Application for an Individual Incidental Take Permit under the Endangered Species Act of 1973

September 6, 2012

Updated: January 18, 2013

Updated: June 13, 2013

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Atlantic Sea Turtle Populations of:

Loggerhead, *Caretta caretta*
Green, *Chelonia mydas*
Kemp's ridley, *Lepidochelys kempii*
Leatherback, *Dermochelys coriacea*
Hawksbill, *Eretmochelys imbricata*

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INTRODUCTION

The North Carolina Division of Marine Fisheries (NCDMF) requests an Incidental Take Permit (ITP) under Section 10 of the Endangered Species Act of 1973 (Public Law 93-205) (ESA). The requested ITP will authorize the implementation of management measures to protect threatened and endangered sea turtles and other ESA listed species, while allowing estuarine gill-net fisheries for southern flounder, *Paralichthys lethostigma* and other species prosecuted by commercial license holders to fish in the internal coastal (estuarine) waters of North Carolina. This request is prompted by notification from the National Marine Fisheries Service (NMFS) - Southeast Regional Office (SERO) in July and November 2009 indicating the need for the state of North Carolina to address unauthorized takes of sea turtles occurring in inshore gill-net fisheries. The NCDMF desires to receive this ITP by April 2013 to implement a monitoring program and management measures that will ensure authorized sea turtle takes are not exceeded, while allowing North Carolina inshore gill-net fisheries to operate.

SPECIES OF CONCERN

loggerhead turtle, *Caretta caretta*
green turtle, *Chelonia mydas*
leatherback turtle, *Dermochelys coriacea*
hawksbill turtle, *Eretmochelys imbricata*
Kemp's ridley turtle, *Lepidochelys kempii*

On June 2, 1970, leatherback and hawksbill sea turtles were listed as endangered under the ESA throughout their ranges. Kemp's ridley sea turtles were listed as endangered on December 2, 1970. Green sea turtles were listed as threatened on July 28, 1978, except for the breeding populations of Florida and the Pacific coast of Mexico, which were listed as endangered. On July 28, 1978, loggerhead sea turtles were listed as threatened wherever they occur. The NMFS determined that the loggerhead sea turtle is composed of nine distinct population segments (DPSs) that constitute ''species'' that may be listed as threatened or endangered under the ESA. In the final ruling on September 22, 2011, NMFS listed four DPSs as threatened and five as endangered under the ESA. The Northwest Atlantic Ocean DPS is listed as threatened.

The geographic distribution of loggerhead sea turtles includes the subtropical and tropical waters and continental shelves and estuaries along the margins of the Atlantic, Pacific, and Indian oceans. Loggerhead sea turtles are rare or absent far from mainland shores. In the Western Hemisphere, their

range extends as far north as Newfoundland and as far south as Argentina. Green sea turtles have a global distribution in tropical and subtropical waters. In U.S. Atlantic waters, green sea turtles occur around the Virgin Islands and Puerto Rico and from Texas to Massachusetts. Leatherback sea turtles occupy the open seas, although they are occasionally seen in coastal waters. Leatherbacks prefer warmer waters; however, they frequently appear in New England waters north to Newfoundland during the summer months. Hawksbill sea turtles are typically a tropical species found throughout the Caribbean. They are commonly observed in the Florida Keys, Bahamas, and southwestern Gulf of Mexico. Hawksbill stragglers have been reported as far north as Massachusetts and as far south as northern Argentina. This species is infrequently found in shallow coastal estuarine systems. Kemp's ridley sea turtles occur most frequently in the Gulf of Mexico, but they also occur along the Atlantic coast as far north as Long Island, NY and Martha's Vineyard, MA.

As water temperatures begin to rise during the spring months, sea turtles migrate northward along the coast and into estuarine waters (Shoop and Kenney 1992; Thompson and Huang 1993; Musick et al. 1994; Witzell and Azarovitz 1996; Braun-McNeill and Epperly 2004; Mansfield et al. 2009). When waters begin cooling during the fall, many sea turtles migrate southward out of the temperate latitudes to warmer waters. Others move offshore to warm waters in or near the Gulf Stream (McClellan and Read 2007; Mansfield et al. 2009). In 1988, researchers with the NMFS Laboratory in Beaufort, NC began monitoring the distribution of sea turtles in North Carolina estuarine and near-shore waters, employing three complementary methods to assess turtle distributions: aerial surveys, public sightings, and mark-recapture studies (Epperly et al. 1995a, 1995b). This research identified a distinct seasonal pattern of sea turtle distribution in the estuarine and near-shore ocean waters of North Carolina. In April, as coastal waters begin to warm, sea turtles enter North Carolina's estuaries. During summer months, sea turtles may be found from the Croatan and Roanoke sounds to the Cape Fear River and as far west as the lower reaches of the Neuse River estuary. The greatest densities of sea turtles occur in Core Sound and along the eastern shore of Pamlico Sound. In the fall, sea turtles leave the estuaries as water temperatures cool and are rarely seen inside the barrier islands from January to March. Sea turtles are observed in offshore ocean waters throughout the year.

Females of all five species of sea turtles lay clutches of eggs in nests on coastal beaches. The adults aggregate off the nesting beaches during the spring to mate. After mating, females move onshore to lay eggs. Up to seven clutches may be laid during a single nesting season. After an incubation period of two months, the hatchlings dig to the surface and move toward the ocean. The young swim offshore and spend their early life in offshore waters. After several years at sea, most species enter the coastal waters and move into bays, river mouths, and estuaries where they spend their juvenile life.

Reported sea turtle strandings in North Carolina increased from 1995 to 2000. Prior to 1995, annual stranding totals averaged < 200. Strandings increased considerably in 2000 with 831 reported statewide. North Carolina strandings from 2001 through 2011 averaged 479 per year with 2011 (n = 848) being the highest year for the time period (Table 1; North Carolina Wildlife Resources Commission Sea Turtle Stranding Network Database Sea Turtle Stranding and Salvage Network - NCSSTN). From 2001 to 2011, strandings were made up of 49.3% loggerhead, 31.1% green sea turtles, and 14.7% Kemp's ridley (Table 1).

ESTUARINE GILL-NET FISHERIES

North Carolina has a unique estuary system. The inshore estuarine system is created by a chain of barrier islands along nearly the entire coast and is defined 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 (Figure 1). This brackish water coastal sound ecosystem is the third largest estuary in the world. This estuary provides prime habitat for numerous finfish species that are harvested by residents and visitors to North Carolina in both the recreational and commercial fisheries.

Analyses of NCDMF commercial harvest trip ticket data, observer data, fish house sampling programs, and input from the fishing industry enables North Carolina fisheries to be characterized by gear type both spatially and temporally (NCDMF 2008). Commercial landings are monitored through the North Carolina Trip Ticket Program (NTTP) which began in 1994. Under this program, all individuals or businesses that buy seafood from licensed commercial fishermen in the state must have a NC seafood dealer's license. These dealers are required to complete a trip ticket every time a commercial fisherman lands fish. Trip tickets capture data on gears used to harvest fish, area fished, species harvested, and total weight by species.

The NCDMF initiated a statewide fishery-dependent sampling program covering the dominant commercial finfish fisheries in 1982 (NCDMF 2008). The objective was to obtain biological and fisheries data on economically important finfish for use in reaching management decisions. The NCDMF field biologists and technicians collect data dockside as fish are landed. Commercial fishermen are also interviewed dockside whenever possible. Data collected include information on location, effort, and gear characteristics, as well as information used to determine the size and age distribution of species landed.

The following descriptions of ongoing North Carolina estuarine gill-net fisheries characterizes the types of gear used, areas and seasonality of the fisheries, target species for each fishery, dockside value, and participation levels. The diversity and scale of the North Carolina fishing industry is illustrated, and

the descriptions provide a basis for understanding how sea turtle interactions may occur in the various estuarine gill-net fisheries.

Along the Atlantic coast, gill nets are a legal gear and used for commercial and recreational purposes in all states, to some degree, with the exception of Pennsylvania and Florida. Commercial and recreational fishermen deploy gill nets in North Carolina's estuarine and ocean waters (Figure 1). Gill nets are highly regulated through the fisheries rules adopted by the North Carolina Marine Fisheries Commission (NCMFC) and by the NCDMF through proclamations issued by the director (Appendix C). Regulations include mandatory attendance, yardage limits, soak-time restrictions, net shot limits, tie down requirements, closed areas (primary nursery areas, Pamlico Sound Gill Net Restricted Area - PSGNRA), mesh size restrictions, minimum distance between fishing operations, marking requirements, permit mandates (PSGNRA), and observer requirements (PSGNRA, Core Sound 2009, Beasley Settlement Agreement).

Gill-net fisheries and related restrictions differ throughout the state depending on season, target species, location, and physical characteristics of water body being fished. In general, there are three primary set techniques: anchored set nets, floating drift nets, and strike or runaround nets. Anchored gill nets are passive sets deployed with an anchor or stake at one or both ends of the net shots or operation. Typically, these nets fish from the bottom upward into the water column. Drift nets are floated with the tides, are not anchored, and are typically used in deeper water areas such as near ocean inlets. With strike or runaround gill-net fisheries, the gear is set and quickly retrieved after surrounding a school of fish.

Anchored gill nets are the primary concern for sea turtle interactions. The drift and runaround gill-net fisheries are executed quickly enough that sea turtle interactions, if any, are minimal. Fishermen typically survey an area before gear is deployed and therefore can determine if sea turtles are present before gear deployment. This ITP application will concentrate on the anchored gill-net fisheries.

Gill nets may be used to target specific size ranges of fish due to the selectivity of different mesh sizes. Consequently, fishermen use gill nets of different mesh sizes to target different species. Commonly used mesh sizes in NC estuarine waters range from 2 ½ inch stretch mesh (ISM) to 6 ½ ISM. Mesh size limitations are frequently established by fisheries rules or by NCDMF proclamation(s).

Gill nets have been subject to increased monitoring over the past decade. In addition to the monitoring efforts throughout the fall PSGNRA from 2001 through 2011, commercial estuarine gill-net observer coverage has been expanded throughout the state since 2004. Information gathered during observer trips includes data on effort and mesh sizes used, as well as data on the size and disposition of captured species (NCDMF 2008; Price 2007a, 2009a, 2010b; Boyd 2012).

Information is gathered by NCDMF in a variety of ways. The NCDMF uses data from its NTTP and fish house samples in addition to observations of commercial trips to characterize North Carolina's

estuarine gill-net fishery. Many commercially valuable species are targeted by gill nets throughout the year with no single size gill-net (i.e., mesh size) being ideal for all species. Resulting information confirm that gill-net fishermen utilize specific mesh size nets depending on the target species. While multiple species are most often landed for a single trip, a target species often comprises the majority of the catch.

By conducting these analyses and combining this information with direct commercial observations, distinct target species for small mesh and large mesh gill-net fisheries may be identified spatially and temporally for NC estuarine waters. Large mesh fisheries consist primarily of five target species including southern flounder, striped bass *Morone saxatilis*, American shad *Alosa sapidissima*, hickory shad *Alosa mediocris*, and catfishes *Ictalurus sp*. Large mesh gill-net fisheries for southern flounder traditionally operate throughout the majority of the sounds and lower estuarine river systems with a peak in effort in the fall months (September through November). Estuarine fisheries for striped bass, which are managed in most areas as bycatch fisheries by the NCDMF, are more limited in time and space due to the anadromous migration pattern of this species. Striped bass gill-net fisheries are permitted subject to regulation from late October through late April with a closed season from May through September. All gill-net fisheries are not allowed to possess striped bass. The majority of striped bass harvest occurs in the Albemarle Sound with additional early spring effort occurring in the Pamlico Sound and the Pamlico and Neuse river systems. American and hickory shad fishing operations occur almost exclusively from January 1 through April 14 due to their anadromous migration patterns and distribution (season established by Fisheries Rule 15A NCAC O3M .0519). Catfish are harvested with large mesh gill nets in the rivers and western Albemarle Sound with the majority of catches occurring during the winter to spring months. The most common mesh size for all large mesh gill-net fisheries is 5 ½ ISM.

Small mesh (<4 ISM) gill-net operations target a more diverse array of species relative to large mesh gill-net fisheries. Mesh sizes used in small mesh gill-net operations vary more than those used in large mesh fisheries. However, the most commonly used small mesh sizes generally fall between 3 and 3 ¾ ISM. Small mesh gill-net 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*. Peaks in spot landings occur in the spring and summer (April through June) and fall (October through November) months and are landed throughout the estuarine waters and river systems. Striped mullet are landed year round, but peaks occur in the fall (October through November). Bluefish are also landed year round throughout the estuarine and river systems with most landings occurring in the spring during April and May. Spotted seatrout and weakfish

are targeted by small mesh gill-net operations primarily in the fall and winter (September through January) months. Weakfish landings may also peak in the spring during April and May. Atlantic menhaden are mostly targeted during the spring (February through May) with another peak in landings occurring in October. Spanish mackerel are primarily targeted during the spring, summer, and fall months. White perch are almost exclusively targeted during the winter and spring months (December through April). Kingfishes are targeted primarily in the spring and the fall.

LANDINGS AND VALUES

As fishermen spend their earnings in community stores, shipyards, offices, and other businesses, additional economic impacts are generated. An analysis using the IMPLAN software package estimates that each $1 spent generates $1.50 in economic impact before leaving the state's borders (IMPLAN version 3.0.5.2 2010). Estuarine gill-net landed species contribute to the businesses of primary dealers and processors which are estimated to have an annual economic impact of 255 million dollars to the state economy (Hadley and Crosson 2010). These estimates do not include further "downstream" impacts of locally caught seafood that support owners and workers of most secondary dealers and processors, restaurants, shipping companies, refrigeration companies, and a multitude of other businesses.

The socioeconomic characteristic of commercial fishing varies by county and region along the coast of North Carolina. By comparing the data gathered from the NCTTP and those from the NC Employment Security Commission, Bianchi (2003) was able to show that 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. In these counties, close to 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. Therefore, in considering the economic impacts of restrictions in one fishery, it is important to understand that North Carolina fishermen rely upon having diverse fishing opportunities to make their living.

Ex-vessel value is a measure of payment a fisherman 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 70 million dollars in 2011. Estuarine landings accounted for 64% of the total and were valued at 44 million dollars in 2011. From 1994 to 2011, the mean value of commercial fishing operations in North Carolina estuarine waters was 58 million dollars. Estuarine gill nets 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 gill nets were southern flounder, striped mullet, Spanish mackerel, striped bass, spot, bluefish, white perch, American shad, red drum *Sciaenops*

ocellatus, and kingfishes. These species made up 92% of the total ex-vessel value for estuarine gill nets in NC for 2011. Gill-net 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 gill nets in estuarine waters in 2011, gill nets were responsible for more than 80% of the total NC estuarine landings for each species. Large mesh (≥5 ISM) gill-net fisheries (e.g., southern flounder, red drum, striped bass, American shad) account for 48% of the total estuarine gill-net value and 55% of the total estuarine gill-net number of trips for 2011.

From 1994 to 2011, the total number of commercial fishing trips for all gears in state waters averaged more than 210,000 per year. The average number of annual commercial fishing trips for all gears in estuarine waters was 191,000 between 1994 and 2011. Beginning in 2002, a decreasing trend in the total number of estuarine trips for all gears was noted with 125,000 trips in 2011. By comparison, the average number of trips for all gears from 2002 to 2010 was 153,000 per year.

The number of annual estuarine gill-net trips averaged 39,000 from 1994 through 2011. The declining trend in total estuarine commercial fishing trips is also reflected in the number of estuarine gill-net trips. Estuarine gill-net trips declined from a high of 51,000 in 1997 to 25,000 trips in 2011.

SEA TURTLE INTERACTION TRENDS

Since 2006, observed and estimated sea turtle interactions in commercial large mesh gill-net fisheries in the PSGNRA have increased (Price 2010a; Boyd 2011; Table 2). Interactions have also been observed outside of the PSGNRA through commercial gill-net observations by the NCDMF and the 2009 NMFS alternative platform (AP) observer work in Core Sound (Price 2007b, 2009b; Boyd 2012; NMFS unpublished data). From 1999 through 2011, a total of 226 sea turtles have been observed by NCDMF in the estuarine gill-net fisheries throughout North Carolina. Of the 226 sea turtles observed, measurements have been recorded (n = 207) for the majority (92%) of them. Green sea turtles (n = 139; 62%) ranged from 115 mm to 457 mm (curved carapace length [CCL] from notch to tip; Figure 2). Kemp's ridley sea turtles (n = 61; 27%) ranged from 110 mm to 559 mm CCL (Figure 3). Loggerhead sea turtles (n = 23; 10%) ranged from 300 mm to 1,067 mm CCL (Figure 4). There have only been two hawksbill sea turtle interactions (250 mm and 330 mm CCL) during the eleven year period and one unidentified sea turtle with no measurement.

From 2005 to 2011, 103 sea turtle interactions were observed in the PSGNRA. Of these, 80% were green sea turtles, 8.7% were loggerhead sea turtles, and 9.7% were Kemp's ridley sea turtles (Table 2). Also, one hawksbill sea turtle interaction was observed in the PSGNRA in 2009 (Price 2010a; Table 2). The majority (69%) of observed sea turtle interactions in the PSGNRA were live individuals that were subsequently tagged and released.

A total of eleven sea turtle interactions were observed outside of the PSGNRA from January 2004 through December 2009 in large mesh gill-net operations in NC estuarine waters. The interactions were comprised of green turtles (n = 6; 3 alive, 3 dead), loggerhead turtles (n =1; alive), and Kemp's ridley turtles (n = 4; 2 alive, 2 dead).

In the summer and fall of 2009, the NMFS AP observations in Core Sound indicated similar sea turtle mortality trends (NMFS unpublished data). The majority (55%) of observed interactions involved green sea turtles (n = 12) with Kemp's ridley (23%; n = 5) and loggerhead (23%; n =5) also being observed. Of the total interactions for all species combined (n = 22), 73% involved live individuals (Table 3).

In 2010, NCDMF began a dedicated statewide observer program to characterize sea turtle interactions throughout the estuarine gill-net fisheries in North Carolina. From 2010 through 2011, a total of 85 observed sea turtle observations occurred (Figure 5). Interactions (n = 85) occurred throughout North Carolina estuarine waters with all but one occurring in Management Units B, C, D1, D2, and E (Figure 6, Figure 7). One interaction occurred on the border of Management Unit A and B in the Roanoke Sound (Figure 6). The mortality rate was 18% for all observed interactions from 2010 through 2011 (Figure 5).

MANAGEMENT HISTORY

The NCDMF has addressed protected sea turtle issues in the coastal waters since the 1970s. This has been accomplished by cooperative agreements with the North Carolina Wildlife Resources Commission (NCWRC), establishment of a sea turtle sanctuary, proclamation authority delegated to the Director of NCDMF, additional queries on recreational surveys, management of the PSGNRA, formation of the NC Sea Turtle Advisory Committee (STAC), implementation of a large mesh gill-net observer program, commercial bycatch reduction gear testing projects, outreach to the fishing industries, and collaboration with the NMFS. The STAC reviewed and made recommendations to NCDMF in 2006 and was re-formed in 2010 to help address issues concerning sea turtles in North Carolina (STAC 2006).

An agreement was established in 1979 with the NCWRC to exercise regulatory jurisdiction over all species of sea turtles and their eggs and nests, consistent with designation of such species as endangered or threatened by the United States Fish and Wildlife Service (USFWS). In 1980, the NCMFC established a Sea Turtle Sanctuary off the coast of North Carolina to protect nesting beaches through NCMFC Rules (Fisheries Rule 15A NCAC 03R. 0101). In 1983, the NCMFC delegated proclamation authority to the NCDMF Director to close areas to protect endangered and threatened species (Fisheries Rule15A NCAC 03I. 0107). In 1989, an addition was made to the Marine Recreational Fisheries

Statistics Survey (MRFSS) program to include a sea turtle sightings query on the survey form. The NCDMF has applied for and received ITPs for several fisheries in the past:

ITP 1008 - incidental takes of sea turtles in the shrimp trawl fishery in the area off the North Carolina coastal ocean waters from Brown's Inlet to Rich's Inlet, 1996–2000

ITP 1325 - incidental takes of sea turtles in the shrimp trawl fishery in the area off the North Carolina coastal ocean waters from Brown's Inlet to Rich's Inlet, 2001–2006

Application (file number 1603), not issued

ITP 1259 - implementation of gill-net management measures to protect threatened and endangered sea turtles in the southeastern Pamlico Sound (PSGNRA), 2000

ITP 1348 - implementation of gill-net management measures to protect threatened and endangered sea turtles in the southeastern Pamlico Sound (PSGNRA), 2001

ITP 1398 - implementation of gill-net management measures to protect threatened and endangered sea turtles in the southeastern Pamlico Sound (PSGNRA), 2002–2004

ITP 1528 - incidental takes of sea turtles along the Outer Banks fall flounder fishery, 2005–2010

ITP 1528 (extension) - incidental takes of sea turtles during the Outer Banks fall flounder fishery, 2011

Application (file number 16230) - incidental takes of sea turtles in the North Carolina Estuarine Gill-Net Fishery, August 11, 2011

PSGNRA Management

During the fall of 1999, increased sea turtle strandings were noted by the NCSSTN in the southeastern portion of Pamlico Sound. Following the stranding reports, immediate investigation of the fisheries activities in this area were conducted by the NCDMF and the NMFS. Observations revealed three gill-net fisheries that were being prosecuted in NC estuarine waters: a shallow water large mesh fishery along the Outer Banks, a deep water large mesh fishery further from shore, and a shallow water small mesh fishery operating throughout Pamlico Sound. The large mesh fisheries targeted southern flounder. The deep water fishery operated in depths ranging from 10 to 20 feet from September through December. The shallow water large mesh fishery generally operated in depths ranging from 3 to 10 feet in areas next to the barrier islands. The small mesh fisheries were composed of runaround and set net fisheries. These fisheries generally target spotted seatrout, weakfish, and bluefish (Gearhart 2003).

Initial monitoring of these fisheries in 1999 identified the large mesh gill-net fishery as the probable source of sea turtle interactions in Pamlico Sound during the fall months. With this information, the NMFS initially issued an emergency rule closing the area to large mesh gill-net fishing operations to

protect threatened and endangered sea turtles (NMFS 1999). To maintain this economically vital flounder fishery, the NCDMF applied for and received an ITP (#1259) in 2000 (Gearhart 2001). The ITP contained a comprehensive conservation plan designed to reduce sea turtle interactions by establishing authorized sea turtle take levels and intensive monitoring, while allowing traditional gill-net fisheries to be prosecuted at reduced levels. Observations in 2000 under the ITP identified a deep water gill-net fishery along the reef and a shallow water gill-net fishery inside of the reef along the inshore waters of Pamlico Sound. The deep water region of Pamlico Sound was indicated as the primary source for sea turtle interactions and associated mortality.

NMFS established a permanent rule closing all potential fishing grounds utilized by the deep water large mesh gill-net fisheries. In 2001, the NCDMF consulted with the NMFS and submitted an application for, and received, ITP # 1348. This ITP mandated further restrictions for the 2001 fishing season by establishing prohibited fishing corridors and restricted areas in portions of the Pamlico Sound while fishermen were allowed to continue to prosecute the flounder fishery as stipulated in the ITP (Gearhart 2002). After the NCDMF designated the PSGNRA, the NMFS closed the remainder of Pamlico Sound to gill-net gear larger than 4 ¼ ISM size effective September 27, 2001 (66 FR 42,845, August 15, 200; Figure 8).

After considering 2001 monitoring data and consulting with the NMFS, the NCDMF applied for and received a three-year ITP (#1398) in 2002. This ITP contained a Habitat Conservation Plan (HCP), which required intensive sea turtle monitoring and a characterization program throughout the PSGNRA from September through December. From 2002 through 2004, the shape, size, and location of restricted areas throughout the PSGNRA did not change. These areas were monitored on an annual basis from September through December. Observed levels of sea turtle interactions in gill-net fisheries were below the levels established by the ITP in 2002, 2003, and 2004 (Gearhart 2003; Price 2004, 2005).

In 2005, the NCDMF consulted with the NMFS and applied for and received a six-year permit (ITP # 1528) in which management measures, restricted and prohibited areas, and monitoring efforts were similar to past management actions (Figure 8). There were several changes in the PSGNRA in 2005 including: establishment of a state closure in addition to the federal closure in order to provide state jurisdiction and enforcement authority, modification in observer program procedures to better direct resources to times and areas of higher potential for sea turtle interactions, and elimination of the permit requirements along the mainland side of Pamlico Sound due to the small number of interactions in this area (ITP # 1528; Price 2006).

Management of the PSGNRA from 2005 through 2011 was consistent and provided continued protection of sea turtles while allowing a shallow water gill-net fishery to operate along the Outer Banks and mainland side of Pamlico Sound. However, beginning in 2006, observed and estimated sea turtle

interactions increased (Table 2). Five sea turtle interactions were observed in 2005 and 15 interactions were observed in 2006 (Table 2). In 2007, observed interactions increased to 20; take estimates based on these 20 interactions were estimated at 186 sea turtle interactions during fishing operations within the PSGNRA (all species combined). Due to the estimated interactions of live green sea turtles surpassing authorized levels, the 2007 PSGNRA season was closed two weeks early (Price 2007a, Price 2007b). In 2008, observed and estimated interactions increased relative to years prior to 2007, but estimated sea turtle takes remained below authorized levels and the fishery operated from September 1 through November 30 (Price 2008, 2009a). In 2009, another increase in observed sea turtle interactions (n = 34) occurred (Table 2). The increase in interactions resulted in a closure of the 2009 PSGNRA on October 22 due to estimated live green sea turtle captures exceeding authorized levels of ITP # 1528 (Price 2010a).

As a result of reports of increased sightings of sea turtles in previous years, the NCDMF considered delaying the opening of the 2010 PSGNRA until mid-September. Instead, the area was opened on September 1 for 17 days and the large mesh gill-net fishery was closely monitored for sea turtle interactions. Interactions were observed (n = 12) below allowable levels and the PSGNRA was subsequently opened from September 20 until November 30 (Table 2; NCDMF 2010). Collectively, these measures allowed the fishery to operate longer and ensure continued protection of endangered and threatened sea turtles.

Due to the PSGNRA having to be closed early in previous years the start date of September 19 was elected by NCDMF for 2011 to hopefully enable continued fishing through the end of the PSGNRA season. The season ended on November 30, 2011 as planned with no interactions observed or reported (Table 2; Boyd 2011). For this statewide ITP, the PSGNRA will be subject to the same management measures implemented throughout the rest of the state.

Current Management

In June 2009, the NMFS began an AP observer program in Core Sound, NC. The NMFS observers documented sea turtle interactions in large mesh gill nets in this area beginning in late-June and notified the NCDMF of their concern for these unauthorized takes. The NCDMF consulted with the NMFS-SERO via conference calls and correspondence to discuss short- and long-term actions to address sea turtle takes in gill nets in Core Sound and throughout the state. In the short term, the agencies agreed for the NCDMF to implement gear restrictions (yardage limits, mesh depth reduction, and net shot reductions) and increased observer coverage in Core Sound and adjacent water bodies (NCDMF Proclamation M-16-2009; Appendix C). For the long-term, the NCDMF continued consultations with the NMFS-SERO (July 2009 to present) concerning the preparation of an ITP application for internal coastal

waters while compiling sea turtle interaction data from gill-net surveys, research projects, and direct observations.

The NCDMF delayed the opening of the 2009 PSGNRA until September 5 as a result of continued sea turtle interactions in Core Sound throughout the summer months and anecdotal reports from fishermen of increased sea turtle sightings along the Outer Banks in Pamlico Sound. Monitoring efforts in the PSGNRA continued through October 22 when authorized levels of live green sea turtles were reached and the NCDMF closed the PSGNRA for the remainder of the season. On October 20, 2009, the day that authorized sea turtle takes were reached in the 2009 PSGNRA, a 60-day Notice of Intent (NOI) to sue the NCDMF and the NCMFC was received from the Duke Environmental Law and Policy Clinic on behalf of the Karen Beasley Sea Turtle Rescue and Rehabilitation Center Foundation (Beasley Center). The NOI stated that the NCDMF and the NCMFC violated Section 9 of the ESA by allowing gear that had unauthorized takes of threatened or endangered sea turtles.

The NCDMF consulted with the NMFS-SERO concerning this NOI while continuing to work toward the preparation of an application for a statewide ITP for gill-net fisheries in internal coastal waters. In November 2009, the NCDMF received further correspondence from the NMFS-SERO reiterating the need to "satisfy the requirements of the ESA" relative to Core Sound sea turtle interactions. The NCDMF continued to collect sea turtle interaction data while developing an interim plan to address sea turtle interactions in gill-net gear. As a result of discussions and correspondence with the NMFS-SERO, the NCDMF submitted an interim plan in January 2010 to address sea turtle interactions in gill-net fisheries prosecuted in internal coastal waters. The plan proposed to close large mesh gill-net fisheries throughout the majority of the estuarine waters of North Carolina from May to December 2010 (Figure 9).

On February 18, 2010 the NCDMF presented the interim proposal to the NCMFC and the public at an emergency NCMFC meeting in New Bern, NC. During the meeting, numerous commercial fishery representatives expressed concern with the proposed closure on the basis of the economic devastation that would result from such a closure. Representatives from the Coastal Conservation Association (CCA-NC) did not support the interim closure stating the plan was too limited in scope. After thoroughly debating the issue, the NCMFC voted to direct the NCDMF to implement alternative measures that included reductions in the number of days per week that large mesh gill nets were allowed to be fished, restricted soak times, reductions in the length of individual nets (shots), and reductions in total yardage.

On February 23, 2010, the Duke Environmental Law and Policy Clinic filed suit against the NCDMF and the NCMFC on behalf of the Beasley Center. Negotiations between the parties occurred between late February and March 23, 2010, when the NCMFC met again. During the meeting, the NCMFC directed the fisheries director to issue a gill-net proclamation effective May 15, 2010 restricting

the number of days during the week that large mesh gill nets would be allowed, limiting soak time, establishing a maximum yardage limit, mandating maximum mesh depth, requiring net shot lengths, establishing spacing between net shots, and eliminating the use of tie-downs and floats or corks along float lines. The NCDMF Director did not issue the proclamation because, as detailed below, ongoing negotiations with the Beasley Center and the Duke Environmental Law and Policy Clinic produced a settlement agreement which preempted this particular action.

The NCMFC met May 12 through 14, 2010 and discussed the parameters of the final Settlement Agreement between the Beasley Center (plaintiff) and the NCDMF and the NCMFC (Appendix B). At that meeting, the NCMFC reached an agreement concerning restrictions that would be implemented in the large mesh gill-net fishery in NC estuarine waters. As a result of the NCMFC action, the NCDMF issued Proclamation M-8-2010 effective May 15, 2010 implementing the provisions of the Settlement Agreement (Appendix C).

Gill-net restrictions implemented by the proclamation included: a 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; large mesh gill nets 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 gill nets 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 gill-net per fishing operation.

Although gill nets are identified as small (<5 ISM) and large (≥5 ISM) in the NTTP, the Settlement Agreement includes gill nets from 4 ISM to 5 ISM in the large mesh category because of observed sea turtle takes in 4 ISM and 4 ½ ISM gill nets in the NCDMF Independent Gill Net Survey. The measures were modified slightly several times during 2010, with the concurrence of the Beasley Center, to improve gear efficiency or adjust fishing area boundaries without compromising the sea turtle conservation provisions of the Settlement Agreement.

MANAGEMENT MEASURES

Settlement Agreement

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 gill nets, 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.

However, 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 the NMFS issues the NCDMF an ITP for the affected areas. Furthermore, this Agreement shall not foreclose more lenient or more restrictive provisions in future ITP applications if warranted by biological data collected through reliable sources including, but not limited to the NMFS and the NCDMF."

Section 2(b) of the Settlement Agreement makes note of the fact that the PSGNRA expired December 31, 2010 and specifies that that area of the Pamlico Sound will be subject to the Agreement. It is the intent of the NCDMF that management measures formerly implemented in the PSGNRA will be replaced by the terms and restrictions in this application. This application's management measures will, upon the issuance of this permit, apply to the shallow water portions of Management Unit B in the fall season (September through November) which was formerly designated as the PSGNRA.

Large Mesh Gill Nets

Large mesh gill-net (≥4 ISM) restrictions were implemented in internal coastal waters by NCDMF Proclamation M-8-2010 effective May 15, 2010 (Appendix C; Table 4). Restrictions limit soak times for unattended gill nets ≥4 ISM from one hour before sunset to one hour after sunrise to remove unattended gill nets from the water when sea turtles are more active (NCDMF 2011). Large mesh gill nets are not allowed at any other time. Seminoff and Jones (2006) found that green sea turtles moved during the day and night but covered more distance during daylight hours. Ogden et al. (1983) reported feeding events by green sea turtles occurred most often during the day; however, activity patterns of other turtles are not as well documented. Anecdotal evidence offered to the STAC by Jean Beasley indicated that, in her Turtle Rescue and Rehabilitation Center, she observes turtles with low activity at night and more active in the day. At a minimum, this regulation reduces the chance for a sea turtle to interact with an unattended gill-net owing to the reduced time unattended gill nets are in the water. ***Information was requested by NMFS after the last revision of the application and is provided in Appendix D and E.***

The Settlement Agreement via Proclamation M-27-2011 reduced the maximum yardage limit for gill nets ≥4 ISM to 2,000 yards per fishing operation from Croatan and Roanoke sounds at the Highway 64/264 bridges to Bogue Sound at the Highway 58 Bridge (Management Units A, B, D1, and D2; Figure 10); the maximum yardage limit from the Highway 58 Bridge (Management Unit D2 southern boundary) to the South Carolina state line (Management Unit E) is 1,000 yards per fishing operation (Figure 10; Appendix C). Net shot lengths are restricted to a maximum of 100 yards with a 25-yard separation

required between each net shot. This management measure, which limits the length of any individual gill net to 100 yards and establishes a minimum distance (25 yards) between gill-net sets, could decrease interactions with sea turtles by reducing the amount of gill net set in any given area. Large mesh gill nets cannot exceed 15 meshes in depth and tie-downs are prohibited. Floats or corks are not allowed along the floatline of nets north of the NC Hwy 58 Bridge. ***Information was requested by NMFS after the last revision of the application and is provided in Appendix D and E.***

With an additional year of observer documentations, the Pamlico, Pungo, Bay, and Neuse rivers (Management Unit C) were exempted from provisions of the Settlement Agreement by Proclamation M-27-2011 on September 12, 2011 due to very few (n = 1) sea turtle interactions (Appendix C; Figure 10). Albemarle Sound and its tributaries as well as Croatan and Roanoke sounds north of the Highway 64/264 bridges (Management Unit A) were also exempt from the provisions of the Settlement Agreement due to no documented sea turtle interactions (Figure 10). Additionally, the NCDMF Observer Program was expanded to achieve a minimum of seven per-cent observer coverage of large mesh gill-net trips as required by the Settlement Agreement, with the exception of exempted areas. In May 2012, the NCMFC voted to decrease the maximum yardage limit from 2,000 to 1,000 yards per fishing operation in Management Unit D2 (Figure 10). In August 2012, the NCMFC voted to consider Management Unit D1 a hotspot and close the area to large mesh gill nets from May 8 through October 14 annually (Figure 7). ***Information was requested by NMFS after the last revision of the application and is provided in Appendix D and E.***

After the implementation of Proclamation M-8-2010 large mesh gill-net effort decreased considerably based on gill-net effort comparisons from 2009 (pre-settlement agreement) through 2011 (post-settlement agreement). Data from the NTTP, fish house sampling, and Observer Program were used to estimate commercial gill-net fleet effort. The large mesh gill-net restrictions led to a reduction (n = 5,104) in large mesh trips from 2009 to 2010 and continued to decrease (n = 4,640) from 2010 to 2011 for an overall reduction of 40% (Table 5). Similar trends occurred with the amount of gill net being fished with a 36% reduction of large mesh gill nets from 2009 to 2010 and 31% from 2010 to 2011 for a total reduction of 56% over the three-year period (Table 6).

The NCDMF required attendance of large mesh gill nets from June 20 to August 31 in 2005, in response to a high abundance of sea turtles in the lower Cape Fear River and associated takes in gill-net gear. The time period for required attendance has increased since 2005. In 2009, attendance of all gill nets in this region was required from May 23 to November 11. Since 2005, seasonal attendance has proven to be an effective method of reducing interactions with turtles, avoiding or reducing mortality when interactions occur, and managing the gill-net fishery in the lower portions of the Cape Fear River. Southern flounder landings have decreased from 2007 through 2010 owing in part to a large reduction in

effort (Table 7). Discussions with NCDMF staff indicate that the attendance requirement allowed for timely detection and release of sea turtles from gill-net gear and also resulted in reduced effort and participation due to the seasonal attendance requirement.

Small Mesh Gill Nets

Although the estuarine gill-net fishery is extensively managed, there is no maximum yardage limit for small mesh gill nets (<4 ISM) for most of North Carolina's estuarine waters with the exception of unattended small mesh gill nets in the Albemarle Sound Management Area (ASMA - Albemarle, Currituck, Croatan, Roanoke sounds and its tributaries), which are limited to 800 yards per operation and allowable mesh size of <4 ISM. Amendment 1 to the Red Drum FMP analyzed small mesh gill-net yardage used in the commercial fishery for a variety of target species (NCDMF 2008). From 2001 to 2006, average gill-net yardage fished ranged from approximately 700 yards per trip in the white perch fishery to over 1,300 yards per trip for the weakfish fishery. Small mesh gill-net yardage fished per trips ranged from 100 yards per trip to 4,000 yards per trip. From 2009 to 2011, there has been a reduction (8%) of small mesh gill-net trips and yardage used in estuarine waters with the number of trips averaging 8,464 per year (Table 5, Table 6).

Required attendance of small mesh (<4 ISM) gill nets in North Carolina's estuarine waters is a management measure designed to minimize bycatch of undersized finfish (Figure 11). Small mesh gill-net attendance is required from mid-May through mid-November in the ASMA, and small mesh gill nets in the upper reaches of Pamlico, Pungo, Neuse, and Trent rivers are required to have year round attendance to minimize bycatch of undersized striped bass (NCDMF 2004). The North Carolina Red Drum FMP implemented attendance requirements for small mesh gill nets from May 1 through October 31 in areas known to be critical for juvenile red drum. These critical areas were defined as all primary and secondary nursery areas, areas within 200 yards of any shoreline, and the extensive shallow grass flats located behind the Outer Banks. An exemption to this rule lifts the attendance requirement for the region from Core Sound to the South Carolina state line in October to allow for the fall spot fishery (NCDMF 2008). Detailed maps of attendance rules for each waterbody can be found at http://portal.ncdenr.org/web/mf/attended-gill-net-areas.

