40 CFR§ 1508.27).

Effects Common to All Alternatives

The NCDMF implemented a wide range of commercial gillnet regulations through proclamation in 2010 in response to the lawsuit filed against NCDMF and the NCMFC for the illegal taking of

sea turtles in state regulated inshore gill net fisheries, and the resulting Settlement Agreement (discussed above in Section 1.0). Gillnet restrictions implemented by the proclamation include: restricted stretch mesh size range of 4 ISM to, and including, 6 ½ ISM for large mesh gill nets; soak times limited to overnight soaks an hour before sunset to an hour after sunrise, Monday evenings through Friday mornings; height restricted to no more than 15 meshes, constructed with a lead core or leaded bottom line and without corks or floats other than needed for identification; tie-downs are prohibited; gill nets restricted to a maximum of 2,000 yards per vessel or 1,000 yards per vessel depending on area fished; and individual net (shot) length restricted to 100 yards with a 25-yard break between shots. These requirements are considered the baseline and the resulting beneficial effects to sea turtles by reducing the number that are incidentally captured in the recreational and commercial gill net fisheries would be the same under all Alternatives.

Incidental Take of Sea Turtles

Negative effects would occur when the NCDMF gillnet fishery results in incidental takes of any species of sea turtles, including live releases and mortalities. Each alternative is expected to result in both live captures and mortalities of sea turtles. Although Alternative 1 is "No Action", or denial of the ITP request, in this EA NMFS assumes that the status quo would largely be maintained for the fishery, which assumes that NCDMF would continue to operate the fishery under the conditions of the Settlement Agreement. No take authorization would be provided; however, it is likely that if the state continues to operate the fishery without an ITP, both live captures and mortalities would occur. For Alternatives 2 and 3, incidental take of sea turtles would be authorized as both live captures and mortalities. Therefore, a broad analysis of the effects of incidental capture is provided in this section.

Incidental capture of sea turtles in the inshore gillnet fishery is known to negatively impact the individuals captured. However, an adverse effect on a single individual or a small group of animals does not always translate into an adverse effect on the species unless it causes an appreciable reduction in the likelihood of survival or recovery for the species. In order for the action to have an adverse effect on a species, the take of individual animals by the fishery would first have to result in:

- mortality,
- serious injury that would lead to mortality, or
- disruption of essential behaviors such as feeding or migration, to a degree that the individual's likelihood of successful reproduction or survival was substantially reduced.

The mortality or reduction in the individual's likelihood of successful reproduction or survival would then have to result in a net reduction in the number of individuals of the species. The loss of the individual or its future offspring would not be offset by the addition, through birth or emigration, of other individuals into the population. That net loss to the species would have to be reasonably expected, directly or indirectly, to reduce the likelihood of both the survival and recovery of the listed species in the wild.

Since 2005, the majority (78.2%) of all observed sea turtle incidental captures in North Carolina inshore gillnets have been released alive. However, it is expected that some proportion of the sea turtles that are released alive after capture in a gillnet will succumb to post-release mortality due

the physiological effects of the capture, or they will experience a decreased ability to forage or migrate, which may make the more susceptible to recapture within a short period of time. Although sea turtles can stay submerged for 20-180 minutes during voluntary dives, forced submergence due to net entanglement can be lethal (Lutz and Bentely, 1985). Turtles caught in a net will struggle in attempts to escape and surface for air, and oxygen stores will be rapidly depleted. The physiological damage incurred due to net entanglement may affect the turtle's behavior and reduce its chances of survival post-release, and recovery from lactic acid build up can take over 15 hours, depending on the length of time submerged and level of acidosis (Lutz and Dunbar-Cooper, 1987).

In November 2009, NMFS Northeast Regional Office (NER) convened a panel of experts to discuss and provide individual expert advice on the potential injury and post-release mortality of sea turtles from capture in fishing gear. Based on the expert panel advice, NER developed formal guidance on assessing bycatch injury and post-release mortality in multiple gear types. The guidance allows experts to use data collected from observed takes to evaluate the condition of turtles and assign a potential post-release mortality rate. To apply the guidance, experts review the data collected by the observers on the body condition, new and existing injuries, as well as the activity level of the captured animal prior to release. At this time, NMFS is unable to apply the NMFS NER guidelines to the interactions that may occur in the North Carolina inshore gillnet fishery because of insufficient detail on the body condition and activity level of the sea turtles observed that are required to apply the criteria. However, NMFS anticipates the ability to apply the guidance to observed takes that occur in the future based on the data collected from observers.

In addition to the NMFS efforts to better characterize post-release mortality, a study was conducted in North Carolina waters to better determine the rate of survival for sea turtles that are captured in shallow-set gillnets and released alive (Snoddy and Southwood Williard, 2010). In this study, the health of 14 live sea turtles captured in North Carolina gillnets was assessed and the turtles were tagged with satellite transmitters prior to release. The primary goal of the study was to investigate the rate of post-release mortality of these turtles based on blood biochemistry and satellite telemetry results (Snoddy and Southwood Williard, 2010). The study documented one confirmed mortality and three suspected mortalities among the 14 turtles. Based on the data they collected, Snoddy and Southwood Williard estimated the post-release mortality of sea turtles captured in shallow-set gillnets ranges from 7.1% to 28.6%, although they caution that these rates are specific to soak times of 4 hours or less (Snoddy and Southwood Williard, 2010).

Despite the small sample size, the results of this study provide insight into the potential post-mortality rates for shallow-set gillnets in North Carolina. Given that the study was conducted in North Carolina waters within the action area and within the fishery that will be covered under the ITP, we will evaluate the requested incidental take against the post-release mortality ranges described above for the purposes of this analysis. An analysis including the post-release criteria can be found below in the sections "Effects of Alternative 2" and "Effects of Alternative 3".

The mortalities resulting from the North Carolina inshore gillnet fishery may result in impacts to the recovery of sea turtle species in the wild. However, it is difficult to identify the impact of this individual fishery on sea turtle populations as there are a number of other stressors on the

population that must be considered as cumulative effects. Additionally, due to the uncertainty of population estimates for each sea turtle species found in North Carolina's waters, it is not possible to know the specific impact of the North Carolina gillnet fishery on these sea turtle species.

NMFS has also prepared a biological opinion, pursuant to section 7(b) of the ESA, evaluating the effects of the issuance of the ITP on listed species under NMFS' jurisdiction. NMFS analyzed the best available scientific and commercial data, the current status of the species, environmental baseline, effects of the proposed action, and cumulative effects to determine whether the proposed action is likely to jeopardize the continued existence of any sea turtle species. In doing so, the analysis focused on the impacts and population response of sea turtles in the Atlantic Ocean. However, except for the NW Atlantic loggerhead turtles that have been listed as a DPS, the impact of the effects of the proposed action on the Atlantic populations is directly linked to the global populations of the species, and the final jeopardy analysis is for the global populations as listed in the ESA.
Based upon the analyses described in the biological opinion, it is NMFS' opinion that issuance of the ITP and the operation of the North Carolina inshore gillnet fisheries under NCDMF management as described in the conservation plan:

> **- is not likely to jeopardize the continued existence of loggerhead, green, hawksbill, Kemp's ridley, or leatherback sea turtles**.

Critical habitat has not been designated for these species in the action area; therefore, the destruction or adverse modification of critical habitat will not occur.

Incidental Take of Other Species
In addition to sea turtles, gillnet fisheries also capture other fish and wildlife. Gillnets target specific species of fish, such as founder, but also incidentally capture non-target fish species, seabirds and marine mammals, in addition to sea turtles. The West Indian manatee *(Trichechus manatus),* also known as the Florida manatee, is a Federally-endangered aquatic mammal protected under the ESA and the Marine Mammal Protection Act. The manatee is also listed as endangered under the North Carolina Endangered Species Act. The U.S. Fish and Wildlife Service (FWS) is the lead Federal agency responsible for the protection and recovery of the West Indian manatee under the provisions of the ESA. As such NMFS consulted with FWS, and in a letter dated November 29, 2011, FWS concurred with NMFS' determination that the proposed action, issuance of an ITP for sea turtles, was not likely to adversely affect the West Indian manatee. Manatees are rare in North Carolina waters; and, therefore, it is not likely that any alternative would have a significant impact on manatees. Seabirds are susceptible to incidental capture in the North Carolina inshore gillnet fishery; and, therefore, negative impacts may occur (e.g., mortality from entanglement and drowning) to seabirds from all of the alternatives. No ESA-listed seabirds are expected to be incidentally captured or adversely affected by the North Carolina inshore gillnet fishery.

Essential Fish Habitat
As noted above, North Carolina inshore waters are characterized as estuarine waters, and are considered EFH for various life stages of bluefish, summer flounder, gag grouper, gray snapper,

cobia, king mackerel, Spanish mackerel, black sea bass, spiny dogfish, and various shrimp species. The following EFH types can be found within inshore waters of North Carolina: state designated nursery and overwintering areas, tidal freshwater and estuarine emergent wetlands, submerged aquatic vegetation, unconsolidated bottom, hardbottom, inter- and subtidal non-vegetated flats, and oyster reefs.

The NMFS Office of Habitat Conservation Division was consulted for technical assistance to determine if the issuance of this ITP would have any expected impact on EFH. NCDMF currently operates and regulates the inshore gillnet fishery; and, therefore, the proposed action evaluated for its impacts on EFH is limited to permitting take of ESA-listed sea turtles and the proposed modifications to the gillnet fishery found in Alternative 3. The permitting of take would not result in an increase in fishing effort; therefore, the issuance of this ITP, the proposed monitoring plan, and mitigation measures, such as mandatory attendance, yardage and mesh size limits, soak-time restrictions, net shot limits, etc., and will not adversely affect EFH beyond the status quo.

Further, in looking at the actual fishing effort that is ongoing and regulated by NCDMF, it is not likely that the continued fishing activity will impact EFH. A 2001 NOAA Technical Memorandum on the potential effects of fishing gear on EFH stated that gillnets have a minimal impact on the benthic environment (Barnette 2001). Barnette summarizes many other studies that examined the effects of gillnets and found them not to be a major contributor to bottom disturbance (Carr 1988; ICES 1991; West *et al*. 1994; ICES 1995; Kaiser *et al*. 1996). As such, NMFS does not anticipate any impacts of issuing this ITP on EFH.

Historic Places, Scientific, Cultural, and Historical Resources

Numerous historic scientific, cultural and historical resources are found throughout the action area. The proposed action would provide an exemption to the ESA take prohibitions for capturing sea turtles incidental to the NCDMF recreational and commercial gillnet fishery deploying anchored sets and operating in inshore waters and does not preclude their availability for other scientific, cultural, or historic uses. All of the alternatives considered, would not occur in or indirectly affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or cause loss or destruction of significant scientific, cultural or historical resources or preclude their availability for other scientific, cultural, or historic uses. Thus, effects on such resources are not anticipated under any of the alternatives.

Public Health and Safety

The proposed action is not expected to have substantial adverse impacts on public health or safety because the action, issuing an ITP, would only provide an exemption to the ESA take prohibitions for capturing sea turtles in the North Carolina inshore gillnet fishery.

Non-Indigenous Species

The issuance of this ITP will not introduce any species to the environment; therefore, it would not result in the introduction or spread of a non-indigenous species.

Effects of the No Action Alternative

An alternative to the proposed action is no action, or denial of the ITP request. In this EA, NMFS will assume for the no action alternative that the status quo would largely be maintained for the fishery. While NMFS cannot know for certain what measures the State would implement absent the ITP, we will assume that NCDMF will maintain the regulations it put in place by proclamation listed in Appendix C of its application. While the proclamations provide significant management measures for this fishery, they do not include the full suite of measures to monitor, minimize, and mitigate the impact of incidental take under the proposed conservation plan. Thus, the reduction in adverse impacts that are expected for the species from implementing that full suite of measures would not be achieved. In addition, it is possible that NCDMF would amend its commercial inshore gillnet fishing regulations to be less restrictive than they are under the existing regulatory structure.

Social and Economic Effects

Under the no action alternative, all large mesh gillnet fishing in Pamlico Sound in the fall of each year would be closed per NMFS regulations (67 FR 56931, September 6, 2002). Interactions and subsequent mortality of sea turtles in large mesh gillnet gear would be prevented in that area. Due to the seasonal nature of the flounder fishery, no fisherman is exclusively dependent on the flounder fishery, rather the participants are diversified into other fisheries, such as blue crab trap and gillnets in the ocean and other inshore areas for various target species. The fall Pamlico Sound large mesh gillnet closure would not result in a total loss of revenue from the flounder fishery and for the participating fisherman.

Under this alternative, the small mesh gillnet fishing in Pamlico Sound would remain open, and all waters outside of Pamlico Sound would remain open to large mesh gillnets. While we cannot know for sure how fishing practices may shift due to the closure, or if most effort would shift to small mesh gillnets and other areas open to large mesh, it is likely that the fisherman will identify alternate locations and gear to use and the overall fishing effort may not be significantly impacted.

Additionally, if no ITP is issued, NCDMF would not receive an exemption from the ESA prohibitions against take; therefore, any incidental takes of sea turtles resulting from the North Carolina commercial inshore gillnet fishery would not be exempted. If NCDMF continues to operate an inshore gillnet fishery without an ITP, and sea turtle takes continue to occur, both NCDMF and the individual fisherman could be liable to third party lawsuits and enforcement action by NMFS for violating the ESA and illegally taking endangered or threatened species. Any incidental takes of sea turtles would result in the effects described in the “Effects Common to All Alternatives” section.

To the extent that this alternative would limit additional burden on licensed commercial inshore gillnet fishermen (e.g. avoiding additional reporting requirements, education etc.), the no action alternative would have less of a socio-economic impact than the two action alternatives. However, this alternative would also prohibit fishing in Pamlico Sound in the fall of each year, which may increase the socio-economic impact of this action, as fishermen would be unable to use that area and would need to shift their effort to other open areas.

Effects of Alternative 2, Issuing the ITP as Requested in the Application

Implementation of Alternative 2 has the potential to result in both positive and negative effects on sea turtle species. In addition to the effects described in the "Effects Common to All Alternatives" section, additional effects of Alternative 2 are provided below.

Incidental Take of Sea Turtles

This alternative includes a conservation plan that requires several management measures to reduce the take of sea turtles. These measures include the use of low-profile gillnets, the prohibition of day soaks and reduced soak times. Each of these measures, when implemented properly by fisherman, will decrease the level of sea turtle take. As such, the implementation of these measures through the conservation plan and ITP are considered to be a benefit to sea turtles over the status quo, and over Alternative 1, where a conservation plan would not be implemented.

Although the measures in the conservation plan would reduce sea turtle takes, under Alternative 2, issuing the ITP as requested in the Application (updated January 18, 2013), will result in 642 estimated annual takes of green and Kemp's ridley sea turtles, and 42 observed annual takes of loggerhead, leatherback and hawksbill sea turtles in the large mesh inshore gillnet fishery for Management Units B, D1, D2, and E (Tables 1 and 2, above). Additionally, this alternative will result in 74 observed annual takes of sea turtles, either live or dead, in the small mesh inshore gillnet fishery in Management Units B, D1, D2, and E (Table 3, above), and 16 observed annual takes of all species and gear types in Management Units A and C (Table 4, above).

As mentioned in the section "Effects Common to All Alternatives," the post-release mortality of live released turtles is an additional factor that must be considered when evaluating the effects of the authorized take on sea turtle populations. Although sea turtles can stay submerged for up to 180 minutes during voluntary dives, forced submergence due to net entanglement can be lethal (Lutz and Bentely, 1985). If the capture is not immediately lethal, the physiological damage incurred during the net entanglement may affect the turtle's behavior after it is released and may reduce its chances of survival.