Amendment 1 to the North Carolina Red Drum FMP expanded on the small mesh gill-net attendance requirements. Specifically, it extended the year round attendance within 200 yards of shore to include the area of the lower Neuse out to the mouth of the river and extended the seasonal attendance requirements to include the period of May 1 through November 30 in the following areas: all primary and permanent secondary nursery areas and all modified no-trawl areas (shallow grass beds in eastern Pamlico and Core sounds); within 200 yards of any shoreline for the areas of Pamlico, Pungo, Neuse, and Bay

rivers; and within 50 yards of any shoreline in areas of Pamlico and Core sounds and in all coastal waters south to the South Carolina state line (NCDMF 2008). However, the area from Core Sound to South Carolina state line was excluded from the shoreline attendance requirement during October and November.

Small mesh gill-net attendance requirements, originally designed to minimize undersized red drum bycatch, also occur in areas and times where sea turtles are most commonly found. Few sea turtle interactions have been documented in small mesh gill nets. The attendance requirements may be the reason for the low number of interactions or it could be the result of reduced effort stemming from the attendance requirements.

Gear Testing

Following the increased number of sea turtle strandings along the sound side of the Outer Banks in 1999 and the establishment of the PSGNRA, the NCDMF began testing modified gill nets for the purpose of developing gear that could reduce sea turtle bycatch and maintain acceptable catch levels of target species in gill-net fisheries throughout the deep water portion of Pamlico Sound (Gearhart and Price 2003; Brown and Price 2005; Price and Salisbury 2007). These studies identified a low-profile gill-net design that had potential for use in the deep water portion of Pamlico Sound to mitigate the bycatch of sea turtles. In addition, the 2006 study indicated the potential for application of this technology in other gill-net fisheries where similar conditions and sea turtle bycatch issues existed (Price and Salisbury 2007; Gilman et al. 2010).

OUTREACH

Communicating management concerns and actions, including protected species interactions issues, has always been an integral part of effective and adaptive fisheries management in North Carolina. The implementation of the PSGNRA has necessitated industry involvement and compliance since 2000. Informing and educating the industry about the ESA, the protection of species listed as either threatened or endangered, and how this applies to the commercial fishing industry has been a major focus of the NCDMF outreach. Outreach efforts include public meetings, workshops, presentations, mail outs of summary information, public involvement (through advisory committees), and direct communications.

As a result of the NCDMF outreach efforts, the NC commercial fishing industry has become increasingly aware of the requirements of the ESA and the need for protected species conservation measures. The NCDMF will continue its efforts to conduct outreach to the industry concerning protected species interactions. The NCDMF will benefit from the incorporation of the knowledge of fishermen

concerning seasonal, annual, spatial, and temporal variations in activities and distribution and abundance of protected species. Input from individuals who depend upon estuarine resources for a living and who observe the environment on a daily basis is a critical component of the NCDMF efforts to achieving sustainable fisheries resources. Outreach provisions included in this permit application will involve the relay of information between state and federal managers and fishing communities in addition to increasing public awareness of ESA mandates for protection of threatened or endangered species.

In the course of its management and conservation actions taken to address sea turtle interactions with commercial fishing operations in North Carolina, the NCDMF has continuous outreach to the commercial and recreational fishing industry and is readily expanding the information to include Atlantic sturgeon, *Acipenser oxyrinchus oxyrinchus*. This outreach occurs in print form at least annually as part of the NCDMF management strategy and continuously through various forms including web-based announcements, press releases, public meetings, mail-out flyers, and direct communications.

Over the last ten years, NCDMF has circulated 30 news releases pertaining to protected species such as sea turtles. The news releases are distributed to 1,691 media outlets and individuals including tackle shops, fish houses, and other prominent places that commercial and recreational fishermen have full access. NCDMF informs the public on changes to management measures that affect protected species through proclamations. Proclamations are automatically sent to anyone holding a standard commercial fishing license or a recreational commercial fishing license via mail and e-mail. Tackle shops, fish dealers, and other individuals are also on the distribution list. In 2008, NCDMF began distributing educational materials to fishermen who obtained a PSGNRA Permit which has annually averaged 160 fishermen since its inception. The materials include a NMFS guide for sea turtle handling and resuscitation to decrease the chance of mortalities. Fishermen are provided with a guide titled "Best Fishing Practices" which goes into detail on how to avoid sea turtle interactions when fishing. Public comment was sought on all materials. For commercial fishermen, NCDMF created a pamphlet describing the proper procedures on what to do if you capture a sea turtle and ways to avoid interactions with sea turtles. These pamphlets are being distributed to every individual who obtains any license or permit where commercial gear is used, totaling 11,426 people. With NMFS's input, NCDMF plans to develop more detailed information for fishermen related to sturgeon interactions. NCDMF will use the already established modes of communication to make certain that the fishing communities have up to date information on how to avoid, minimize, and mitigate sturgeon interactions.

Outreach continues to be conducted to educate the fishing community and the public on the parameters of the ESA and Marine Mammal Protection Act (MMPA). Additionally, the NCDMF will rely on outreach to solicit ideas and suggestions concerning reducing Atlantic sturgeon interactions with commercial fishing gear. Communication with the fishing industry is a critical component in successful

management of fisheries and achieving sustainable resources while minimizing bycatch of finfish and protected species (Zollet et al. 2011).

CONSERVATION PLAN

The objective of this ITP is to provide a multifaceted management framework in the Conservation Plan (CP) with coverage of interconnected fisheries and a flexible adaptive management approach that holds promise as a model for future fisheries ITP management. The ESA mandates that CPs be based on the best scientific and commercial data available and detail the anticipated impact (i.e., amount, extent, and type of anticipated takes) of the proposed activity, outline steps that will be taken to monitor, mitigate, and minimize the impacts; the funding available to implement such measures; and describe alternative measures considered, including why those alternatives are not being used. Agency rules or policies describe how each of these elements is to be determined. The most difficult aspect is the consideration of cumulative and aggregate affects of multiple fisheries on five species of sea turtles.

The proposed statewide coverage for estuarine gill-net fisheries will allow NCDMF and NMFS to better evaluate and control the impacts of these fisheries. Additionally, by including an adaptive management scheme, the ITP CP 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 statewide approach offers the potential to capture the benefits of regional planning, which includes increased flexibility, reduced regulatory burden on the state, allowance for long-term planning, and more coordinated decision making. A statewide approach enables NMFS and NCDMF to consider cumulative impacts on a wide scale, as required by the ESA, by examining overlapping fisheries.

The NCDMF has monitored gill-net fisheries throughout Pamlico Sound since 2000 and has conducted numerous observations outside of this area since 2004 (Figure 12). The information gathered from these direct observations allows NCDMF to generate requested estimated take numbers for observed fisheries and build a functional conservation plan. It is important to recognize that this CP maintains flexibility in design and management adaptations necessary to address potential changing finfish and sea turtle populations and distributions, varying fishing practices, and data collections while providing for a better understanding of fishery bycatch issues and to more efficiently direct human resources.

The detailed CP for this ITP application provides mitigation measures that will provide protection for sea turtles and other endangered species such as Atlantic sturgeon. NCDMF submitted a Section 10 ITP application for Atlantic sturgeon on April 5, 2012. For most of the state, the provisions adopted from the Settlement Agreement and various FMPs will concurrently protect sea turtles and Atlantic sturgeon in

the same fisheries. The areas of most concern for Atlantic sturgeon have very few sea turtle interactions (n = 1) and are assessed thoroughly in the Atlantic sturgeon ITP application currently under review by NMFS.

ANTICIPATED IMPACT: SEA TURTLES

North Carolina estuarine gill-net fisheries are highly regulated with many measures already in place to decrease sea turtle interactions. The most common impact gill-net fisheries have on sea turtles is capturing. Interactions typically occur when sea turtles are entangled in large mesh (≥4 ISM) gill nets. Since 2005, the majority (78.2%) of all observed sea turtle species incidentally captured in estuarine gill nets have been released alive.

Requested Takes

Commercial Fishery Observer Data

The NCDMF Sea Turtle Bycatch Monitoring Program (Program 466) and Alternative Platform Observation Program (Program 467) are the primary programs by which the NCDMF collects information on bycatch from the state's commercial gill-net fisheries.

Data collected from the commercial fishery observer programs were used to develop models for estimating sea turtle interactions. These programs collect a number of gear and environmental variables, but only variables that were also available from the NTTP were considered because the same data from the commercial fisheries are required to estimate the total number of interactions. Only trips in which passive gears (i.e., anchored sink gill nets and anchored floating gill nets) were observed were included in the analyses.

Commercial Fishery Effort

An estimate of total effort for North Carolina's estuarine gill-net fisheries was needed to predict the number of interactions for the entire fishery. Total effort was estimated by combining information from three NCDMF monitoring programs: Sea Turtle Bycatch Monitoring Program (see above), NTTP, and Commercial Fish House Sampling Program (Program 461). Effort was measured as soak time (days) multiplied by net length (yards).

Commercial fisheries statistics in North Carolina are collected under a mandatory reporting program, the NTTP (Lupton and Phalen 1996). Data on individual fishing trips are recorded on trip ticket forms used by state-licensed fish dealers to document all transfers of fish sold from the fishermen to the dealer. Information reported on these forms includes transaction date, area fished, gear used, landed

species, and total weights of each individual species, as well as fisherman and dealer information. The NTTP is considered a census of all North Carolina landings and fishing trips.

Commercial catches and effort are directly characterized through the fishery-dependent Commercial Fish House Sampling Program. Commercial fishermen are interviewed and the catch is sampled. Data collected include information on location, effort, and gear characteristics, as well as information used to determine the size and age distribution of species landed.

Information gathered from these three programs was used to characterize North Carolina's estuarine gill-net fisheries and to determine total effort of gill net (passive gears only) used by year, mesh size, management unit, and season. Data from Program 461 and Program 466 were used to determine the average gill-net effort (yards fished and soak time) for both small (<4 ISM) and large (≥4 ISM) gill-net fisheries. These data were then applied to the data from the NTTP to determine trip-level effort for all trips taken.

Analyses

Model Development

A generalized linear model (GLM) framework was used to predict sea turtle interactions in North Carolina's estuarine gill-net fisheries based on data collected from 2007 through 2011. Only those variables available in all data sources could be considered as potential covariates in the model. Available variables included mesh size, year, season, and Management Unit. Mesh sizes were categorized as large (≥4 ISM) or small (<4 ISM). Seasons were designated as: winter (December–February); spring (March–May); summer (June–August); and fall (September–November). Throughout this section (estimation of incidental takes), the term "year" is based on the season designation such that a year includes the month of December from the previous calendar year and the months January through November from the current calendar year. Management Units are defined elsewhere in the ITP (A, B, C, D1, D2, and E; Figure 10). Interactions were modeled independent of turtle disposition (i.e., alive or dead).

The Poisson distribution is commonly used for modeling count data; however, the Poisson distribution assumes equidispersion (the variance is equal to the mean). Count data are more often characterized by a variance larger than the mean, known as overdispersion. Some causes of overdispersion include missing covariates, missing interactions, outliers, modeling non-linear effects as linear, ignoring hierarchical data structure, ignoring temporal or spatial correlation, excessive number of zeros, and noisy data (Zuur et al. 2009, 2012). A less common situation is underdispersion in which the variance is less than the mean. Underdispersion may be due to the model fitting several outliers too well or inclusion of too many covariates or interactions (Zuur et al. 2009).

Data for each species were fit with a standard Poisson GLM and the degree of dispersion was evaluated. If over- or underdispersion was detected, an attempt was made to identify and eliminate the cause of the over- or underdispersion (to the extent allowed by the data) before considering alternative models, as suggested by Zuur et al. (2012). In the case of overdispersion, a negative binomial distribution can be used as it allows for overdispersion relative to the Poisson distribution. Alternatively, one can use a quasi-GLM model to correct the standard errors for overdispersion. If the overdispersion results from an excessive number of zeros (more than expected for a Poisson or negative binomial), then a model designed to account for these excess zeros can be applied. There are two types of models that are commonly used for count data that contain excess zeros. Those models are zero-altered (two-part or hurdle models) and zero-inflated (mixture) models (see Minami et al. 2007 and Zuur et al. 2009 for detailed information regarding the differences of these models). Minami et al. (2007) suggests that zero-inflated models may be more appropriate for catches of rarely encountered species; therefore, zero-inflated models were considered here when appropriate.

Models were developed independently for each turtle species for which there were a sufficient number of observed interactions to support a model (green and Kemp's ridley). A minimum of 5 to 10 positive events (interactions) are required to reduce bias and risk of overfitting (Harrell et al. 1984; Stokes et al. 2009; Peduzzi et al. 1996). The numbers of interactions were modeled by a set of explanatory variables and an offset term for effort. The offset term was included in the model to account for differences in fishing effort among observations (Crawley 2007; Zuur et al. 2009, 2012). Using effort as an offset term in the model assumes that the number of turtle interactions is proportional to fishing effort (A. Zuur, Highland Statistics Ltd., pers. comm.).

The variables investigated included year, mesh size, season, and Management Unit, all of which were treated as categorical variables. All available covariates were included in the initial models and assessed for significance using the appropriate statistical test. Non-significant covariates were removed using backwards selection to find the best-fitting predictive model for each species.

Where multiple models were fit to the same data, the predictive ability of each model was compared using techniques described in Potts and Elith (2006) and Zuur et al. (2009). A linear regression was fit to the observed versus predicted values to assess bias and prediction consistency (Potts and Elith 2006). The value of the intercept provides an indication of the bias and the slope provides a measure of the spread of the predictions relative to the spread of the observed values. A perfect fit is indicated by an intercept equal to zero and a slope equal to one. Other measures used to compare observed and fitted values among the models included the root mean square error (RMSE), mean absolute error (MAE), and Akaike Information Criterion (AIC). Models were further compared using statistical tests such as the log-likelihood ratio test for nested models and Vuong's (1989) test for comparing a zero-inflated distribution

model to its standard distribution counterpart. The model chi-square statistic was calculated for the best-fitting model for each species to determine if the overall model is statistically significant. The predictive ability of the best-fitting model was also assessed by counting the number of residuals within [-1,1]; a large number of residuals falling within this range is indicative of a good predictive model for the data (Ngatchou-Wandji and Paris 2011).

Estimation of Interactions

Estimated numbers of total annual interactions were computed using the best-fitting GLM for each species and assuming effort levels equivalent to those observed in 2010. The GLM coefficients were applied to the corresponding predictor variables from the NTTP data to predict interaction numbers for each management unit by season and mesh size.

Results

The observed numbers of interactions for hawksbill (1), loggerhead (10), and leatherback (0) turtles during the 2007 to 2011 time period were too low to support modeling (Table 8, Table 9). The results of the model development and estimation of interactions for green and Kemp's ridley turtles are discussed below. ***Information was requested by NMFS after the last revision of the application and is provided in Appendix D and E.***

Predictive Models

Green Turtles

All trips that occurred during spring and winter, all small mesh trips, and all trips in Management Units A, C, and D2 were removed from all datasets for the analyses of green turtle data because no green turtles were observed in any of these strata during 2007 to 2011 (Table 8, Table 9). In the remaining 1,226 trips, a total of 96 green turtles were observed during the time period. The number of green turtles observed on any one trip ranged from zero to five individuals (Figure 13).

The green turtle data were first fit with a standard Poisson GLM that included year, season, and Management Unit as covariates; green turtles were only observed in large mesh so mesh size was not considered as a potential covariate. Season was not significant (likelihood ratio test, LRT = 0.025, *p*-value = 0.8738) and so was removed from the model. The best-fitting Poisson GLM (Table 10) included year and Management Unit as covariates, which were found to be significant (Table 11). The final Poisson model was nearly equidispersed—the estimated dispersion value was 1.004.

A Cook's distance plot suggests there were no outliers with a high impact on the regression parameters estimated by the Poisson GLM (i.e., no observations where Cook's distance > 1; Figure 14). The frequency distribution of green turtle interactions predicted by the Poisson GLM was similar to the

observed frequency distribution (Figure 15). A total of 1,154 out of 1,226 (94.13%) residuals were within [-1,1], lending support that the model is a good predictable model for the data (Figure 16). There were no obvious patterns in the plots of model residuals (Figure 16, Figure 17). The model was found to provide an overall significant fit to the data ($\chi^2 = 62.48$, df = 6, $p < 0.0001$).

Despite there being no indication of overdispersion, a zero-inflated Poisson (ZIP) GLM was developed for the green turtle data for exploratory purposes. The best-fitting ZIP GLM is summarized in Table 12. The dispersion of the ZIP GLM was 0.7605, indicating an underdispersed model. This is a sign that the model may be overfitting the data. Vuong's (1989) test suggested the ZIP GLM provided a marginally better fit than the standard Poisson GLM at $\alpha = 0.05$ (test statistic = -1.708, $p = 0.04386$). While the AIC values also suggest the ZIP provided a better fit, the RMSE and MAE favor the standard Poisson GLM (Table 13). Additionally, the slopes and intercepts of the regressions fit between the observed and predicted values of both models indicated the standard Poisson GLM is less biased and more consistent than the ZIP GLM. Overall, the standard Poisson GLM was considered the best-fitting model for the green turtle data.

Kemp's Ridley Turtles

All trips that occurred during winter, all trips in Management Unit C and all trips that occurred during 2007 were removed from all datasets for the analyses of Kemp's ridley turtle data because none were observed in any of these strata during 2007 to 2011 (Table 8, Table 9). Though one Kemp's ridley turtle was observed in Management Unit A, all trips that occurred in Management Unit A were also removed; inclusion of these trips resulted in overfitting of the model, which led to unrealistic estimates of incidental takes (Table 9). In the remaining 1,454 trips, a total of 41 Kemp's ridley turtles were observed during the time period. The number of Kemp's ridley turtles observed on any one trip ranged from 0 to 4 individuals (Figure 18).

The Kemp's ridley turtle data were first fit with a standard Poisson GLM that included year, mesh, season, and Management Unit as covariates. Year (LRT = 3.749, $p = 0.2899$) and mesh (LRT = 0.024, $p = 0.8777$) were not significant and so were removed from the model. The best-fitting Poisson GLM (Table 14) included season and Management Unit as covariates, which were found to be significant (Table 15). The dispersion value of the final Poisson model was 1.257, suggesting the model was slightly overdispersed. An examination of the Cook's distance plot suggested no problems with outliers in the model fitting process (Figure 19). In order to address the possible overdispersion, alternative models were considered.

The frequency distribution of the observed data (Figure 18) suggested an excess number of zeros could be causing the overdispersion. Models assuming the zero-inflated Poisson and the zero-inflated

negative binomial distribution were considered, but a viable zero-inflated model could not be developed. A standard negative binomial GLM that included season and Management Unit as covariates was fit to the Kemp's ridley turtle data and the model fit is summarized in Table 16. Both covariates were found to be significant (Table 17). The estimated dispersion value for the final negative binomial GLM was 1.161. The negative binomial GLM was found to provide a statistically significantly better fit than the Poisson GLM ($\chi^2 = 10.09$, $p = 0.0007442$). This was generally supported by the performance statistics (Table 18). A visual comparison of the observed and predicted frequency distribution indicated a good fit by the negative binomial GLM (Figure 20). A total of 1,431 out of 1,454 (98.4%) residuals were within [-1,1], lending support that the negative binomial GLM is a good predictable model for the Kemp's ridley turtle data (Figure 21). There were no obvious patterns in the plots of model residuals (Figure 21, Figure 22). The negative binomial model provided an overall significant fit to the data ($\chi^2 = 68.06$, df = 5, $p < 0.0001$).

Annual Estimated Takes

Green Turtles

The best-fitting Poisson GLM for the green turtle data was applied to the 2010 effort data to estimate the total number of annual green turtle interactions (Table 10). These estimates only apply to the large mesh (≥4 ISM) estuarine gill-net fishery; no green turtles were observed in the small mesh (<4 ISM) component so it was not possible to make predictions for small mesh. Assuming effort levels are equal to those observed in 2010, a total of 539 green turtle interactions are estimated to occur annually (Table 19). ***Information was requested by NMFS after the last revision of the application and is provided in Appendix D and E.***

Kemp's Ridley Turtles

The best-fitting negative binomial GLM for the Kemp's ridley data was used to estimate the annual number of Kemp's ridley turtle interactions (Table 18). These estimates only apply to the large mesh (≥4 ISM) estuarine gill-net fishery; only 2 Kemp's ridley sea turtle was observed in the small mesh (<4 ISM) component which is not an adequate sample size to make predictions for small mesh. A total of 205 Kemp's ridley turtles are estimated to occur annually assuming effort levels equal to those observed in 2010 (Table 20). ***Information was requested by NMFS after the last revision of the application and is provided in Appendix D and E.***

Estimating Takes in the Conservation Plan

Of the 226 sea turtle observed interactions recorded in the estuarine gill-net fisheries from 1999 through 2011, disposition (alive/dead) was recorded (n = 218) with 151 alive and 67 dead for all species producing a mortality rate of 30%. The ratio of alive to dead sea turtles is 2.3:1 for all sea turtles. Post interaction mortality data for North Carolina were not available, nor used within this initial model, though adjustments could be made to the model in the future to incorporate post interaction data for North Carolina, if available. A ratio of 2:1 was applied to the relative percent species composition of known interactions for computation of final species counts and mortalities taking into consideration available mortality data and the lack of post-mortality data.

The closure of Management Unit D1 as a hotspot from May 8 through October 14 annually was incorporated into the estimated takes post-modeling (Figure 7). ***Information was requested by NMFS after the last revision of the application and is provided in Appendix D and E.***

Annual Requested Takes Summary

Effort is a key component for estimating annual sea turtle takes. To compare how effort levels and other mitigation measures enacted in 2010 affected the take levels, annual takes were estimated for green and Kemp's ridley sea turtles for 2007 through 2010 based on effort levels from each year (Table 21). Estimated sea turtle takes averaged 2,819 from 2007 through 2009 with an 83% decrease from 2009 to 2010 (Table 21). This decrease in the amount of estimated takes was in large part due to the drastic reduction in effort coupled with other mitigation measures implemented by the Settlement Agreement (i.e., reduced soak time, yardage limit) Pre-Settlement Agreement effort will never be achieved again owing to regulations in place to protect threatened and endangered species such as sea turtles limiting the effort in the large mesh gill-net fisheries throughout North Carolina's estuarine waters.

Requested sea turtle takes for the large and small mesh estuarine gill-net fisheries were broken down by Management Unit, season, and disposition for each species. Estimated takes were used where interaction levels allowed modeling. The estimated takes were based upon observer coverage for the Management Unit and season (i.e., total number estimated by disposition multiplied by percent observer coverage). For all other species, Management Unit, and/or seasons where estimated take numbers were not available, an observed take number was calculated. The requested takes in this application reflect annual estimated and observed takes in large and small mesh estuarine gill-net fisheries for the duration of the ITP.

Requested takes for the large (n = 684) and small (n = 74) mesh estuarine gill-net fisheries combine all species for Management Units B, D1, D2, and E (Table 22, Table 23). Management Units A

and C are currently exempt from the Settlement Agreement due to the very low (n = 2) observed interactions; however, for each of these Management Units two interactions are requested per season for both the large and small mesh gill-net fisheries (n = 16) to account for environmental or population fluctuations (Table 24).

ANTICIPATED IMPACTS: POPULATION LEVELS

The provisions proposed in this ITP application and the expanded NCDMF Observer Program will provide data that can be used to characterize interaction trends by gear, season, and area and allow for implementation of management measures to reduce takes. The resulting data may lead to management measures, fishing practices, and gear modifications that will ultimately conserve more sea turtles than the preliminary analysis used for estimating a range of takes in this application. The NCDMF believes that the gill-net restrictions implemented May 15, 2010 and subsequently modified, with the concurrence of the Duke Environmental Law and Policy Clinic and the Beasley Center, will be effective in reducing sea turtle interactions with gill-net gear. Reports from onboard and AP observations will allow sea turtle gill-net interactions to be closely monitored and provide for the timely implementation of additional mitigation measures should estimated observed sea turtle takes approach the allowed levels.

Population Assessments

According to the NOAA Technical Memorandum NMFS-SEFSC-455 Stock Assessments of Loggerhead and Leatherback Sea Turtles and an Assessment of the Impact of the Pelagic Longline Fishery on the Loggerhead and Leatherback Sea Turtles of the Western North Atlantic, "It is very difficult to identify the impact of a fishery on sea turtle populations as the response of the populations is based on the cumulative impacts from all sources. An important consideration in assessing fishery impacts on sea turtle populations is whether or not interactions result in mortality and subsequent loss to the population. Also, there is not serious injury criteria upon which an animal may be assessed for likelihood of survival and therefore we are assuming that 50% of all animals interacting with the pelagic longlines subsequently die as a result of that interaction, regardless of where hooked, amount of line remaining on the animal, or the species" (NMFS-SEFSC 2001).

"The most commonly available metric for monitoring sea turtle abundance and trends is the number of nesting females (or their nesting activities; e.g., tracks or nests). This segment represents a very small portion of a sea turtle population, so quantifying population- level impacts of fisheries bycatch, which affects juveniles and adult males as well as adult females, is extremely challenging" (NRC 2010). The National Research Council (NRC) continues with, "Abundance assessment is essential, but

abundance information alone is insufficient to understand the causes underlying trends in sea-turtle populations or to predict future trends. In addition to reliable abundance estimates, it is necessary to understand key demographics. To date, sufficiently complete demographic information has not been used in population assessments of sea turtles in the United States" (NRC 2010). Listed below are a few of the recommendations put forth from the NRC (2010) for the problem of inadequate information which is available for population assessments because the data have not been collected, or if they have been collected, they have not been analyzed or made accessible in a manner that allows them to be useful:

- NMFS and USFWS should develop plans for the collection and analysis of data to address data gaps. This development should include outside experts who collect, analyze, and use the data.
- NMFS and USFWS should present a comprehensive assessment plan and a data plan to sea-turtle biologists to facilitate effective data collection for this integrated approach and to obtain input from them on improvement of the plans.
- NMFS and USFWS, with other government agencies and funding sources, should support the collection and analysis of these data.
- NMFS and USFWS should partner with other government agencies, universities, and non-governmental organizations to improve coordination among data holders. Incentives should be developed to encourage data sharing.

NMFS reviews each sea turtle population's status on a five-year period. The uncertainties in many aspects of the population such as the structure, non-breeding segments, and trends in productivity were highlighted in the five-year status report for each species that occur in North Carolina waters in 2007 (NMFS and USFWS 2007a–e). Data needed for accurate assessments for most populations are not available (NRC 2010). Specifically, the green turtle five-year status review states, "The paucity of information regarding these aspects continues to inhibit effective modeling of populations and prevents a full understanding of which nesting concentrations are most at risk" (NMFS and USFWS 2007a). Research needs to be expanded to the marine environment to gain a better understanding of the biology of all the life phases of sea turtles to accurately assess the populations (NMFS and USFWS 2007a). The green turtle five-year status review continues stating, "There is a major need for additional demographic information, which will require rigorous tagging programs coupled with studies using molecular tools such as genetics and stable isotopes" (NMFS and USFWS 2007a).

Due to the uncertainty of population estimates for each sea turtle species found in North Carolina's waters, it is not possible to know with precision the full impact the gill-net fisheries have on each population; however, the decrease in fishing effort and number of sea turtle interactions compared to previous effort suggest bycatch of sea turtles in the gill-net fisheries is minimally affecting the populations. Effort has decreased over the last three years (40%) and will never achieve levels that have

been seen in the past due to fishery regulations which prohibit the amount of gear and soak times allowed in North Carolina's estuarine waters.

ANTICIPATED IMPACT: HABITAT

This proposed activity will have no impact on the habitat of sea turtles. The NCDMF and the NCMFC are key partners in North Carolina's Coastal Habitat Protection Plan (CHPP; Deaton et al. 2010). The CHPP identifies goals and priorities including protections for and improvements of habitats for marine species such as sea turtles. North Carolina's Coastal Habitat Protection Plan was written and developed to:

1. Document the ecological role and function of aquatic habitats for coastal fisheries.
2. Provide status and trends information on the quality and quantity of coastal fish habitat.
3. Describe and document threats to coastal fish habitat, including threats from both human activities and natural events.
4. Describe the current rules concerning each habitat.
5. Identify management needs.
6. Develop options for management action using the above information.

As part of the CHPP, NCDMF has participated in identifying goals which are consistent with improvement of sea turtle habitat such as:

Goal 3 Enhance Habitat and Protect it from Physical Impact

This goal provides for expanding habitat restoration, including: creation of subtidal oyster reef no-take sanctuaries, re-establishment of riparian wetlands and stream hydrology, and preparation and implementation of a comprehensive beach and inlet management plan that addresses ecologically based guidelines, socio-economic concerns, and fish habitat; protection of Submerged Aquatic Vegetation (SAV), shell bottom, and hard bottom areas from fishing gear effects through improved enforcement, establishment of protective buffers around habitats, and further restriction of mechanical shellfish harvesting; and protection of habitat by revising estuarine and public trust shoreline stabilization rules using best available information, considering estuarine erosion rates, and the development and promotion of incentives for use of alternatives to vertical shoreline stabilization measures.

MONITOR, MINIMIZE, AND MITIGATE IMPACTS

Monitor Impacts

NCDMF Observer Program

The NCDMF has obtained commercial gill-net fishery observations throughout the Pamlico Sound and outside of the PSGNRA, both spatially and temporally, since 2000 (Brown and Price 2005; Price 2004, 2005, 2006, 2007a–b, 2008, 2009a–b, 2010a–b; Boyd 2012; Figure 12). The purpose of these observations is to characterize effort, catch, and finfish bycatch by area and season. Additionally, these programs were established to monitor fisheries for protected species interactions. The NCDMF has also conducted both inshore and near-shore shrimp trawl observations (Brown 2009) and obtained a limited number of pound net observations (Price 2007b). In 2010, in addition to continued estuarine gill-net observations, the NCDMF expanded the observer program to obtain observations in the recreational hook-and-line fishery. In 2011, the observer program was expanded to include the channel net fishery and the long haul seine fishery. The latter two monitoring programs were funded through an ESA Section 6 grant award to the states of NC, SC, and GA with the NCDMF functioning as a cooperator.

Traditionally, the NCDMF has collected data from commercial gill-net fisheries through an onboard observer program (Program 466; Price 2007b, 2009b, 2010a). This program has allowed for the collection of data that are used for fishery management and monitoring protected species bycatch issues, the latter focused primarily on the PSGNRA. The traditional observer program is complemented by an AP program (Program 467) where operations are monitored at close proximity from state owned vessels. Both programs are critical for NCDMF monitoring and management of gill-net fisheries, conservation of protected species, and for providing outreach opportunity to the fishing industry. Information gathered from these programs is utilized when making management decisions, in stock assessments, in the development of Fishery Management Plans (FMP), and for identifying bycatch (finfish, protected species) problem areas. All non-confidential observer program data are available, by request, from the NCDMF (Appendix A). ***Information was requested by NMFS after the last revision of the application and is provided in Appendix D and E.***

The NCDMF monitored estuarine gill-net and recreational hook-and-line fisheries using alternative platforms in 2010 and 2011. Program 467 was added to the NCDMF Biological Database to house AP data and the program is structured with flexibility to incorporate multiple fishery operations (e.g., gill-net, haul seine, pound nets, trawls, and channel net fisheries). The data collected through the AP program are modeled after data collected in the NMFS AP study conducted in the Core Sound gill-net fishery during 2009. The NCDMF received copies of the NMFS AP field forms and data sheets and staff

incorporated elements of the forms in the NCDMF program to ensure transferability from state to state and state to federal programs.

The NCDMF AP program utilizes vessels that may vary in model but will range in size from approximately 19' to 25'. The NCDMF has procured various vessels suitable for use in the AP program for use by observer program personnel. All boats are equipped and maintained in accordance with US Coast Guard safety regulations and NCDMF safety policies.

The onboard observer program requires the observer to ride onboard the commercial fishermen's vessel. Protected species interactions, gear parameters, as well as detailed gill-net catch and discard information for other species are recorded. The AP program requires two observers in a state owned vessel to monitor commercial fishermen hauling their gill nets. The AP observers document protected species interactions and also provide catch and discard estimates for information for other species that are observed. The data logs for the AP program differ slightly from the traditional observer program due to a reduction of the quantity of catch and bycatch species data collected. Observers are trained by NCDMF staff on all data collection protocols. All observers are trained to handle, transport, identify, resuscitate, tag, and release sea turtles in accordance with the NMFS standards by NCDMF staff or personnel with the NMFS Laboratory in Beaufort, NC. Marine Patrol officers are regularly trained by staff on all data collection protocols and provided field and final data sheets for weekly observations. Marine Patrol officers also participate in sea turtle identification, resuscitation, handling, and tagging training with the NMFS-Beaufort Lab. ***Information was requested by NMFS after the last revision of the application and is provided in Appendix D and E.***

Data collections from observer trips include: date, location, unit, time, season, gill-net description (net length, number of net shots, mesh size, presence/absence of tie downs, vertical mesh height, and hang ratio), soak time, and water depth. Environmental parameter data (wind, tide stage, and water quality) are collected when feasible. Total catches of target species are estimated and final disposition (kept or discarded) is recorded. Sea turtle interaction information includes species, condition, tag numbers, and final disposition. Sea turtle interactions are photo documented when possible. Gill-net interactions involving other protected species are also documented. All observers are required to adhere to these data collection parameters. Observers are debriefed by phone daily and submit weekly debrief reports. At the end of each day, observers contact the observer coordinator and provide the following trip information: the fishermen's name, area fished, all protected species interactions, quantity and species of fish caught, fishing effort in the area, other vessels in the area, as well as any other information which will assist in the determination of ongoing observer effort required at that location. ***Information was requested by NMFS after the last revision of the application and is provided in Appendix D and E.***

NCDMF has not used volunteer observers to date primarily due to a lack of expressed interest on the part of the public and logistics of observers having to contact fishermen in the evening to arrange trips for the next day and predawn rendezvous for trips with fishermen at docks or boat ramps. Additionally, NCDMF is concerned about possible liability issues, limited availability of NCDMF required safety equipment (US Coast Guard approved cold weather survival gear, personal Emergency Position-Indicating Radio Beacon or EPRBs), and limited staff to train and supervise volunteers.

Observer data are coded into the NCDMF Biological Database Program 466 and 467 following the completion of an observed trip. The NCWRC STSSN is contacted within 24 hrs of an observed interaction and standard interaction reports are submitted within 48 hrs. Summary reports are provided monthly to the NMFS-Office of Protected Resources (OPR), the NMFS-SERO, and the STAC with estimates of total sea turtle takes by Management Unit, season, species, and disposition (alive/dead). If observed takes exceed allowable levels, the NCDMF will issue a proclamation closing the remaining portion of the season for the responsible gill-net gear in the Management Unit(s) where levels were met.

The NCDMF staff created field data forms for Marine Patrol officers to use for observed trips; these forms are in the AP data format. The forms are specific to gill-net observations and include location, effort, activity, violations, and protected species information. The Marine Patrol observer trip data will be similar to other NCDMF observer staff data collections, downloaded into the NCDMF biological database, and used to improve fisheries observations by area and season and to provide prompt responses to protected species interactions.

In order to accomplish CP objectives and to provide optimal coverage throughout the state, the Observer Program created Management Units to maintain proper coverage of the fisheries. Management Units were delineated on the basis of three primary factors: similarity of fisheries and management; extent of known protected species interactions in commercial gill-net fisheries; unit size; and the ability of the NCDMF to monitor fishing effort (Figure 10).

Management Unit A will encompass 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 will encompass 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 will include all of Pamlico Sound and the Northern portion of Core Sound.

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

Management Unit D is divided into two areas, D-1 and D-2, to allow the NCDMF to effectively address areas of high sea turtle abundance or "hot spots".

Management Unit D-1 will encompass 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 D-2 will encompass 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 Hwy 58 bridge. Management Unit D-2 includes Newport River and Bogue Sound.

Management Unit E will encompass all estuarine waters south and west of the Hwy 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.

The observer program will maintain statewide gill-net fishery coverage in all Management Units while gill-net 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 fisheries efforts, observer coverage will be relative to the fisheries efforts for that 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 the NCDMF to increase observer coverage in areas where high concentrations of protected species populations may potentially interact with fishing gear. The Observer Program does not have allocated sea days associated with Management Units. Under the requested ITP, the NCDMF will implement management measures in estuarine gill-net fisheries in accordance with the CP. A comprehensive monitoring program will be established through the CP to ensure the functionality of management measures and allow timely adaptations to address sea turtle and other protected species conservation issues. If estimated takes achieve allowable levels in a Management Unit or sub-unit, the NCDMF will respond by issuing a proclamation closing the season for the responsible gill-net gear in the applicable area. Proclamations involving gill-net restrictions must be issued a minimum of 48 hours prior to the effective date and time. ***Information was requested by NMFS after the last revision of the application and is provided in Appendix D.***

Since 2010, NCDMF staff conducted onboard and AP observations (n = 1,496) in large mesh gill-net fisheries in the five areas described under Management Units (Table 25). Since May 15, 2010 Management Units have been observed on a seasonal basis (Table 26). Beginning in 2010, small mesh gill-net observations (n = 278) were conducted with only one interaction (Table 27). Observations in the past have been concentrated in areas and during times of known or suspected sea turtle concentrations and anticipated trips have been based on prior year's gill-net effort by area and season. The NTTP data from the previous year are used to estimate the number of large mesh gill-net trips by Management Unit, month, and season when weighting coverage (Table 26). In addition, NCDMF observations from

onboard gill-net observations (2000 to 2011) and independent gill-net sampling programs (1990 through 2011) are used to direct coverage to known areas of increased sea turtle interactions.

Due to the decrease in large mesh trips (40%) and yards fished (56%) since 2009 and the fluctuations in the fisheries, NCDMF uses the previous year's data to estimate coverage and predict the amount of trips needed for observation. The goal of NCDMF is to provide 10% statewide, estuarine large mesh gill-net trip coverage weekly with a minimum of 7% as dictated by the Settlement Agreement. The number of trips needed to maintain the 7–10% coverage statewide will vary depending on fishing effort in each Management Unit. To estimate real-time observer coverage, observer data (observed trips) are divided by NTTP data (actual trips) for each Management Unit weekly, monthly, and seasonally (Table 26). For 2012, the number of trips to be observed for 7% observer coverage is based upon NTTP data from 2011, which indicate that approximately 14,422 large mesh gill-net trips were made in 2011; therefore, NCDMF needs 1,010 to 1,442 observed trips to maintain 7–10% statewide coverage. ***Information was requested by NMFS after the last revision of the application and is provided in Appendix D.***

Small mesh gill-net attendance requirements designed to minimize undersized red drum bycatch also occur in areas and times where sea turtles are most commonly found. Few sea turtle interactions (n = 2) have been documented in small mesh gill nets with only one occurring (Kemp's ridley; alive) from 2010 through 2011 (Table 27). From July 2010 through December 2011, there were a total of 12,268 small mesh gill-net trips made in NC with observers on 278 trips for coverage of 2.3% (Table 6, Table 27). Coverage for small mesh gill nets in North Carolina's waters will vary but remain within 1–2% for the duration of the ITP.