While we do not have sufficient observer data to apply the NMFS NER post-release mortality guidance to the North Carolina inshore gillnet fishery at this time, the results of the Snoddy and Southwood-Williard study is a useful tool for evaluating post-release mortality because the study occurred in the specific fishery and area subject to the ITP. Snoddy and Southwood-Williard (2010) estimated the post-release mortality of live sea turtles released from shallow-set gillnets in North Carolina ranged from 7.1% to 28.6%. While the sample size was small (n=14), we are incorporating the post-release mortality ranges as part of this analysis to be precautionary and describe the potential total mortality that might occur as a result of Alternative 2.

When looking at the estimated annual takes of green and Kemp's ridley sea turtles in the large mesh inshore gillnet fishery occurring in Management Units B, D1, D2, and E, Alternative 2 would authorize 428 live sea turtle takes (330 greens, 98 Kemp's ridley), and 214 dead sea turtle takes (165 green, 49 Kemp's ridley). Applying the post-release mortality ranges to the 428 live

captures, we can assume that of the 330 live green turtles captured, between 23.4 and 94.4 turtles may succumb to post-release mortality, and of the 98 live Kemp's ridley sea turtles, between 6.9 and 28 turtles may succumb to post-release mortality.

When looking at the observed annual takes across all species and mesh size, a total of 132 sea turtles, either live or dead, are requested. A conservative estimate would assume that all 132 should be classified as dead in this analysis, since condition of the animal is not specified in the take request. However, if we assume that all 132 turtles were captured alive and released, we could apply the post-release ranges to those live takes. In this scenario, of the 132 live observed takes, between 9.4 and 37.8 turtles may succumb to post-release mortality from the injuries and physiological impacts resulting from the capture, although it is likely that some mix of live and dead turtles will be observed as takes.

The expected mortalities and any post-release mortalities resulting from Alternative 3 may result in some level of minimal impacts to the recovery of sea turtle species in the wild. It is difficult to identify the direct impact of this fishery on sea turtle populations as there are a number of other stressors on the population that must be considered as cumulative effects. However, increases in nesting trends have been observed for loggerhead, Kemp's ridley and green sea turtles in recent years while the North Carolina inshore gillnet fishery had greater effort and fewer management measures intended to protect sea turtles. Under Alternative 3, the impact from the inshore gillnet fishery on these species can be expected to be less than they were in the past and less than under Alternative 1, where the ITP would not be issued.

Because the ITP is concerned only with the effects of the fishery on listed species, and is not a fishery management action, issuance of the proposed ITP would not interfere with benthic productivity, predator-prey interactions, or other biodiversity or ecosystem functions. Issuance of the proposed ITP would not involve alteration of substrate, movement of water or air masses, or other interactions with physical features of ocean and coastal habitat. Thus, effects on biodiversity and habitat are not anticipated.

Alternative 2 includes an Adaptive Management provision, through which NCDMF may make regulatory changes to the fishing season, as needed, to decrease sea turtle interactions. Regulatory changes might include increasing monitoring, increasing restrictions and closing specific areas to fishing. By including an adaptive management provision, the ITP will allow NCDMF to respond to new information about populations of protected resources, changes in knowledge about sea turtle life history characteristics, and enhancements to targeted fishery gear types in a way that protects sea turtles and other endangered or threatened species as well as preserving a fishing industry that relies on access to North Carolina's estuarine waters. This process will ensure that the incidental take of sea turtles does not exceed the authorize level and will therefore ensure continued protection for endangered or threatened sea turtle populations and other protected species.

Social and Economic Impacts
Issuance of the proposed ITP would not occur in or indirectly affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or cause loss or destruction of significant scientific, cultural or historical resources or preclude their

availability for other scientific, cultural, or historic uses. Thus, effects on such unique areas are not anticipated.

Alternative 2 may result in a minimal additional burden to licensed North Carolina inshore gillnet fisherman, through a requirement to carry or work closely with observers within the fishery and for reporting sea turtle takes to NCDMF. The North Carolina observer program is not expected to cause significant additional burden to the fisherman because this fishery is already subject to both NCDMF and NMFS observer coverage independent of the state program, and further the gillnet fisherman in North Carolina have been working within the monitoring framework of the proposed application since 2010, through measures put in place by NCDMF's 2010 proclamation. Fishermen will be required to report incidental takes to NCDMF and undertake specific measures to resuscitate turtles as necessary, and follow disposition guidelines; however, as mentioned above, fishermen have been subject to these requirements since 2010, and therefore this Alternative is not expected to cause further socio-economic burden.

Effects of Alternative 3, Issue ITP as Requested in Application, with Modifications and Additional Requirements (Preferred Alternative)

Implementation of Alternative 3 has the potential to result in both positive and negative effects on the sea turtle species. In addition to the effects described in the "Effects Common to All Alternatives" section, additional effects of Alternative 2 are provided below.

Incidental Take of Sea Turtles
Similar to Alternative 2, this alternative includes a conservation plan that requires several management measures to reduce the take of sea turtles. These measures include the use of low-profile gillnets, the prohibition of day soaks and reduced soak times. Each of these measures, when implemented properly by fisherman, will decrease the level of sea turtle take. As such, the implementation of these measures through the conservation plan and ITP are considered to be a benefit to sea turtles over the status quo, and over Alternative 1, where a conservation plan would not be implemented.

Although the measures in the conservation plan would reduce sea turtle takes, this alternative would result in both lethal and non-lethal take, with impacts of such take described above in the "Effect Common to All Alternatives" section. As described above, Alternative 3 would result in a lower number of takes authorized by the proposed ITP for sea turtles than in Alternative 2, resulting in fewer biological impacts than Alternative 2.

Under Alternative 3, the total estimated annual takes of Kemp's ridley and green sea turtles, for the large mesh inshore gillnet fishery in Management Units B, D1, D2, and E remains the same at 642 estimated takes (Tables 1 and 6, above). However, all observed annual take requests have been decreased. The level of observed annual takes in large mesh gillnets in Management Units B, D1, D2, and E has been reduced from 42 to 26 takes (Tables 2 and 7, above). The level of observed takes in small mesh gillnets in Management Units B, D1, D2 and E has been reduced from 74 to 44 takes (Tables 3 and 8, above). Additionally, the observed takes in Management Units A and C across all species and gear types has been reduced in half from 16 to 8 (Tables 4

and 9, above). In total, this represents an overall decrease in observed annual takes by 59%, from 132 in Alternative 2 to 58 in Alternative 3.

As mentioned in the section “Effects Common to All Alternatives,” the post-release mortality of live released turtles is an additional factor that must be considered when evaluating the effects of the authorized take on sea turtle populations. While we do not have sufficiently detailed observer data to apply the NMFS NER post-release mortality guidance to the North Carolina inshore gillnet fishery at this time, the results of the Snoddy and Southwood Williard study may be a useful tool for evaluating post-release mortality because the study occurred in the specific fishery and area subject to the ITP. Snoddy and Southwood Williard 2010 estimated the post-release mortality of live sea turtles released from shallow-set gillnets in North Carolina to range from 7.1% to 28.6%. This range was derived from a study with a small sample size of 14 turtles, and the results may not be universally applicable to all inshore gillnets in North Carolina, given varying soak times. However, we are incorporating the post-release mortality ranges as part of this analysis to be precautionary and describe the potential total mortality that might occur as a result of Alternative 3.

As with Alternative 2, when looking at the estimated annual takes of green and Kemp’s ridley sea turtles in the large mesh inshore gillnet fishery occurring in Management Units B, D1, D2, and E, Alternative 3 would authorize 428 live sea turtle takes (330 greens, 98 Kemp’s ridley), and 214 dead sea turtle takes (165 green, 49 Kemp’s ridley). When applying the post-release mortality ranges to the 428 live captures, we might assume that of the 330 live green turtles captured, between 23.4 and 94.4 turtles might succumb to post-release mortality, and of the 98 live Kemp’s ridley sea turtles, between 6.9 and 28 turtles might succumb to post-release mortality.