Between 2000 and 2011, a number of changes were made in the PSGNRA such as: adjustments to allowable fishing areas, restrictions modified (e.g., state closure, net length restriction), and allowable take levels reduced (Gearhart 2003; Price 2010a). These adaptations were made feasible as a result of the extensive monitoring program conducted by the NCDMF in the PSGNRA. In the future, data from the expanded observer program may allow the NCDMF to request adjustments to the take levels proposed in this ITP application.

The NCDMF Marine Patrol is responsible for enforcing Fisheries Rules and NCDMF proclamations. Enforcement of management measures will be a key component of the CP. Marine Patrol officers are stationed within three coastal districts or in the vicinity of the NCDMF offices in Elizabeth City, Manteo, Washington, Morehead City, and Wilmington. Weekly responsibilities for Marine Patrol officers include fish house inspections, aerial surveys, on the water fishing gear and license checks, fishermen interviews, enforcement of regulations, and monitoring fishing activities. Marine Patrol officers are also responsible for obtaining AP observed gill-net trips weekly to expand upon the existing

observer coverage statewide. ***Information was requested by NMFS after the last revision of the application and is provided in Appendix D and E.***

Minimize Impacts

Fishery Reduction

After the implementation of Proclamation M-8-2010, large mesh gill-net effort decreased considerably based on gill-net effort comparisons from 2009 (pre-settlement agreement) through 2011 (post-settlement agreement). The NTTP data for NC estuarine waters from 2009 through 2011indicate the amount of large mesh gill-net trips were reduced by 40% during this period (Table 5). Similar trends occurred with the amount of gill-net being fished with a 36% reduction of large mesh gill nets from 2009 to 2010 and 31% from 2010 to 2011 for a total reduction of 56% over the three-year period (Table 6). The NCDMF is confident that the management measures described herein will be adequate for conservation of sea turtles in North Carolina's internal coastal waters.

The provisions proposed in this ITP application and the expanded NCDMF Observer Program will provide data that can be used to characterize interaction trends by gear, season, disposition, and Management Unit and allow for implementation of management measures to reduce takes. The NCDMF believes that the gill-net restrictions implemented May 15, 2010 and subsequently modified, with the concurrence of the Duke Environmental Law and Policy Clinic and the Beasley Center, have been effective in reducing sea turtle interactions with large mesh gill nets.

Mitigate Impacts

Adaptive Management

The NCDMF will use proclamation authority to implement management measures necessary to reduce sea turtle takes in estuarine gill-net fisheries in North Carolina. This flexibility is a necessary component of an ITP as increased knowledge will be acquired through extensive monitoring, outreach, and data collections. Proclamation authority allows the NCDMF to implement timely responses that may provide increased protection of sea turtles. The need for additional management measures or better direction of resources will be determined by the NCDMF in consultation with the NMFS-OPR and the NMFS-SERO throughout the ITP process.

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 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. This flexibility was a vital component of the NCDMF management of the PSGNRA and will apply to our monitoring and management strategy for gill-net fisheries prosecuted in internal coastal waters of the state. A long-term adaptive approach will provide for the protection and conservation of sea turtles and other protected species.

Mitigation Measures

Mitigation measures in the CP and continued monitoring of the fishery will provide managers with the tools necessary to modify fisheries practices in a timely fashion**.** North Carolina Marine Fisheries Commission Rule 15A NCAC 03I .0107(b) Endangered or Threatened Species states, in part, "The Fisheries Director may close or restrict by proclamation any coastal waters with respect to taking or attempting to take any or all kinds of marine resources when the method (equipment) used is a serious threat to an endangered or threatened species listed pursuant to 16 USC 1533(c)". Such actions may include time/area closures, attendance requirements, gear restrictions, and increased monitoring efforts. However, if information collected by the NCDMF Observer Program indicates that no interactions have been observed or estimated takes are well below authorized levels, relaxation of restrictions during some seasons or in some areas may be in order. The CP and subsequent monitoring will provide management flexibility and protection of ESA listed species and the most efficient use of management resources.

Mitigation measures will be implemented by the NCDMF to minimize and reduce sea turtle and other protected species interactions in gill-net fisheries. 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. These measures will potentially minimize sea turtle interactions, reduce sea turtle mortality, and offer protection to other threatened and/or endangered species.

For the ten year life of the requested ITP, the NCDMF will issue proclamations implementing additional restrictions if necessary to provide increased protection of sea turtles and other ESA listed species or liberalizing gill-net or area restrictions if supported by NCDMF or NMFS biological data. Restrictions may include additional measures to reduce fishing effort, reduced yardage, attendance requirements, or other gear limitations.

Outreach, extensive monitoring, and identification of areas of concern will allow the NCDMF Observer Program to efficiently direct resources on a seasonal and area basis. Variations in finfish distribution and abundance, changes in commercial fishing behavior, and variable protected species distribution and migration will direct monitoring efforts in gill-net fisheries. Since these factors do not remain static, it will be paramount for the NCDMF Observer Program to be adaptable and flexible to respond to changing conditions in fisheries and distributions of protected species. Adaptive responses

and flexibility in this program are necessary for increased understanding of protected species behavior patterns and to have the ability to respond to the changes associated with protected species conservation.

Hotspots

A key component of an adaptive monitoring program is the identification of areas of high potential for bycatch of protected species in gill-net fisheries through observed interactions and on the water sightings of sea turtles by the NCDMF observers, biological staff, Marine Mammal Stranding Program, 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. In the PSGNRA, identification of hotspots helped characterize bycatch and facilitated the implementation of effective conservation measures (e.g., delineation of restricted areas, prohibited areas, direction of resources) necessary to minimize sea turtle takes and reduce mortality.

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. Proactive measures have been implemented for areas where NCDMF has data showing increased abundance over long periods of time such as Management Unit D1 (Figure 7). From 2010 through 2011, 44% of all observed sea turtle interactions (n = 85) occurred in Management Unit D1 and was therefore designated a hotspot by NCDMF (Figure 7). This determination was presented to the NCMFC which then closed Management Unit D1 to large mesh gill nets from May 8 through October 14 annually to reduce the number of sea turtle interactions occurring in North Carolina waters.

Seasonal and Area Closures

A seasonal closure is a management measure designed to limit effort, and in the case of sea turtles, designed to reduce interactions. The Settlement Agreement included a partial season closure limiting fishing with unattended gill nets ≥4 ISM to 4 days per week from Croatan and Roanoke sounds at the Highway 64/264 bridges to Beaufort Inlet and 5 days per week from Beaufort Inlet to the South Carolina state line. Unattended gill nets ≥4 ISM can be fished 7 days per week in areas exempted by the Settlement Agreement. If estimated takes are approached for any species and disposition (alive/dead) in a Management Unit for any given season, the Management Unit will be closed for the duration of the season (i.e., for the summer —June through August —in Management Unit B, NCDMF approaches the

estimated allowable takes for alive, green sea turtles, Management Unit B will close to all large mesh gill nets until the fall—September through November—and reopen the following season). This will allow NCDMF to close certain areas with high sea turtle abundance for the given season. ***Information was requested by NMFS after the last revision of the application and is provided in Appendix D and E.***

Area closures are a way to address hotspots or locations with high incidences of protected species interactions as compared with other locations confirmed by observations or fishery-independent surveys. Gill nets >4 ¼ ISM are prohibited in the deep water portions of Pamlico Sound and areas around Oregon, Hatteras, and Ocracoke inlets from September 1 through December 15 to minimize sea turtle interactions (NCDMF 2011). The shallow water portions of Pamlico Sound are open during this time as a result of a Section 10 ITP for the PSGNRA; these waters would also be closed without the ITP. Area D1 is currently closed from May 8 through October 14 annually to unattended large mesh gill nets ≥4 ISM due to high sea turtle interactions (Figure 7).

Other hotspots for sea turtles may exist in estuarine waters, but additional observer coverage is needed to document them. Identifying these hotspots and managing them proactively provides the best chance to minimize interactions and to avoid early season closures in the Management Units where these hotspots occur.

Area closures tend to result in fishermen shifting their fishing effort to open areas if it is feasible. If the effort shifts to an area where sea turtles are not commonly found, then the area closure will reduce interactions with protected species. Shifting fishing effort in other areas could lead to increased protected species interactions, which could result in more area and season closures. If any shift in effort occurs, the NCDMF Observer Program will also shift effort to continue coverage of the fishery.

These management measures can be implemented individually or in conjunction with one another and can be applied statewide or to specific areas. A combination of management measures may be an effective way to minimize sea turtle interactions. The potential management options provide the necessary flexibility to implement management measures that are most effective in terms of minimizing protected species interactions and still providing fishing opportunities for the commercial estuarine gill-net fishery for a particular area.

Funding

The NCDMF Observer Program has received funding from several sources including: state appropriations, the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA), the USFWS, the Atlantic Coast Cooperative Statistics Program (ACCSP), and the National Fish and Wildlife Foundation (NFWF). The NCDMF will continue to receive state appropriated monies and seek additional funding for the continuation of these vital fisheries monitoring programs. Currently, NCDMF employs

14 observers statewide to cover all estuarine waters. If funding becomes unavailable to comply with the ITP, then NCDMF will close Management Units to gill nets where observer coverage cannot be obtained. If this continues, NCDMF will close the estuarine gill-net fisheries to comply with the ITP.

The CP adaptive approach recognizes the need to allow fishing to continue if adequate safeguards for protected resources exist, balanced by the legitimate interests of state fisheries which are an important part of the economy (and history and culture) of eastern North Carolina. In conjunction with a reliable level of observer coverage, this will allow NCDMF to target specific problem fisheries by adding further gear or effort restrictions or by closing certain areas to fishing altogether. Where conditions and observation indicate that interactions are not likely, the fishing restrictions can be relaxed and this adaptive approach will result in more efficient use of resources and a high level of protection for protected resources.

ALTERNATIVES CONSIDERED

Alternative 1: No-Action Alternative

Implications of No Action to the State:

If NCDMF did not apply for a permit, it believes that it would be immune to suit pursuant to its sovereign immunity. By applying for this permit, the state does not waive and explicitly preserves that immunity. However, if NCDMF does not apply for a permit, it would be more difficult to gather important data about sea turtles from the fishermen who actively fish North Carolina waters. These data will, in turn, be used to develop and inform management measures for the enhancement of sea turtles, as well as for the balanced development of the fisheries as a whole. For this reason, NCDMF believes that permit application is in the best interests of the state and rejects the no action alternative.

Implications of a No Action Alternative on the Fisheries:

If NCDMF did not apply for a permit, the fishermen conducting fishing operations and having interactions with sea turtles could be subject to suit under the ESA. Those fishermen could be sued under civil and criminal provisions by the federal agencies charged with administering the ESA or by individuals under the civil provisions allowing citizen suit actions under the ESA. This would impose a litigation risk on the fishermen, already struggling in a time of economic downturn. Fishermen do have the option to apply individually for an ITP. NCDMF sees that process as one imposing huge burdens on fishermen. Fishermen do not have the staff to do data collection and analysis and can only do management on an ad hoc basis. This piecemeal approach to management would not be practical nor offer the same level of protection to sea turtles and other protected species that could be achieved through comprehensive management by NCDMF.

The No Action Alternative was rejected.

Alternative 2.

Alternative 2 is to not apply for an ITP and to close state waters to all commercial gear except those that do not have incidental takes. This approach would not allow for collection of long-term comprehensive data that could assist in the eventual recovery of the species. A full closure of fisheries in North Carolina would have a severe and unprecedented economic impact on participating fishermen, as well as on the local and regional economy. Closing these waters would be directly contradictory to the NCDMF's mission of: "Ensuring sustainable marine and estuarine fisheries and habitats for the benefit of the people of North Carolina."

Closure of the fisheries would also shift demand to other fisheries to provide food for the markets currently served by North Carolina fishermen. This increased demand could drive prices up quickly, placing seafood out of reach economically for many consumers. In addition, this would push North Carolina consumers away from their fresh, locally caught sources of seafood and towards imported seafood with associated pressures on costly refrigerated transportation and fuel consumption.

Recovery of sea turtles could be hampered through the closure of the commercial fishery due to loss of available data. Much of what is known about protected species and their biology has come from samples collected through commercial gears. Many commercial fishermen provide tag return data to the USFWS, and observers have the potential to collect genetic samples. Essentially, loss of these fisheries could result in limited data sets that would no longer provide information to the NMFS or states for use to effectively monitor the populations of protected species.

Finally, closure of the fisheries would shutter an important chapter in North Carolina history. NCDMF surveys asked fishermen for their opinion as to how historically important they think commercial fishing is to their community. On a scale of one to ten, with one being not at all important to ten being extremely important, the average rating across all 175 persons interviewed was 9.7, indicating almost universal agreement that fishing has been historically important to their community.

Because fishery closure would not guarantee recovery of the species, would deprive North Carolina of information that it can use to manage the species, and because of the tremendous economic, social, and historic importance of the fishery, this measure has been determined to be impracticable and NCDMF has rejected the option to close the fishery.

Alternative 3.

Large mesh gill-net effort could be reduced further throughout the state by reducing yardage, limiting soak time, and requiring attendance. Such actions could possibly reduce sea turtle interactions. After the implementation of Proclamation M-8-2010, gill-net effort decreased considerably based on gill-net effort comparisons from 2009 (pre-settlement agreement) through 2011 (post-settlement agreement). The large mesh gill-net restrictions led to a large reduction in large mesh trips from 2009 to 2010 (n = 5,104 reduction) and continued to decrease from 2010 to 2011 (n = 4,640 reduction) for an overall effort reduction of 40% (Table 5). Similar trends occurred with the amount of gill-net being fished with a 36% reduction of large mesh gill nets from 2009 to 2010 and 31% from 2010 to 2011 creating a total reduction of 56% over the three year period (Table 6).

Requiring large mesh gill-net attendance in estuarine waters would likely reduce mortalities of sea turtles by minimizing the time the animals are entangled. Additional reductions of interactions and mortalities would likely result from reduced effort in terms of both number of trips made and yards of gill-net fished and from fishermen choosing not to fish.

NCDMF believes that the mitigation measures put into place by the Settlement Agreement for large mesh gill nets, which reduced gill-net effort statewide, have proven to be an optimal management option to continue the fisheries and reduce sea turtle interactions. The soak times limited to nighttime hours only is believed to have reduced the number of interactions and mortalities in the large mesh fisheries. While the fisheries may fluctuate periodically, the effort will never increase above the levels prior to 2010 due to the stringent management measures. NCDMF does not recommend further mitigation measures to reduce large mesh gill-net effort at this time and therefore rejects Alternative 3.

Alternative 4.

Currently, all areas that are exempt from the Settlement Agreement (Management Unit A and C) do not have weekly closures. Expanding the 3-day weekly closures to the rest of the state to reduce effort from unattended gill nets ≥4 ISM could reduce sea turtle interactions. This is dependent on effort not appreciably increasing during days when fishing is allowed. A seasonal closure that occurs when sea turtles are present in North Carolina's estuarine waters would provide the most protection. Another possibility would be to limit season closures to areas where sea turtles are more common or during months of high water temperatures when discard mortality is higher.

NCDMF believes the mitigation measures detailed in the CP including hotspot closures, gear modifications, and effort reductions provide adequate protection for sea turtles in estuarine waters of NC.

There has only been one sea turtle interaction in exempt Management Unit A for the duration of the Observer Program and that interaction occurred on the southern border where Management Unit B begins (Figure 6). Exempt Management Unit C has also only had one sea turtle interaction (Figure 6). Due to this very low sea turtle interaction occurrence, expanding the 3-day weekly closures is not warranted for Management Units A and C. Further area and seasonal closures are not justified at this time and therefore Alternative 4 was rejected.

Alternative 5.

Small mesh gill-net effort could be reduced throughout the state by reducing yardage, limiting soak time, and requiring attendance—possibly reducing sea turtle interactions. From 2009 to 2011, there has been a reduction (8%) of small mesh gill-net yardage and trips in estuarine waters with the number of trips averaging 8,464 and a total of 6,763,626 yards of net deployed for the three-year period (Table 5, Table 6). Attendance is already required in most areas of North Carolina from May through November during peak sea turtle abundance (Figure 11). There are only two documented sea turtle interactions in small mesh gill nets within North Carolina's waters (Jacob Boyd, NCDMF, personal communication). Implementing a maximum yardage limit for small mesh gill nets could provide additional protection to sea turtles by reducing the yardage of small mesh gill nets in the water at any given time, assuming that fishing effort does not increase. Any reduction in the maximum yardage limit will need to ensure that it will appreciably reduce yardage for a particular water body, which means a uniform yardage limit for gill nets less than 4 ISM in all water bodies might not be appropriate. Because of the low number of interactions and May through November attendance requirements, NCDMF does not believe further restrictions to small mesh gill nets are necessary at this time and therefore rejects Alternative 5.

APPLICATION

The NCDMF acknowledges the requested estimated take numbers represent a worst-case scenario**.** It is highly unlikely that the total authorized take level will be approached in a season or a year because the NCDMF will close a Management Unit for the remainder of that season if takes approach the authorized level for one of the five species for either disposition (alive/dead), not the authorized level for all species. The NCDMF believes that the gear restrictions, adaptive management, extensive monitoring, delineation of Management Units, and frequency of take analysis (estimate of takes monthly in each of the five Management Units) will ensure continued protection for endangered or threatened sea turtle

populations and other protected species. ***Information was requested by NMFS after the last revision of the application and is provided in Appendix D and E.***

North Carolina fishermen and communities depend greatly upon the fisheries resources of this state. The industry remains committed to working with managers to address bycatch problems in gill-net fisheries. The NCDMF will continue to address protected species bycatch issues through timely management actions, development of bycatch reducing gears, and outreach to the fishing industry.

The requested ten-year ITP will allow for the establishment of a comprehensive CP with a monitoring infrastructure to provide for management measures to be implemented for protection of sea turtles and other protected species in North Carolina's estuarine waters. The monitoring program will allow for characterization of the gill-net fisheries and sea turtle distributions and interactions in these waters. This information will provide managers with the tools to address concerns in the short-term and the information needed to plan and manage resources in the long-term both for the conservation of protected species and the opportunity for various user groups to access North Carolina fisheries resources. This program will remain adaptive and flexible throughout its course as the NCDMF will continue to work with the NMFS to address protected species issues in North Carolina fisheries.

The NCDMF, PO Box 769, Morehead City, NC 28557, (Phone 252-726-7021) makes application for an Individual ITP under Section 10(a)(1)(B) of the ESA authorizing implementation of management measures for protection of threatened and endangered sea turtles and other ESA listed species while allowing gill-net fisheries to be prosecuted in the estuarine waters of North Carolina. This request is being made to cover activities described herein from the date of authorization not to exceed ten years.

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TABLES

Table 1. Sea turtle strandings in North Carolina by species and year from 2001 through 2011 from the North Carolina Wildlife Resources Commission (NCWRC).

	Species						Total	
Year	Loggerhead	Green	Leatherback	Hawksbill	Kemp's Ridley	Unknown	Number	Year (%)
2001	216	53	12	1	58	19	359	6.8
2002	286	94	28	0	43	18	469	8.9
2003	364	43	15	2	45	7	476	9.0
2004	266	88	12	0	59	24	449	8.5
2005	249	66	9	4	30	20	378	7.2
2006	202	49	7	1	41	21	321	6.1
2007	156	140	4	0	29	11	340	6.5
2008	176	299	3	0	58	11	547	10.4
2009	213	299	3	1	113	9	638	12.1
2010	295	377	0	0	171	5	848	16.1
2011	171	132	6	0	126	5	440	8.4
Total (Species)	2,594	1,640	99	9	773	150	5,265	
Total (Species %)	49.3	31.1	1.9	0.2	14.7	2.8		

Table 2. Observed and estimated sea turtles takes by species and disposition (alive/dead) per year throughout the Pamlico Sound Gill Net Restricted Area (PSGNRA) from 2005 through 2011.

	Year							Takes		
Species/Disposition	2005	2006	2007	2008	2009	2010	*2011	Total Species	Total (%)	Annual Estimate
Green										
Alive	2	4	14	8	21	11		60	72.3	120
Dead		3	5	7	7			22	26.5	48
Unknown	1							1	1.2	
Total	3	7	19	15	28	11		83	80.6	168
Hawksbill										
Alive								0	0.0	**2
Dead					1			1	100.0	**2
Unknown								0	0.0	
Total					1			1	1.0	**2
Kemp's Ridley										
Alive	1	2			1			4	40.0	27
Dead		2		1	3			6	60.0	14
Unknown								0	0.0	
Total	1	4		1	4			10	9.7	41
Loggerhead										
Alive		3	1	1	1	1		7	77.8	38
Dead	1	1						2	22.2	3
Unknown								0	0.0	
Total	1	4	1	1	1	1		9	8.7	41
Total Year	5	15	20	17	34	12		103		250

*No sea turtles were observed or reported in 2011

**Annual estimate for hawksbill and leatherback sea turtles are 2 lethal or live due to rareness

Table 3. Observed sea turtle interactions by species and disposition (alive/dead) from the National Marine Fisheries Service (NMFS) Alternative Platform (AP) Gill Net Observer Program in Core Sound, NC during June through November 2009.

	Disposition		
Species	Alive	Dead	Total
Green	8	4	12
Loggerhead	4	1	5
Kemp's Ridley	4	1	5
Total	16	6	22

Table 4. Summary of significant sea turtle gill-net restrictions and exemptions implemented by the North Carolina Division of Marine Fisheries (NCDMF) through proclamation from May 2010 through May 2012.

M-8-2010 May 15, 2010	With the **exception** of western Albemarle and Currituck sounds and the PSGNRA from September through November: Large mesh gill-nets (4-6.5 in.) must be fifteen (15) meshes deep with lead lines, floats prohibited north of Hwy. 58 bridge, allowed south of it. Maximum 2,000 yds. North of Hwy. 58 bridge, 1,000 yds South. No more than 100 yds set in a continuous line and 25 yds. between sets with four nights fishing (Tuesday – Friday)
M-2-2011 January 20, 2011	In order to have a shad harvest season, Albemarle Sound Management Area(ASMA), Pamlico Sound and its tributaries (including Pamlico, Pungo, Bay and Neuse rivers) and the Cape Fear River were exempted from the four day fishing week, the mesh height, lead line and float requirements, and the 100 yard continuous length limit. These exemptions were in place until March 28, 2011.
M-27-2011 September 12, 2011	Large mesh gill-net restrictions were no longer required in Albemarle, Croatan and Roanoke sounds north and west of Hwy 64/264 bridges as well as Pamlico, Bay and Neuse rivers.
M-30-2011 September 18, 2011	An extra day (Monday) was allowed for setting large mesh gill-nets south of Beaufort Inlet.
M-6-2012 February 2, 2012	In order to have a shad harvest season, the ASMA, Pamlico Sound and its tributaries (including Pamlico, Pungo, Bay and Neuse rivers), upper New River and the Cape Fear River were exempted from the four day fishing week, the mesh height, lead line and float requirements, and the 100 yard continuous length limit. These exemptions were in place until March 28, 2012.
M-23-2012 May 20, 2012	Southern Core Sound (D1) was closed to large mesh gill-nets and 2,000 yd. maximum length restriction is reduced to 1,000 yds. from Beaufort to the Hwy. 58 bridge.

Table 5. Large (≥4 in) and small (<4 in) mesh gill-net trips from 2009 through 2011 by season and Management Unit.

		Large Mesh			Small Mesh		
Season	Management Unit	2009	2010	2011	2009	2010	2011
Winter	A	527	1,364	956	1,089	927	1,037
	B	209	227	172	397	347	136
	C	172	89	142	216	198	39
	D1	1	8	5	2	5	1
	D2	1	0	0	30	36	30
	E	48	65	61	124	221	65
Spring	A	2,396	3,685	2,303	1,044	790	580
	B	1,172	1,265	790	1,046	1,191	1,516
	C	1,363	1,020	843	465	203	88
	D1	119	61	59	15	20	19
	D2	115	59	68	20	10	36
	E	401	276	302	195	145	174
Summer	A	2,461	1,030	538	467	413	329
	B	2,947	1,585	2,219	900	1,285	1,126
	C	1,216	392	591	321	155	138
	D1	250	123	134	4	2	5
	D2	252	74	175	16	24	45
	E	829	287	409	211	198	135
Fall	A	4,789	2,938	928	524	339	405
	B	2,520	3,129	2,275	717	779	994
	C	1,058	577	654	272	155	92
	D1	139	109	92	54	49	84
	D2	312	212	277	67	90	302
	E	869	487	429	777	477	985
Total		24,166	19,062	14,422	8,973	8,059	8,360

Table 6. Large (≥4 in) and small (<4 in) mesh gill-net yardage from 2009 through 2011 by season and Management Unit.

		Large Mesh (yd)			Small Mesh (yd)		
Season	Management Unit	2009	2010	2011	2009	2010	2011
Winter	A	464,110	1,401,066	631,600	621,167	618,471	695,760
	B	220,183	231,685	186,413	518,451	354,786	132,822
	C	159,246	72,367	91,818	172,830	135,914	12,019
	D1	189	7,965	6,044	918	2,497	356
	D2	2,054	0	0	12,500	22,667	24,000
	E	23,013	31,490	47,742	87,614	163,764	19,661
Spring	A	3,253,460	3,954,793	1,832,505	1,014,521	666,994	334,139
	B	2,438,626	1,918,251	1,106,442	1,088,407	1,146,738	1,293,947
	C	1,174,977	816,019	449,891	428,506	171,083	46,378
	D1	308,149	111,665	93,223	16,035	18,357	12,781
	D2	157,650	71,408	68,588	8,333	3,933	10,800
	E	457,526	229,141	206,421	192,391	47,781	37,751
Summer	A	4,309,898	1,372,350	716,880	294,912	330,400	263,200
	B	5,618,804	2,170,202	3,139,355	807,177	1,359,577	1,208,472
	C	1,372,477	454,055	726,293	187,081	85,417	77,200
	D1	572,208	209,878	228,708	2,770	978	2,668
	D2	292,368	60,063	140,642	6,667	11,084	20,783
	E	981,551	239,549	339,789	67,500	69,850	48,650
Fall	A	7,956,341	4,003,029	1,130,833	448,048	273,800	301,825
	B	3,526,907	4,352,324	3,252,756	622,974	734,925	876,369
	C	1,224,431	676,270	767,273	157,109	91,200	53,300
	D1	258,756	189,576	162,429	27,527	26,843	47,688
	D2	317,033	219,514	285,111	32,367	34,997	96,223
	E	1,029,165	379,986	329,963	217,426	407,150	861,650
Total		36,119,122	23,172,644	15,940,719	7,033,232	6,779,205	6,478,442

Table 7. Southern flounder landings data from 2005 through 2010 for the lower Cape Fear River.

Year	Species	Waterbody	Pounds
2005	Southern Flounder	Cape Fear River	13,636
2006	Southern Flounder	Cape Fear River	16,463
2007	Southern Flounder	Cape Fear River	9,374
2008	Southern Flounder	Cape Fear River	8,405
2009	Southern Flounder	Cape Fear River	11,132
2010	Southern Flounder	Cape Fear River	3,090
Total			62,100

Table 8. Number of turtles observed in North Carolina's large mesh (≥4 in) estuarine gill-net fishery by the North Carolina Division of Marine Fisheries (NCDMF) Sea Turtle Bycatch Monitoring Program (Program 466) by year, season, and Management Unit from 2007 through 2011.

			Species						
Year	Season	Management Unit	Green	Hawksbill	Kemp's Ridley	Leatherback	Loggerhead	*Unknown	Total
2007	Fall	B	19	0	0	0	1	0	20
2008	Spring	B	0	0	1	0	0	0	1
2008	Summer	B	1	0	0	0	0	0	1
2008	Fall	B	15	0	1	0	1	0	17
2009	Summer	B	2	0	2	0	0	0	4
2009	Fall	B	28	1	4	0	1	0	34
2010	Fall	B	7	0	0	0	1	0	8
2011	Summer	B	0	0	0	0	0	1	1
2011	Summer	D1	0	0	4	0	0	0	4
2011	Summer	E	1	0	0	0	1	0	2
2011	Fall	D2	0	0	1	0	0	0	1
2011	Fall	E	1	0	0	0	1	0	2
Total			74	1	13	0	6	1	95

*Includes sea turtles that could not be identified to the species level

Table 9. Number of turtles observed in the North Carolina Division of Marine Fisheries (NCDMF) Alternative Platform (AP) Observer Program (Program 467) by mesh size, year, season, and Management Unit from 2010 through 2011.

				Species					
Mesh	Year	Season	Management Unit	Green	Hawksbill	Kemp's Ridley	Leatherback	Loggerhead	Total
Large	2010	Fall	D1	5	0	1	0	1	7
	2010	Fall	E	3	0	1	0	0	4
	2010	Spring	E	0	0	1	0	0	1
	2010	Summer	B	2	0	0	0	0	2
	2010	Summer	D1	6	0	15	0	1	22
	2010	Summer	E	3	0	0	0	0	3
	2011	Spring	D1	0	0	3	0	1	4
	2011	Summer	A	0	0	1	0	0	1
	2011	Summer	B	0	0	1	0	0	1
	2011	Summer	D1	3	0	4	0	0	7
	2011	Summer	D2	0	0	0	0	1	1
	2011	Summer	E	0	0	1	0	0	1
Small	2011	Fall	D2	0	0	1	0	0	1
Total				22	0	29	0	4	55

Table 10. Estimated coefficients of predictors and their standard errors for the Poisson GLM fit to the green turtle data.

Covariate	Coefficient	Std. Error
Intercept	-9.05081	0.23069
Year - 2008	-0.50782	0.34014
Year - 2009	-0.05673	0.29415
Year - 2010	-0.49834	0.32311
Year - 2011	-2.52339	0.52067
Unit - D1	1.45672	0.31489
Unit - E	1.89865	0.39851

Table 11. Results of the model selection for the Poisson GLM fit to the green turtle data.

Dropped Term	df	Deviance	AIC	LRT	Pr(>χ^2)
None		461.19	635.09		
Year	4	507.67	673.56	46.472	1.964e-09
Unit	2	489.76	659.65	28.565	6.270e-07

Table 12. Estimated coefficients of predictors and their standard errors for the ZIP GLM fit to the green turtle data.

Count Part (Poisson with log link)			Zero-Inflation Part (binomial with logit link)		
Covariate	Coefficient	Std. Error	Covariate	Coefficient	Std. Error
Intercept	-7.5731	0.3399	Intercept	0.9850	0.2707
Year - 2008	-0.7768	0.3981	Season - Summer	-0.4087	0.4368
Year - 2009	-0.2208	0.3591			
Year - 2010	-0.9781	0.4291			
Year - 2011	-2.9880	0.5921			
Unit - D1	1.5833	0.4474			
Unit - E	2.2320	0.5185			

Table 13. Performance statistics of Poisson and ZIP GLM models fit to the green turtle data.

Model	Intercept	Slope	RMSE	MAE	AIC	LL	df
Poisson	0.01808	0.7691	0.3601	0.1388	635.1	-310.5	7
ZIP	0.04094	0.4564	0.3680	0.1416	607.9	-294.9	9

Table 14. Estimated coefficients of predictors and their standard errors for the Poisson GLM fit to the Kemp's ridley turtle data.

Covariate	Coefficient	Std. Error
Intercept	-11.9838	0.3840
Season - Spring	1.1506	0.5759
Season - Summer	1.4615	0.4257
Unit - D1	2.9286	0.4257
Unit - D2	1.4000	0.7924
Unit - E	1.4484	0.6831

Table 15. Results of the model selection for the Poisson GLM fit to the Kemp's ridley turtle data.

Dropped Term	df	Deviance	AIC	LRT	Pr(>χ^2)
None		219.69	298.78		
Season	2	233.60	308.69	13.905	0.0009565
Unit	3	278.26	351.35	58.569	1.188e-12

Table 16. Estimated coefficients of predictors and their standard errors for the negative binomial GLM fit to the Kemp's ridley turtle data.

Covariate	Coefficient	Std. Error
Intercept	-11.9474	0.3901
Season - Spring	0.9626	0.6556
Season - Summer	1.3613	0.4564
Unit - D1	2.9065	0.4652
Unit - D2	1.4969	0.8079
Unit - E	1.5330	0.7025

Table 17. Results of the model selection for the negative binomial GLM fit to the Kemp's ridley turtle data.

Dropped Term	df	Deviance	AIC	LRT	Pr(>χ^2)
None		158.28	288.69		
Season	2	167.49	293.90	9.207	0.01002
Unit	3	203.77	328.18	45.487	7.292e-10

Table 18. Performance statistics of Poisson and negative binomial GLM models fit to the Kemp's ridley turtle data.

Model	Intercept	Slope	RMSE	MAE	AIC	LL	df
Poisson	-0.007375	1.262	0.2032	0.04890	298.8	-143.4	6
Neg. Bin.	-0.008450	1.371	0.2040	0.04810	290.7	-138.3	7

Table 19. Estimated number of annual green turtle takes (n = 539) for North Carolina's large mesh (≥4 in) estuarine gill-net fishery based on the Poisson GLM and assuming effort levels equal to those observed in 2010, by season and Management Unit.

	Management Unit			
Season	B	D1	E	Total
Summer	78	31	55	164
Fall	259	27	89	375
Total	337	58	144	539

Table 20. Estimated number of annual Kemp's ridley turtle takes (n = 205) for North Carolina's large mesh (≥4 in) estuarine gill-net fishery based on the negative binomial GLM and assuming effort levels equal to those observed in 2010, by mesh size, season, and Management Unit.

	Management Unit				
Season	B	D1	D2	E	Total
Spring	27	22	3	17	69
Summer	28	47	3	14	92
Fall	24	11	3	6	44
Total	79	80	9	37	205

Table 21. Estimated number of annual green and Kemp's ridley sea turtle takes for North Carolina's large mesh (≥4 in) estuarine gill-net fishery for 2007 through 2010 based on effort levels from each year.

	Year			
Species	2007	2008	2009	2010
Green	2,264	1,561	2,498	520
Kemp's Ridley	624	817	693	158
Total	2,888	2,378	3,191	678

Table 22. Annual requested takes (n = 684) for the large mesh (≥4 in) estuarine gill-net fisheries for Management Units B, D1, D2, and E by season, species, and disposition (alive/dead).

			Management Unit												
			B			D1			D2			E			
Species	Estimated/Observed	Disposition	Spring	Summer	Fall	Spring	**Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Total
Green	Estimated	Alive	0	52	173	0	0	9	0	0	0	0	37	59	330
	Estimated	Dead	0	26	86	0	0	5	0	0	0	0	18	30	165
	Observed	Alive/Dead	*2			*2			*2	*2	*2	*2			12
Kemps Ridley	Estimated	Alive	18	19	16	11	0	4	2	2	2	11	9	4	98
	Estimated	Dead	9	9	8	5	0	2	1	1	1	6	5	2	49
Loggerhead	Observed	Alive/Dead	*2	*2	*2	*2	0	*2	*2	*2	*2	*2	*2	*2	22
Hawksbill	Observed	Alive/Dead		*1			*1			*1			*1		4
Leatherback	Observed	Alive/Dead		*1			*1			*1			*1		4
Total				426			44			23			191		684

*Number of observed takes allowed (dead or alive) where interaction levels were too low to model

**Management Unit D1 closed in Summer as hotspot

Table 23. Annual requested takes (n = 74) for the small mesh (<4 in) estuarine gill-net fisheries for Management Units B, D1, D2, and E by season, species, and disposition (alive/dead).

			Management Units												
			B			D1			D2			E			
Species	Estimated/Observed	Disposition	Spring	Summer	Fall	Spring	**Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Total
Kemps Ridley	Observed	Alive	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	24
Green	Observed	Alive/Dead	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	24
Loggerhead	Observed	Alive/Dead	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	24
Hawksbill	Observed	Alive/Dead		*1			*1			*1			*1		4
Leatherback	Observed	Alive/Dead		*1			*1			*1			*1		4
Total				20			20			20			20		80

*Number of observed takes allowed (dead or alive) where interaction levels were too low to model

**Management Unit D1 closed in Summer as hotspot

Table 24. Annual requested takes (n = 16) for the small (<4 in) and large (≥4 in) mesh estuarine gill-net fisheries for Management Units A and C by season and disposition.

			Management Units								
			A				C				
Species	Estimated/Observed	Disposition	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Total
All	Observed	Alive/Dead	*2	*2	*2	*2	*2	*2	*2	*2	16

*Number of observed takes allowed (dead or alive) where interaction levels were too low to model

Table 25. Observed large mesh (≥4 in) gill-net trips from Programs 466 (onboard) and 467 (Alternative Platform) from 2010 through 2011 by Management Unit.

Year		Program		
2010	Management Unit	466	467	Total
	A	0	13	13
	B	174	58	232
	C	33	92	125
	D1	0	56	56
	D2	0	112	112
	E	5	115	120
	Total	212	446	658
2011	Management Unit	466	467	Total
	A	0	14	14
	B	264	60	324
	C	38	50	88
	D1	19	31	50
	D2	12	116	128
	E	65	169	234
	Total	398	440	838
	Total			1,496

Table 26. Observed large mesh (≥4 in) gill-net trips from Programs 466 (onboard) and 467 (Alternative Platform) compared to total large mesh gill-net trips from 2010 through 2011 by season and Management Unit.

		Actual Effort		Observed Trips		Coverage (%)	
Season	Management Unit	2010	2011	2010	2011	2010	2011
Winter	A	1,364	956	0	0	0.00	0.00
	B	227	172	1	0	0.44	0.00
	C	89	142	11	24	12.36	16.90
	D1	8	5	0	0	0.00	0.00
	D2	0	0	0	0	n/a	n/a
	E	65	61	5	3	7.69	4.92
Spring	A	3,685	2,303	0	5	0.00	0.22
	B	1,265	790	7	16	0.55	2.02
	C	1,020	843	18	22	1.76	2.61
	D1	61	59	2	12	3.29	20.41
	D2	59	68	11	17	18.64	25.00
	E	276	302	9	45	3.26	14.90
Summer	A	1,030	538	4	2	0.39	0.37
	B	1,585	2,219	35	124	2.21	5.59
	C	392	591	60	20	15.31	3.38
	D1	123	134	41	31	33.43	23.19
	D2	74	175	39	61	52.70	34.86
	E	287	409	53	91	18.47	22.25
Fall	A	2,938	928	9	7	0.31	0.75
	B	3,129	2,275	189	184	6.04	8.09
	C	577	654	36	12	6.24	1.83
	D1	109	92	13	17	11.97	18.57
	D2	212	277	62	50	29.25	18.05
	E	487	429	53	95	10.88	22.14
Total		19,062	14,422	658	838	3.45	5.81

Table 27. Total number of small mesh (<4 in) gill-net trips and sea turtle interactions by Management Unit through onboard and alternative platform observations throughout the estuarine waters of North Carolina from July 2010 through December 2011.