When looking at the observed annual takes across all species and mesh size, a total of 78 sea turtles, either live or dead, are requested. A conservative estimate would assume that all 78 should be classified as dead in this analysis, since condition of the animal is not specified in the take request. However, if we assume that all 78 turtles were captured alive and released, we could apply the post-release ranges to those live takes. In this scenario, of the 78 live observed takes, between 5.5 and 22.3 turtles might succumb to post-release mortality from the injuries and physiological impacts resulting from the capture, although it is likely that some mix of live and dead turtles will be observed as takes.

The expected mortalities and any post-release mortalities resulting from Alternative 3 may result in impacts to the recovery of sea turtle species in the wild. However, it is difficult to identify the impact of this individual fishery on sea turtle populations as there are a number of other stressors on the population that must be considered as cumulative effects. Additionally, due to the uncertainty of population estimates for each sea turtle species found in North Carolina’s waters, it is not possible to know the direct and specific impact of the North Carolina gillnet fishery on these sea turtle species.

Similar to Alternative 2, this alternative includes an Adaptive Management provision, through which NCDMF may make regulatory changes to the fishing season, as needed, to decrease sea turtle interactions. Regulatory changes might include increasing monitoring, increasing

restrictions and closing specific areas to fishing. By including an adaptive management provision, the ITP will allow NCDMF to respond to new information about populations of protected resources, changes in knowledge about sea turtle life history characteristics, and enhancements to targeted fishery gear types in a way that protects sea turtles and other endangered or threatened species as well as preserving a fishing industry that relies on access to North Carolina's estuarine waters. This process will ensure that the incidental take of sea turtles does not exceed the authorize level and will therefore ensure continued protection for endangered or threatened sea turtle populations and other protected species.

Similar to Alternative 2, the issuance of the proposed ITP under Alternative 3 would not interfere with benthic productivity, predator-prey interactions, or other biodiversity or ecosystem functions. Issuance of the proposed ITP would not involve alteration of substrate, movement of water or air masses, or other interactions with physical features of ocean and coastal habitat. Thus, effects on biodiversity and habitat are not anticipated.

Lastly, the additional monitoring and reporting requirements incorporated into Alternative 3 may benefit sea turtles through improving our knowledge of sea turtle interactions in the North Carolina inshore gillnet fisheries. This monitoring will potentially provide a more robust understanding of how and when sea turtles interact with inshore gillnets, so that future mitigation measures can focus on those times and areas. The model used to predict interactions can be updated to more accurately account for sea turtle bycatch in the fishery, which will then inform future ITP development. Additionally, observer data may illustrate which life stages of the various species are most commonly affected by gillnets, thereby providing some indication of the effects on population size and overall health of sea turtles found in North Carolina inshore waters. Based on this information NMFS and NCDMF can make more informed decisions to further reduce bycatch of sea turtle in gillnets.

Social and Economic Impacts

Similar to Alternative 2, Alternative 3 may result in a minimal additional burden to licensed North Carolina inshore gillnet fisherman, through a requirement to carry or work closely with observers within the fishery and for reporting sea turtle takes to NCDMF. The North Carolina observer program is not expected to cause significant additional burden to the fisherman because this fishery is already subject to both NCDMF and NMFS observer coverage independent of the state program, and further the gillnet fisherman in North Carolina have been working within the monitoring framework of the proposed application since 2010, through measures put in place by NCDMF's 2010 proclamation. Fishermen will be required to report incidental takes to NCDMF and undertake specific measures to resuscitate turtles as necessary, and follow disposition guidelines; however, as mentioned above, fishermen have been subject to these requirements since 2010. As a result, this Alternative is not expected to cause further socio-economic burden.

Issuance of the proposed ITP under Alternative 3 would not occur in or indirectly affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or cause loss or destruction of significant scientific, cultural or historical resources or preclude their availability for other scientific, cultural, or historic uses. Thus, effects on such unique areas are not anticipated.

Cumulative Impacts

A cumulative impact is the impact on the environment resulting from the incremental impact of the action, when added to other past, present, and reasonably foreseeable future actions, regardless of the agency (federal or nonfederal) or person undertaking such other actions. Significance from the proposed action cannot be avoided if it is reasonable to anticipate a significant cumulative impact on the environment. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over time.

Current Threats
Sea turtles face numerous natural and anthropogenic threats that shape their status and affect their ability to recover. As many of the threats are either the same or similar in nature for all listed sea turtle species, those identified in this section below are discussed in a general sense for all listed sea turtles. Threat information specific to a particular species is discussed in the previous 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, 1992, 1993, 2008, 2011). Alteration of prey abundance and alteration of bottom habitats from bottom-tending fishing gear (e.g., bottom trawlers) have also been identified as a threat to sea turtles.

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 and similar fisheries in international waters and foreign nation waters. 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 and similarly across their range in the waters of other countries. These fishing methods include trawls, gillnets, purse seines, hook-and-line gear [including bottom longlines and vertical lines (e.g., bandit gear, handlines, and rod-reel)], pound nets, and trap fisheries. The Southeast U.S. shrimp fisheries have historically been the largest 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. 1995; Bolten et al. 1994; Crouse 1999). 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.

Coastal Development and Erosion Control
Coastal development can deter or interfere with nesting, affect nesting success, and degrade nesting habitats for sea turtles. Structural impacts to nesting habitat include the construction of buildings and pilings, beach armoring and renourishment, and sand extraction (Bouchard et al. 1998; Lutcavage et al. 1997). These factors may decrease the amount of nesting area available to females and change the natural behaviors of both adults and hatchlings, directly or indirectly, through loss of beach habitat or changing thermal profiles and increasing erosion, respectively. (Ackerman 1997; Witherington et al. 2003; Witherington et al. 2007). In addition, coastal development is usually accompanied by artificial lighting which can alter the behavior of nesting adults (Witherington 1992) and is often fatal to emerging hatchlings that are drawn away from the water (Witherington and Bjorndal 1991). In-water erosion control structures such as breakwaters, groins, and jetties can impact nesting females and hatchling as they approach and leave the surf zone or head out to sea by creating physical blockage, concentrating predators, creating longshore currents, and disrupting of wave patterns.

Environmental Contamination
Multiple municipal, industrial, and household sources, as well as atmospheric transport, introduce various pollutants such as pesticides, hydrocarbons, organochlorides (e.g., DDT, PCBs, and PFCs), and others that may cause adverse health effects to sea turtles (Garrett 2004; Grant and Ross 2002; Hartwell 2004; Iwata et al. 1993). Acute exposure to hydrocarbons from petroleum products released into the environment via oil spills and other discharges may directly injure individuals through skin contact with oils (Geraci 1990), inhalation at the water's surface and ingesting compounds while feeding (Matkin and Saulitis 1997). Hydrocarbons also have the potential to impact prey populations, and therefore may affect listed species indirectly by reducing food availability in the action area. In 2010, there was a massive oil spill in the Gulf of Mexico at BP's Deepwater Horizon (DWH) well. Official estimates are that millions of barrels of oil were released into the Gulf of Mexico. Additionally, approximately 1.8 million gallons of chemical dispersant was applied on the seawater surface and at the wellhead to attempt to break down the oil. At this time the assessment of total direct impact to sea turtles has not been determined. Additionally, the long-term impacts to sea turtles as a result of habitat impacts, prey loss, and subsurface oil particles and oil components broken down through physical, chemical, and biological processes are not known.

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 and oceanic stage juveniles of all species).

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 2007c). 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 2007c).

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

Other changes in the marine ecosystem caused by global climate change (e.g., ocean acidification, salinity, oceanic currents, dissolved oxygen levels, nutrient distribution, etc.) could influence the distribution and abundance of lower trophic levels (e.g., phytoplankton, zooplankton, submerged aquatic vegetation, crustaceans, mollusks, forage fish, etc.) 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 primary 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 in certain parts of their range (NMFS and USFWS 2008a).

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.