Management Unit	Observed Small Mesh Trips	Interactions
A	7	0
B	86	0
C	54	0
D1	18	0
D2	90	1
E	23	1
Total	278	2

FIGURES

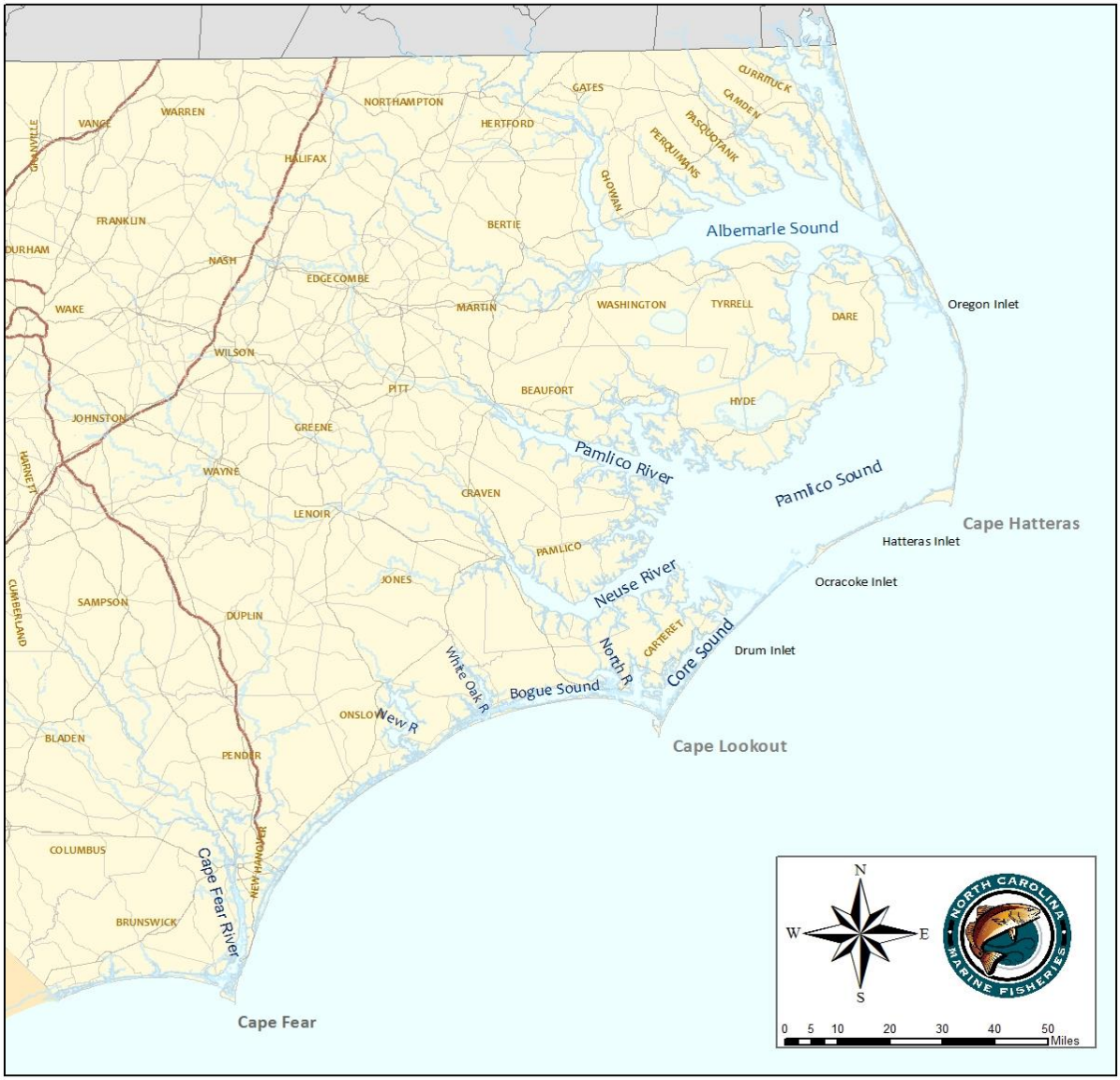


Figure 1. Map of estuarine waters in North Carolina.

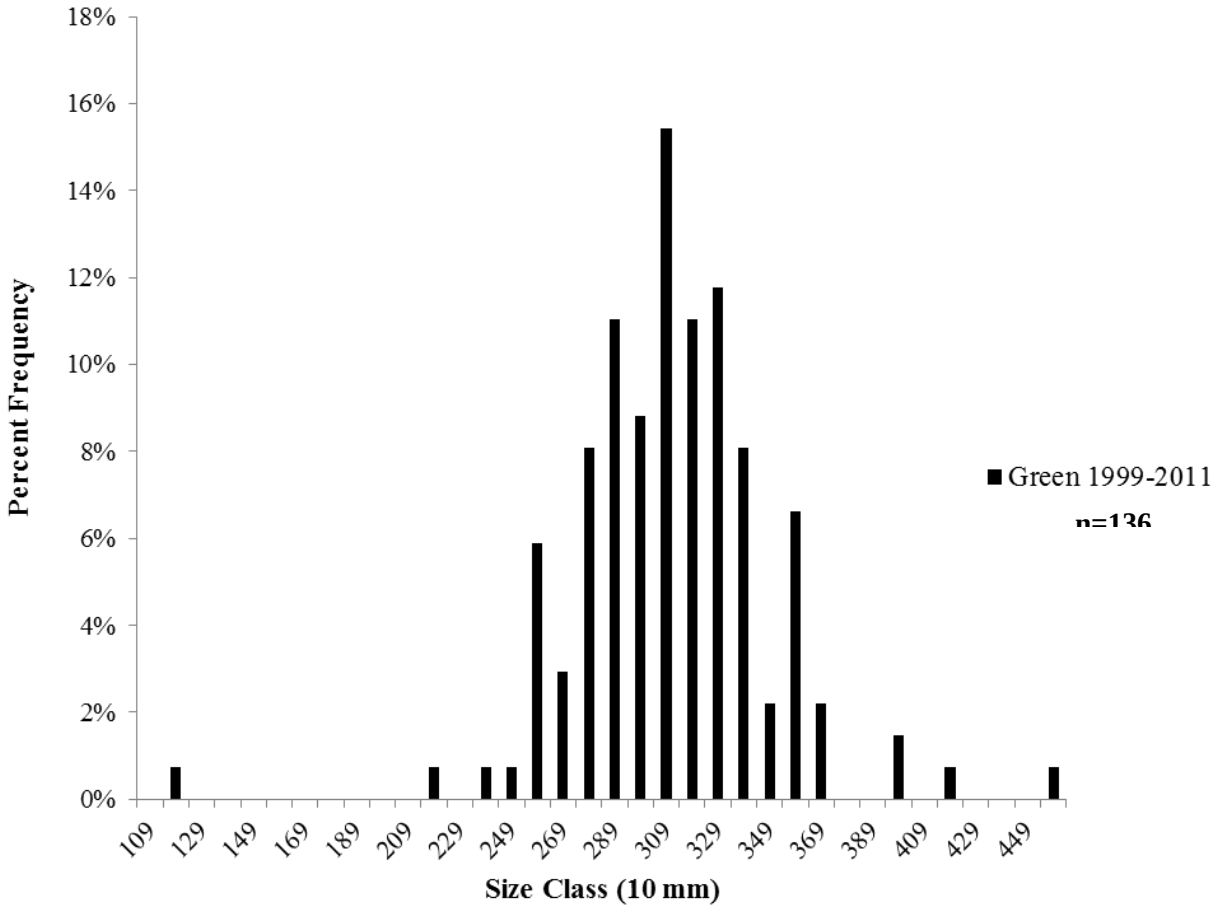


Figure 2. Length-frequency (curved carapace length) from notch to tip of observed incidental captures of green sea turtles (n = 136) from the North Carolina Division of Marine Fisheries (NCDMF) Observer Program from onboard and alternative platform observations from 1999 through 2011.

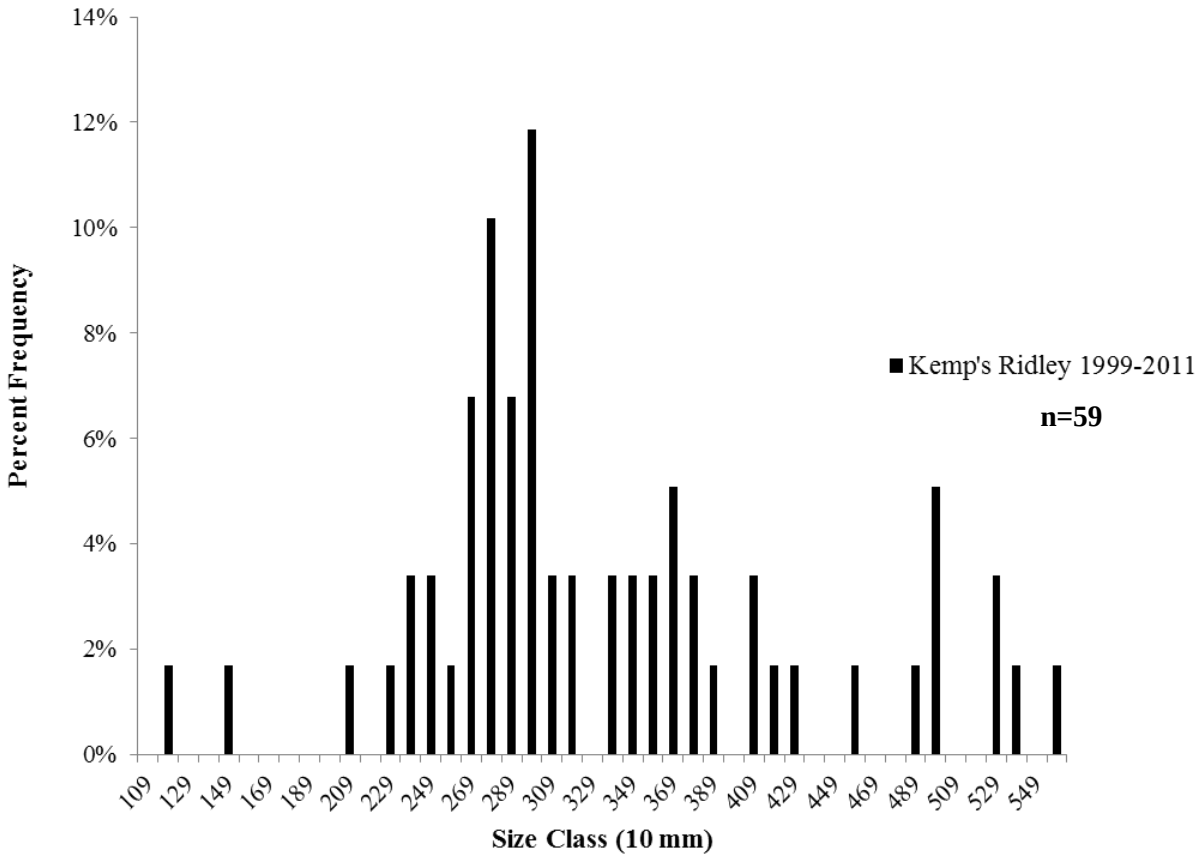


Figure 3. Length-frequency (curved carapace length) of observed incidental captures of Kemp's ridley sea turtles (n = 59) from the North Carolina Division of Marine Fisheries (NCDMF) Observer Program from onboard and alternative platform observations from 1999 through 2011.

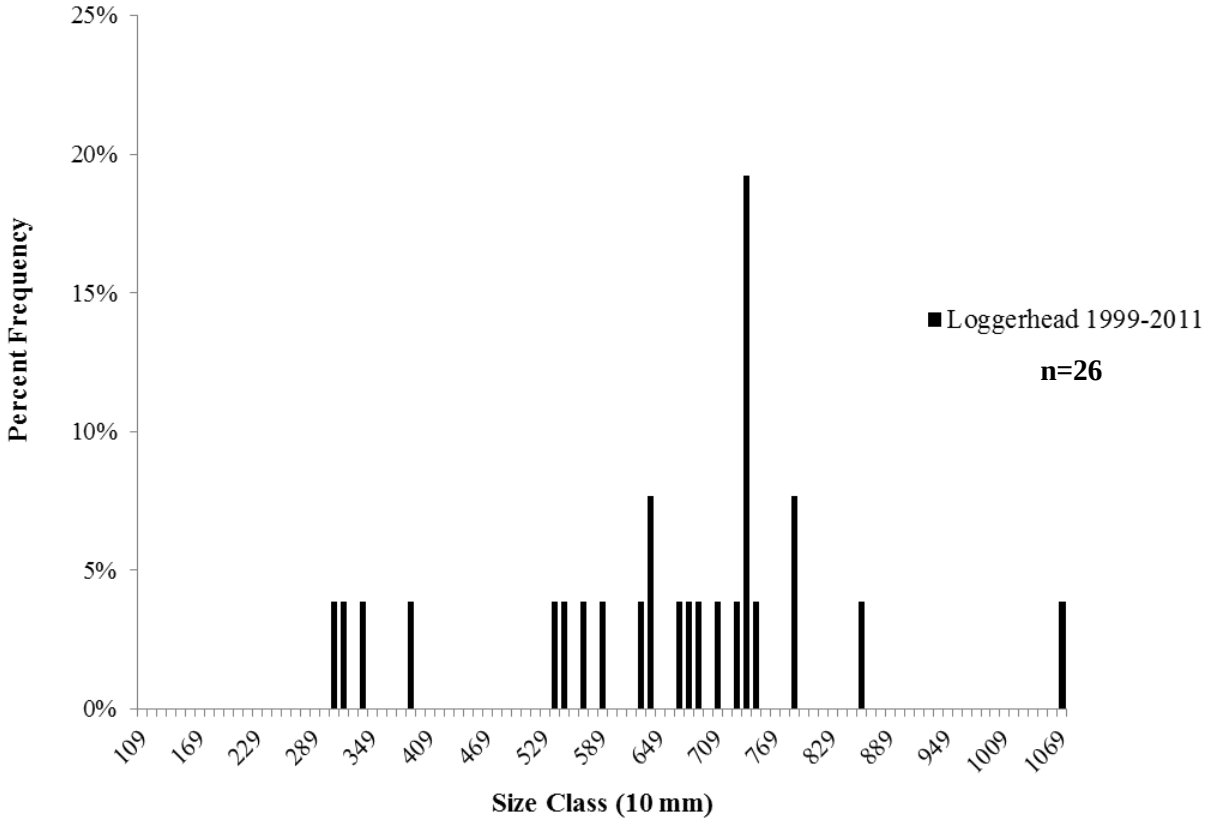


Figure 4. Length-frequency (curved carapace length) of observed incidental captures of loggerhead sea turtles (n = 26) from the North Carolina Division of Marine Fisheries (NCDMF) Observer Program from onboard and alternative platform observations from 1999 through 2011.

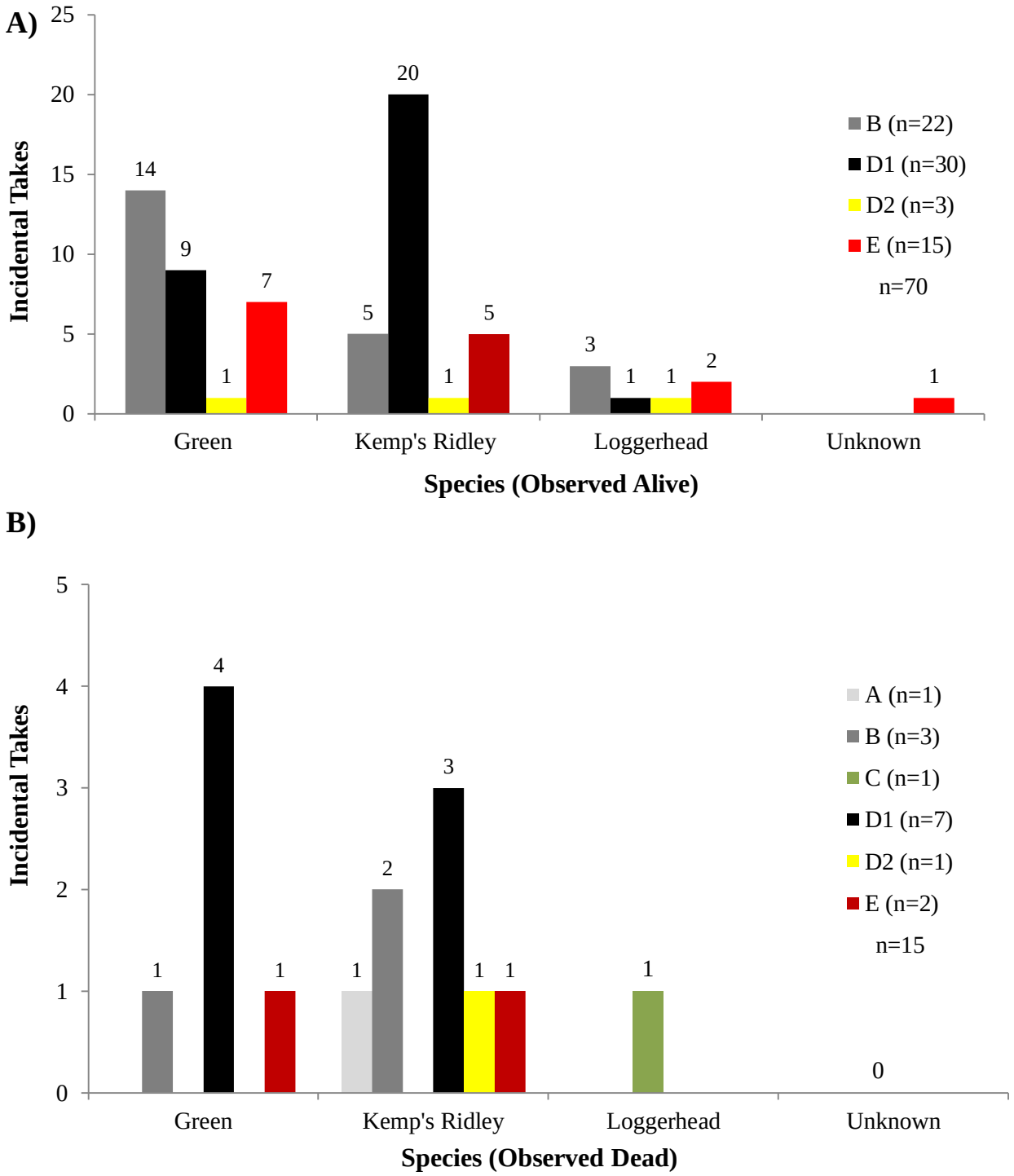


Figure 5. Observed incidental captures of sea turtles (n = 85) by species, Management Unit, and disposition [(Figure A; n = 70) (Figure B; n = 15 dead)] from the North Carolina Division of Marine Fisheries (NCDMF) Observer Program (onboard and alternative platform observations) from 2010 through 2011.

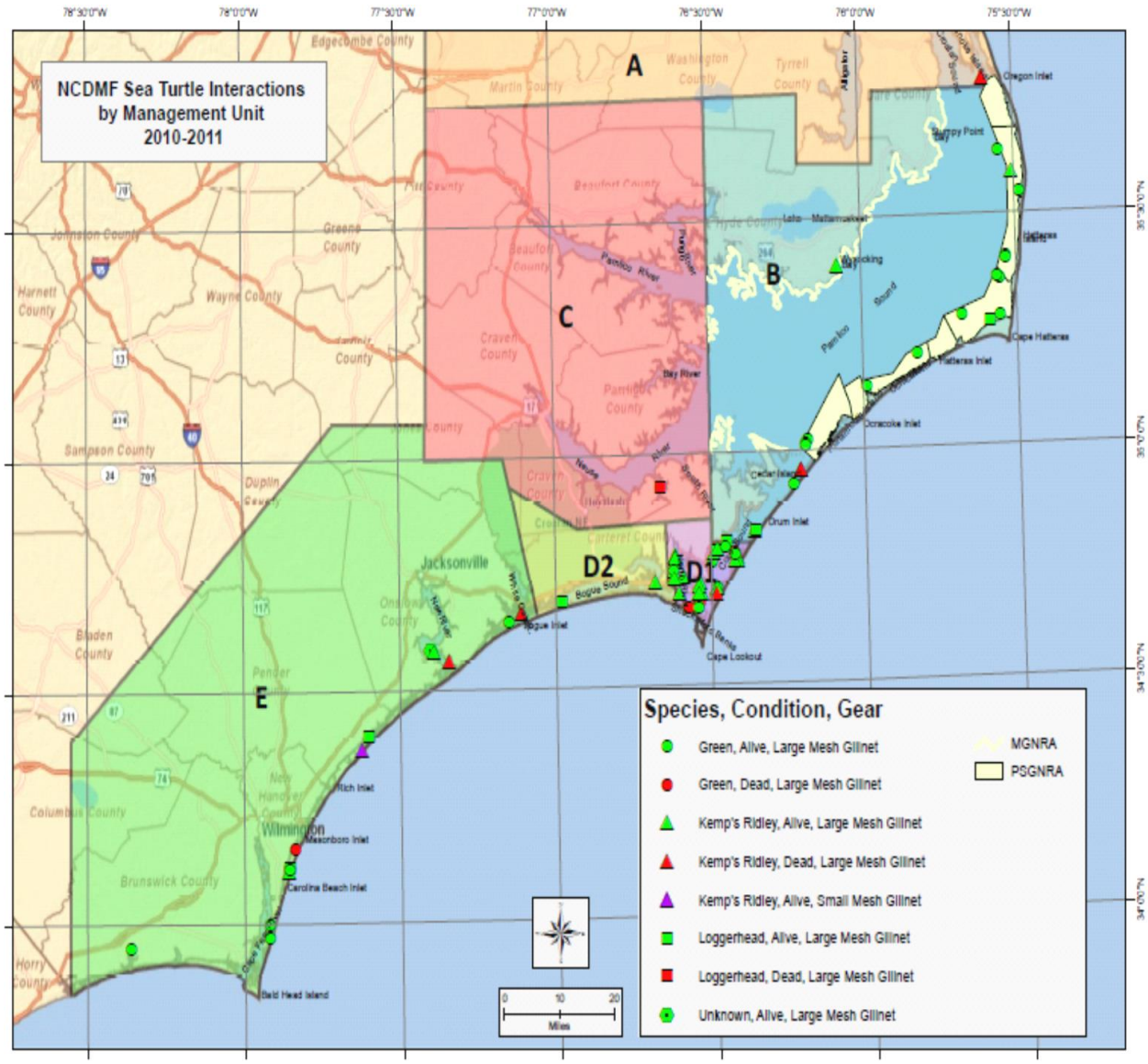


Figure 6. Observed sea turtle interactions (n = 85) by species, disposition (alive/dead), gear, and Management Unit from the North Carolina Division of Marine Fisheries (NCDMF) Observer Program (onboard and alternative platform observations) from 2010 through 2011.

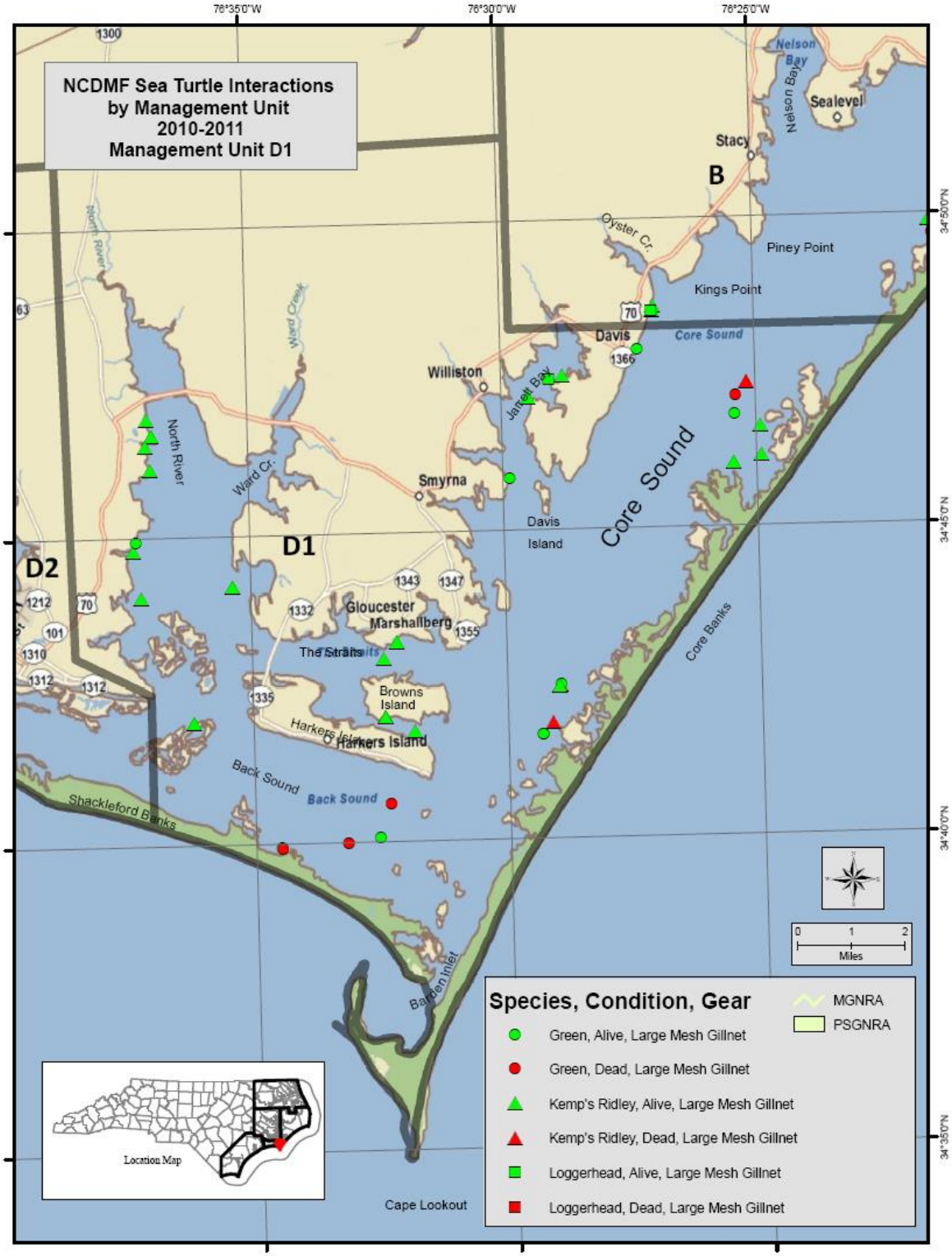


Figure 7. Observed sea turtle interactions (n = 37) by species, disposition (alive/dead), and gear for Management Unit D1 from the North Carolina Division of Marine Fisheries (NCDMF) Observer Program (onboard and alternative platform observations) from 2010 through 2011.

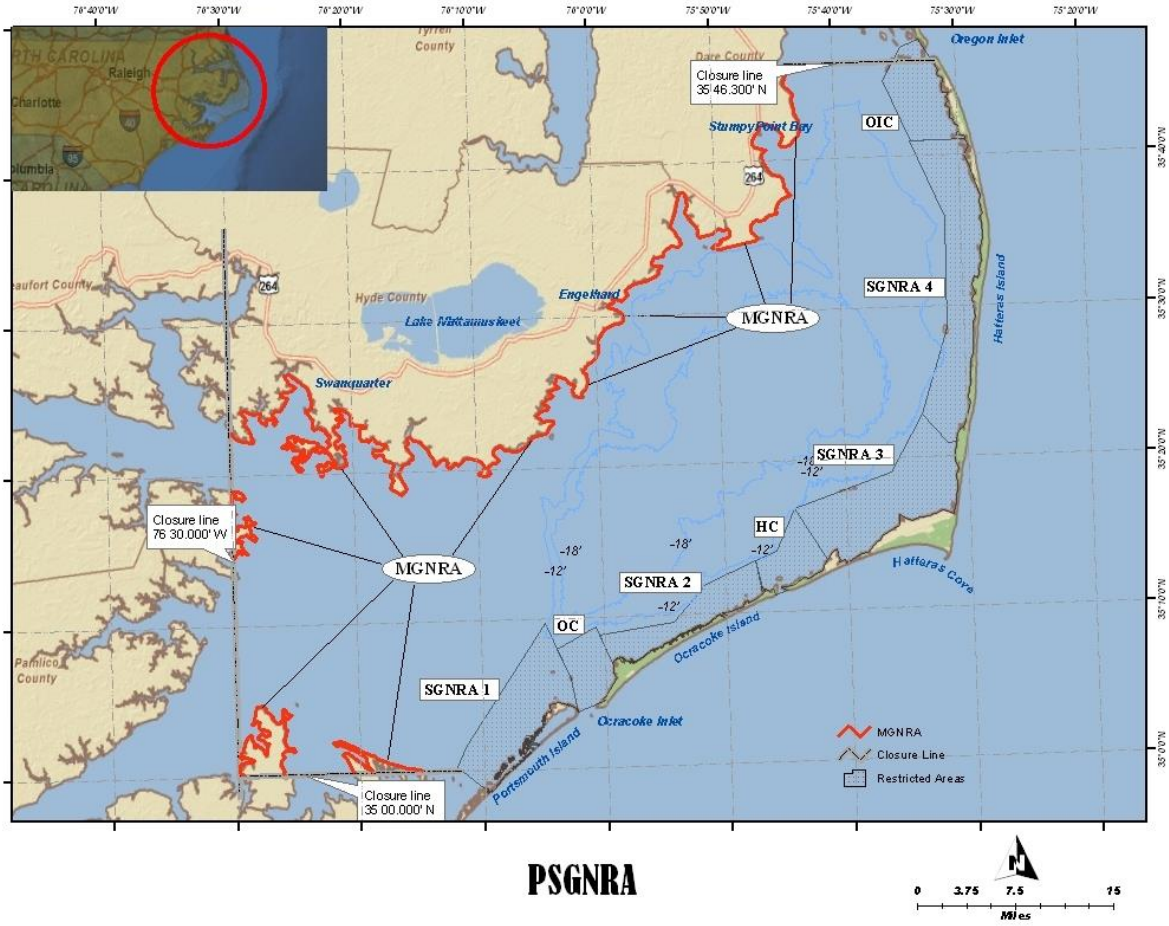


Figure 8. Map of the Pamlico Sound Gill Net Restricted Area (PSGNRA) and the National Marine Fisheries Service (NMFS) closed area for large mesh (≥5 in) gill nets; S1-S4=Shallow Water Gill Net Restricted Areas 1-4, MGNRA=Mainland Gill Net Restricted Area, OC=Ocracoke Corridor, OIC=Ocracoke Inlet Corridor, HC=Hatteras Inlet Corridor.

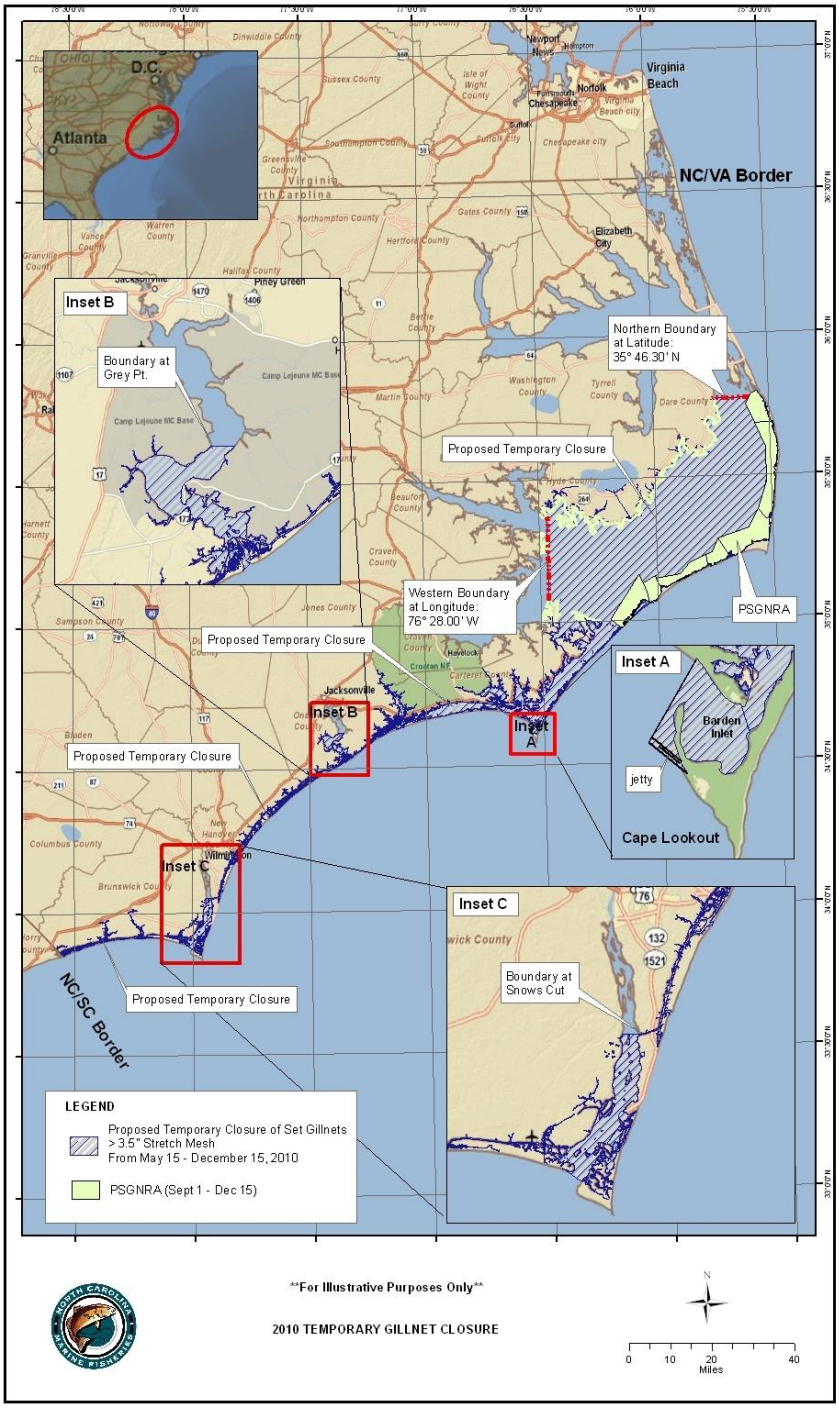


Figure 9. The North Carolina Division of Marine Fisheries (NCDMF) proposed (but not enacted) large mesh (≥4 in) gill-net closure for 2010 in North Carolina estuarine waters.

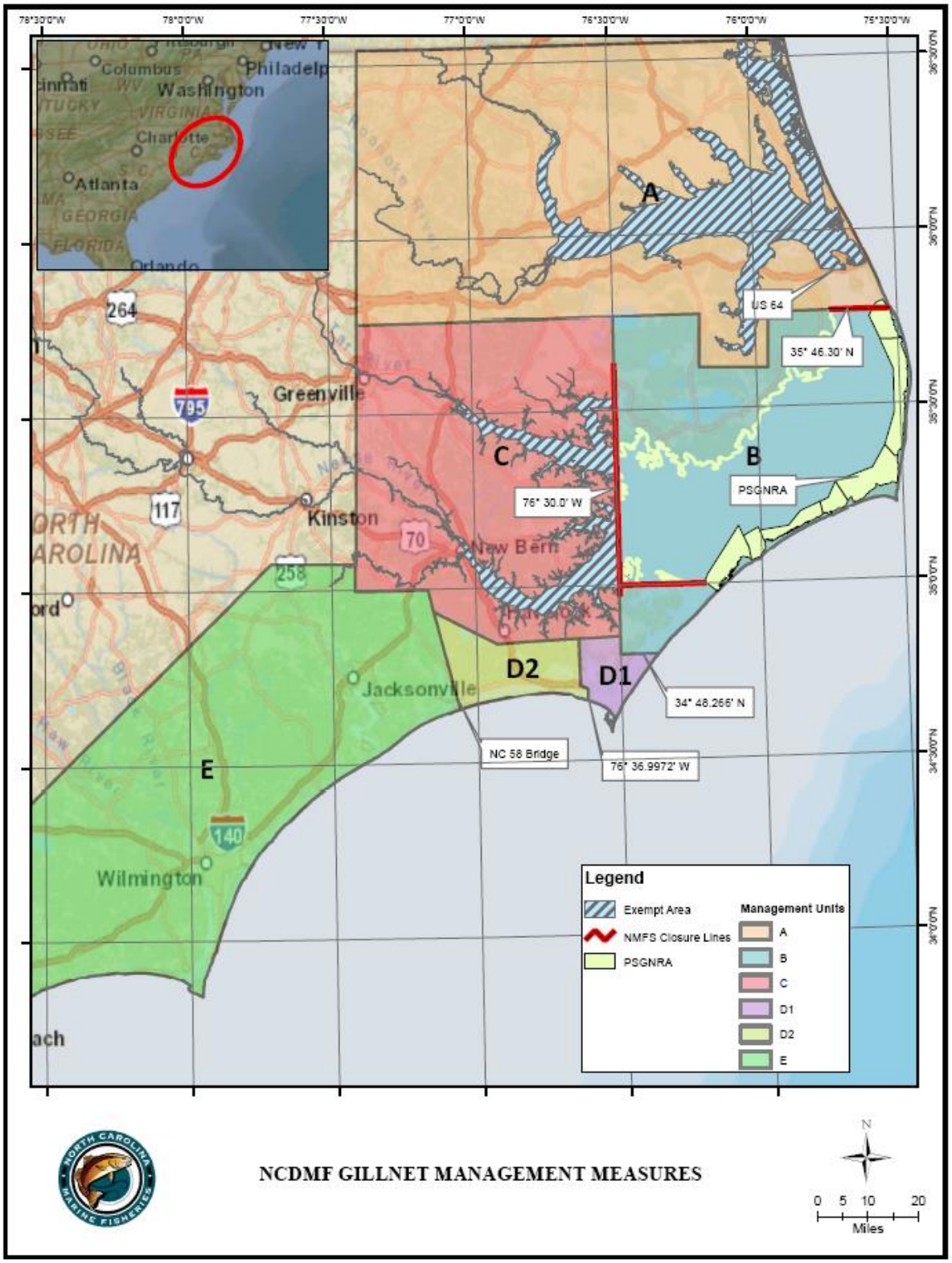


Figure 10. Map of Management Units, exempted areas, federal closure, and the Pamlico Sound Gill Net Restricted Area (PSGNRA) for North Carolina's estuarine waters.

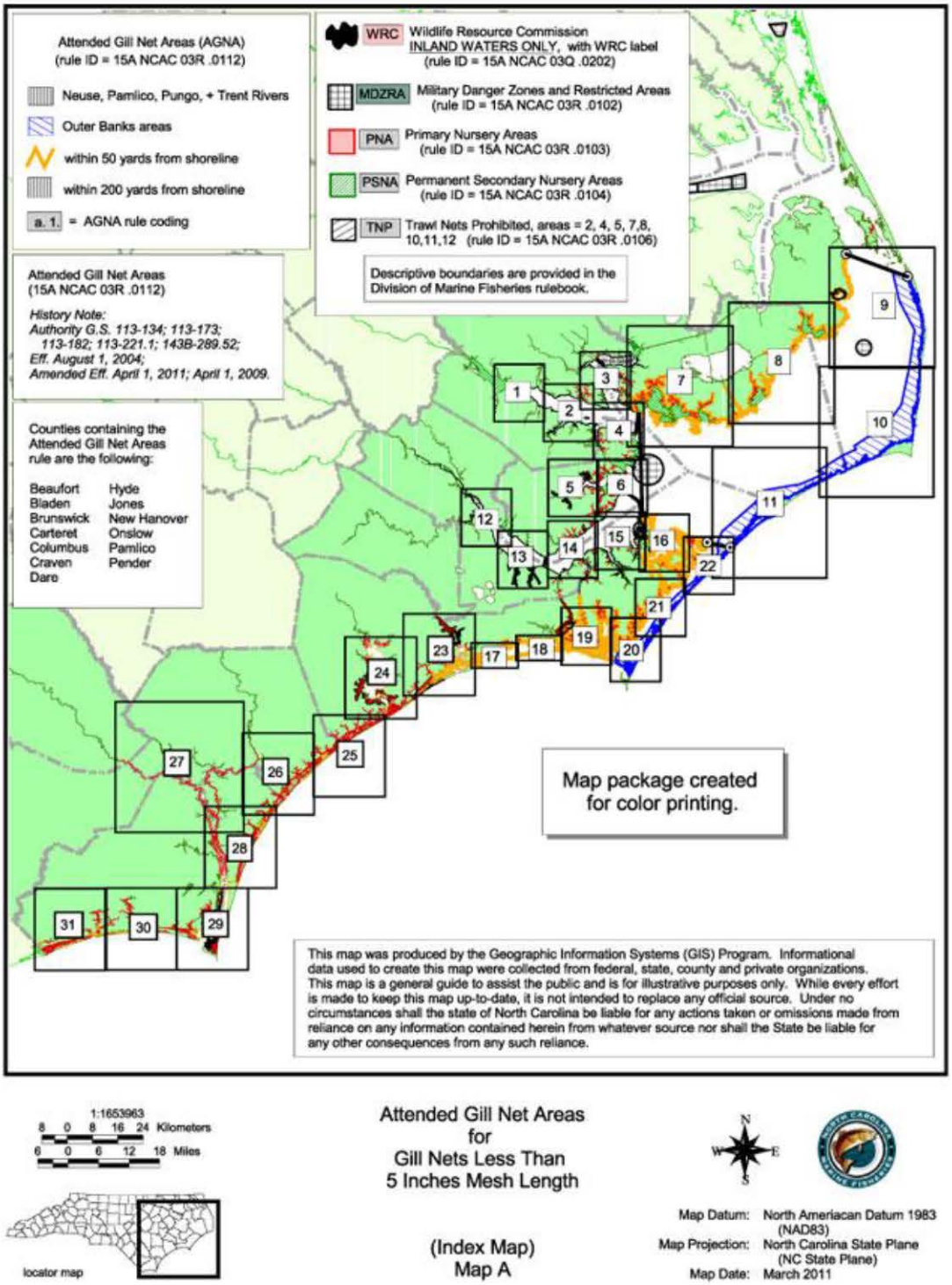


Figure 11. Map of the small mesh (<5 in) attendance requirements throughout North Carolina waters http://portal.ncdenr.org/web/mf/attended-gill-net-areas

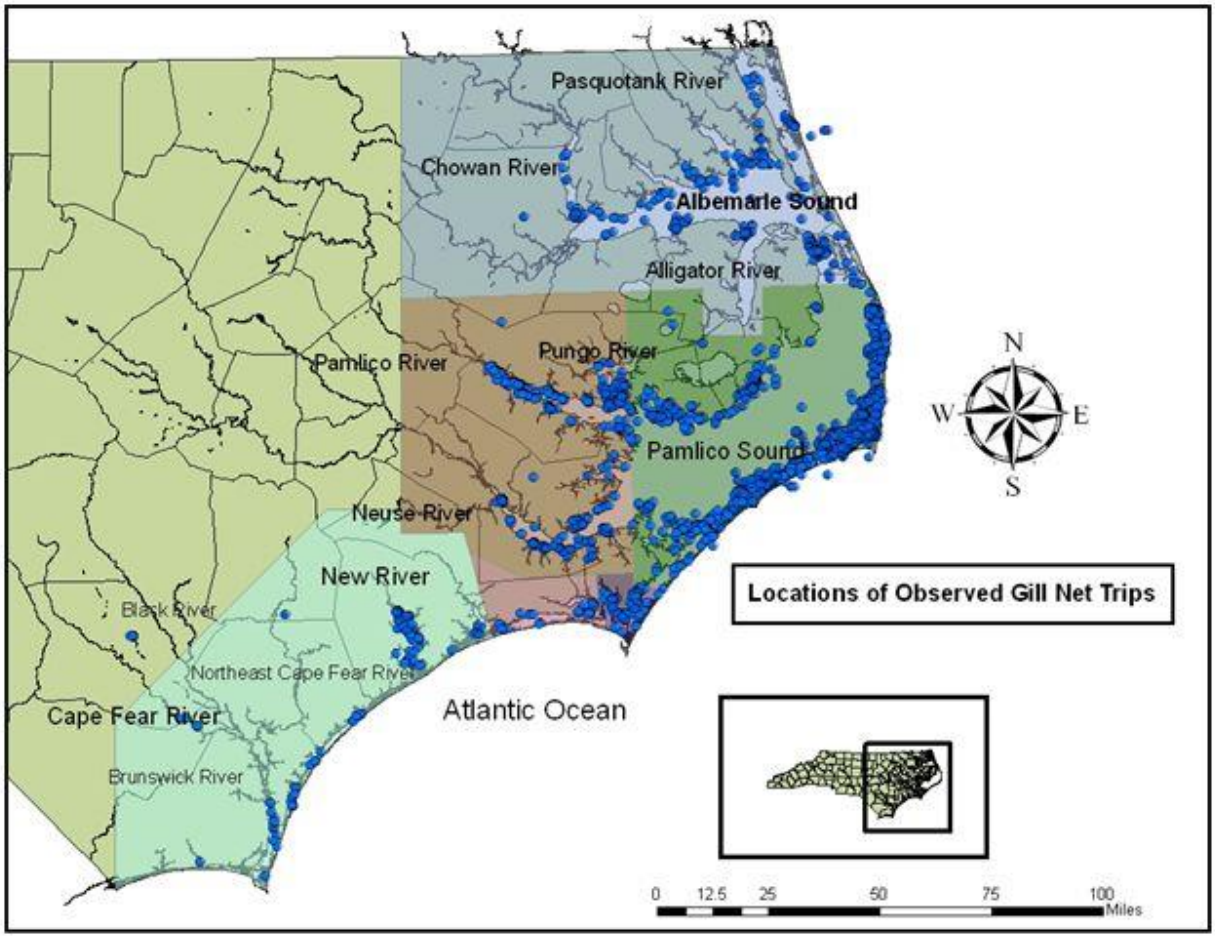


Figure 12. Locations of observed gill-net trips from the North Carolina Division of Marine Fisheries (NCDMF) Observer Program from 2000 through 2011.

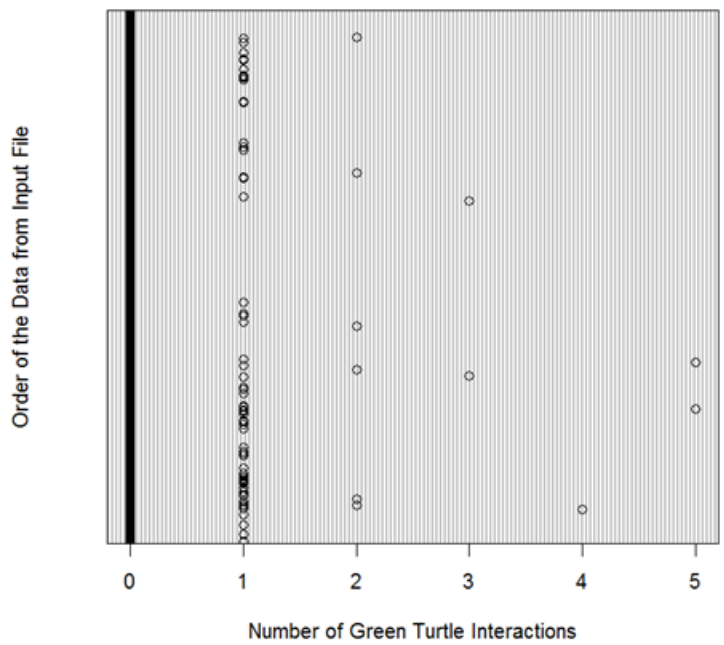


Figure 13. Cleveland dotplot for counts of green turtles observed in the North Carolina Division of Marine Fisheries (NCDMF) Observer Program (onboard and alternative platform) during 2007 through 2011.

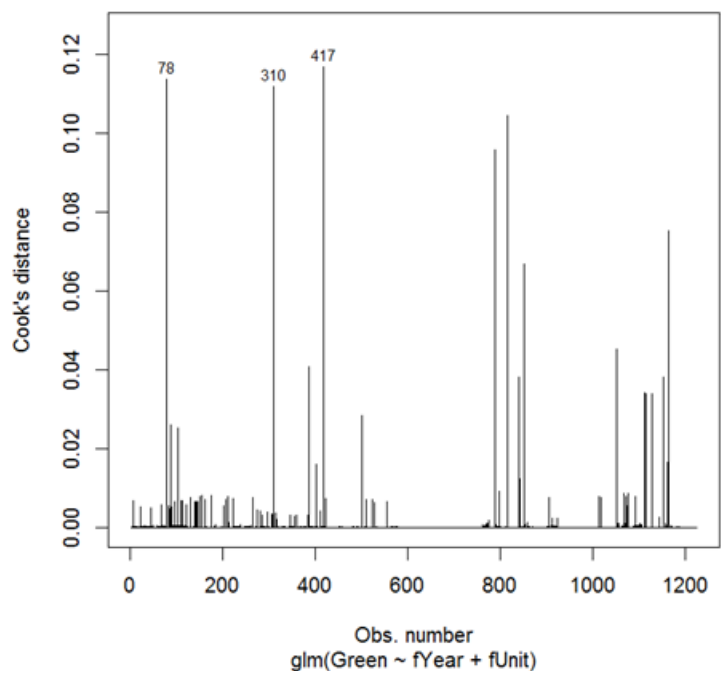


Figure 14. Cook's distance values of the Poisson GLM fit to the green turtle data.

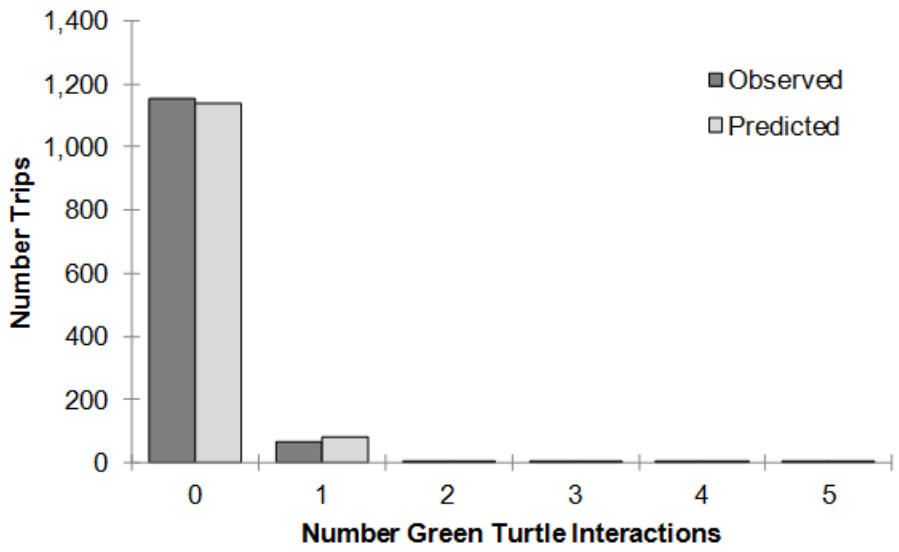


Figure 15. Comparison of observed frequencies to frequencies predicted by the Poisson GLM fit to the green turtle data.

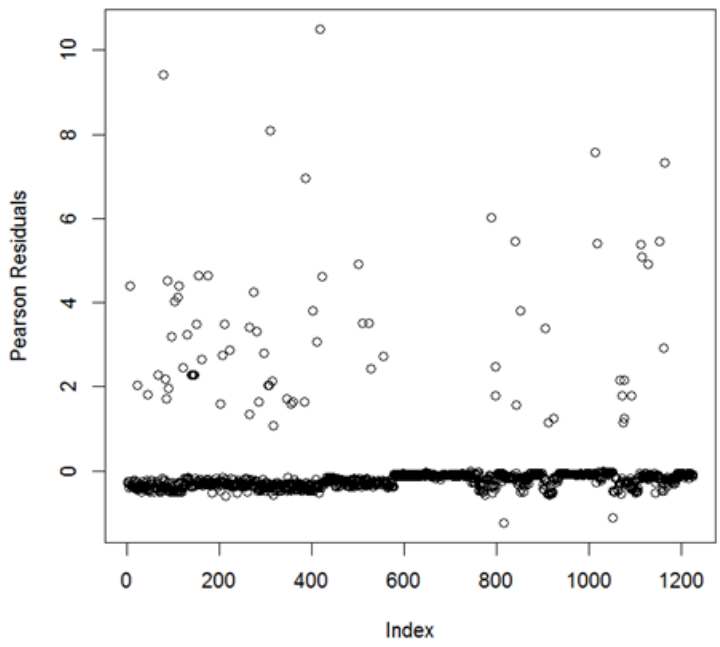


Figure 16. Index plot of Pearson residuals for the Poisson GLM fit to the green turtle data.

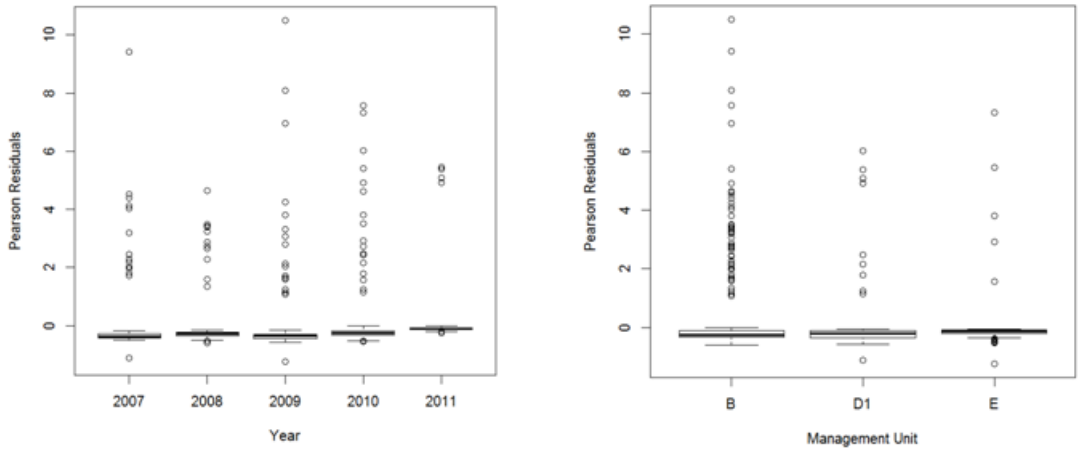


Figure 17. Pearson residuals by year and management unit for the Poisson GLM fit to the green turtle data.

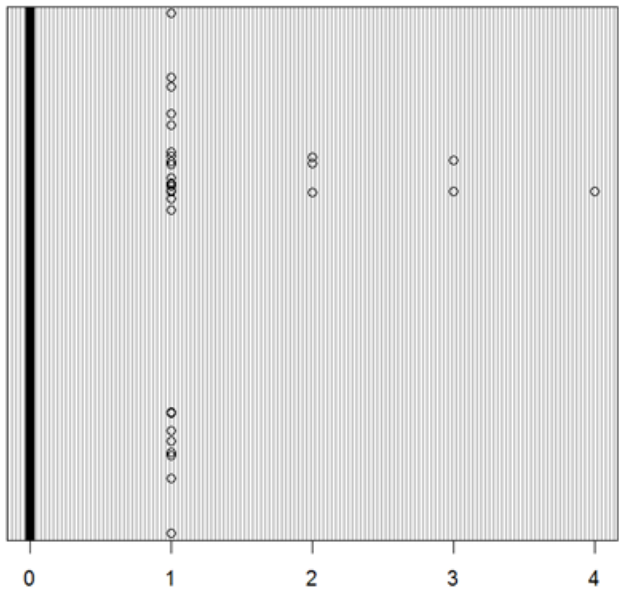


Figure 18. Cleveland dotplot for counts of Kemp's ridley turtles observed in the North Carolina Division of Marine Fisheries (NCDMF) Sea Turtle Bycatch Monitoring Program and the Alternative Platform Observation Program during 2007 through 2011.

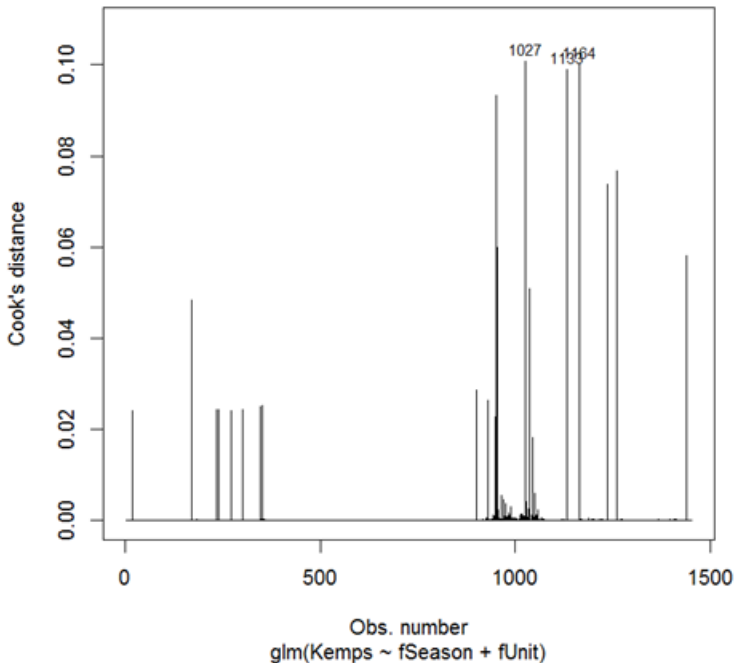


Figure 19. Cook's distance values of the Poisson GLM fit to the Kemp's ridley turtle data.

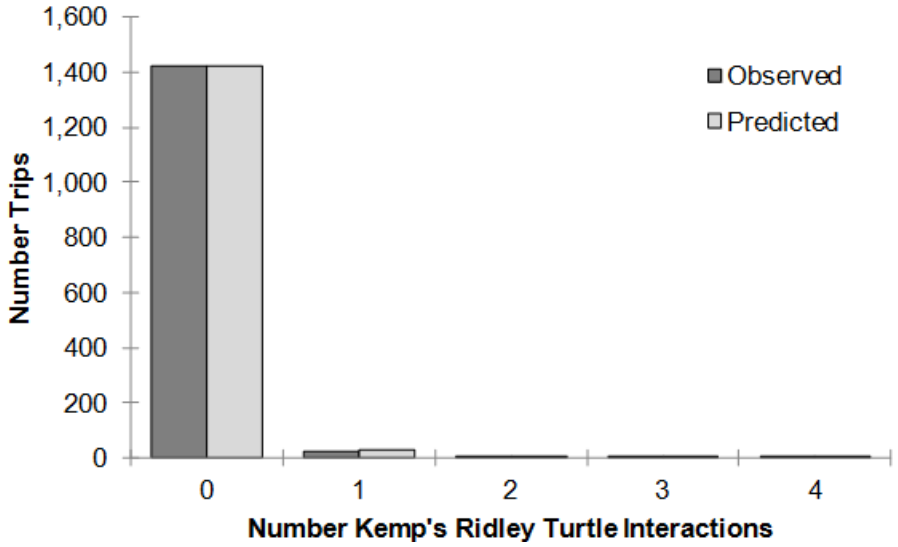


Figure 20. Comparison of observed frequencies to frequencies predicted by the negative binomial GLM fit to the Kemp's ridley turtle data.

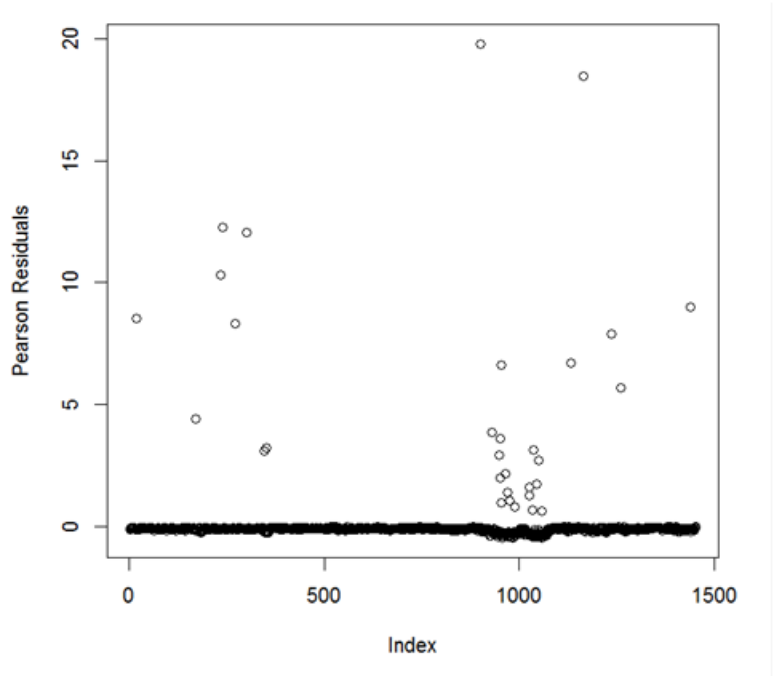


Figure 21. Index plot of Pearson residuals for the negative binomial GLM fit to the Kemp's ridley turtle data.

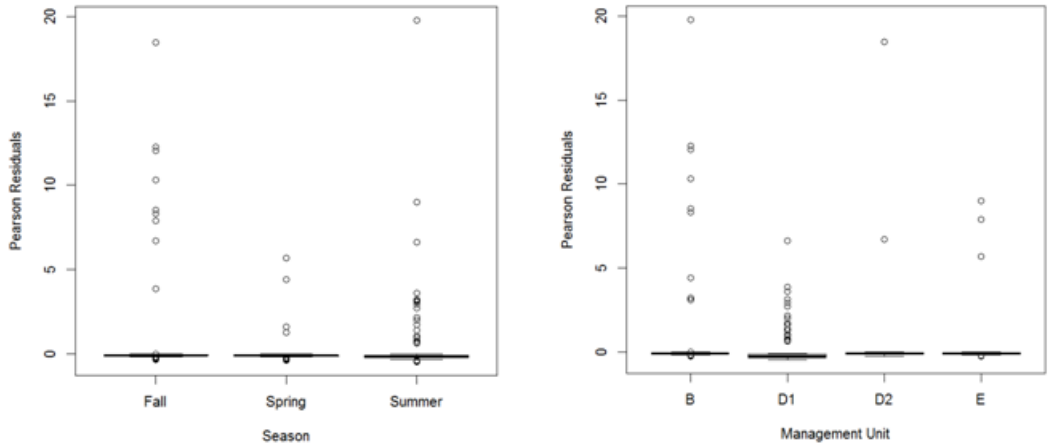
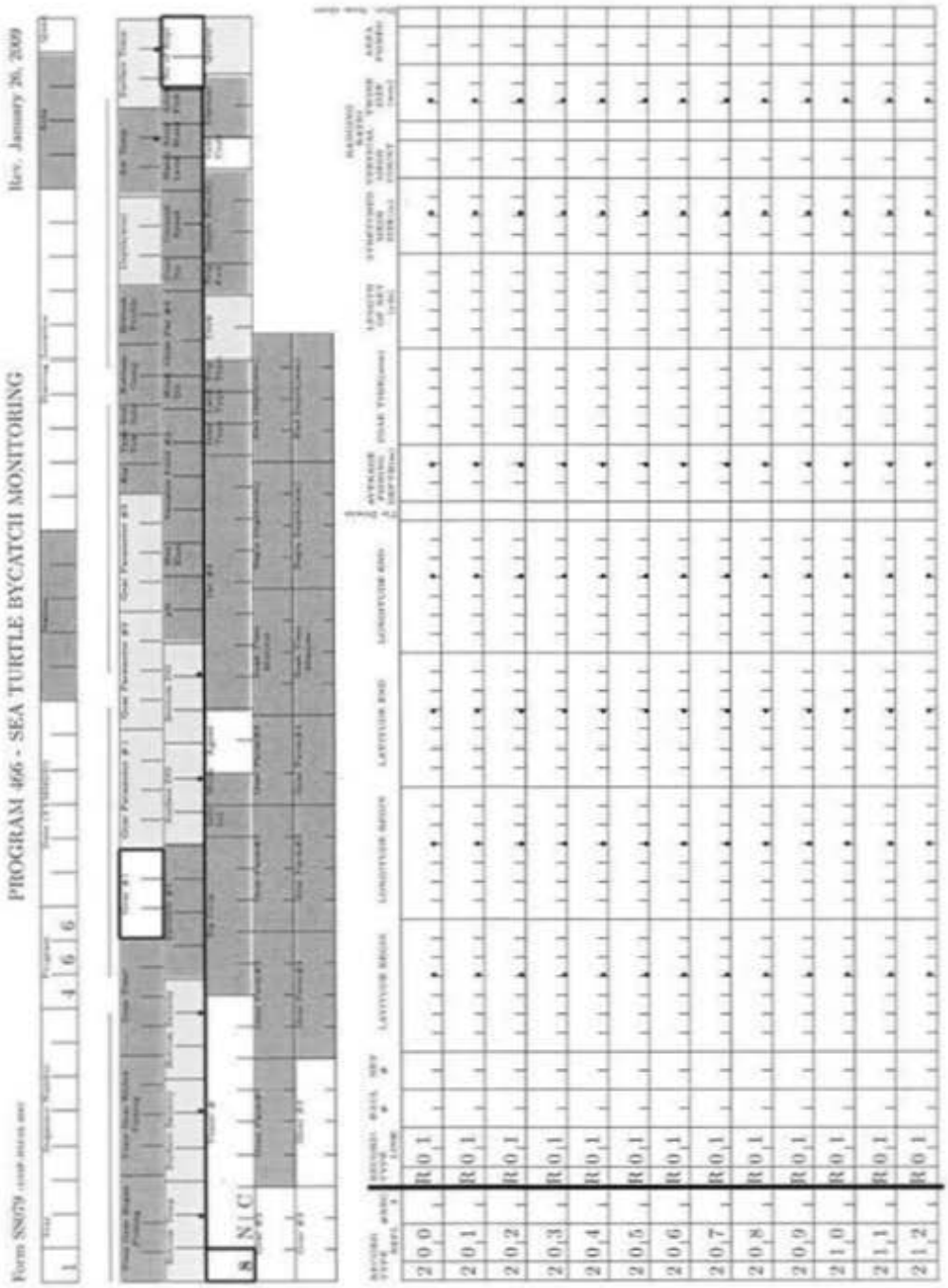


Figure 22. Pearson residuals by season and management unit for the negative binomial GLM fit to the Kemp's ridley turtle data.

APPENDIX A. DATA LOGS

PROGRAM 466 DATA LOGS: ONBOARD OBSERVATIONS



Form SS080 (DMF-PMAR-005)

PROGRAM 466 - SEA TURTLE BYCATCH MONITORING

Rev. February 2, 2009

RECORD TYPE REFL	#REC 2	RECORD TYPE LINE	HAUL #	SET #	LATITUDE BEGIN	LONGITUDE BEGIN	LATITUDE END	LONGITUDE END	TIE DOWNS AVERAGE FISHING DEPTH(m)	SOAK TIME(min)	LENGTH OF NET (yds)	STRETCHED MESH SIZE(in)	HANGING RATIO VERTICAL MESH COUNT	TWINE SIZE (mm)	DIST. FROM SHORE AREA FISHED
2 1 3		R 0 1													
2 1 4		R 0 1													
2 1 5		R 0 1													
2 1 6		R 0 1													
2 1 7		R 0 1													
2 1 8		R 0 1													
2 1 9		R 0 1													
2 2 0		R 0 1													
2 2 1		R 0 1													
2 2 2		R 0 1													
2 2 3		R 0 1													
2 2 4		R 0 1													
2 2 5		R 0 1													
2 2 6		R 0 1													
2 2 7		R 0 1													
2 2 8		R 0 1													
2 2 9		R 0 1													
2 3 0		R 0 1													
2 3 1		R 0 1													
2 3 2		R 0 1													
2 3 3		R 0 1													

Form DMF—BM.14

Rev. 05/05/86

Program

Sequence No.

Location

Date

Form SS112 (DNR-SSES-PAR)

Rev. December 6, 2010

SPECIES BIOLOGICAL DATA

466

Program_____

Location_____

Date_____

Sequence No._____

3 | Rept No | Species

Species Code | Status

Collection No | Collection Weight(kg)

Subsample No | Subsample Weight(kg)

Subsubsample No | Subsubsample Weight(kg)

Place of Record | Tag Type | Number Tagged

Quality | Tag Type | Number Tagged

Record Type	Line Num	Frequency	Curved Complete Length (mm Curve)	Weight (kg)	Sex	Maturity	Parameter A	Parameter B	Curved Complete Width (mm)	Parameter D	Internal Tag #1 (mm)	Internal Tag #2 (mm)	Alive/Dead Fin/Curved Size	Tag Status	Ring
4															
4															
4															
4															
4															
4															
4															
4															
4															
4															
4															
4															
4															
4															
4															
4															
4															
4															
4															
4															
4															
4															
4															

Form SS111 (DMF-BM04.OP.C)

Rev. June 20, 2007

SPECIES BIOLOGICAL DATA

Program 466

Location

Date

Sequence No.

3 | Rept No | Species Code | Status | Collection No | Collection Weight | Sample No | Sample Weight | Subsample No | Subsample Weight | Form of Record Type Line No. | Tag Type Freq. | Number Tagged | Length(mm) | Weight(kg) | Sex | Maturity | 1st Oper. | 2nd Oper. | Retention | Maximum | Alive/Dead | Tag Status | Tag Number | Age Status Struct Age

4			1															
4			1															
4			1															
4			1															
4			1															
4			1															
4			1															
4			1															
4			1															
4			1															

3 | Rept No | Species Code | Status | Collection No | Collection Weight | Sample No | Sample Weight | Subsample No | Subsample Weight | Form of Record Type Line No. | Tag Type Freq. | Number Tagged | Length(mm) | Weight(kg) | Sex | Maturity | 1st Oper. | 2nd Oper. | Retention | Maximum | Alive/Dead | Tag Status | Tag Number | Age Status Struct Age

4			1															
4			1															
4			1															
4			1															
4			1															
4			1															
4			1															
4			1															
4			1															
4			1															

3 | Rept No | Species Code | Status | Collection No | Collection Weight | Sample No | Sample Weight | Subsample No | Subsample Weight | Form of Record Type Line No. | Tag Type Freq. | Number Tagged | Length(mm) | Weight(kg) | Sex | Maturity | 1st Oper. | 2nd Oper. | Retention | Maximum | Alive/Dead | Tag Status | Tag Number | Age Status Struct Age

4			1															
4			1															
4			1															
4			1															
4			1															
4			1															
4			1															
4			1															
4			1															
4			1															

PROGRAM 467 DATA LOGS: ALTERNATIVE PLATFORM OBSERVATIONS

Form SS160 Rev. September 7, 2010

ENVIRONMENTAL AND STATION DATA

1	Year	Sequence Number	Program 4 6 7	Date (YYMMDD)	Station

Starting Location	Interview Number	Area	Quad

Time Gear Over	Time Gear Began Fishing	Time Gear Ended Fishing	Time Gear Onboard	Soak Time	Length Warp	Pitch	RPM

Gear #1	Headrope Length *GP1*	Body/Wing Net Mesh *GP2*	Tailbag/Back Net Mesh *GP3*	Rig	Ted Pos *Tow*	Sed Size	Bottom Comp	Ted Type *Profile*	Depth

Air Temp	Surface Temp	Bottom Temp	Surface Salinity	Bottom Salinity	Area Fished *Var1*	Surface DO	Bottom DO

pH	Wea Elem	Body Mesh Size *Var2*	Wind Dir	Gear Par #4 *Wind Speed*	Curr Dir	Current Speed	Water Level	Alter State	Allow Fish	No of Repl

8	Vessel # *Var5*	Zip Code	P/T	Mode	Agent	TT Dealer # *Var3*

View Type	Land Type	Quan Sed	Crew	Trip End	Secchi(cm) *DepthEnd*	Sam Code	Daysout	Quality

Gear #2	Wing Mesh Depth *G2P1*	Webbing Type *G2P2*	Surface Sal *G2P3*	Gear Parm #4	Distance to Shore *G2Soak*	Bot Sal	Sur. DO

Gear #3	Bottom Right Grid Lat-Long *G3P1-3*	Gear Parm#4	Soak Time Minutes	Grid Unit	Bottom DO

H 01

Latitude 1	Longitude 1
Latitude 2	Longitude 2

SCFL/RSCFL	CFVR

Rec Type	Rep	Kept Catch *Colsze*	Sample Size	# Rec 3	Q	Species Code	D	SoakTime *GrTrip*	Discards *Price*
2	0 0		9 9 9 9 9 9						

Rec Type	Line	T D	Avg Depth	Net Length (yds)	Stretch Mesh Size	Vert Mesh Ct	H R	Twine Size (mm)	Leadline Weight	T L	Area Fished	D S
R	0 1											

TD=Tie Downs HR=Hanging Ratio TL=Top Line DS=Distance from shore

Rec Type	Rep	Kept Catch *Colsze*	Sample Size	# Rec 3	Q	Species Code	D	SoakTime *GrTrip*	Discards *Price*
2	0 1		9 9 9 9 9 9						

Rec Type	Line	T D	Avg Depth	Net Length (yds)	Stretch Mesh Size	Vert Mesh Ct	H R	Twine Size (mm)	Leadline Weight	T L	Area Fished	D S
R	0 1											

TD=Tie Downs HR=Hanging Ratio TL=Top Line DS=Distance from shore

ENVIRONMENTAL AND STATION DATA Continued

Rec Type	Rep	Kept Catch *Colsze*	Sample Size	# Rec 3	Q	Species Code	D	SoakTime *GrTrip*	Discards *Price*
2	0 2		9 9 9 9 9 9						

Rec Type	Line	T D	Avg Depth	Net Length (yds)	Stretch Mesh Size	Vert Mesh Ct	H R	Twine Size (mm)	Leadline Weight	T L	Area Fished	D S
R	0 1											

TD=Tie Downs HR=Hanging Ratio TL=Top Line DS=Distance from shore

Rec Type	Rep	Kept Catch *Colsze*	Sample Size	# Rec 3	Q	Species Code	D	SoakTime *GrTrip*	Discards *Price*
2	0 3		9 9 9 9 9 9						

Rec Type	Line	T D	Avg Depth	Net Length (yds)	Stretch Mesh Size	Vert Mesh Ct	H R	Twine Size (mm)	Leadline Weight	T L	Area Fished	D S
R	0 1											

TD=Tie Downs HR=Hanging Ratio TL=Top Line DS=Distance from shore

Rec Type	Rep	Kept Catch *Colsze*	Sample Size	# Rec 3	Q	Species Code	D	SoakTime *GrTrip*	Discards *Price*
2	0 4		9 9 9 9 9 9						

Rec Type	Line	T D	Avg Depth	Net Length (yds)	Stretch Mesh Size	Vert Mesh Ct	H R	Twine Size (mm)	Leadline Weight	T L	Area Fished	D S
R	0 1											

TD=Tie Downs HR=Hanging Ratio TL=Top Line DS=Distance from shore

Rec Type	Rep	Kept Catch *Colsze*	Sample Size	# Rec 3	Q	Species Code	D	SoakTime *GrTrip*	Discards *Price*
2	0 5		9 9 9 9 9 9						

Rec Type	Line	T D	Avg Depth	Net Length (yds)	Stretch Mesh Size	Vert Mesh Ct	H R	Twine Size (mm)	Leadline Weight	T L	Area Fished	D S
R	0 1											

TD=Tie Downs HR=Hanging Ratio TL=Top Line DS=Distance from shore

Rec Type	Rep	Kept Catch *Colsze*	Sample Size	# Rec 3	Q	Species Code	D	SoakTime *GrTrip*	Discards *Price*
2	0 6		9 9 9 9 9 9						

Rec Type	Line	T D	Avg Depth	Net Length (yds)	Stretch Mesh Size	Vert Mesh Ct	H R	Twine Size (mm)	Leadline Weight	T L	Area Fished	D S
R	0 1											

TD=Tie Downs HR=Hanging Ratio TL=Top Line DS=Distance from shore

Rec Type	Rep	Kept Catch *Colsze*	Sample Size	# Rec 3	Q	Species Code	D	SoakTime *GrTrip*	Discards *Price*
2	0 7		9 9 9 9 9 9						

Rec Type	Line	T D	Avg Depth	Net Length (yds)	Stretch Mesh Size	Vert Mesh Ct	H R	Twine Size (mm)	Leadline Weight	T L	Area Fished	D S
R	0 1											

TD=Tie Downs HR=Hanging Ratio TL=Top Line DS=Distance from shore

Rec Type	Rep	Kept Catch *Colsze*	Sample Size	# Rec 3	Q	Species Code	D	SoakTime *GrTrip*	Discards *Price*
2	0 8		9 9 9 9 9 9						

Rec Type	Line	T D	Avg Depth	Net Length (yds)	Stretch Mesh Size	Vert Mesh Ct	H R	Twine Size (mm)	Leadline Weight	T L	Area Fished	D S
R	0 1											

TD=Tie Downs HR=Hanging Ratio TL=Top Line DS=Distance from shore

Rec Type	Rep	Kept Catch *Colsze*	Sample Size	# Rec 3	Q	Species Code	D	SoakTime *GrTrip*	Discards *Price*
2	0 9		9 9 9 9 9 9						

Rec Type	Line	T D	Avg Depth	Net Length (yds)	Stretch Mesh Size	Vert Mesh Ct	H R	Twine Size (mm)	Leadline Weight	T L	Area Fished	D S
R	0 1											

TD=Tie Downs HR=Hanging Ratio TL=Top Line DS=Distance from shore

Rec Type	Rep	Kept Catch *Colsze*	Sample Size	# Rec 3	Q	Species Code	D	SoakTime *GrTrip*	Discards *Price*
2	1 0		9 9 9 9 9 9						

Rec Type	Line	T D	Avg Depth	Net Length (yds)	Stretch Mesh Size	Vert Mesh Ct	H R	Twine Size (mm)	Leadline Weight	T L	Area Fished	D S
R	0 1											

TD=Tie Downs HR=Hanging Ratio TL=Top Line DS=Distance from shore

Form SS162

Rev. September 15, 2010

SPECIES BIOLOGICAL DATA

Program 467

Location

Date

Sequence No.