Actions Taken to Reduce Threats

Actions have been taken to reduce human-caused impacts to sea turtles from various sources, particularly since the early 1990s. Some actions have resulted in significant steps towards reducing the recurring sources of mortality of sea turtles and improving the status of all sea turtle populations in the Atlantic and Gulf of Mexico. For example, the Turtle Excluder Device (TED) regulation published on February 21, 2003 (68 FR 8456), significantly reduces the impacts of trawl fisheries on sea turtles, though shrimp trawling is still considered to be one of the largest sources of anthropogenic mortality for most sea turtle species (NMFS-SEFSC 2009). Other actions include lighting ordinances, in situ nest protection and predation control to help increase hatchling survival, as well as measures to reduce the mortality of pelagic immature, benthic immature, and mature age classes from various fisheries and other marine activities.

Conclusion and Summary of Cumulative Effects

As noted above, sea turtles found in the affected environment for this ITP may travel widely throughout the Atlantic, Gulf of Mexico, and Caribbean Sea. Therefore, individuals found in an area can potentially be affected by activities anywhere within this wide range. The environmental baseline for determining impacts includes the past and present impacts of all state, tribal, local, private, and other human activities in the ITP area. A number of human activities have contributed to the current status of listed sea turtle species in the action area. Some of those activities, (e.g., commercial harvesting of individuals as well as eggs) no longer occur in the United States yet are still a problem in some countries. Other human activities are ongoing and appear to be directly or indirectly affecting these species.

Taken together, the components of the environmental baseline for the action area include sources of natural mortality as well as influences from oceanographic and climatic features in the action areas. Circulation and productivity patterns influence prey distribution and habitat quality for listed species. The effects of climatic variability on these species in the action areas and the availability of prey remain largely undetermined; however, it is likely that any changes in weather and oceanographic conditions resulting in effects on population dynamics (i.e. sex ratios) as well as prey availability would have dire consequences for sea turtle species. The most significant threats affecting sea turtles in the Atlantic are fisheries, and there are many conservation activities directed at reducing this threat. Other environmental impacts to turtles may result from vessel operations, discharges, dredging, military activities, oil and gas development activities, industrial cooling water intake, aquaculture, recreational fishing, vessel traffic, coastal development, habitat degradation, directed take, and marine debris.

The ITP will authorize the incidental capture of sea turtles, resulting in both live captures that will be released alive and mortalities. Effects of past and ongoing human threats (e.g., fisheries, vessel traffic, etc.) occurring in this broad area have contributed to the current status of the listed sea turtles. Based on the analysis in this EA and supported by ESA Section 7 consultation, the issuance of the ITP will not appreciably reduce the species likelihood of survival and recovery in the wild, nor would it adversely affect reproductive or mortality rates. The incremental impact of the authorization of takes of sea turtles incidental to the otherwise legal North Carolina inshore gillnet fishery, when added to other past, present, and reasonably foreseeable future actions, is not expected to result in population-level effects; and, therefore, will not have cumulatively significant impacts.

5.0 Mitigation Measures

No additional mitigation measures are required beyond the measures included as ITP conditions, and discussed in the description of the Preferred Alternative. The preferred alternative includes multiple requirements and mitigation measures to reduce the take of sea turtles during the continued operation of the North Carolina inshore gillnet fishery, including: adaptive management, reporting requirements, handling and resuscitation requirements, tagging, and data sharing with the NC STSSN.

However, additional mitigation measures may be implemented by the NCDMF to further minimize and reduce sea turtle and other protected species interactions in gillnet fisheries, if they determine additional measures to be necessary in consultation with NMFS. These measures may include extensive outreach, timely response to hotspots, an adaptive observer program, and implementation of further restrictions through Fisheries Rules or NCDMF proclamations.

In summary, the ITP conditions sufficiently limit the level of take in the North Carolina inshore gillnet fishery. The required observer coverage will monitor the take levels so that adaptive management may be used, as necessary, to further reduce the take of sea turtles.

6.0 ESA Section 7 Consultation

The OPR ESA Interagency Cooperation Division has completed an ESA Section 7 consultation to determine if issuance of the ITP is likely to adversely affect NMFS ESA-listed sea turtles that are the subject of the ITP. NMFS analyzed the best available scientific and commercial data, the current status of the species, environmental baseline, effects of the proposed action, and cumulative effects to determine whether the proposed action is likely to jeopardize the continued existence of any sea turtle species. In doing so, the analysis focused on the impacts and population response of sea turtles in the Atlantic Ocean. However, except for the NW Atlantic loggerhead turtles that have been listed as a DPS, the impact of the effects of the proposed action on the Atlantic populations is directly linked to the global populations of the species, and the final jeopardy analysis is for the global populations as listed in the ESA.

Based upon the analyses described above, it is our opinion that issuance of the ITP and the operation of the North Carolina inshore gillnet fisheries under NCDMF management and as described in the conservation plan:

- is not likely to jeopardize the continued existence of loggerhead, green, hawksbill, Kemp's ridley, or leatherback sea turtles.

Critical habitat has not been designated for these species in the action area; therefore, the destruction or adverse modification of critical habitat will not occur.

7.0 Public Review and Comment

Public Review on the Incidental Take Permit Application

As part of the NEPA scoping process and review of all Section 10(a)(1)(B) ITP applications, NMFS makes each application and associated conservation plan available for public review. On October 5, 2011 NMFS published a Notice of Receipt (NOR) of the State's draft application for a Section 10(a)(1)(B) ITP for its commercial inshore gillnet fishery and made available the application and conservation plan for public review and comment for 30 days. Upon receiving comments back, NMFS requested for NCDMF to make several modifications to the application. NCDMF submitted an amended application on September 6, 2012, and then on October 31, 2012 NMFS published a NOR of the state's amended application and made the application and conservation plan available for public review and comment for 30 days. Additionally, NMFS solicited input from three independent reviewers with expertise in sea turtle biology and conservation, population modeling, bycatch estimation, and observer programs on both the 2011 and 2012 versions of the application. Comments received during both comment periods from the public and independent reviewers have been considered in subsequent revisions of the conservation plan and have been incorporated into the analysis in this EA as well as an implementing agreement between NCDMF and NMFS.

Comments have been grouped together by topic, and will not be associated with the specific reviewer.

General Comments
Several commenters felt that the application and conservation plan (all or part) were inadequate and failed to meet the ESA minimum requirements. Commenters felt that NMFS should not issue a ITP at all or should only issue one after substantial revisions including terms and conditions. One commenter requested that NMFS include an annual provision in the ITP to publish an annual report in the Federal Register with a request for notice and comment before the ITP could be renewed for the following year. Other commenters suggested several clarifications throughout the application with respect to the various topics listed below.

One commenter believes all gillnets in North Carolina should be banned similar to other states in the southeast United States.

Requested Takes

NMFS received several comments on the number of takes requested by NCDMF in both applications that went out for public review. In general, commenters felt the number of takes requested was too high. Several noted that the second revision had improved the application and favored the reduced number of requested takes in large mesh gillnets. Commenters also asked how the number of takes requested compared with other authorized takes in fisheries or other activities in the northwest Atlantic Ocean. One commenter suggested comparing the North Carolina gillnet bycatch rate per metric ton of fish caught to the bycatch rates in other fisheries to ensure the rates are commensurate.

Commenters questioned how the number of requested takes was generated. In particular, commenters felt that extrapolating previous fishing effort and historic levels of take (to generate anticipated takes) was inappropriate for determining the number of requested takes as it did not consider reductions expected from mitigation measures or whether each population could withstand that level of take. With respect to the predictive model used to estimate takes, one commenter requested that NMFS include the model as an appendix to the ITP and have it peer-reviewed while another commenter requested that NCDMF update the model with current fishing effort rather than historical effort. One reviewer requested that measures of error (e.g., confidence intervals) surrounding the "worse-case scenario" bycatch estimates be included in the application. Further, several commenters noted that the "worse-case scenario" is never fully explained or defined with respect to estimate takes. Another reviewer requested more information on how the preferred model was applied to unobserved fishing effort to estimate the total number of interactions. Along those lines, the reviewer suggested using an average of fishing effort from 2010 and 2011 instead of simply using 2010 data or clearly explaining why that was not done. One reviewer provided detailed, technical comments on the models, evaluation criteria, outputs, and conclusions.