3	Repl No.	Species	Status
Species Code			
Collection No	Collection Weight(kg)		
Sample No	Sample Weight(kg)		
Subsample No	Subsample Weight(kg)		
Form of Record	Tag Type	Number Tagged	
Quality	Tag Type	Number Tagged	

4	LineNum	Freq	Length	Weight	S	M	Bait/Hook Type *Pa*	Handling Time *Pb*	Cur Carapace Width *Pc*	Turtle Loc *Pd*	Hook Location *Pe*

Tag #2 *Pf*	A/D *EGG*	St	Tag #1	Etag Number

A/D=Alive or Dead St=Tag Status Etag= Pit Tag

H	H Id	Lattitude	Longitude

H Record ID numbers are 1-up per collection NOT replicate.

4	LineNum	Freq	Length	Weight	S	M	Bait/Hook Type *Pa*	Handling Time *Pb*	Cur Carapace Width *Pc*	Turtle Loc *Pd*	Hook Location *Pe*

Tag #2 *Pf*	A/D *EGG*	St	Tag #1	Etag Number

A/D=Alive or Dead St=Tag Status Etag= Pit Tag

H	H Id	Lattitude	Longitude

H Record ID numbers are 1-up per collection NOT replicate.

4	LineNum	Freq	Length	Weight	S	M	Bait/Hook Type *Pa*	Handling Time *Pb*	Cur Carapace Width *Pc*	Turtle Loc *Pd*	Hook Location *Pe*

Tag #2 *Pf*	A/D *EGG*	St	Tag #1	Etag Number

A/D=Alive or Dead St=Tag Status Etag= Pit Tag

H	H Id	Lattitude	Longitude

H Record ID numbers are 1-up per collection NOT replicate.

4	LineNum	Freq	Length	Weight	S	M	Bait/Hook Type *Pa*	Handling Time *Pb*	Cur Carapace Width *Pc*	Turtle Loc *Pd*	Hook Location *Pe*

Tag #2 *Pf*	A/D *EGG*	St	Tag #1	Etag Number

A/D=Alive or Dead St=Tag Status Etag= Pit Tag

H	H Id	Lattitude	Longitude

H Record ID numbers are 1-up per collection NOT replicate.

ENVIRONMENTAL AND STATION DATA Continued

Rec Type	Rep	Kept Catch *Colsze*	Sample Size	# Rec 3	Q	Species Code	D	SoakTime *GrTrip*	Discards *Price*
2	1 1		9 9 9 9 9 9						

Rec Type	Line	T D	Avg Depth	Net Length (yds)	Stretch Mesh Size	Vert Mesh Ct	H R	Twine Size (mm)	Leadline Weight	T L	Area Fished	D S
R	0 1											

TD=Tie Downs HR=Hanging Ratio TL=Top Line DS=Distance from shore

Rec Type	Rep	Kept Catch *Colsze*	Sample Size	# Rec 3	Q	Species Code	D	SoakTime *GrTrip*	Discards *Price*
2	1 2		9 9 9 9 9 9						

Rec Type	Line	T D	Avg Depth	Net Length (yds)	Stretch Mesh Size	Vert Mesh Ct	H R	Twine Size (mm)	Leadline Weight	T L	Area Fished	D S
R	0 1											

TD=Tie Downs HR=Hanging Ratio TL=Top Line DS=Distance from shore

Rec Type	Rep	Kept Catch *Colsze*	Sample Size	# Rec 3	Q	Species Code	D	SoakTime *GrTrip*	Discards *Price*
2	1 3		9 9 9 9 9 9						

Rec Type	Line	T D	Avg Depth	Net Length (yds)	Stretch Mesh Size	Vert Mesh Ct	H R	Twine Size (mm)	Leadline Weight	T L	Area Fished	D S
R	0 1											

TD=Tie Downs HR=Hanging Ratio TL=Top Line DS=Distance from shore

Rec Type	Rep	Kept Catch *Colsze*	Sample Size	# Rec 3	Q	Species Code	D	SoakTime *GrTrip*	Discards *Price*
2	1 4		9 9 9 9 9 9						

Rec Type	Line	T D	Avg Depth	Net Length (yds)	Stretch Mesh Size	Vert Mesh Ct	H R	Twine Size (mm)	Leadline Weight	T L	Area Fished	D S
R	0 1											

TD=Tie Downs HR=Hanging Ratio TL=Top Line DS=Distance from shore

Rec Type	Rep	Kept Catch *Colsze*	Sample Size	# Rec 3	Q	Species Code	D	SoakTime *GrTrip*	Discards *Price*
2	1 5		9 9 9 9 9 9						

Rec Type	Line	T D	Avg Depth	Net Length (yds)	Stretch Mesh Size	Vert Mesh Ct	H R	Twine Size (mm)	Leadline Weight	T L	Area Fished	D S
R	0 1											

TD=Tie Downs HR=Hanging Ratio TL=Top Line DS=Distance from shore

Rec Type	Rep	Kept Catch *Colsze*	Sample Size	# Rec 3	Q	Species Code	D	SoakTime *GrTrip*	Discards *Price*
2	1 6		9 9 9 9 9 9						

Rec Type	Line	T D	Avg Depth	Net Length (yds)	Stretch Mesh Size	Vert Mesh Ct	H R	Twine Size (mm)	Leadline Weight	T L	Area Fished	D S
R	0 1											

TD=Tie Downs HR=Hanging Ratio TL=Top Line DS=Distance from shore

Rec Type	Rep	Kept Catch *Colsze*	Sample Size	# Rec 3	Q	Species Code	D	SoakTime *GrTrip*	Discards *Price*
2	1 7		9 9 9 9 9 9						

Rec Type	Line	T D	Avg Depth	Net Length (yds)	Stretch Mesh Size	Vert Mesh Ct	H R	Twine Size (mm)	Leadline Weight	T L	Area Fished	D S
R	0 1											

TD=Tie Downs HR=Hanging Ratio TL=Top Line DS=Distance from shore

Rec Type	Rep	Kept Catch *Colsze*	Sample Size	# Rec 3	Q	Species Code	D	SoakTime *GrTrip*	Discards *Price*
2	1 8		9 9 9 9 9 9						

Rec Type	Line	T D	Avg Depth	Net Length (yds)	Stretch Mesh Size	Vert Mesh Ct	H R	Twine Size (mm)	Leadline Weight	T L	Area Fished	D S
R	0 1											

TD=Tie Downs HR=Hanging Ratio TL=Top Line DS=Distance from shore

Rec Type	Rep	Kept Catch *Colsze*	Sample Size	# Rec 3	Q	Species Code	D	SoakTime *GrTrip*	Discards *Price*
2	1 9		9 9 9 9 9 9						

Rec Type	Line	T D	Avg Depth	Net Length (yds)	Stretch Mesh Size	Vert Mesh Ct	H R	Twine Size (mm)	Leadline Weight	T L	Area Fished	D S
R	0 1											

TD=Tie Downs HR=Hanging Ratio TL=Top Line DS=Distance from shore

Form SS168 (Continuation of 162)

Rev. May 3, 2010

SPECIES BIOLOGICAL DATA

Program 467

Date

Location

Sequence No.

4	LineNum	Freq	Length	Weight	S	M	Bait/Hook Type *Pa*	Handling Time *Pb*	Cur Carapace Width *Pc*	Turtle Loc *Pd*	Hook Location *Pe*

Tag #2 *Pf*	A/D *E*	St	Tag #1	Etag Number

E=EggStg A/D=Alive or Dead St=Tag Status Etag= Pit Tag

H	0	6	Lattitude	Longitude

4	LineNum	Freq	Length	Weight	S	M	Bait/Hook Type *Pa*	Handling Time *Pb*	Cur Carapace Width *Pc*	Turtle Loc *Pd*	Hook Location *Pe*

Tag #2 *Pf*	A/D *E*	St	Tag #1	Etag Number

E=EggStg A/D=Alive or Dead St=Tag Status Etag= Pit Tag

H	0	7	Lattitude	Longitude

4	LineNum	Freq	Length	Weight	S	M	Bait/Hook Type *Pa*	Handling Time *Pb*	Cur Carapace Width *Pc*	Turtle Loc *Pd*	Hook Location *Pe*

Tag #2 *Pf*	A/D *E*	St	Tag #1	Etag Number

E=EggStg A/D=Alive or Dead St=Tag Status Etag= Pit Tag

H	0	8	Lattitude	Longitude

4	LineNum	Freq	Length	Weight	S	M	Bait/Hook Type *Pa*	Handling Time *Pb*	Cur Carapace Width *Pc*	Turtle Loc *Pd*	Hook Location *Pe*

Tag #2 *Pf*	A/D *E*	St	Tag #1	Etag Number

E=EggStg A/D=Alive or Dead St=Tag Status Etag= Pit Tag

H	0	9	Lattitude	Longitude

4	LineNum	Freq	Length	Weight	S	M	Bait/Hook Type *Pa*	Handling Time *Pb*	Cur Carapace Width *Pc*	Turtle Loc *Pd*	Hook Location *Pe*

Tag #2 *Pf*	A/D *E*	St	Tag #1	Etag Number

E=EggStg A/D=Alive or Dead St=Tag Status Etag= Pit Tag

H	1	0	Lattitude	Longitude

Observer Trip Information

Date_____ **Port**_____ **Fishermens Name** _____

Vessel # NC - _____

Observer Name_____ **Permit #**_____

Haul # _____ **Stretched Mesh Sizes** _____

Net # _____ **Meshes Deep** _____

Soak Time *(hrs)* ___ ___ . ___ **Twine Size** _____

Haul (*Start/End*) - Lat. _____ **Total Yards** _____

Long _____ **Tie-Downs** _____

Water Depth _____

Area *(circle)* **Mainland S1 S2 S3 S4 OI HC OC CS, etc** **Distance from shore:** _____

Turtles Caught(#) _____ **Kept** **Discard** **Reg. Discard**

Comments:

Haul # _____ **Stretched Mesh Sizes** _____

Net # _____ **Meshes Deep** _____

Soak Time *(hrs)* ___ ___ . ___ **Twine Size** _____

Haul (*Start/End*) - Lat. _____ **Total Yards** _____

Long _____ **Tie-Downs** _____

Water Depth _____

Area *(circle)* **Mainland S1 S2 S3 S4 OI HC OC CS, etc** **Distance from shore:** _____

Turtles Caught(#) _____ **Kept** **Discard** **Reg. Discard**

Comments:

Haul # _____ **Stretched Mesh Sizes** _____

Net # _____ **Meshes Deep** _____

Soak Time *(hrs)* ___ ___ . ___ **Twine Size** _____

Haul (*Start/End*) - Lat. _____ **Total Yards** _____

Long _____ **Tie-Downs** _____

Water Depth _____

Area *(circle)* **Mainland S1 S2 S3 S4 OI HC OC CS, etc** **Distance from shore:** _____

Turtles Caught(#) _____ **Kept** **Discard** **Reg. Discard**

Comments:

SEA TURTLE INCIDENTAL CAPTURE REPORT

SEA TURTLE INCIDENTAL CAPTURE REPORT

OBSERVER'S NAME: _____ DATE _____ - _____ - _____
year month day

AFFILIATION/ADDRESS _____

_____ AREA CODE/PHONE NUMBER _____

GEAR _____ SOAK/TOW TIME _____

GEAR PARAMETERS INCLUDING MESH SIZE _____

LOCATION (include county, body of water; any nearby nautical landmarks such as channel markers, inlets, etc.) _____

_____

LATITUDE _____ LONGITUDE _____

REMARKS _____

_____

_____

TURTLE NO	SPECIES (use code)		COND (use code)	FLIPPER TAG #s (only for turtles found with tags)*	DISP (use codes)			CURVED LNGTH (mm)	CURVED WIDTH (mm)
1									

TABLE DEFINITIONS AND CODES

TURTLE No. = number assigned to each turtle captured at this intersection location in the order it was encountered by the observer (1, 2, 3…).

SPECIES:
CC = Loggerhead
CM = Green
DC = Leatherback
EL = Hawksbill
LK = Kemp's ridley
UN = Unidentified

COND (condition of turtle):
0 = Alive
1 = Fresh Dead
2 = Moderately decomposed
3 = Severely decomposed
4 = Dried carcass
5 = Skeleton, bones only

DISP (final disposition of turtle):
1 = Painted and left on a beach or dune
2 = Buried
3 = Salvaged carcass all or part
5 = Unpainted, left on a beach or dune
6 = Alive, released
7 = Alive, taken to a holding facility

Carapace measurements:

CURVED LNGTH – curved carapace length taken with metric tape measure only.
CURVED WIDTH – curved carapace width taken with metric tape measure only.

STURGEON INCIDENTAL CAPTURE REPORT

STURGEON

INCIDENTAL CAPTURE REPORT

OBSERVER'S NAME **DATE** - -
year month day

AFFILIATION/ADDRESS:

AREA CODE/PHONE NUMBER:

GEAR: **SOAK/TOW TIME:**

GEAR PARAMETERS INCLUDING MESH SIZE:

LOCATION (include county, body of water, mgmt area, nearby nautical landmarks such as channel markers, inlets, etc.):

LATITUDE: **LONGITUDE:**

COMMENTS:

STURGEON #	SPECIES (use codes)	CONDITION (use codes)	TAG # (if tag present)	Disposition (use codes)	TOTAL LENGTH (mm)	FORK LENGTH (mm)	WEIGHT (kg)	Weight Estimate (E) Actual (A)

If more sturgeon are caught than boxes provided, use extra sheets as needed.

TOTAL NUMBER OF STURGEON CAUGHT AT THIS INTERACTION LOCATION:

Table definitions and codes

Sturgeon # - number assigned to each sturgeon at this interaction location in the order they were encountered (1, 2, 3...)

Species:
AS - Atlantic sturgeon
SNS - Shortnose sturgeon

Condition (condition of sturgeon)
0 - Alive
1 - Fresh Dead
2 - Moderately Decomposed
3 - Severly Decomposed
4 - Dried Carcass
5 - Skeleton, bones only

Disposition (final disposition of sturgeon)
1 - Alive, released
2 - Dead, released
3 - Dead, collected for study

Total Length - Tip of the snout to the tip of the longest lobe of the caudal fin in millimeters

Fork Length - Tip of the snout to the fork of the tail in millimeters

Weight - If fish can be safely weighed use either basket or sling. If fish cannot be safely weighed please provide estimated weight in kilograms

Record whether weight is estimate (E) or actual (A) weight

APPENDIX B. SETTLEMENT AGREEMENT

SETTLEMENT AGREEMENT

THIS SETTLEMENT AGREEMENT (hereinafter, "Agreement") is made and entered into on the last day executed below, among the Karen Beasley Sea Turtle Rescue and Rehabilitation Center ("Plaintiff") and the North Carolina Division of Marine Fisheries; Dr. Louis Daniel III, in his official capacity as Director of the North Carolina Division of Marine Fisheries; and the North Carolina Marine Fisheries Commission ("hereinafter, collectively, "Defendants").

WITNESSETH

WHEREAS, on February 23, 2010, Plaintiff filed a complaint against the Defendants in the United States District Court for the Eastern District of North Carolina, Southern Division, file no. 7:10-CV-32-BO ("Complaint").

WHEREAS, in the Complaint, Plaintiff contends that Defendants are in violation of the Endangered Species Act ("ESA"), 16 U.S.C. §§ 1531 *et seq.* by authorizing gill nets to operate and to "take" protected sea turtles in state waters not covered by Incidental Take Permit ("ITP") No. 1528 issued to the North Carolina Division of Marine Fisheries ("DMF") by the National Marine Fisheries Service ("NMFS"), and not complying with the ITP requirements for observer coverage and enforcement.

WHEREAS, Defendants contend that the Court lacks jurisdiction over them on various grounds including sovereign immunity, lack of subject matter jurisdiction and personal jurisdiction, and further contend that they are not in violation of the ESA.

WHEREAS, the DMF is in the process of preparing an application for a statewide ITP from NMFS under Section 10 of the ESA to cover incidental takes of protected sea turtles by gill nets within the internal coastal waters of North Carolina.

WHEREAS, the Plaintiff and Defendants each acknowledge the efforts of the other to amicably resolve the controversy over the protection of sea turtles listed under the ESA while also maintaining a viable commercial gill net fishery.

NOW THEREFORE, in order to avoid further controversy and expense, without in any way waiving the Defendants' claims regarding sovereign immunity, the parties to this Agreement have agreed upon the following terms and conditions:

1. Restrictions on Large Mesh Gill Nets.

(a) For the purpose of this Agreement, large mesh gill nets are defined as 4-inch stretched mesh to 6 ½- inch stretched mesh, inclusive.

(b) Until such time that a statewide ITP is issued to DMF by NMFS, the following interim restrictions on large mesh gill nets apply within the internal coastal waters of North Carolina, as defined in 15A N.C.A.C. 3I.0101(1)(c):

> (i) Soak times shall be limited to approximately 12 hours, from sunset to sunrise, Monday through Friday. More specifically, the start and end times

for each soak period is as follows: sunset on Monday to sunrise on Tuesday; sunset on Tuesday to sunrise on Wednesday; sunset on Wednesday to sunrise on Thursday; sunset on Thursday to sunrise on Friday. Large mesh gill nets may be set no sooner than 1 hour before sunset and must be retrieved no later than 1 hour after sunrise. Any nets deployed earlier than this specified time or nets that remain deployed after the specified time will be subject to enforcement action by the N.C. Marine Patrol in accordance with state law and marine fisheries rules and regulations.

(ii) Large mesh gill nets shall be low-profile configured as follows:

(1) a net height of no more than 15 meshes.
(2) a lead core or leaded bottom line.
(3) no corks, floats or other buoys unless needed for identification requirements, except as provided in Paragraph 2(e) of this Agreement.

(iii) A maximum of 2,000 yards of large mesh gill net may be used per vessel, except as provided in Paragraph 2(e) of this Agreement.

(iv) Large mesh gill nets must be set in individual 100-yard shots with at least a 25 yard break between individual shots.

(v) Gill nets shall not choke coastal creeks in violation of 15A N.C.A.C. 3J .0101. There must be passage for sea turtles and other non-targeted species.

(vi) No gill nets over 6 1/2- inch stretched mesh will be allowed in internal coastal waters.

2. Applicability of Restrictions.

(a) Upon execution of this Agreement, the Restrictions as listed in the above Paragraph 1 and below Paragraphs 2(e) and 2(i) ("restrictions") will be implemented by proclamation to go into effect beginning May 15, 2010, effective year-round as interim measures until the DMF is issued a statewide ITP from NMFS pursuant to section 10 of the ESA, except that DMF may implement more restrictive measures if required by NMFS.

(b) The Pamlico Sound Gillnet Restricted Area (PSGNRA) covered by ITP No. 1528 is not subject to this Agreement, while the permit is in effect. ITP No. 1528 will remain in effect from September 1, 2010 to December 31, 2010, after which time the PSGNRA will be subject to this Agreement.

(c) The Currituck Sound, for the purpose of this Agreement, is defined as the area north of the Currituck Sound Bridge, which is located between the following coordinates: 36° 04.828'N, 75° 47.405'W (western end) and 36° 05.577'N, 75° 44.585'W (eastern end). The Currituck Sound is not subject to the provisions of this Agreement.

(d) The Albemarle Sound, for the purpose of this Agreement, is defined as the area west of a line running from coordinates 36° 09.928' N, 75° 54.695' W (northern end) and 35° 57.559' N, 75° 56.820' W (southern end). The Albemarle Sound is not subject to the provisions in this Agreement except for the observer coverage provisions as specified in Paragraph 3(d) of this Agreement.

(e) For the area south of the NC Highway 58 bridge, which is located between coordinates 77° 4.02738 W, 34° 40.78489 N (northern end) and 77° 3.7438 W, 34° 39.86202 N (southern end), floats are allowed to be used on nets and a maximum of 1000 yards of gill net may be used per vessel. All other restrictions specified in this Agreement shall apply to this area.

(f) The restrictions set forth in this Agreement shall apply only to set large mesh gill nets. They shall not apply to strike nets, runaround nets, drop nets or any other gear that is immediately retrieved.

(g) In recognition that low profile nets have not been tested at scale, adaptive management and monitoring measures will need to be implemented to assess their feasibility. Therefore, the restrictions in this Agreement shall not apply to scientific research or collection pursuant to N.C. Gen. Stat. § 113-200 (Fisheries Resource Grants), 15A N.C.A.C. 3O.0503(g) (Scientific or Educational Collection Permits), or conducted by the DMF or its employees or agents in efforts to assess, manage and monitor the large mesh gill net fishery in North Carolina, including but not limited to testing of low profile nets and alternative harvest methods.

(h) No provision of this Agreement shall be interpreted to supersede any existing DMF proclamation that is more restrictive.

(i) The restrictions shall apply to standard commercial fishing license ("SCFL") holders and recreational commercial gear license ("RCGL") holders.

3. Observer Program.

(a) The DMF shall provide observer coverage of large mesh gill net fishing beginning on May 15, 2010 on various platforms. Observers will consist of DMF staff, the N.C. Marine Patrol, and volunteer observers certified by DMF's observer training program. The observer coverage will not be static and may adapt according to season, sea turtle behavior and location, and other environmental and biological conditions.

(b) The DMF shall deploy resources sufficient to provide observer coverage with a target of 10% coverage and a minimum of 7% coverage per week of the total large mesh gill net fishing effort within internal coastal waters, except for areas exempted pursuant to this Agreement. For each fishing year, DMF will calculate observer coverage by using the previous year's effort data from the North Carolina trip ticket program.

(c) If the DMF is unable to provide minimum coverage due to financial, budget or staffing constraints, then the large mesh gill net fishery will be closed by proclamation until such time that the minimum coverage can be resumed.

(d) This subsection (d) applies only to Albemarle Sound as an interim measure until the DMF obtains a statewide ITP from NMFS. In the Albemarle Sound, as defined above in Paragraph 2(d), each N.C. Marine Patrol officer assigned to that area within the Northern District will be responsible for conducting one observed trip per week. Should reliable reports of sea turtle presence be submitted, additional observer coverage in such area will be required.

4. The Sea Turtle Advisory Committee (STAC).

(a) The Sea Turtle Advisory Committee shall be established as an advisory committee of the MFC.

(b) The STAC will consist of 12 members appointed by the MFC Chairman and the Karen Beasley Sea Turtle Rescue and Rehabilitation Center. The Karen Beasley Sea Turtle Rescue and Rehabilitation Center may appoint six of the twelve members of the STAC. The STAC may be dissolved by mutual agreement of the parties at any time.

(c) The duties of the STAC include but are not limited to the following: reviewing observer reports, devising means for fishermen to report turtle interactions, assisting with fishermen education, determining measures to reduce the incidental take of sea turtles, monitoring observer program issues, and reviewing all future ITP provisions and take calculations prior to formal application to NMFS.

5. **ITP Development.**

(a) The restrictions as listed in Paragraphs 1, 2(e) and 2(i) are minimum requirements for the 2010 statewide ITP application.

(b) The STAC will advise in the development of the new ITP applications and the overall take calculations.

(c) Effective for the 2012 license year (May 15, 2011), the dealer report required by the DMF will be expanded to include effort data recorded in terms of the number of 100-yard shots set by fishermen.

(d) 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 the DMF an ITP for the affected areas. Furthermore, this Agreement shall not foreclose more lenient or more restrictive provisions in future ITP applications if warranted by biological data collected through reliable sources including but not limited to NMFS and the DMF.

6. Dismissal with Prejudice. Plaintiff shall dismiss its Complaint against Defendants with Prejudice within 10 calendar days of the execution of this Agreement by all the parties.

7. **Release of Claims.** The Plaintiff hereby releases and waives all claims and causes of action that it has against the Defendants, the State of North Carolina, and all other departments, agencies, divisions, and other components of the State of North Carolina and all past and present agents, employees, officials, and representatives of the State of North

Carolina on account of and/or in any way growing out of the actions or omissions arising from the use of gill nets in North Carolina's internal coastal waters alleged or which could have been alleged in Plaintiff's Complaint. This release and waiver of claims and causes of action continues in effect until a new Section 10 Permit under the ESA is issued by NMFS for North Carolina's internal coastal waters. Once the Section 10 Permit is issued, there will be no further need for the proclamation provided for in Paragraph 2(a) to remain in effect.

8. **Cost.** Each party shall bear its own costs, including attorney fees.

9. **No Admission of Liability.** The undersigned agree that this Agreement is a full and complete compromise settlement of disputed claims and causes of action set forth in Plaintiff's Complaint and is intended merely to terminate any and all claims or causes of action relating to the allegations therein. There is no admission of fault, wrongdoing, or liability by any party. Defendants do not waive their claim of sovereign immunity by entering into this Agreement.

10. **Full Cooperation.** The parties agree to cooperate fully, to execute any and all supplementary documents necessary to effectuate this Agreement, and to take all additional actions that may be necessary to give full force and effect to the terms of this Agreement.

11. **Enforceability.** In the event of breach of this Agreement, the parties have an action at law in any court having jurisdiction over the matter. The Agreement is not enforceable by third parties.

12. **Entire Agreement.** This Agreement contains the entire agreement between the parties and there are no understandings or agreements, verbal or otherwise, regarding this settlement except as expressly set forth herein.

13. **Reading of Agreement.** The parties hereby acknowledge that the individual executing the Agreement on his/her behalf is authorized to execute this Agreement on his/her behalf and to bind the respective entities to the terms contained herein and that he or she has read this Agreement, conferred with his or her attorney, fully understands its contents, consents to the settlement of the claims on the terms set forth herein, and does so in reliance upon his or her own judgment and advice of his or her attorney and not in reliance on any other representations or promises of Defendants or their representatives or attorneys.

IN WITNESS WHEREOF, this Agreement is executed in counterparts effective on the last date of execution indicated on the subsequent signature pages. This Agreement shall become effective upon the execution by all named parties.
[SIGNATURES APPEAR ON THE FOLLOWING PAGE]

PLAINTIFF:
BY: _____ dated 13 May, 2010
Jean Beasley, Director
Karen Beasley Sea Turtle Rescue and
Rehabilitation Center

DEFENDANTS:
BY: _____ dated 5/13/, 2010
Dr. Louis Daniel III, Director
For: North Carolina Division of Marine Fisheries

BY: _____ dated 5/13/, 2010
Dr. Louis Daniel III, Director
In his official capacity as Director of the
North Carolina Division of Marine Fisheries

BY: _____ dated May 13, 2010
W. Robert Bizzell, Chairman
For: North Carolina Marine Fisheries Commission

APPENDIX C. LARGE MESH GILL-NET PROCLAMATIONS

M-8-2010

PROCLAMATION

RE: LARGE MESH GILL NETS: INTERNAL COASTAL WATERS

Dr. Louis B. Daniel III, Director, Division of Marine Fisheries, hereby announces that effective at 6:00 P.M., Saturday, May 15, 2010, the following provisions shall apply to the use of large mesh gill nets:

I. SUSPENSION OF PORTION OF MARINE FISHERIES RULE 15A NCAC 03J .0103

The following portion of Marine Fisheries Rules for Coastal Waters 15A NCAC 03J .0103 is suspended: Section (i) (1), which reads:
(i)For gill nets with a mesh length five inches or greater, it is unlawful:
(1) To use more than 3,000 yards of gill net per vessel in internal waters regardless of the number of individuals involved.

II. AREAS AND EXEMPTIONS

A. This proclamation applies to all internal coastal waters except for Albemarle and Currituck sounds and their tributaries described as follows:
1. In Albemarle Sound, the restrictions do not apply west of a line beginning at a point 35º 57.5590'N - 75º 56.8200' W; running northerly to a point 36º 09.9280'N - 75º 54.6950'W.

2. In Currituck Sound, the restrictions do not apply north of the Highway 158 Wright Memorial Bridge beginning at a point on the western shore at 36º 04.8280'N - 75º 47.4050'W; running easterly along the south side of the bridge to a point on the east shore at 36º 05.5770'N - 75º 44.5850'W.

B. Run-around or strike nets and drop nets that are used to surround a school of fish and then are immediately retrieved are exempted from the restrictions in this proclamation.

C. The Pamlico Sound Gill Net Restricted Area (PSGNRA) will operate under Incidental Take Permit (ITP) No. 1528 and is exempt from the restrictions in this proclamation during the September through December 2010 period. Restrictions in this proclamation apply to the PSGNRA outside of that time period.

III. GILL NET RESTRICTIONS

It is unlawful to use large mesh gill nets (defined as 4 inches to 6½ inches stretched mesh, inclusive) unless they comply with the following provisions:

A. It is unlawful to set and retrieve large mesh gill nets except during the following times:
1. No sooner than one hour before sunset on Monday and no later than one hour after sunrise on Tuesday.
2. No sooner than one hour before sunset on Tuesday and no later than one hour after sunrise on Wednesday.
3. No sooner than one hour before sunset on Wednesday and no later than one hour after sunrise on Thursday.

4. No sooner than one hour before sunset on Thursday and no later than one hour after sunrise on Friday.

B. It is unlawful to use large mesh gill nets of more than 15 meshes in height and without a lead core or leaded bottomline. It is unlawful to use cork, floats, or other buoys except those required for identification except that south of the Highway 58 bridge, beginning at a point on the north shore at 34° 40.7848'N - 77° 04.0273'W; running southerly to a point on the south shore at 34° 39.8620'N – 77° 03.7438'W, floats are allowed.

C. It is unlawful to use more than 2,000 yards of large mesh gill net per vessel north of the Highway 58 bridge (coordinates above) and it is unlawful to use more than 1,000 yards of large mesh gill net per vessel south of the Highway 58 bridge.

D. It is unlawful to set more than 100 yards of large mesh gill net in a continuous line.

E. It is unlawful to use large mesh gill nets without leaving a space of at least 25 yards between separate lengths of net.

IV. GENERAL INFORMATION

A. This proclamation is issued under the authority of N.C.G. S. 113-134; 113-170.4; 113-170.5; 113-182; 113-221.1; 143B-289.52 and N.C. Fisheries Rules 15A NCAC 03H .0103 and 03J .0101 and .0103.

B. It is unlawful to violate the provisions of any proclamation issued by the Fisheries Director under his delegated authority pursuant to N.C. Fisheries Rule 15A NCAC 03H .0103.

C. The intent of this proclamation is to implement gill net restrictions while the Division applies for a statewide incidental take permit from NMFS under Section 10 of the Endangered Species Act.

D. The restrictions in this proclamation apply to gill nets used by Recreational Commercial Gear License holders as well as Standard and Retired Commercial Fishing Licenses holders.

E. The small mesh gill net attendance requirements in N.C. Marine Fisheries Rule 15A NCAC 03J .0103 (h), size restrictions in 03J .0103(a)(2), the navigational passage requirements in 03J .0101, as well as all other existing gill net rules and proclamations remain in effect.

This proclamation supersedes Proclamation M-19-2009, dated August 26, 2009.

May 13, 2010
1:45 P.M.
M-8-2010

M-2-2011

PROCLAMATION

RE: LARGE MESH GILL NETS: INTERNAL COASTAL WATERS

Dr. Louis B. Daniel III Director, Division of Marine Fisheries, hereby announces that effective at **Noon, Thursday, January 20, 2011**, the following provisions shall apply to the use of large mesh gill nets:

I. SUSPENSION OF PORTION OF MARINE FISHERIES RULE 15A NCAC 03J .0103

The following portion of Marine Fisheries Rules for Coastal Waters 15A NCAC 03J .0103 **is suspended:** Section (i) (1), which reads:
(i) For gill nets with a mesh length five inches or greater, it is unlawful:
(1) To use more than 3,000 yards of gill net per vessel in internal waters regardless of the number of individuals involved.

II. AREAS AND EXEMPTIONS

A. This proclamation applies to all internal coastal waters **except for Albemarle and Currituck sounds and their tributaries described as follows:**

1. In Albemarle Sound, the restrictions do not apply north and west of a line beginning at a point 35º 57.5590'N - 75º 56.8200' W; running northeasterly to a point 36º 04.8280'N - 75º 47.4050'W.

2. In Currituck Sound, the restrictions do not apply north of the Highway 158 Wright Memorial Bridge beginning at a point on the western shore at 36º 04.8280'N - 75º 47.4050'W; running easterly along the south side of the bridge to a point on the east shore at 36º 05.5770'N - 75º 44.5850'W.

B. Run-around or strike nets and drop nets that are used to surround a school of fish and then are immediately retrieved are exempted from the restrictions in this proclamation.

C. For the American and hickory shad fishery, the following areas are exempt from the restrictions listed in Section III. A., B., and D of this proclamation. The maximum yardage limit in III. C is still in effect.

1. Albemarle Sound Management Area as defined in Marine Fisheries Rule 15A NCAC 03R .0201 (

2. In Pamlico Sound and its tributaries (including Pamlico, Pungo, Bay and Neuse rivers), south of a line at Highway 158 Wright Memorial Bridge beginning at a point on the western shore at 36º 04.8280'N - 75º 47.4050'W; running easterly along the south side of the bridge to a point on the east shore at 36º 05.5770'N - 75º 44.5850'W and north of a line at the Wainwrights beginning at a point 34° 59.7942'N – 76° 14.6514'W on Camp Point; running easterly to a point at 34° 58.7853'N – 76° 09.8922'W on Core Banks.

3. In Cape Fear River and its tributaries, north of a line running from a point on the west shore at 34° 04.6040'N – 77° 56.4780'W; running easterly to a point on the east shore at 34° 04.7920'N – 77° 55.4740'W.

III. GILL NET RESTRICTIONS

It is unlawful to use large mesh gill nets (defined as 4 inches to 6½ inches stretched mesh, inclusive) unless they comply with the following provisions:

A. It is unlawful to set and retrieve large mesh gill nets except during the following times:

1. No sooner than one hour before sunset on Monday and no later than one hour after sunrise on Tuesday.

2. No sooner than one hour before sunset on Tuesday and no later than one hour after sunrise on Wednesday.

3. No sooner than one hour before sunset on Wednesday and no later than one hour after sunrise on Thursday.

4. No sooner than one hour before sunset on Thursday and no later than one hour after sunrise on Friday.

B. It is unlawful to use large mesh gill nets of more than 15 meshes in height and without a lead core or leaded bottomline. It is unlawful to use cork, floats, or other buoys except those required for identification **except that south of the Highway 58 bridge**, beginning at a point on the north shore at 34° 40.7848'N - 77° 04.0273'W; running southerly to a point on the south shore at 34° 39.8620'N – 77° 03.7438'W, **floats are allowed.**

C. It is unlawful to **use or possess** more than 2,000 yards of large mesh gill net per vessel north of the Highway 58 bridge (coordinates above) and it is unlawful to use or possess more than 1,000 yards of large mesh gill net per vessel south of the Highway 58 bridge.

D. It is unlawful to set more than 100 yards of large mesh gill net without leaving a space of at least 25 yards between separate lengths of net.

IV. GENERAL INFORMATION

A. This proclamation is issued under the authority of N.C.G. S. 113-134; 113-170.4; 113-170.5; 113-182; 113-221.1; 143B-289.52 and N.C. Fisheries Rules 15A NCAC 03H .0103 and 03J .0101 and .0103.

B. It is unlawful to violate the provisions of any proclamation issued by the Fisheries Director under his delegated authority pursuant to N.C. Fisheries Rule 15A NCAC 03H .0103.

C. The intent of this proclamation is to implement gill net restrictions while the Division applies for a statewide incidental take permit from NMFS under Section 10 of the Endangered Species Act. The proclamation also includes and exemption of certain areas from gill net restrictions for the shad fishery.

D. The restrictions in this proclamation apply to gill nets used by Recreational Commercial Gear License holders as well as Standard and Retired Commercial Fishing Licenses holders.

E. The small mesh gill net attendance requirements in N.C. Marine Fisheries Rule 15A NCAC 03J .0103 (h), size restrictions in 03J .0103(a)(2), the navigational passage requirements in 03J .0101, as well as all other existing gill net rules and proclamations remain in effect. This does not allow flounder nets in the eastern ASMA.

F. This proclamation supersedes Proclamation M-23-2010 Revised, dated November 29, 2010.

January 18, 2011
11:00 A.M.
M-2-2011

M-27-2011

PROCLAMATION

RE: LARGE MESH GILL NETS: INTERNAL COASTAL WATERS
Dr. Louis B. Daniel III Director, Division of Marine Fisheries, hereby announces that effective at **one hour before sunset on Monday, September 12, 2011**, the following provisions shall apply to the use of large mesh gill nets:

I. SUSPENSION OF PORTION OF MARINE FISHERIES RULE 15A NCAC 03J .0103
The following portion of Marine Fisheries Rules for Coastal Waters 15A NCAC 03J .0103 **is suspended:** Section (i) (1), which reads:

(i) For gill nets with a mesh length five inches or greater, it is unlawful
(1) To use more than 3,000 yards of gill net per vessel in internal waters regardless of the number of individuals involved. The provisions below in this proclamation shall be complied with at all times.

II. AREAS AND EXEMPTIONS
A. This proclamation applies to all internal coastal waters **except for portions of Croatan and Roanoke sounds, Albemarle and Currituck sounds and their tributaries and the Neuse, Bay and Pamlico rivers described as follows:**

1. In Croatan and Roanoke sounds, the restrictions **do not apply north and west** of the Virginia Dare Memorial Bridge and the Washington Baum Bridge described below:

A. Croatan Sound - beginning at a point 35º 53.1720'N - 75º 45.6160' W on the mainland shore; running easterly along the south side of the Virginia Dare Memorial Bridge to a point at 35° 53.1630'N - 75º 40.1640'W on Roanoke Island.

B. Roanoke Sound - beginning at a point 35º 53.6240'N - 75º 38.4170' W on shore at Roanoke Island; running easterly along the south side of the Washington Baum Bridge to a point at 35° 54.3820'N - 75º 35.9240'W on the Outer Banks shore .

2. In Pamlico, Bay and Neuse rivers, the restrictions do not apply west of a line in the vicinity of the mouths of those waterbodies described below:

A**.** Pamlico River – a line beginning at a point at 35º 24.5920'N - 76º 32.3810'W near Currituck Point; running southwesterly to a point at 35º 19.6960'N - 76º 36.5360'W near Fulford Point.

B. Bay River – a line beginning at a point 35º 11.0760'N - 76º 31.6200'W near Bay Point; running southerly to a point at 35º 08.9290'N - 76º 32.2680'W near Maw Point.

C. Neuse River – a line beginning at a point 35º 08.9290'N - 76º 32.2680'W near Maw Point; running southerly to a point at 34° 59.29400'N – 76°59.2940'N – 76° 34.8230'W on the east shore of the mouth of South River.