Population Impacts

Several commenters feel the application fails to consider the population impact of the proposed levels of take, particularly on juveniles and with respect to post-release mortality and sub-lethal effects. The commenter noted that a large number of anticipated takes likely represents potentially significant impacts at the population level and issuing a Finding of No Significant Impact (FONSI) would be inappropriate. One commenter suggested assessing genetic composition, relative size and vulnerability, and overall population status of sea turtle species in North Carolina inshore waters. Another commenter noted that the application concludes that fishing will minimally affect the populations without providing any analysis to support that conclusion. One comment encouraged NMFS to consider effects of other fisheries in its baseline analysis of the direct and indirect effects of the proposed action as well as cumulative effects.

Several comments addressed post-release mortality. One noted that the 78.2% of all turtles being released alive since 2005 is misleading because it does not include post-release mortality that could range from 7.1-28.5%, which is an underestimate as it is based on soak times of 4 hours or less. One commenter noted that "18% for all observed interactions" would be more appropriately worded as "the immediate mortality rate" to take into account undocumented post-release mortality.

Mitigation Measures
Several commenters recommended additional mitigation measures, such as greater geographic or seasonal restrictions on gillnets; shorter net lengths; lower profile nets, particularly in deep water; different mesh sizes; reduced soak times; and mandatory attendance of all large mesh gillnets. Another felt the mitigation measures included were not comprehensive or detailed enough to minimize interactions. One commenter suggested that the same requirements imposed by the settlement agreement should be included in the ITP. NMFS received some comments seeking clarification as to whether the requirements of the previous ITP (#1528) for the Pamlico Sound Gillnet Restricted Area would continue under this new ITP.

Monitoring Program
Commenters noted that the observer program should be designed to provide adequate levels of coverage geographically, temporally, and spatially. With respect to the level of coverage, one commenter recommended 15% coverage or that necessary to achieve a bycatch estimate with a CV of 20-30% while another noted the 10% goal and 7% minimum were a compromise during the settlement process and are by no means an ideal level of coverage. One commenter asked NCDMF to include numerical estimates of uncertainty for bycatch estimates (i.e., CVs or other measures of accuracy and precision). Further, one commenter felt the low percentages by area depend far too heavily on extrapolation and are too imprecise to be protective of the species. One commenter asked for clarification as to how the proposed level of observer coverage represents "high" coverage, particularly whether the resulting bycatch estimates would be accurate and real-time. With respect to small mesh gillnets, one commenter felt the amount of observer coverage should be the same as for large mesh gillnets (7%) until more is known about capture rates.

After the first year of the ITP, one commenter suggested conducting an analysis of vessel selection bias and observer effect to determine whether the observed trips are representative of the large and small mesh fisheries. Similarly, another commenter requested more information on the sampling methodology used to place the three types of observers (traditional, alternate platform, and NCDMF Marine Patrol) and their data collection procedures to evaluate the potential for bias.

Several commenters feel that Areas A and C should not be exempt from the observer program; if takes are requested in a particular area, that area should be subject to observer coverage. Further, commenters noted that if an area cannot be observed at required levels, NCDMF should be required to close the area by proclamation until minimum levels can be met. One commenter suggested alternative monitoring schemes.

Adaptive Management
NMFS received several comments relative to the adaptive management approach proposed by NCDMF to address hotspots of bycatch. One commenter encouraged NMFS to formalize standard practices for incorporating hotspot information into decision-making as a condition of the ITP. Several comments highlighted the importance of the monitoring program for informing the adaptive management approach; those commenters were concerned that limited funding may preclude such an approach. Given that the adaptive management approach may encompass closures, commenters asked NMFS to clarify the criteria by which an area could be reopened

following a closure. One idea posed by a commenter included delaying opening the Pamlico Sound Gillnet Restricted Area until the water reached a certain temperature, to be determined in consultation with the Sea Turtle Advisory Committee and NCWRC biologists. Lastly, one commenter requested that NMFS consider "changed circumstances" and "unforeseen circumstances" in the ITP as those circumstances relate to adaptive management.

Funding
Several comments raised concerns with the information included in the application related to the level and stability of funding to implement the ITP requirements (e.g., monitoring program). Commenters recommended including a mandatory provision in the ITP that if funding is not available to monitor an area at the required level (7% for large mesh, 1% for small mesh), NCDMF would close that area to the relevant fisheries until funding and the associated observer coverage could be restored.

ITP Duration
Several commenters think that a 10-year ITP is too long, particularly given the limited data available to inform the application and potential lack of funding to implement the monitoring program. Some feel that a 2-3 year ITP is more appropriate to allow for reassessing take authorization, cumulative effects, management measures (including the adaptive management approach), area boundaries, and other new information (e.g., population shifts, technological advances, fishing changes, sea level rise, etc.). One commenter recommended that NMFS include a provision in the ITP that would require NCDMF to confer with the Sea Turtle Advisory Committee prior to submitting an ITP modification request or a future application, and to include the Committee's comments with the application to NMFS.

Public Comments Received on the Draft Environmental Assessment

A total of 53 public comments were received on the Draft EA. All comments received during the public comment period have been considered and incorporated into the analysis in this EA as appropriate, and responses have been provided below. Comments have been grouped together by topic and will not be associated with the specific reviewer.

General Comments
Several comments were received in general support of issuance of the permit and many provided support specifically for either Alternative 2 or Alternative 3. In that group of comments, several individuals noted that NCDMF has already put regulations in place that reduced the overall effort of the fishery, and therefore should receive the ITP. Several commenters offered general support for restricting and monitoring the take of sea turtles in the North Carolina gillnet fishery but were in favor of issuing the permit.
Several other comments expressed full or partial opposition to the issuance of the permit. Other comments expressed general opposition to the use of gillnets or to the methods used by NCDMF for the operation and oversight of the inshore gillnet fishery.

> NMFS Response: NMFS appreciates the comments received and has taken them into consideration when evaluating the alternatives.

No Action Alternative
Several commenters stated that Alternative 1, No Action, is not a true "no action" alternative and they believed a true no action alternative should look at the environment if the North Carolina inshore gillnet fishery was permanently closed and did not exist.

> NMFS Response: The No Action alternative is meant to look at the status quo, or the environment as it occurs at the present time, absent the proposed action. The proposed action is to issue an ITP to NCDMF to minimize and authorize the take of sea turtles in an existing fishery. As described in Alternative 1 above, the baseline for this EA is the status quo, in which the fishery is operating at its current capacity per NCDMF regulations and the settlement agreement. To look at the No Action alternative as if the fishery does not exist would be a false analysis of the cumulative effects and would not analyze the correct baseline.

Affects Analysis
One commenter suggested that impacts of each alternative were not fully analyzed. Impacts must be considered for the direct and indirect impacts of gillnet fishing on non-targeted fish species, sea birds and migratory birds, and Atlantic sturgeon.

> NMFS Response: To the extent possible, NMFS evaluated the impacts of the proposed action, on non-target species, sea birds and migratory birds. The proposed action is the issuance of an ITP in a currently operating fishery. Therefore, impacts to these species are only considered when looking at the changes that will occur from the baseline or status quo. This discussion has been expanded in the Final EA for clarity.

ESA Section 7 Consultation
Several commenters requested that a full summary of the ESA Section 7 consultation be included in the Final EA.

> NMFS Response: This has been included in the Final EA.

Mitigation to Further Minimize Takes
One commenter urged NMFS to further minimize and mitigate sea turtle takes. It was requested that NMFS add in additional information on the mitigation that NCDMF has already put in place and the benefits of those programs. The take requested in the application and what is listed in Alternative 3 is still excessive and unnecessary.

> NMFS Response: NMFS has evaluated whether additional take minimization is necessary and appropriate. NMFS has worked cooperatively with NCDMF to minimize take to the maximum extent possible. As data are collected during implementation of this ITP, we will gain a better understanding of the level of take that occurs in this fishery and its impact on sea turtle species allowing us to further reduce take in the future.

Enforcement
One comment urged NMFS to ensure proper enforcement of the ITP that is put in place.

NMFS Response: NMFS will remain in regular contact with NCDMF throughout the effective duration of the ITP and through the reporting process outlined in the ITP to ensure that all ITP conditions are followed. Additionally, NMFS and NCDMF have developed an ITP Implementing Agreement to ensure proper execution of the permit conditions and maintain regular communication and coordination.

Comments on the Application

One commenter noted that in the section summarizing public scoping comments on the NCDMF application, NMFS noted comments were received from three independent experts, but NMFS did not provide those conversations or analyses.

NMFS Response: The comments received from the independent expert reviewers were included within the summary of public scoping comments received.

Social and Economic Analysis

One commenter noted that the document does not provide a specific reference to the economic importance of the North Carolina large mesh flounder fishery, and it also does not provide economic value of the sea turtles that will be taken in the fishery. One commenter stated that the artisanal commercial fishery is extremely important and the wild nutrition seafood that they harvest is critical to the North Carolina culture and populations. One commenter noted that the large mesh gillnet fishery is necessary to sustain the seafood market in North Carolina. Removing this fishery will have a direct economic impact on the communities. It was noted by one commenter that seafood is part of North Carolina's culture and brand. Another commenter noted that Alternative 1 may have significant social and economic impacts, because without a permit, NCDMF may decide to close the inshore gillnet fishery. One commenter noted that some fishermen do often survive on the flounder fishery alone, and cannot reasonably rely on other fisheries or fishing areas to support them. One commenter noted that although there are fewer active fishermen in North Carolina now as compared to previous years, the fishery is still a critical component of the economy and a source of food for the community.

NMFS Response: These comments were noted and additional information on the social and economic value of the North Carolina inshore gillnet fishery has been provided in this Final EA.

Scope of Permit

One commenter suggested that sea turtle takes occurring in the pound net fishery should be included in the ITP application. Another commenter urged NMFS to mitigate takes in the hook and line fishery.

NMFS Response: NMFS is aware of sea turtle takes that occur in the North Carolina pound net fishery, as well as in the recreational hook and line fishery. However, the application that was submitted by NCDMF was focused only on the North Carolina inshore gillnet fishery. As such, the inshore gillnet fishery is the subject of analysis in this EA.

ITP Duration

Several commenters expressed concern for the 10-year time period for this ITP, and several suggested a time period of 3-5 years might be more appropriate, particularly given the limited data available to inform the application and potential lack of funding to implement the monitoring program.

> NMFS Response: NMFS acknowledges the concern for a 10-year time period for this ITP. In response to concerns for the timing of the permit, NMFS and NCDMF have developed an Implementing Agreement that outlines the structure and responsibilities throughout the permit period. Further, the ITP requires a specific level of monitoring in each area and season. If NCDMF does not have the funding to implement the monitoring program, NCDMF would need to close the relevant area(s) in the relevant season(s).

Available Scientific Data

Several commenters noted that stock assessments of all sea turtle species are necessary for this analysis.

> NMFS Response: NMFS has used the best available scientific data to complete our analysis of this ITP application. In the absence of a specific population number or ideal data set for an analysis, NMFS is required to use the best scientific and commercial data available. For this analysis, NMFS used observer data and relevant research to conduct a thorough analysis.

Estimated vs. Observed Take Authorization

Several commenters noted confusion in the relationship between estimated and observed takes in the Draft EA Alternatives 2 and 3. It was suggested that additional information be added to clarify what will be authorized.

> NMFS Response: NMFS has added additional information to the descriptions of Alternative 2 and Alternative 3 to provide clarification. A generalized linear model (GLM) framework was used to predict sea turtle interactions in North Carolina's inshore gillnet fisheries based on data collected from 2007 through 2011. However for some species and areas, insufficient data were available to complete the model and develop predicted take estimates. Therefore, the take of those species has been expressed as an annual observed take number.

Literature Cited

Two commenters noted that several references were missing from the literature cited section of the Draft EA and requested that they be added.

> NMFS Response: NMFS has updated the literature cited section in the Final EA.

Lethal vs. Non-Lethal Takes

One commenter noted that most interactions result in live released animals and not mortalities; therefore, the term take should be clarified because there are low mortalities.

NMFS Response: The term take refers to both lethal and non-lethal interactions. In the analysis NMFS evaluates all take, both lethal and non-lethal and the potential impact on the species population.

Funding

Several commenters raised concerns that the application submitted by NCDMF does not include adequate information related to the level and stability of funding to implement the permit requirements, and commenters suggested that NMFS should not issue the permit without proof that funding will be available for the monitoring program.

NMFS Response: NCDMF will be responsible for maintaining the specific monitoring levels that are required in the ITP. If funding is not available to implement the comprehensive monitoring program, NCDMF would be responsible for closing particular area(s) during particular season(s) in which they could not meet the required monitoring levels. If NCDMF cannot maintain the necessary monitoring program, then the permit conditions will not be met and take coverage would not apply.

8.0 List of Preparers and Agencies Consulted

This document was prepared by the Marine Mammal and Sea Turtle Conservation Division of NMFS' OPR (F/PR2) in Silver Spring, Maryland.

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10.0 Appendix A – Finding of No Significant Impact

FINDING OF NO SIGNIFICANT IMPACT
on Issuance of an Incidental Take Permit (File No. 16230) to the North Carolina Division of Marine Fisheries for take of Sea Turtles in the North Carolina Inshore Gillnet Fishery

National Marine Fisheries Service

Background:
On September 6, 2012 (updated January 18, 2013), the North Carolina Division of Marine Fisheries (NCDMF) submitted an application to the National Marine Fisheries Service (NMFS) for an Incidental Take Permit (ITP) to incidentally take ESA-listed sea turtles associated with large and small mesh gillnet fisheries operating in the inshore North Carolina waters year-round. The ITP application includes provisions that were put in place in 2010 as a result of a lawsuit and Settlement Agreement with the Karen Beasley Sea Turtle Rescue and Rehabilitation Center (Beasley Center), as well as additional management measures as part of a state-wide conservation plan. The application and conservation plan include take requests for endangered Kemp's ridley, leatherback, and hawksbill sea turtles and threatened green and loggerhead sea turtles.

In accordance with the National Environmental Policy Act, NMFS has prepared an Environmental Assessment (EA) analyzing the impacts on the human environment associated with the proposed action, which is to issue the incidental take permit with additional take limitations, conditions, and monitoring *(Environmental Assessment on the Effects of Issuing Incidental Take Permit No. 16320 to North Carolina Division of Marine Fisheries for the Incidental Take of Sea Turtles Associated with the Otherwise Lawful Commercial Inshore Gillnet Fishery in North Carolina Inshore State Waters)*. In addition, a Biological Opinion was issued under section 7 of the Endangered Species Act (ESA) summarizing the results of an interagency consultation. The analyses in the EA, as informed by the Biological Opinion, support the following determination.

Analysis:
The National Oceanic and Atmospheric Administration's Administrative Order 216-6 (May 20, 1999), for implementing NEPA, contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality (CEQ) NEPA implementing regulations at 40 C.F.R. 1508.27 state the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant to making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ's context and intensity criteria. These include:

(1) Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat (EFH) as defined under the Magnuson - Stevens Act and identified in Fishery Management Plans?

Response: The proposed action is not expected to cause substantial damage to the ocean and coastal habitats and/or EFH. The proposed action would provide an exemption to the ESA take prohibitions for capturing sea turtles incidental to the otherwise lawful North Carolina inshore

gillnet fishery and would not alter or affect unique areas, including any components of EFH.

(2) Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?