III. EXEMPTION FOR RUN-AROUND, STRIKE OR DROP NETS
A run-around, strike or drop net that is used to surround a school of fish and then is immediately retrieved is exempted from the restrictions in this proclamation.

IV. GILL NET CONSTRUCTION AND USE REQUIREMENTS
It is unlawful to use large mesh gill nets (defined as 4 inches to 6½ inches stretched mesh, inclusive) unless they comply with the following provisions:

A. It is unlawful to use large mesh gill nets of more than 15 meshes in height and without a lead core or leaded bottomline. It is unlawful to use cork, floats, or other buoys except those required for identification **except that floats are allowed south of the Highway 58 (B. Cameron Langston) Bridge**, beginning at a point on the north shore at 34° 40.7848'N - 77° 04.0273'W; running southerly to a point on the south shore at 34° 39.8620'N – 77° 03.7438'W.

B. It is unlawful to **use or possess** more than 2,000 yards of large mesh gill net per vessel north of the Highway 58 Bridge (coordinates above) and it is unlawful to **use or possess** more than 1,000 yards of large mesh gill net per vessel south of the Highway 58 Bridge.

C. It is unlawful to set more than 100 yards of large mesh gill net without leaving a space of at least 25 yards
between separate lengths of net.

V. GILL NET SETTING TIME REQUIREMENTS

It is unlawful to use large mesh gill nets (defined as 4 inches to 61/2 inches stretched mesh inclusive) for daytime sets other than during the setting and retrieval periods specified below. Only single night overnight soaks are permitted, and are only lawful if set and retrieved as follows:

A. Nets set for Tuesday retrieval may be set no sooner than one hour before sunset on Monday and must be retrieved no later than one hour after sunrise on Tuesday.

B. Nets set for Wednesday retrieval may be set no sooner than one hour before sunset on Tuesday and must be retrieved no later than one hour after sunrise on Wednesday.

C. Nets set for Thursday retrieval may be set no sooner than one hour before sunset on Wednesday and must be retrieved no later than one hour after sunrise on Thursday.

D. Nets set for Friday retrieval may be set no sooner than one hour before sunset on Thursday and must be retrieved no later than one hour after sunrise on Friday.

No other overnight sets are permitted, and in no case shall daytime sets occur other than during setting and retrieval periods as specified above.

VI. GENERAL INFORMATION

A. This proclamation is issued under the authority of N.C.G. S. 113-134; 113-170.4; 113-170.5; 113-182; 113-221.1; 143B-289.52 and N.C. Fisheries Rules 15A NCAC 03H .0103 and 03J .0101 and .0103.

B. It is unlawful to violate the provisions of any proclamation issued by the Fisheries Director under his delegated authority pursuant to N.C. Fisheries Rule 15A NCAC 03H .0103.

C. The intent of this proclamation is to implement gill net restrictions while the Division applies for a statewide incidental take permit from NMFS under Section 10 of the Endangered Species Act. It returns gill net restrictions for use of large mesh gill nets (defined as 4 inches to 6½ inches stretched mesh, inclusive) to those in existence prior to May of 2010 for the areas listed in II. A. 2.

D. The restrictions in this proclamation apply to gill nets used by Recreational Commercial Gear License holders as well as Standard and Retired Commercial Fishing Licenses holders.

E. **The small mesh gill net attendance requirements in N.C. Marine Fisheries Rule 15A NCAC 03J .0103 (h), size restrictions in 03J .0103(a)(2), the navigational passage requirements in 03J .0101, as well as all other existing gill net rules and proclamations remain in effect.**

F. Proclamation M-7-2011, dated February 25, 2011 prohibits the use of gill nets with a stretched mesh length more than 6 ½ inches.

G. This proclamation supersedes Proclamation M-18-2011 (Revised) dated July 12, 2011, M-22-2011 and M-23-2011, dated July 12, 2011**. It does not supersede Proclamation M-24-2011, dated July 14, 2011, which closed southern Core Sound, Back Sound, the Straits and North River to large mesh gill nets.**

September 7, 2011
8:20 A.M.
M-27-2011

M-30 -2011

PROCLAMATION

RE: LARGE MESH GILL NETS: INTERNAL COASTAL WATERS
Dr. Louis B. Daniel III Director, Division of Marine Fisheries, hereby announces that effective at **one hour before sunset on Sunday, September 18, 2011**, the following provisions shall apply to the use of large mesh gill nets:

I. SUSPENSION OF PORTION OF MARINE FISHERIES RULE 15A NCAC 03J .0103
The following portion of Marine Fisheries Rules for Coastal Waters 15A NCAC 03J .0103 **is suspended:** Section (i) (1), which reads:

(i) For gill nets with a mesh length five inches or greater, it is unlawful:
(1) To use more than 3,000 yards of gill net per vessel in internal waters regardless of the number of individuals involved. The provisions below in this proclamation shall be complied with at all times.

II. AREAS AND EXEMPTIONS
A. This proclamation applies to all internal coastal waters **except for portions of Croatan and Roanoke sounds, Albemarle and Currituck sounds and their tributaries and the Neuse, Bay and Pamlico rivers described as follows:**

1. In Croatan and Roanoke sounds, the restrictions **do not apply north and west** of the Virginia Dare Memorial Bridge and the Washington Baum Bridge described below:

a. Croatan Sound - beginning at a point 35º 53.1720'N - 75º 45.6160' W on the mainland shore; running easterly along the south side of the Virginia Dare Memorial Bridge to a point at 35° 53.1630'N - 75º 40.1640'W on Roanoke Island.

b. Roanoke Sound - beginning at a point 35º 53.6240'N - 75º 38.4170' W on shore at Roanoke Island; running easterly along the south side of the Washington Baum Bridge to a point at 35° 54.3820'N - 75º 35.9240'W on the Outer Banks shore .

2. In Pamlico, Bay and Neuse rivers, the restrictions do not apply west of a line in the vicinity of the mouths of those waterbodies described below:

a. Pamlico River – a line beginning at a point at 35º 24.5920'N - 76º 32.3810'W near Currituck Point; running southwesterly to a point at 35º 19.6960'N - 76º 36.5360'W near Fulford Point.

b. Bay River – a line beginning at a point 35º 11.0760'N - 76º 31.6200'W near Bay Point; running southerly to a point at 35º 08.9290'N - 76º 32.2680'W near Maw Point.

c. Neuse River – a line beginning at a point 35º 08.9290'N - 76º 32.2680'W near Maw Point; running southerly to a point at 34° 59.29400'N – 76°59.2940'N – 76° 34.8230'W on the east shore of the mouth of South River.

III. EXEMPTION FOR RUN-AROUND, STRIKE OR DROP NETS

A run-around, strike or drop net that is used to surround a school of fish and then is immediately retrieved is exempted from the restrictions in this proclamation.

IV. GILL NET CONSTRUCTION AND USE REQUIREMENTS
It is unlawful to use large mesh gill nets (defined as 4 inches to 6½ inches stretched mesh, inclusive) unless they comply with the following provisions:

A. It is unlawful to use large mesh gill nets of more than 15 meshes in height and without a lead core or leaded bottomline. It is unlawful to use cork, floats, or other buoys except those required for identification **except that floats are allowed south of the Highway 58 (B. Cameron Langston) Bridge**, beginning at a point on the north shore at 34° 40.7848'N - 77° 04.0273'W; running southerly to a point on the south shore at 34° 39.8620'N – 77° 03.7438'W.

B. It is unlawful to **use or possess** more than 2,000 yards of large mesh gill net per vessel north of the Highway 58 Bridge (coordinates above) and it is unlawful to **use or possess** more than 1,000 yards of large mesh gill net per vessel south of the Highway 58 Bridge.

C. It is unlawful to set more than 100 yards of large mesh gill net without leaving a space of at least 25 yards
between separate lengths of net.

V. GILL NET SETTING TIME REQUIREMENTS

It is unlawful to use large mesh gill nets (defined as 4 inches to 61/2 inches stretched mesh inclusive) for daytime sets other than during the setting and retrieval periods specified below. Only single night overnight soaks are permitted, and are only lawful if set and retrieved as follows:
In all areas subject to the restrictions in this proclamation,

A. Nets set for Tuesday retrieval may be set no sooner than one hour before sunset on Monday and must be retrieved no later than one hour after sunrise on Tuesday.

B. Nets set for Wednesday retrieval may be set no sooner than one hour before sunset on Tuesday and must be retrieved no later than one hour after sunrise on Wednesday.

C. Nets set for Thursday retrieval may be set no sooner than one hour before sunset on Wednesday and must be retrieved no later than one hour after sunrise on Thursday.

D. Nets set for Friday retrieval may be set no sooner than one hour before sunset on Thursday and must be retrieved no later than one hour after sunrise on Friday.

In the area bound in the north by a line at longitude 76° 36.9972'W which runs from a point on Shackleford Banks northerly to Lennoxville Point, then to the head of Turner Creek, and northerly up the western side of North River (see map), and bound in the south by the North Carolina-South Carolina border, an additional overnight soak period is permitted in addition to V. A. through D above:

A. Nets set for Monday retrieval may be set no sooner than one hour before sunset on Sunday and must be retrieved no later than one hour after sunrise on Monday.
No other overnight sets are permitted, and in no case shall daytime sets occur other than during setting and retrieval periods as specified above.

VI. GENERAL INFORMATION

A. This proclamation is issued under the authority of N.C.G. S. 113-134; 113-170.4; 113-170.5; 113-182; 113- 221.1; 143B-289.52 and N.C. Fisheries Rules 15A NCAC 03H .0103 and 03J .0101 and .0103.

B. It is unlawful to violate the provisions of any proclamation issued by the Fisheries Director under his delegated authority pursuant to N.C. Fisheries Rule 15A NCAC 03H .0103.
C. The intent of this proclamation is to implement gill net restrictions while the Division applies for a statewide incidental take permit from NMFS under Section 10 of the Endangered Species Act. It returns

gill net restrictions for use of large mesh gill nets (defined as 4 inches to 6½ inches stretched mesh, inclusive) to those in existence prior to May of 2010 for the areas listed in II. A. 2.

D. The restrictions in this proclamation apply to gill nets used by Recreational Commercial Gear License holders as well as Standard and Retired Commercial Fishing Licenses holders.

E. **The small mesh gill net attendance requirements in N.C. Marine Fisheries Rule 15A NCAC 03J .0103 (h), size restrictions in 03J .0103(a)(2), the navigational passage requirements in 03J .0101, as well as all other existing gill net rules and proclamations remain in effect.**

F. Proclamation M-7-2011, dated February 25, 2011 prohibits the use of gill nets with a stretched mesh length more than 6 ½ inches.

G. This proclamation supersedes Proclamation M-27-2011 dated September 7, 2011**. It does not supersede Proclamation M-24-2011, dated July 14, 2011, which closed southern Core Sound, Back Sound, the Straits and North River to large mesh gill nets. That area will re-open by proclamation on October 3, 2011.**

September 13, 2011
9:30 A.M.
M-30-2011

M-6-2012

PROCLAMATION

RE: LARGE MESH GILL NETS: INTERNAL COASTAL WATERS
Dr. Louis B. Daniel III Director, Division of Marine Fisheries, hereby announces that effective at **9:00 A.M. Thursday, February 2, 2012**, the following provisions shall apply to the use of large mesh gill nets:

I. SUSPENSION OF PORTION OF MARINE FISHERIES RULE 15A NCAC 03J .0103
The following portion of Marine Fisheries Rules for Coastal Waters 15A NCAC 03J .0103 **is suspended:** Section (i) (1), which reads:

(i) For gill nets with a mesh length five inches or greater, it is unlawful:
(1) To use more than 3,000 yards of gill net per vessel in internal waters regardless of the number of individuals involved. The provisions below in this proclamation shall be complied with at all times.

II. AREAS AND EXEMPTIONS
A. This proclamation applies to all internal coastal waters **except the Albemarle Sound Management Area as described in Marine Fisheries Rule 15A NCAC 03R .0201 (a) and the Neuse, Bay and Pamlico rivers described as follows:**

1. In Pamlico, Bay and Neuse rivers, the restrictions do not apply west of a line in the vicinity of the mouths of those waterbodies described below:

a. Pamlico River – a line beginning at a point at 35º 24.5920'N - 76º 32.3810'W near Currituck Point; running southwesterly to a point at 35º 19.6960'N - 76º 36.5360'W near Fulford Point.

b. Bay River – a line beginning at a point 35º 11.0760'N - 76º 31.6200'W near Bay Point; running southerly to a point at 35º 08.9290'N - 76º 32.2680'W near Maw Point.

c. Neuse River – a line beginning at a point 35º 08.9290'N - 76º 32.2680'W near Maw Point; running southerly to a point at 34° 59.29400'N – 76°59.2940'N – 76° 34.8230'W on the east shore of the mouth of South River.

B. **For the American and hickory shad fishery**, the following areas are exempt from the restrictions listed in Section IV. A., B., and D of this proclamation. The maximum yardage limit in IV. C is still in effect.

1. Pamlico Sound – south of a line beginning at a point 35° 48.3693'N – 75° 43.7232'W on Roanoke Marshes Point, running southeasterly to a point 35° 44.1710'N – 75° 31.0520'W on the north point of Eagle Nest Bay. North of a line at the Wainwrights beginning at a point 34° 59.7942'N – 76° 14.6514'W on Camp Point; running easterly to a point at 34° 58.7853'N – 76° 09.8922'W on Core Banks.

2. In Cape Fear River and its tributaries, north of a line running from a point on the west shore at 34° 04.6040'N – 77° 56.4780'W; running easterly to a point on the east shore at 34° 04.7920'N – 77° 55.4740'W.

3. In New River north of the Highway 172 Bridge.

III. EXEMPTION FOR RUN-AROUND, STRIKE OR DROP NETS

A. A run-around, strike or drop net that is used to surround a school of fish and then is immediately retrieved is exempted from the restrictions in this proclamation.

IV. GILL NET SETTING REQUIREMENTS

A. **It is unlawful** to use large mesh gill nets (defined as 4 inches to 61/2 inches stretched mesh inclusive) for daytime sets other than during the setting and retrieval periods specified below. Only single night overnight soaks are permitted, and are only lawful if set and retrieved as follows:

1. Nets set for Tuesday retrieval may be set no sooner than one hour before sunset on Monday and must be retrieved no later than one hour after sunrise on Tuesday.

2. Nets set for Wednesday retrieval may be set no sooner than one hour before sunset on Tuesday and must be retrieved no later than one hour after sunrise on Wednesday.

3. Nets set for Thursday retrieval may be set no sooner than one hour before sunset on Wednesday and must be retrieved no later than one hour after sunrise on Thursday.

4. Nets set for Friday retrieval may be set no sooner than one hour before sunset on Thursday and must be retrieved no later than one hour after sunrise on Friday.

In the area bound in the north by a line at longitude 76° 36.9972'W which runs from a point on Shackleford Banks northerly to Lennoxville Point, then to the head of Turner Creek, and northerly up the western side of North River (see map), and bound in the south by the North Carolina-South Carolina border, an additional overnight soak period is permitted in addition to IV. 1. through 4. above: Nets set for Monday retrieval may be set no sooner than one hour before sunset on Sunday and must be retrieved no later than one hour after sunrise on Monday.
No other overnight sets are permitted, and in no case shall daytime sets occur other than during setting and retrieval periods as specified above.

B. It is unlawful to use large mesh gill nets of more than 15 meshes in height and without a lead core or leaded bottomline. It is unlawful to use cork, floats, or other buoys except those required for identification **except that floats are allowed south of the Highway 58 (B. Cameron Langston) Bridge**, beginning at a point on the north shore at 34° 40.7848'N - 77° 04.0273'W; running southerly to a point on the south shore at 34° 39.8620'N – 77° 03.7438'W.

C. It is unlawful to **use or possess** more than 2,000 yards of large mesh gill net per vessel north of the Highway 58 Bridge (coordinates above) and it is unlawful to **use or possess** more than 1,000 yards of large mesh gill net per vessel south of the Highway 58 Bridge.

D. It is unlawful to set more than 100 yards of large mesh gill net without leaving a space of at least 25 yards between separate lengths of net.

V. GENERAL INFORMATION

A. This proclamation is issued under the authority of N.C.G. S. 113-134; 113-170.4; 113-170.5; 113-182; 113- 221.1; 143B-289.52 and N.C. Fisheries Rules 15A NCAC 03H .0103 and 03J .0101 and .0103.

B. It is unlawful to violate the provisions of any proclamation issued by the Fisheries Director under his delegated authority pursuant to N.C. Fisheries Rule 15A NCAC 03H .0103.

C. The intent of this proclamation is to implement gill net restrictions while the Division applies for a statewide
incidental take permit from NMFS under Section 10 of the Endangered Species Act. It lists the areas

exempted earlier from restrictions for use of large mesh gill nets (defined as 4 inches to 6½ inches stretched mesh, inclusive) and adds Pamlico Sound, Cape Fear and upper New River to those exempted areas so that the shad fishery can be pursued.

D. Proclamation FF-84-2011, dated December 15, 2011 prohibits the **setting of gill nets in the joint fishing waters of the state from midnight on Friday to midnight on Sunday each week**. Portions of Albemarle and Currituck sounds are exempt from that provision.

E. **Shad net restrictions for the Albemarle Sound will be effective February 2, 2012. Gill net restrictions for the entire ASMA are now the same and are found in Proclamation M-5-2012, dated January 31, 2012.**

F. The restrictions in this proclamation apply to gill nets used by Recreational Commercial Gear License holders as well as Standard and Retired Commercial Fishing Licenses holders.

G. **The small mesh gill net attendance requirements in N.C. Marine Fisheries Rule 15A NCAC 03J .0103 (h), size restrictions in 03J .0103(a)(2), the navigational passage requirements in 03J .0101, as well as all other existing gill net rules and proclamations remain in effect.**
H. Proclamation M-7-2011, dated February 25, 2011 prohibits the use of gill nets with a stretched mesh length more than 6 ½ inches.

I. This proclamation supersedes Proclamation M-2-2012 dated January 11, 2012. **No changes have been made to existing gill-net restrictions. Additional exemptions (the southern portion of the ASMA) have been made in some areas to allow the American and hickory shad fishery to occur.**

January 31, 2012
9:00 A.M.
M-6-2012

M-23-2012 (REVISED)

PROCLAMATION

RE: LARGE MESH GILL NETS: INTERNAL COASTAL WATERS
Dr. Louis B. Daniel III Director, Division of Marine Fisheries, hereby announces that effective at **6:21 P.M. on Sunday, June 10, 2012**, the following provisions shall apply to the use of large mesh gill nets:

I. SUSPENSION OF PORTION OF MARINE FISHERIES RULE 15A NCAC 03J .0103
The following portion of Marine Fisheries Rules for Coastal Waters 15A NCAC 03J .0103 **is suspended:** Section (i) (1), which reads:

(i) For gill nets with a mesh length five inches or greater, it is unlawful:
(1) To use more than 3,000 yards of gill net per vessel in internal waters regardless of the number of individuals involved.
The provisions below in this proclamation shall be complied with at all times.

II. AREAS AND EXEMPTIONS
A. This proclamation applies to all internal coastal waters **except for portions of Croatan and Roanoke sounds, Albemarle and Currituck sounds and their tributaries and the Neuse, Bay and Pamlico rivers described as follows:**

1. In Croatan and Roanoke sounds, the restrictions **do not apply north and west** of the Virginia Dare Memorial Bridge and the Washington Baum Bridge described below:

a. Croatan Sound - beginning at a point 35º 53.1720'N - 75º 45.6160' W on the mainland shore; running easterly along the south side of the Virginia Dare Memorial Bridge to a point at 35° 53.1630'N - 75º 40.1640'W on Roanoke Island.

b. Roanoke Sound - beginning at a point 35º 53.6240'N - 75º 38.4170' W on shore at Roanoke Island; running easterly along the south side of the Washington Baum Bridge to a point at 35° 54.3820'N - 75º 35.9240'W on the Outer Banks shore .

2. In Pamlico, Bay and Neuse rivers, the restrictions **do not apply** west of a line in the vicinity of the mouths of those waterbodies described below:

a. Pamlico River – a line beginning at a point at 35º 24.5920'N - 76º 32.3810'W near Currituck Point; running southwesterly to a point at 35º 19.6960'N - 76º 36.5360'W near Fulford Point.

b. Bay River – a line beginning at a point 35º 11.0760'N - 76º 31.6200'W near Bay Point; running southerly to a point at 35º 08.9290'N - 76º 32.2680'W near Maw Point.

c. Neuse River – a line beginning at a point 35º 08.9290'N - 76º 32.2680'W near Maw Point; running southerly to a point at 34° 59.29400'N – 76°59.2940'N – 76° 34.8230'W on the east shore of the mouth of South River.

3. In the areas described in II.A. 1. and 2. above, the maximum large mesh gill net yardage allowed is 3,000 yards.

B. **CLOSED AREA DESCRIPTION**
It is unlawful to use large mesh gill nets (defined as 4 inches to 6½ inches stretched mesh, inclusive) in the area described in II. B. below from April 1 through November 30.
SOUTHERN CORE SOUND, BACK SOUND, THE STRAITS, NORTH RIVER AND TRIBUTARIES –The area bound in the north by a line at latitude 34° 48.2660' N which runs

approximately from the Club House on Core Banks westerly to a point on the shore at Davis near Marker "1", **bound in the west by a line** at longitude 76° 36.9972' W, which runs northerly from a point on Shackleford Banks to Lennoxville Point, then to the head of Turner Creek, and northerly up the western side of North River, **and bound in the east by the COLREGS demarcation line at Barden Inlet** including southern Core Sound, Back Sound The Straits, North River and all tributaries. (See Map) **This area will not re-open June 4, 2012.**

III. EXEMPTION FOR RUN-AROUND, STRIKE OR DROP NETS
A run-around, strike or drop net that is used to surround a school of fish and then is immediately retrieved is exempted from the restrictions in this proclamation.

IV. GILL NET CONSTRUCTION AND USE REQUIREMENTS
It is unlawful to use large mesh gill nets (defined as 4 inches to 6½ inches stretched mesh, inclusive) unless they comply with the following provisions:

A. It is unlawful to use large mesh gill nets of more than 15 meshes in height and without a lead core or leaded bottomline. It is unlawful to use cork, floats, or other buoys except those required for identification **except that floats are allowed south of the Highway 58 (B. Cameron Langston) Bridge**, beginning at a point on the north shore at 34° 40.7848'N - 77° 04.0273'W; running southerly to a point on the south shore at 34° 39.8620'N – 77° 03.7438'W.

B. It is unlawful to **use or possess more than 2,000 yards** of large mesh gill net per fishing operation regardless of the number of vessels involved in coastal fishing waters **north of a line** at latitude 34° 48.2660' N which runs approximately from the Club House on Core Banks westerly to a point on the shore at Davis near Marker "1".

C. It is unlawful to **use or possess more than 1,000 yards** of large mesh gill net per fishing operation regardless of the number of vessels involved in coastal fishing waters bound in the north by a **line** at longitude 76° 36.9972' W, which runs northerly from a point on Shackleford Banks to Lennoxville Point, then to the head of Turner Creek, and northerly up the western side of North River and **bound in the south by the North Carolina-South Carolina border.**

D. It is unlawful to set more than 100 yards of large mesh gill net without leaving a space of at least 25 yards between separate lengths of net.

V. GILL NET SETTING TIME REQUIREMENTS
It is unlawful to use large mesh gill nets (defined as 4 inches to 61/2 inches stretched mesh inclusive) for daytime sets other than during the setting and retrieval periods specified below. Only single night overnight soaks are permitted, and are only lawful if set and retrieved as follows:
In all areas subject to the restrictions in this proclamation,

A. Nets set for Tuesday retrieval may be set no sooner than one hour before sunset on Monday and must be retrieved no later than one hour after sunrise on Tuesday.

B. Nets set for Wednesday retrieval may be set no sooner than one hour before sunset on Tuesday and must be retrieved no later than one hour after sunrise on Wednesday.

C. Nets set for Thursday retrieval may be set no sooner than one hour before sunset on Wednesday and must be retrieved no later than one hour after sunrise on Thursday.

D. Nets set for Friday retrieval may be set no sooner than one hour before sunset on Thursday and must be retrieved no later than one hour after sunrise on Friday.
In the area bound in the north by a line at longitude 76° 36.9972'W which runs from a point on

Shackleford Banks northerly to Lennoxville Point, then to the head of Turner Creek, and northerly up the western side of North River, and bound in the south by the North Carolina-South Carolina border, an additional overnight soak period is permitted in addition to V. A. through D above:

E. Nets set for Monday retrieval may be set no sooner than one hour before sunset on Sunday and must be retrieved no later than one hour after sunrise on Monday.
No other overnight sets are permitted, and in no case shall daytime sets occur other than during setting and retrieval periods as specified above.

VI. GENERAL INFORMATION

A. This proclamation is issued under the authority of N.C.G. S. 113-134; 113-170.4; 113-170.5; 113-182; 113- 221.1; 143B-289.52 and N.C. Fisheries Rules 15A NCAC 03H .0103 and 03J .0101 and .0103.

B. It is unlawful to violate the provisions of any proclamation issued by the Fisheries Director under his delegated authority pursuant to N.C. Fisheries Rule 15A NCAC 03H .0103.

C. The intent of this proclamation is to implement gill net restrictions while the Division applies for a statewide
incidental take permit from NMFS under Section 10 of the Endangered Species Act. **It closes southern Core Sound, Back Sound, the Straits and North River to large mesh gill nets from April through November. It also reduces the maximum yardage of large mesh gill nets allowed between Lennoxville Point (near Beaufort) and the North Carolina-South Carolina border from 2,000 yards to 1,000 yards.**

D. The restrictions in this proclamation apply to gill nets used by Recreational Commercial Gear License holders as well as Standard and Retired Commercial Fishing Licenses holders.

E. **Marine Fisheries Rule 15A NCAC 03I .0113 specifies that it is unlawful for any licensee under Chapter 113, Subchapter IV of the General Statutes to refuse to allow the Fisheries Director or his agents to obtain biological data, harvest information, or other statistical data necessary or useful to the conservation and management of marine and estuarine resources from fish in the licensee's possession. The Division of Marine Fisheries has implemented an observer program as an inspection procedure to obtain such data.**

F. The small mesh gill net attendance requirements in N.C. Marine Fisheries Rule 15A NCAC 03J .0103 (h), size restrictions in 03J .0103(a)(2), the navigational passage requirements in 03J .0101, as well as all other existing gill net rules and proclamations remain in effect.

G. Proclamation M-7-2012, dated February 23, 2012 prohibits the use of gill nets with a stretched mesh length more than 6 ½ inches.

H. This proclamation supersedes Proclamation M-23-2012 dated May 16, 2012. **It corrects the southern boundary of the 1,000 yard maximum gill net length requirement in IV. C. and clarifies the yardage limits in the various areas.**

BY:_____
Dr. Louis B. Daniel III, Director
DIVISION OF MARINE FISHERIES

June 8, 2012
11:15 A.M.
M-23-2012(REVISED)

M-15-2008

PROCLAMATION

RE: COMMERCIAL GILL NETS - PAMLICO SOUND GILL NET RESTRICTED AREA (PSGNRA)

Dr. Louis B. Daniel III, Director, Division of Marine Fisheries, hereby announces that effective 12:01 A.M., Monday, September 15, 2008, the following management measures will be implemented for commercial gill net fisheries in Pamlico Sound:

PAMLICO SOUND CLOSURE:
It is unlawful to use large mesh gill nets (greater than or equal to 5 ½ inch stretched mesh) from September 1, 2008 to midnight on November 30, 2008 in the internal waters of Pamlico Sound south and west of the 35° 46.3000 'N latitude line, east of the 76° 30.0000'W longitude line, and north of the 35° 00.0000'N latitude line except as provided in the areas described below as the Pamlico Sound Gill Net Restricted Areas (PSGNRAs).

PSGNRA DESCRIPTIONS:
Shallow Water Gill Net Restricted Areas (SGNRA)

1. SGNRA1
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 near Marker # 2CS at the mouth of Wainwright Channel at 35° 00.2780'N- 76° 12.1682'W, then running northeasterly near Marker "HL" at 35° 01.5665'N- 76° 11.4277'W, then running northeasterly near 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. SGNRA2
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 a point at 35° 08.7925'N- 76° 00.3627'W near Big Foot Slough Entrance, then running easterly to a point at 35° 09.4994'N- 75° 54.2943'W, then running northeasterly to a point at 35° 11.9803'N- 75° 51.6396'W, then running easterly to a point at 35° 13.4489'N- 75° 47.5534'W, then running southerly to just 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 the point of beginning.

3. SGNRA3
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. SGNRA4
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'W,

then running easterly to a point on shore at 35° 41.0000'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.

GILL NET RESTRICTIONS:

A. It is unlawful to use more than 200 yards of gill-net in one continuous line.

B. If the 200 yard sections are connected, a single yellow buoy is required to be placed at each end of the break between sections of net. The buoys must conform to the size and construction requirements in N.C. Fisheries Rule 15A NCAC 3J .0103 (c).

C. It is unlawful to have gill-nets set in SGNRA 2, 3 and 4 from 10:00 a.m. until 6:00 p.m. This restriction does not apply to SGNRA 1.

GENERAL INFORMATION:

A. This proclamation is issued under the authority of N.C.G. S. 113-134; 113-170.4; 113-170.5; 113-182; 113-221.1; 143B-289.52 and N.C. Fisheries Rules 15A NCAC 3H .0103, 3I .0107, 3I .0113, 3J .0103, 3O .0506 and 3R .0201.

B. It is unlawful to violate the provisions of any proclamation issued by the Fisheries Director under his delegated authority pursuant to N.C. Fisheries Rule 15A NCAC 3H .0103.

C. The intent of this proclamation is to implement management measures in the fall gill net fisheries in Pamlico Sound that are expected to reduce interactions with threatened and endangered sea turtles. These actions are expected to provide increased levels of protection for threatened and endangered sea turtles in Pamlico Sound gill net fisheries. Sea turtle abundance has increased throughout the PSGNRA and deep water (>5' deep) gill net sets increase capture and subsequent mortality of turtles.

D. "Attendance" is defined in N.C. Fisheries Rule 15A NCAC 3I .0101 (b) (40).

E. Gill Net Restricted Area Permits are available at no cost from all Division of Marine Fisheries License Offices.

F. This proclamation supplements, but does not supersede, the small mesh gill net attendance requirement for areas described in Marine Fisheries Rule 3J .0103 from May 1 through October 31 each year.

G. This proclamation (in Section III.) adds gill net restrictions in SGNRAs 1, 2, 3 and 4 from Proclamation M-13-2008, dated August 20, 2008. THESE ARE THE ONLY CHANGES. If these measures do not decrease sea turtle interactions, closures may be necessary.

By: _____
Dr. Louis B. Daniel, Director
DIVISION OF MARINE FISHERIES
September 12, 2008
2:00 P.M.
M-15-2008

APPENDIX D. NMFS INFORMATION REQUEST AND UPDATE

On June 14, 2010, the NCDMF submitted an application for an ITP to address sea turtle interactions with set gill nets in NC internal coastal waters. A revised ITP application was submitted on August 17, 2011 based on feedback received from NMFS on May 12, 2011. Feedback on the revised application from NMFS was provided again on May 2, 2012 after public and peer review comments had been compiled. In response to requested changes from NMFS, and considering the public and peer review comments, including the comments made by the STAC, NCDMF made extensive revisions to its application and resubmitted September 6, 2012. After another round of public and peer review comments NMFS requested more information and clarification on certain portions of the application. On November 14, 2012 the response to the information request was discussed via teleconference between NMFS and NCDMF and provided to them beforehand. NMFS recommended that NCDMF update the current ITP application with an appendix containing all the updated information requested.

NMFS COMMENTS

1. The bycatch estimates based on both 2010 and 2011 effort data
2. A table of predicted Kemp's ridley and green turtle bycatch rates in each management unit and season
3. CVs and/or CIs for corresponding bycatch estimates
4. Definition of the "worst case scenario" with respect to bycatch estimates
5. A table summarizing all management actions by management unit and season that are currently in practice or will be taken to reduce sea turtle bycatch
6. Details of the observer program sampling design and observer protocols
    - A simulation using existing observer data to determine the level of coverage necessary to produce accurate and precise bycatch estimates in the inshore gillnet fishery, by management unit and season, to ensure allowable takes are not exceeded
    - Description of methodology used to place observers for alternate platform, Marine patrol, and traditional onboard observers to avoid sampling bias
7. Cumulative annual requested take tables for Kemp's ridley, loggerhead, and exempt areas for consideration

NCDMF RESPONSE (BOLD – TAKEN DIRECTLY FROM ITP APPLICATION)

1. Tables 1 and 2 have bycatch estimates based on both 2010 and 2011 effort data for green and Kemp's ridley turtles by season and Management Unit. **These tables were expanded from Tables 19 and 20 in**

the ITP application page 64 which have estimates based on 2010 effort data. It is important to note that 2011 was an anomalous year with Hurricane Irene hampering efforts (38% decline from 2010) for the entire fall season. Another anomaly was the absence of sea turtle activity in the fall of 2011 with no turtles observed or reported during the PSGNRA. Fishing effort may fluctuate, but will never increase above 2010 levels due to the management measures put in place restricting large mesh gill nets; therefore, 2010 effort levels were considered to be the best representation of the current large mesh fisheries when estimated sea turtle bycatch.

Table 1. Estimated number of green turtle takes based on 2010 effort (n = 539) and 2011 effort (n = 68) for North Carolina's large mesh (≥4 in) estuarine gill-net fishery based on the Poisson GLM by season and Management Unit.

	Management Unit							
	B		D1		E		Total	
Season	**2010**	2011	**2010**	2011	**2010**	2011	**2010**	2011
Summer	**78**	15	**31**	5	**55**	10	**164**	30
Fall	**259**	25	**27**	3	**89**	10	**375**	38
Total	**337**	40	**58**	8	**144**	20	**539**	68

Table 2. Estimated number of Kemp's ridley turtle takes based on 2010 effort (n = 205) and 2011 effort (n = 194) for North Carolina's large mesh (≥4 in) estuarine gill-net fishery based on the Poisson GLM by season and Management Unit.

	Management Unit									
	B		D1		D2		E		Total	
Season	**2010**	2011	**2010**	2011	**2010**	2011	**2010**	2011	**2010**	2011
Spring	**27**	11	**22**	13	**3**	3	**17**	13	**69**	40
Summer	**28**	40	**47**	52	**3**	8	**14**	19	**92**	119
Fall	**24**	17	**11**	9	**3**	4	**6**	5	**44**	35
Total	**79**	68	**80**	74	**9**	15	**37**	37	**205**	194

2. **Tables 19 and 20 in the ITP application on page 64 have** the of predicted Kemp's ridley and green turtle bycatch rates for each Management Unit and season where data were available to model (Tables 1 and 2 above were modified from Tables 19 and 20 in the ITP to include estimations from 2011 effort data).

For green turtles the ITP application explains, "**All trips that occurred during spring and winter, all small mesh trips, and all trips in Management Units A, C, and D2 were removed from all datasets for the analyses of green turtle data because no green turtles were observed in any of these strata during 2007 to 2011 (Table 8, Table 9)".**

For Kemp's ridley turtles the ITP application explains, **"All trips that occurred during winter, all trips in Management Units C and E, and all trips that occurred during 2007 were removed from all datasets for the analyses of Kemp's ridley turtle data because none were observed in any of these strata during 2007 to 2011 (Table 8, Table 9)";** however, please be aware that Management Unit E should not be included in this sentence as Kemp's ridley turtles were observed in that area and estimated accordingly.

3. Tables 3 and 4 have the upper and lower 95% confidence intervals based on effort data from 2010 and 2011 for green and Kemp's ridley turtles.

Table 3. Confidence intervals for estimated green turtle takes based on 2010 and 2011 effort data for North Carolina's large mesh (≥4 in) estuarine gill-net fishery by Management Unit and season.

2010				
			95% Confidence Interval	
Season	Management Unit	Takes	Upper	Lower
Summer	B	78	114	42
	D1	31	49	14
	E	55	95	15
Fall	B	259	380	138
	D1	27	43	12
	E	89	154	24
2011				
Summer	B	15	29	1
	D1	5	9	0
	E	10	21	0
Fall	B	25	48	2
	D1	3	6	0
	E	10	21	0

Table 4. Confidence intervals for estimated Kemp's ridley turtle takes based on 2010 and 2011 effort data for North Carolina's large mesh (≥4 in) estuarine gill-net fishery by Management Unit and season.

Season	Management Unit	Takes	95% Confidence Intervals	
			Upper	Lower
2010				
Spring	B	27	61	0
	D1	22	47	0
	D2	3	8	0
	E	17	43	0
Summer	B	28	52	3
	D1	47	72	22
	D2	3	8	0
	E	14	30	0
Fall	B	24	42	6
	D1	11	20	1
	D2	3	8	0
	E	6	13	0
2011				
Spring	B	11	25	0
	D1	13	28	0
	D2	3	7	0
	E	13	31	0
Summer	B	40	75	5
	D1	52	80	24
	D2	8	19	0
	E	19	42	0
Fall	B	17	30	4
	D1	9	17	1
	D2	4	11	0
	E	5	11	0

4. Worst case scenario:

ITP application page 49–"The NCDMF acknowledges the requested estimated take numbers represent a worst-case scenario. It is highly unlikely that the total authorized take level will be approached or exceeded in a season or a year because the NCDMF will close a Management Unit for the remainder of that season if takes exceed the authorized level for one of the five species for either disposition (alive/dead), not the authorized level for all species".

ITP application page 44–"If estimated takes are reached for any species and disposition (alive/dead) in a Management Unit for any given season, the Management Unit will be closed for the duration of the season (i.e., for the summer —June through August —in Management Unit B, NCDMF reaches the estimated allowable takes for alive, green sea turtles, Management Unit B will close to all large mesh gill nets until the fall—September through November—and reopen the following season). This will allow NCDMF to close certain areas with high sea turtle abundance for the given season".

The bycatch estimates for each species represents the maximum threshold of allowable takes for the given species. If the maximum allowed threshold is met for any species the Management Unit will close for the remainder of the season; therefore, the maximum allowable threshold will not be met for every species in every Management Unit for every season each year. It would be impossible to foresee which species would meet their maximum allowed threshold first from year-to-year; therefore, each species was modeled independently.

5. **Table 4 in the ITP application summarizes all significant sea turtle gill-net restrictions and exemptions implemented by NCDMF from May 2010 through May 2012.** Below, Table 5 summarizes the management actions by Management Unit and season:

Table 4. Summary of significant sea turtle gill net restrictions and exemptions implemented by NCDMF through proclamation from May 2010 through May 2012.