Response: No substantial impacts on biodiversity or ecosystem function within the affected action areas are expected. The proposed action would provide an exemption to the ESA take prohibitions for capturing sea turtles incidental to the otherwise lawful North Carolina inshore gillnet fishery. The proposed action does not interfere with benthic productivity, predator-prey interactions, or other biodiversity or ecosystem functions. The ITP requires all take to be reported to NCDMF, and the state will actively monitor the level of take that occurs. Sea turtle mortalities are expected and are authorized by the permit, but NMFS expects that these mortalities would not appreciably reduce the species' likelihood of survival and recovery in the wild.

(3) Can the proposed action reasonably be expected to have a substantial adverse impact on public health or safety?

Response: The proposed action is not expected to have substantial adverse impacts on public health or safety because the action, issuing an ITP, would only provide an exemption to the ESA take prohibitions for capturing sea turtles in the North Carolina inshore gillnet fishery.

(4) Can the proposed action reasonably be expected to adversely affect endangered or threatened species, their critical habitat, marine mammals, or other non-target species?

Response: The proposed action would provide an exemption to the ESA take prohibitions for the incidental capture of ESA-listed sea turtles; therefore, endangered and threatened sea turtles will be affected. The Marine Mammal and Sea Turtle Conservation Division consulted with NMFS Endangered Species Act Interagency Cooperation Division, which determined in its Biological Opinion that issuance of the permit is likely to adversely affect individual loggerhead, leatherback, Kemp's ridley, green and hawksbill sea turtles, but those effects are not likely to jeopardize the continued existence of these species or to result in the destruction or adverse modification of designated critical habitat. The West Indian manatee *(Trichechus manatus),* also known as the Florida manatee, is a Federally-endangered aquatic mammal protected under the ESA and the Marine Mammal Protection Act. The manatee is also listed as endangered under the North Carolina Endangered Species Act. The U.S. Fish and Wildlife Service (FWS) is the lead Federal agency responsible for the protection and recovery of the West Indian manatee under the provisions of the ESA. As such NMFS consulted with FWS, and in a letter dated November 29, 2011, FWS concurred with NMFS' determination that the proposed action, issuance of an ITP for sea turtles, was not likely to adversely affect the West Indian manatee. Manatees are rare in North Carolina waters; and, therefore, it is not likely that any alternative would have a significant impact on manatees. Seabirds are susceptible to incidental capture in the North Carolina inshore gillnet fishery; and, therefore, negative impacts may occur (e.g., mortality from entanglement and drowning) to seabirds from all of the alternatives. No ESA-listed seabirds are expected to be incidentally captured or adversely affected by the North Carolina inshore gillnet fishery.

(5) Are significant social or economic impacts interrelated with natural or physical environmental

effects?

Response: There would be no significant social or economic impacts interrelated with significant natural or physical environmental effects. The North Carolina inshore gillnet fishery is currently in operation, and NCDMF has previously issued regulatory proclamations that have specified requirements for when gillnets can be placed in the water. The permit and conservation plan are based in large part on the existing regulations, and NMFS does not anticipate any additional incremental impact resulting from issuance of the permit.

(6) Are the effects on the quality of the human environment likely to be highly controversial?

Response: On October 31, 2012, NMFS published a notice of receipt of NCDMF's application (File No. 16230) and a request for public comment in the *Federal Register* (77 FR 65864). The public comment period was open for 30-days, ending on November 30, 2012. Additionally, on July 16, 2013 (78 FR 51709), NMFS published a Federal Register Notice requesting public comment for 15 days on the Draft Environmental Assessment. NMFS received comments on the content and specific components of the application and Draft EA. NMFS received no comments indicating any highly controversial issues.

NMFS does not expect the issuance of the proposed permit to have highly controversial effects on the quality of the human environment.

(7) Can the proposed action be reasonably expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, essential fish habitat, or ecologically critical areas?

Response: The proposed action would provide an exemption to the ESA take prohibitions for capturing sea turtles incidental to the North Carolina inshore gillnet fishery. The nature of the action is such that it would not result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, EFH, or ecologically critical areas.

(8) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

Response: The effects of the proposed action on the human environment would be limited to the sea turtle captures authorized to be taken incidental to the North Carolina inshore gillnet fishery, and those effects are not unique or unknown. The Endangered Species Conservation Division consulted with NMFS Endangered Species Act Interagency Cooperation Division, which determined in its Biological Opinion that issuance of the permit is not likely to jeopardize the continued existence of NMFS ESA-listed species or to result in the destruction or adverse modification of designated critical habitat. The Conservation Plan and permit rely on proven effective methods for monitoring, minimizing, and mitigating the impacts of incidental take in a fishery.

(9) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

Response: The proposed action and other individually insignificant actions do not result in cumulatively significant impacts. The proposed action will authorize the incidental capture of sea turtles, resulting in both live captures and mortalities. Sea turtles face numerous natural and anthropogenic threats throughout their life histories that shape their status and affect their ability to recover. Effects of past and ongoing human and natural factors (fisheries, vessel traffic, etc.) occurring in this broad area have contributed to the current status of the listed sea turtles. Based on the analysis in this EA and supported by ESA section 7 consultation, NMFS expects that issuance of the proposed incidental take permit would not appreciably reduce the species likelihood of survival and recovery in the wild, nor would it adversely affect spawning, mortality rates, or recruitment rates. The incremental impact of the proposed authorization of takes of sea turtles incidental to the otherwise legal North Carolina inshore gillnet fishery, when added to other past, present, and reasonably foreseeable future actions, is not expected to result in population-level effects; and, therefore, will not have cumulatively significant impacts.

(10) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

Response: The proposed action would provide an exemption to the ESA take prohibitions for capturing sea turtles incidental to the North Carolina inshore gillnet fishery. The nature of the action is such that it would not result in effects to these areas or resources.

(11) Can the proposed action reasonably be expected to result in the introduction or spread of a non-indigenous species?

Response: The proposed action would not introduce any species; therefore, it would not result in the introduction or spread of a non-indigenous species.

(12) Is the proposed action likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

Response: The decision to issue this ITP would not be precedent-setting and would not affect any future decisions. Issuing an ITP to a specific individual or organization for a given activity does not in any way guarantee or imply that NMFS will authorize other individuals or organizations to conduct the same or similar activity.

(13) Can the proposed action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?

Response: The proposed action would provide an exemption to the ESA take prohibitions for capturing sea turtles incidental to the North Carolina inshore gillnet fishery in accordance with the Endangered Species Act. The proposed action would not result in any violation of Federal state or local laws for environmental protection. The ITP does not relieve NCDMF of the responsibility for obtaining other permits, or complying with other Federal, State, local, or international laws or regulations, if necessary and required.

(14) Can the proposed action reasonably be expected to result in cumulative adverse effects having a substantial effect on the target species or non-target species?

Response: The action of issuing an ITP to the NCDMF is not expected to result in any cumulative adverse effects to the target or non-target species of the North Carolina inshore gillnet fishery, that are the subject of the proposed ITP. Based on the analysis in this EA and supported by ESA section 7 consultation, NMFS expects that issuance of the proposed ITP would not appreciably reduce the likelihood of survival and recovery in the wild for any sea turtle species. The incremental impact of the proposed authorization of takes of sea turtles incidental to the otherwise legal North Carolina inshore gillnet fishery, when added to other past, present, and reasonably foreseeable future actions, is not expected to result in population-level effects. As noted in the EA, Atlantic Sturgeon may also be taken in the North Carolina inshore gillnet fishery, but impacts will be evaluated in a forthcoming EA.

DETERMINATION

In view of the information presented in this document and the analyses contained in the EA prepared for issuance of the ITP, pursuant to the ESA, and the ESA section 7 Biological Opinion, NMFS hereby determines that the issuance of ITP No. 16230 would not significantly impact the quality of the human environment as described above. In addition, all direct, indirect and cumulative beneficial and adverse impacts of the proposed action have been addressed in reaching the conclusion of no significant impacts. Accordingly, preparation of an Environment Impact Statement (EIS) for this action is not necessary.

Perry Gayaldo 9.6.13

for Donna S. Wieting Date
Director, Office of Protected Resources