M-8-2010 May 15, 2010	**With the exception of western Albemarle and Currituck sounds and the PSGNRA from September through November: Large mesh gill nets (4-6.5 in.) must be fifteen (15) meshes deep with lead lines, floats prohibited north of Hwy. 58 bridge, allowed south of it. Maximum 2,000 yds. North of Hwy. 58 bridge, 1,000 yds. south. No more than 100 yds. set in a continuous line and 25 yds. between sets with four nights fishing (Tuesday – Friday)**
M-2-2011 January 20, 2011	**In order to have a shad harvest season, Albemarle Sound Management Area(ASMA), Pamlico Sound and its tributaries (including Pamlico, Pungo, Bay and Neuse rivers) and the Cape Fear River were exempted from the four day fishing week, the mesh height, lead line and float requirements, and the 100 yard continuous length limit. These exemptions were in place until March 28, 2011.**
M-27-2011 September 12, 2011	**Large mesh gill net restrictions were no longer required in Albemarle, Croatan and Roanoke sounds north and west of Hwy 64/264 bridges as well as Pamlico, Bay and Neuse rivers.**
M-30-2011 September 18, 2011	**An extra day (Monday) was allowed for setting large mesh gill nets south of Beaufort Inlet.**
M-6-2012 February 2, 2012	**In order to have a shad harvest season, the ASMA, Pamlico Sound and its tributaries (including Pamlico, Pungo, Bay and Neuse rivers), upper New River and the Cape Fear River were exempted from the four day fishing week, the mesh height, lead line and float requirements, and the 100 yard continuous length limit. These exemptions were in place until March 28, 2012.**
M-23-2012 May 20, 2012	**Southern Core Sound (D1) was closed to large mesh gill nets and 2,000 yd. maximum length restriction is reduced to 1,000 yds. from Beaufort to the Hwy. 58 bridge.**

Table 5. Overview of management actions for large mesh gill nets (≥4 in) by Management Unit and season taken by the North Carolina Division of Marine Fisheries to reduce sea turtle bycatch in the large mesh gill-net fisheries. Some restrictions may not fall exactly on start and end dates of seasons.

Management Unit	Season			
	Spring	Summer	Fall	Winter
A	*	*	*	*****
B	*	*	*	*****
C	*****	*****	*****	*****
D1	**	**	**	*****
D2	***	***	***	*****
E	****	****	****	*****

*Sea Turtle Restrictions: With the exception of western Albemarle and Currituck sounds: Large mesh gill nets (4-6.5 in.) must be fifteen (15) meshes deep with lead lines, floats prohibited, maximum 2,000 yds, no more than 100 yds. set in a continuous line, and 25 yds. between sets with four nights fishing (Tuesday – Friday). Restrictions apply when water temperatures average above 55°F.

**Sea Turtle Restrictions: with 1,000 yard limit and closed from May 8 through October 14 as hotspot

***Sea Turtle Restrictions: with 1,000 yard limit

****Sea Turtle Restrictions: with 1,000 yard limit and floats allowed

*****Exempt from Sea Turtle Restrictions

6. Description of Methodology:

ITP application page 39–"The observer program will maintain statewide gill-net fishery coverage in all Management Units while gill-net 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 fisheries efforts, observer coverage will be relative to the fisheries efforts for that 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 the NCDMF to increase observer coverage in areas where high concentrations of protected species populations may potentially interact with fishing gear".

ITP application page 40–"Observations in the past have been concentrated in areas and during times of known or suspected sea turtle concentrations and anticipated trips have been based on prior year's gill-net effort by area and season. The NTTP data from the previous year are used

to estimate the number of large mesh gill-net trips by Management Unit, month, and season when weighting coverage (Table 26)".

ITP application page 40–"NCDMF uses the previous year's data to estimate coverage and predict the amount of trips needed for observation. The goal of NCDMF is to provide 10% statewide, estuarine large mesh gill-net trip coverage weekly with a minimum of 7%. The number of trips needed to maintain the 7–10% coverage statewide will vary depending on fishing effort in each Management Unit. To estimate real-time observer coverage, observer data (observed trips) are divided by NTTP data (actual trips) for each Management Unit weekly, monthly, and seasonally (Table 26). For 2012, the number of trips to be observed for 7% observer coverage is based upon NTTP data from 2011, which indicate that approximately 14,422 large mesh gill-net trips were made in 2011; therefore, NCDMF needs 1,010 to 1,442 observed trips to maintain 7–10% statewide coverage".

Existing observer data from previous years is used when estimating the amount of trips needed for the current year in each Management Unit and season **(Table 26 ITP application)**. Also, real time trip ticket data is used for areas where effort may be increasing. Each year effort can potentially shift from one Management Unit to another making it important for NCDMF to not base the observer effort solely on previous years trip ticket data, but also on current effort changes.

The following is the methodology used to place observers for alternative platform, Marine Patrol, and traditional onboard observation trips:

Traditional, onboard trips are the preferred method of obtaining observer data and are used most frequently. Each observer attempts three to four trips per working week. Observers are assigned a Management Unit to work weekly and the amount of observers assigned to a Management Unit depends upon the season and fishing effort. The Observer Program uses a stratified, random design to allocate observers for fishing trips. Onboard observer trips are random and stratified by Management Unit, season, and gear. Fishermen holding a Standard Commercial Fishing License (SCFL) and landing fish in North Carolina using gill nets in the previous years are pooled by Management Unit. The contact information is then given to the observer assigned to that area and the observer contacts the fishermen randomly to set up trips from the list of names given. Real time trip ticket information is also used when pooling fishermen to contact along with contacting fishermen at fish houses. Alternative platform trips are utilized for areas that may be hard to get onboard trips in (i.e., fishermen in remote locations that leave from their residence by boat). Alternative platform trips are also utilized in areas where fishing effort may increase quickly or sea turtle abundance is high. Alternative platform trips are also random and stratified by Management Unit, season, and gear. Marine Patrol also conducts alternative platform trips weekly in all Management Units based on the same methodology as the Observer Program. Coordination of onboard, alternative platform, and Marine Patrol alternative platform trips is done daily, monthly, and yearly to avoid sampling bias and to achieve the maximum amount of observer coverage possible.

ESTIMATION OF OPTIMAL OBSERVER COVERAGE LEVELS IN NORTH CAROLINA'S ESTUARINE GILL-NET FISHERY

INTRODUCTION

The purpose of this section is to respond to the request for "a simulation using existing observer data to determine the level of coverage necessary to produce accurate and precise bycatch estimates in the inshore gillnet fishery, by management unit and season, to ensure allowable takes are not exceeded".

METHODS

The number of trips needed to achieve a 20, 30, and 40% coefficient of variation (CV) was calculated as (Rossman 2007; Murray 2012):

$$n_{proj} = \left(CV_{obs} \times \frac{\sqrt{n_{obs}}}{CV_{proj}} \right)^2$$

where n_{proj} is the number of trips needed to achieve a given precision level; CV_{obs} is the precision level around the predicted number of turtle interactions; n_{obs} is the number of of observed trips; and CV_{proj} is the desired precision level.

The CV_{obs} values were calculated using standard bootstrapping techniques (Efron and Tibshirani 1993) following the method described by Murray (2011). Bootstrap replicates were generated by sampling observer trips with replacement 1,000 times within strata (mesh/season/management unit); the best fitting model for the sea turtle species (refer to ITP application) was reparameterized with each replicate. Each reparameterized model was then applied to the NTTP data to predict the number of annual interactions. CV statistics were calculated using the bootstrap-estimated interaction numbers. Calculations were made assuming observer level coverage and fishery effort equal to levels observed in 2010 and 2011.

The number of trips needed to achieve the various precision levels were computed by mesh size, season, and Management Unit for green and Kemp's ridley sea turtles; as described in the ITP application, there were too few observations of hawksbill, loggerhead, and leatherback turtles to support modeling of interactions so the analysis described here could not be applied to these species. Calculations could not be made for strata in which no trips were observed.

RESULTS

The projected numbers of trips needed to achieve a 20, 30, or 40% CV vary among seasons and Management Units for both species when assuming effort levels equal to those in either 2010 (Tables 6,

7) or 2011 (Tables 8, 9). Overall, the projected numbers of trips needed to achieve any of the selected precision levels are generally higher when assuming effort levels equal to those observed in 2011. This is, in part, due to the higher numbers of interactions observed (refer to ITP application) in and predicted for 2010.

Some strata already have precision levels better than 30 and 40% for green sea turtles and better than 40% for Kemp's ridley sea turtles. The more precise estimates for both species tend to occur in management units B and D1, where observed numbers of these species were highest (refer to ITP application).

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Table 6. Predicted number of interactions of green sea turtles and associated CV (CV_{obs}), number of observed trips (n_{obs}), and number of trips needed (n_{proj}) to achieve various levels of precision (CV_{proj}) in North Carolina's large mesh (≥4 in) estuarine gill-net fishery based on 2010 effort by season and Management Unit.

					n_{proj}		
Season	Management Unit	Predicted Interactions	CV_{obs}	n_{obs}	CV_{proj} = 0.2	CV_{proj} = 0.3	CV_{proj} = 0.4
Summer	B	78	0.217	35	41	18	10
	D1	31	0.334	41	114	51	29
	E	55	0.456	53	276	123	69
Fall	B	259	0.215	189	218	97	55
	D1	27	0.321	13	34	15	8
	E	89	0.449	53	268	119	67
Total		539		384	951	423	238

Table 7. Predicted number of interactions of Kemp's ridley sea turtles and associated CV (CV_{obs}), number of observed trips (n_{obs}), and number of trips needed (n_{proj}) to achieve various levels of precision (CV_{proj}) in North Carolina's large mesh (≥4 in) estuarine gill-net fishery based on 2010 effort by season and Management Unit.

					n_{proj}		
Season	Management Unit	Predicted Interactions	CV_{obs}	n_{obs}	CV_{proj} = 0.2	CV_{proj} = 0.3	CV_{proj} = 0.4
Spring	B	27	0.581	7	59	26	15
	D1	22	0.454	2	10	5	3
	D2	3	0.768	11	162	72	41
	E	17	0.699	9	110	49	28
Summer	B	28	0.415	35	151	67	38
	D1	47	0.268	41	74	33	18
	D2	3	0.654	39	417	186	104
	E	14	0.607	53	488	217	122
Fall	B	24	0.377	189	672	299	168
	D1	11	0.376	13	46	20	11
	D2	3	0.773	62	927	412	232
	E	6	0.691	53	633	281	158
Total		205		514	3,749	1,667	938

Table 8. Predicted number of interactions of green sea turtles and associated CV (CV_{obs}), number of observed trips (n_{obs}), and number of trips needed (n_{proj}) to achieve various levels of precision (CV_{proj}) in North Carolina's large mesh (≥4 in) estuarine gill-net fishery based on 2011 effort by season and Management Unit.

					n_{proj}		
Season	Management Unit	Predicted Interactions	CV_{obs}	n_{obs}	CV_{proj} = 0.2	CV_{proj} = 0.3	CV_{proj} = 0.4
Summer	B	15	0.431	124	575	256	144
	D1	5	0.541	31	227	101	57
	E	10	0.556	91	702	312	176
Fall	B	25	0.416	184	796	354	199
	D1	3	0.523	17	116	52	29
	E	10	0.586	95	816	362	204
Total		68		542	3,232	1,437	809

Table 9. Predicted number of interactions of Kemp's ridley sea turtles and associated CV (CV_{obs}), number of observed trips (n_{obs}), and number of trips needed (n_{proj}) to achieve various levels of precision (CV_{proj}) in North Carolina's large mesh (≥4 in) estuarine gill-net fishery based on 2011 effort by season and Management Unit.

					n_{proj}		
Season	Management Unit	Predicted Interactions	CV_{obs}	n_{obs}	CV_{proj} = 0.2	CV_{proj} = 0.3	CV_{proj} = 0.4
Spring	B	11	0.566	16	128	57	32
	D1	13	0.462	12	64	28	16
	D2	3	0.765	17	249	111	62
	E	13	0.721	45	585	260	146
Summer	B	40	0.407	124	514	228	128
	D1	52	0.283	31	62	28	15
	D2	8	0.638	61	621	276	155
	E	19	0.573	91	748	332	187
Fall	B	17	0.384	184	679	302	170
	D1	9	0.386	17	63	28	16
	D2	4	0.78	50	761	338	190
	E	5	0.669	95	1061	472	265
Total		194		743	5,535	2,460	1,382

ANNUAL CUMULATIVE REQUESTED TAKES

During the November 14, 2012 teleconference NMFS suggested breaking down the annual requested takes for Kemp's ridley and loggerhead sea turtles cumulatively similar to the previous ITP's for the PSGNRA (Tables 10, 11). NCDMF also suggested annual cumulative requested takes for all species of sea turtles for the exempt areas (Table 12).

Table 10. Annual cumulative requested Kemp's ridley takes (n = 147) for the large mesh (≥4 in) estuarine gill-net fisheries for Management Units B, D1, D2, and E by disposition (alive/dead).

			Management Unit				
Species	Estimated	Disposition	B	D1	D2	E	Total
Kemp's ridley	Annual Cumulative	Alive	53	15	6	25	98
	Annual Cumulative	Dead	26	7	3	12	49
Total			79	22	9	37	147

Table 11. Annual cumulative requested loggerhead takes (n = 22) for the large mesh (≥4 in) estuarine gill-net fisheries for Management Units B, D1, D2, and E by disposition (alive/dead).

			Management Unit				
Species	Observed	Disposition	B	D1	D2	E	Total
Loggerhead	Annual Cumulative	Alive/Dead	6	4	6	6	22

Table 12. Annual cumulative requested takes (n = 16) for the large mesh (≥4 in) and small mesh (<4 in) estuarine gill-net fisheries for Management Units A and C by disposition (alive/dead) for all species.

			Management Units		
Species	Observed	Disposition	A	C	Total
All	Annual Cumulative	Alive/Dead	8	8	16

On April 17, 2013 NMFS set up a teleconference with NCDMF to go over the revised ITP application that was submitted on January 18, 2013. Information was provided to NMFS to clarify issues they had with the application. On April 22, 2013 NMFS again asked for further clarification on different aspects of the ITP application which NCDMF promptly responded to. At that time NCDMF was informed by NMFS that they hoped to have a draft permit within a month to discuss with NCDMF. On April 30, 2013 staff was called by NMFS for further explanation on the methodologies of the Observer Program. Explanations were provided and NMFS did not have any more questions at the time.

After the last phone call between staff of NCDMF and NMFS is was decided that another teleconference was in order. On May 20, 2013, the NCDMF had a teleconference with NMFS concerning the ITP application status and to review the Biological Opinion and Environmental Assessment protocols. At this time NMFS raised concerns on the number of observed takes requested in the ITP application. During our last teleconference, we agreed to base allowable takes by area on an annual basis instead of a seasonal basis. As such, we can reduce the number of requested observed takes by taking the seasonal component out of the equation. NMFS brought up the idea of having an Implementing Agreement for the Sea Turtle ITP, much like the Implementing Agreement NMFS has suggested for the Sturgeon ITP. We asked NMFS to provide us a copy of a draft Implementing Agreement, and we would consider it. We were told that this would provide more flexibility and could reduce the risk of the permit being suspended due to excessive takes. However, the Implementing Agreement will not allow for additional takes. In addition, their description of the Implementing Agreement sounded very similar to the ITP Conservation Plan. NMFS explained that any new information could be provided in another appendix to the existing application.

During this time, NCDMF has been working on exemptions to the Settlement Agreement to allow a decrease in observer coverage during times of no sea turtle activity (i.e., winter), allow the shad fishery in the upper Cape Fear River to be exempt from the inclusions of the Agreement where we have no observed or reported interactions, and to allow fishermen an extra hour after sunrise due to safety concerns. During multiple calls with NMFS there was no negative feedback given to NCDMF for any of these management measures; however, 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 gill nets, 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. Therefore, NCDMF is including these amendments into the ITP application in order to satisfy the requirements of the Settlement Agreement. These measures do not in any way affect the

number of requested sea turtle interactions or change other adaptive management approaches outlined in the Conservation Plan of the ITP application.

Because NCDMF has been working on an Implementing Agreement (IA) for Atlantic sturgeon NCDMF volunteered to draft an IA for NMFS review before going out for public comment.

Below is the list of information provided to NMFS. This should serve to supplement the existing revised ITP application. The information and clarity provided does not increase the number of incidental takes requested. When NCDMF updated the September 6, 2012 ITP application on January 18, 2013 with the information request by NMFS via Appendix D, in order to decipher text that was original (Sept 6) from updated (Jan 18) staff bolded original text and left updated information alone. Staff did the same for this update with the new text being underlined, original (Sept 6) bold, and the last update (Jan 18) regular. Updates are listed in the order they were sent to NMFS:

APRIL 24, 2013

Updated and clarified information pertaining to the Observer Program methodologies and corrections to tables in the ITP application.

7. Description of Methodology:

ITP application page 39–"The observer program will maintain statewide gill-net fishery coverage in all Management Units while gill-net 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 fisheries efforts, observer coverage will be relative to the fisheries efforts for that 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 the NCDMF to increase observer coverage in areas where high concentrations of protected species populations may potentially interact with fishing gear".

ITP application page 40–"Observations in the past have been concentrated in areas and during times of known or suspected sea turtle concentrations and anticipated trips have been based on prior year's gill-net effort by area and season. The NTTP data from the previous year are used to estimate the number of large mesh gill-net trips by Management Unit, month, and season when weighting coverage (Table 26)".

ITP application page 40–"NCDMF uses the previous year's data to estimate coverage and predict the amount of trips needed for observation. The goal of NCDMF is to provide 10% statewide, estuarine large mesh gill-net trip coverage weekly with a minimum of 7%. The number

of trips needed to maintain the 7–10% coverage statewide will vary depending on fishing effort in each Management Unit. To estimate real-time observer coverage, observer data (observed trips) are divided by NTTP data (actual trips) for each Management Unit weekly, monthly, and seasonally (Table 26). For 2012, the number of trips to be observed for 7% observer coverage is based upon NTTP data from 2011, which indicate that approximately 14,422 large mesh gill-net trips were made in 2011; therefore, NCDMF needs 1,010 to 1,442 observed trips to maintain 7–10% statewide coverage".

The goal of NCDMF is to provide weekly 7-10% statewide observer coverage of estuarine large mesh gill-net trips while also providing 7-10% seasonally for each management unit. The amount of coverage in each management unit to obtain the 7-10% weekly statewide coverage will vary depending on fishing efforts. Existing observer data from previous years is used when estimating the amount of trips needed for the current year for each week and in each management unit and season **(Table 26 ITP application; Tables 1 and 2)**. Also, preliminary trip ticket data and reports from observers and other staff are used to determine if effort is fluctuating between management units. Each year effort can potentially shift from one management unit to another making it important for NCDMF to not base the observer effort solely on previous years trip ticket data, but also on current effort changes. Changes in effort are monitored on a daily, weekly, and monthly basis to ensure proper observer coverage is being maintained. Monthly Observer Reports are provided by week and by month and management unit (Tables 1 and 2).

The monthly report by week has the following data columns (Table 1):

- Trips: Estimate – this is the trip ticket data from the previous year showing the amount of large mesh gill-net trips that occurred for each week. Actual – this is the preliminary trip ticket data from the current year used to estimate fishing effort for each week. Actual – Area A – this column subtracts the number of trips made in management unit A from the rest of the management units combined for each week (this was done to show how much fishing effort was occurring in the exempt management unit A and what the observer coverage is for the rest of the state not including management unit A).
- Observed Large Mesh: Effort – this represents the amount of attempted trips; meaning, we (observers or Marine Patrol) went out looking for fishing activities and to get trips but none were found for each week. Trips – this is the actual amount of large mesh gill-net trips observed for each week. Yards – this is the total amount of large mesh gill-net yards observed for each week.
- Coverage (%): Effort – this is the Observer Large Mesh Trips/Observer Large Mesh Effort. Estimated – this is the Observer Large Mesh Effort/Trips Estimated. Actual – this is the Observer Large Mesh Trips/Trips Actual. Actual – Area A – this is the Observer Large Mesh Trips/Trips Actual – Area A.

- Observed Takes By Species: this is the number of sea turtles observed by disposition (alive/dead) for each species for each week.

The monthly report by area has the following data columns (Table 2):

- Trips: Estimate – this is the trip ticket data from the previous year showing the amount of large mesh gill-net trips that occurred in each management unit by month. Actual – this is the preliminary trip ticket data from the current year used to show estimated fishing effort in each management unit by month.
- Observed Large Mesh: Effort – this represents the amount of attempted trips; meaning, we (observers or Marine Patrol) went out looking for fishing activities and to get trips but none were found in each management unit by month. Trips – this is the actual amount of large mesh gill-net trips observed in each management unit by month. Yards – this is the total amount of large mesh gill-net yards observed in each management unit by month.
- Coverage (%): Effort – this is the Observer Large Mesh Trips/Observer Large Mesh Effort. Actual – this is the Observer Large Mesh Trips/Trips Actual.
- Observed Takes By Species: this is the number of sea turtles observed by disposition (alive/dead) for each species in each management unit by month.

*To estimate observer coverage by week the Coverage: Actual-Area A calculation is used (Table 1) and to estimate observer coverage by season and management unit the Coverage: Actual calculation is used (Table 2).

An example from 2012 data (Tables 1 and 2):

- Table 1 represents 2012 observer data broken down by week. For the summer season (June-August) NCDMF averaged 10.4% observer coverage by week with a minimum of 6.0% (week of Aug 12) and a maximum of 13.5% (week of Jun 17). Table 2 represents 2012 observer data broken down by month and management unit. For the summer season (June-August) NCDMF averaged 7.9% observer coverage in management unit B (where 38.4% of the large mesh fishing effort occurred), 3.8% in management unit C (10.6% of fishing effort), 22.6% observer coverage in management unit D2 (3.0% of fishing effort), and 17.4 % observer coverage in management unit E (14.6% of fishing effort). Management unit A (33.3% of fishing effort) is an exempt area with minimal coverage for this time frame (summer 2012) and management unit D1 was closed as a hotspot for the entirety of the summer season. Using these tables, NCDMF can estimate fishing effort and observer coverage needed weekly and monthly by management unit in order to provide proper coverage for areas with known sea turtle activity. Tables 1 and 2 represent finalized observer data for 2012.

The following is the methodology used to place observers for alternative platform, Marine Patrol, and traditional onboard observation trips:

Traditional, onboard trips are the preferred method of obtaining observer data and are used most frequently. For alternative platform trips, observers and Marine Patrol follow the same protocols. Each observer attempts three to four trips per working week. Observers are assigned a management unit to work weekly and the amount of observers assigned to a management unit depends upon the season and fishing effort. Fishing effort is estimated from the previous year's trip ticket data by week and by month and management unit to determine where and how much observer coverage is needed each week and for each management unit by month/season(Tables 1 and 2). Trends from other previous year's trip ticket data are also analyzed to determine if fishing effort is shifting from one management to another. The Observer Program uses a stratified, random design to allocate observers for fishing trips. Onboard observer trips are random and stratified by management unit, season, and gear. Fishermen holding a Standard Commercial Fishing License (SCFL) and landing fish in North Carolina using gill nets in the previous years are pooled by Management Unit. The contact information is then given to the observer assigned to that area and the observer contacts the fishermen randomly to set up trips from the list of names given. Preliminary trip ticket information is also used when pooling fishermen to contact along with contacting fishermen at fish houses. Observers hand out business cards with their contact information and brochures explaining the Observer Program and giving the fishermen another outlet to allow observers on their vessels. In addition to the business cards and brochures the Observer Program utilizes a website to provide outreach to fishermen to obtain trips. Alternative platform trips are utilized for areas that may be hard to get onboard trips in (i.e., fishermen in remote locations that leave from their residence by boat). Alternative platform trips are also utilized in areas where fishing effort may increase quickly or sea turtle abundance is high. Alternative platform trips are also random and stratified by management unit, season, and gear. Marine Patrol also conducts alternative platform trips weekly in all management units based on the same methodology as the Observer Program. The fishing effort data is analyzed to determine if areas that normally have fishing activity for a given period have fluctuated (Table 1 and 2). Coordination of onboard, alternative platform, and Marine Patrol alternative platform trips is done daily, monthly, and yearly to avoid sampling bias and to achieve the maximum amount of observer coverage possible for each management unit.

Table 1. Data collected by week through the NCDMF Observer Program for 2012.

	Trips			Observer Large Mesh			Coverage (%)				Observed Takes By Species								
											Kemp's		Green		Loggerhead		Hawksbill		Unknown
Week	Estimated	Actual	Actual - Area A	Effort	Trips	Yards	Effort	Estimated	Actual	Actual-Area A	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live
WINTER																			
8-Jan	87	33	6	44	0	0	0.0	50.6	0.0	0.0									
**15-Jan	73	43	13	40	3	750	7.5	54.8	7.0	23.1									
22-Jan	68	45	12	46	3	1,350	6.5	67.6	6.7	25.0									
29-Jan	53	76	20	53	5	2,550	9.4	100.0	6.6	25.0									
5-Feb	126	180	63	44	7	8,750	15.9	34.9	3.9	11.1									
12-Feb	198	200	63	40	8	5,000	20.0	20.2	4.0	12.7									
19-Feb	255	202	63	51	6	3,480	11.8	20.0	3.0	9.5									
26-Feb	240	281	62	51	6	4,660	11.8	21.3	2.1	9.7									
SPRING																			
4-Mar	351	466	149	55	17	13,050	30.9	15.7	3.6	11.4									
11-Mar	362	410	153	56	16	7,220	28.6	15.5	3.9	10.5									
18-Mar	410	513	195	54	12	5,950	22.2	13.2	2.3	6.2									
^25-Mar	458	601	230	45	11	4,625	24.4	9.8	1.8	4.8									
1-Apr	327	444	138	33	3	2,500	9.1	10.1	0.7	2.2									
8-Apr	448	260	52	40	7	4,300	17.5	8.9	2.7	13.5									
15-Apr	448	279	88	42	3	2,100	7.1	9.4	1.1	3.4									
22-Apr	131	188	77	22	4	1,800	18.2	16.8	2.1	5.2									
29-Apr	88	175	95	15	6	7,600	40.0	17.0	3.4	6.3									
6-May	129	243	176	50	16	11,310	32.0	38.8	6.6	9.1			2						
13-May	199	254	183	56	23	19,980	41.1	28.1	9.1	12.6									
20-May	229	251	178	53	22	18,300	41.5	23.1	8.8	12.4									
27-May	234	294	197	51	26	25,380	51.0	21.8	8.8	13.2									
SUMMER																			
3-Jun	270	263	180	49	22	16,140	44.9	18.1	8.4	12.2			1						
10-Jun	290	404	269	54	31	20,930	57.4	18.6	7.7	11.5	1								
17-Jun	316	375	245	63	33	23,745	52.4	19.9	8.8	13.5				1					
24-Jun	281	508	362	50	30	26,465	60.0	17.8	5.9	8.3			1						
1-Jul	306	409	260	56	26	30,335	46.4	18.3	6.4	10.0	1								
8-Jul	275	289	176	41	17	16,580	41.5	14.9	5.9	9.7									
15-Jul	354	316	207	59	26	28,400	44.1	16.7	8.2	12.6									1
22-Jul	355	322	219	55	23	22,980	41.8	15.5	7.1	10.5			1						
29-Jul	348	333	222	63	25	20,500	39.7	18.1	7.5	11.3			1	1					
5-Aug	363	465	305	66	35	30,460	53.0	18.2	7.5	11.5			1						
12-Aug	356	412	285	37	17	18,075	45.9	10.4	4.1	6.0									
19-Aug	387	523	350	63	40	46,670	63.5	16.3	7.6	11.4			1						
26-Aug	232	574	374	52	24	19,160	46.2	22.4	4.2	6.4									
FALL																			
2-Sep	209	606	391	73	44	44,890	60.3	34.9	7.3	11.3			1						
9-Sep	223	435	248	46	29	25,010	63.0	20.6	6.7	11.7	1								
16-Sep	286	662	385	65	42	44,680	64.6	22.7	6.3	10.9		1	2						
23-Sep	709	837	543	54	33	39,100	61.1	7.6	3.9	6.1			2						
30-Sep	670	818	469	63	31	30,005	49.2	9.4	3.8	6.6									
7-Oct	714	497	220	89	41	31,785	46.1	12.5	8.2	18.6									
14-Oct	505	455	241	70	38	28,550	54.3	13.9	8.4	15.8									1
21-Oct	367	608	351	77	46	32,575	59.7	21.0	7.6	13.1				1					
28-Oct	399	574	317	79	48	46,950	60.8	19.8	8.4	15.1			3						
4-Nov	268	152	86	37	13	9,850	35.1	13.8	8.6	15.1					1				
11-Nov	204	251	121	66	21	21,000	31.8	32.4	8.4	17.4									
18-Nov	141	279	110	48	17	15,400	35.4	34.0	6.1	15.5									
25-Nov	88	156	45	41	9	5,350	22.0	46.6	5.8	20.0									
WINTER																			
2-Dec	92	164	48	53	12	8,690	22.6	57.6	7.3	25.0									
9-Dec	62	31	12	31	0	0	0.0	50.0	0.0	0.0									
16-Dec	42	31	7	36	0	0	0.0	85.7	0.0	0.0									

Table 1. Cont.																				
23-Dec	26	20	4	41	0	0	0.0	157.7	0.0	0.0										
30-Dec	15	14	2	28	0	0	0.0	186.7	0.0	0.0										
Total	14,067	17,221	9,267	2,646	977	854,930	36.9	18.8	5.7	10.5	3	1	16	3	1	0	0	0	2	
							Obs Trips/Obs Effort	Obs Effort/Trips Estimated	Obs Trips/ Actual Trips	Obs Trips/Actual Trips - Area A										

**Beginning of shad season

^ End of shad season

Table 2. Data collected by area through the NCDMF Observer Program for 2012.

		Trips		Observer Large Mesh			Coverage (%)		Observed Takes By Species								
									Kemp's		Green		Loggerhead		Hawksbill		Unknown
Month	Area	Estimated	Actual	Effort	Trips	Yards	Effort	Actual	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live
WINTER																	
January	A	270	169	42	0	0	0.0	0.0									
	B	9	13	23	0	0	0.0	0.0									
	C	7	45	53	10	6,750	18.9	22.2									
	D1	0	0	4	0	0	0.0	0.0									
	D2	0	1	20	0	0	0.0	0.0									
	E	9	8	55	4	1,300	7.3	50.0									
February	A	661	737	31	1	50	3.2	0.1									
	B	28	46	22	3	2,300	13.6	6.5									
	C	119	198	56	19	22,900	33.9	9.6									
	D1	0	0	6	0	0	0.0	0.0									
	D2	0	1	18	0	0	0.0	0.0									
	E	49	36	63	8	875	12.7	22.2									
SPRING																	
March	A	894	1,395	33	4	600	12.1	0.3									
	B	54	123	24	4	4,000	16.7	3.3									
	C	678	610	55	23	19,100	41.8	3.8									
	D1	2	2	6	0	0	0.0	0.0									
	D2	0	12	22	0	0	0.0	0.0									
	E	103	67	79	21	2,010	26.6	31.3									
April	A	1,030	636	31	2	1,900	6.5	0.3									
	B	93	193	22	5	2,600	22.7	2.6									
	C	34	35	21	3	2,600	14.3	8.6									
	D1	4	15	7	3	5,400	42.9	20.0									
	D2	13	28	14	1	100	7.1	3.6									
	E	63	59	29	7	3,700	24.1	11.9									
May	A	27	337	45	6	9,600	13.3	1.8									
	B	484	516	60	34	47,940	56.7	6.6									
	C	102	66	29	4	3,400	13.8	6.1									
	D1	51	27	6	5	4,710	83.3	18.5			2						
	D2	62	77	11	5	3,500	45.5	6.5									
	E	138	146	74	40	14,000	54.1	27.4									

Table 2. Cont.

SUMMER																	
June	A	113	585	46	7	8,450	15.2	1.2									
	B	709	724	72	50	73,510	69.4	6.9			1						
	C	196	142	26	5	2,150	19.2	3.5									
	D1	65	0	0	0	0	0.0	0.0									
	D2	68	58	22	17	5,800	77.3	29.3	1								
	E	153	281	83	55	19,025	66.3	19.6	1		1	1					
July	A	219	486	42	2	500	4.8	0.4									
	B	802	509	68	48	74,160	70.6	9.4			1						
	C	180	111	42	5	3,900	11.9	4.5									
	D1	42	0	0	0	0	0.0	0.0									
	D2	46	35	13	8	1,400	61.5	22.9									
	E	131	258	71	36	15,900	50.7	14.0			1	1					1
August	A	224	789	30	9	13,390	30.0	1.1									
	B	757	909	93	66	103,045	71.0	7.3			1						
	C	220	339	43	11	9,650	25.6	3.2									
	D1	28	0	0	0	0	0.0	0.0									
	D2	61	77	19	12	6,800	63.2	15.6									
	E	135	277	88	52	17,170	59.1	18.8			2						
FALL																	
September	A	293	1,152	37	22	32,770	59.5	1.9	1		1						
	B	807	783	76	52	85,430	68.4	6.6		1	2						
	C	411	433	36	11	8,020	30.6	2.5									
	D1	44	0	0	0	0	0.0	0.0									
	D2	122	139	17	11	3,150	64.7	7.9									
	E	234	304	65	41	11,225	63.1	13.5			1						
October	A	335	1,014	39	18	29,030	46.2	1.8									
	B	1,234	485	90	64	78,910	71.1	13.2			2	1					
	C	234	288	45	12	4,495	26.7	4.2									
	D1	38	36	39	23	12,375	59.0	63.9			1						
	D2	117	107	36	15	6,800	41.7	14.0									
	E	173	245	78	44	11,250	56.4	18.0									1
November	A	297	578	35	13	14,790	37.1	2.2									
	B	214	138	56	26	29,300	46.4	18.8									
	C	31	88	35	4	1,400	11.4	4.5									
	D1	12	27	16	9	5,450	56.3	33.3					1				
	D2	63	31	14	0	0	0.0	0.0									
	E	86	92	75	17	6,350	22.7	18.5									
WINTER																	
December	A	167	76	35	0	0	0.0	0.0									
	B	15	24	24	0	0	0.0	0.0									
	C	1	1	14	0	0	0.0	0.0									
	D1	0	0	6	0	0	0.0	0.0									
	D2	5	2	9	0	0	0.0	0.0									
	E	1	0	50	0	0	0.0	0.0									
Total		14,067	17,221	2,646	977	854,930	36.9	5.7	3	1	16	3	1	0	0	0	2
							Obs Trips/ Obs Effort	Obs Trips/ Actual Trips									

Updated Table 8. Number of sea turtles observed in the North Carolina Division of Marine Fisheries (NCDMF) Onboard Observer Program (Program 466) by mesh size, year, season, management unit, and species from 2007 through 2011.

				Species						
	Year	Season	Management Unit	Green	Hawksbill	Kemp's Ridley	Leatherback	Loggerhead	*Unknown	Total
Large	2007	Fall	B	19	0	0	0	1	0	20
	2008	Spring	B	0	0	1	0	0	0	1
	2008	Summer	B	1	0	0	0	0	0	1
	2008	Fall	B	15	0	1	0	1	0	17
	2009	Summer	B	2	0	2	0	0	0	4
	2009	Fall	B	28	1	4	0	1	0	34
	2010	Fall	B	7	0	0	0	1	0	8
	2011	Summer	B	0	0	0	0	0	1	1
	2011	Summer	D1	0	0	4	0	0	0	4
	2011	Summer	E	1	0	0	0	1	0	2
	2011	Fall	D2	0	0	1	0	0	0	1
	2011	Fall	E	1	0	0	0	1	0	2
Small	2011	Fall	D2	0	0	1	0	0	0	1
	Total			74	1	14	0	6	1	96

*Includes sea turtles that could not be identified to the species level

Updated Table 9. Number of sea turtles observed in the North Carolina Division of Marine Fisheries (NCDMF) Alternative Platform (AP) Observer Program (Program 467) by mesh size, year, season, management unit, and species from 2010 through 2011.

				Species					
Mesh	Year	Season	Management Unit	Green	Hawksbill	Kemp's Ridley	Leatherback	Loggerhead	Total
Large	2010	Fall	D1	5	0	1	0	1	7
	2010	Fall	E	3	0	1	0	0	4
	2010	Spring	E	0	0	1	0	0	1
	2010	Summer	B	2	0	0	0	0	2
	2010	Summer	D1	6	0	15	0	1	22
	2010	Summer	E	3	0	0	0	0	3
	2011	Spring	D1	0	0	3	0	1	4
	2011	Summer	A	0	0	1	0	0	1
	2011	Summer	B	0	0	1	0	0	1
	2011	Summer	D1	3	0	4	0	0	7
	2011	Summer	D2	0	0	0	0	1	1
	2011	Summer	E	0	0	1	0	0	1
Small	2011	Summer	E	0	0	1	0	0	1
Total				22	0	29	0	4	55

Updated Table 27. Total number of small mesh (<4 in) gill-net trips (n = 145) and the number of sea turtles observed (n = 2) by year, management unit, season, and species through onboard and alternative platform observations throughout the estuarine waters of North Carolina from 2010-2011.

		Year			Species
Season	Management Unit	2010	2011	Total	Kemp's ridley
Winter	A	0	1	1	
	B	5	0	5	
	C	5	19	24	
	D1	1	0	1	
	D2	0	0	0	
	E	6	0	6	
Fall	A	0	0	0	
	B	1	12	13	
	C	0	0	0	
	D1	0	1	1	
	D2	4	3	7	1
	E	4	0	4	
Spring	A	0	3	3	
	B	3	32	35	
	C	1	11	12	
	D1	0	0	0	
	D2	0	0	0	
	E	2	3	5	
Summer	A	0	0	0	
	B	0	15	15	
	C	2	1	3	
	D1	0	0	0	
	D2	0	1	1	
	E	3	6	9	1
Total		37	108	145	2

JUNE 4, 2013

As per NMFS request the observed takes reduced for the large and small mesh fisheries including the exempt areas.

Updated Table 22. Annual requested takes (n = 668) for the large mesh (≥4 in) estuarine gill-net fisheries for management units B, D1, D2, and E by species and disposition (alive/dead).

			Management Units				
Species	Estimated/Observed	Disposition	B	D1	D2	E	Total
Green	Estimated	Alive	225	9	0	96	330
	Estimated	Dead	112	5	0	48	165
	*Observed	Alive/Dead	0	0	6	0	6
Kemps ridley	Estimated	Alive	53	15	6	25	98
	Estimated	Dead	26	7	3	12	49
Loggerhead	*Observed	Alive/Dead	3	3	3	3	12
Hawksbill	*Observed	Alive/Dead	1	1	1	1	4
Leatherback	*Observed	Alive/Dead	1	1	1	1	4
Total			421	41	20	186	668

*Number of observed takes allowed (dead or alive) where interaction levels were too low to model

Updated Table 23. Annual requested takes (n = 44) for the small mesh (<4 in) estuarine gill-net fisheries for management units B, D1, D2, and E by species.

Species	Estimated/Observed	Disposition	Management Units				Total
			B	D1	D2	E	
Kemps ridley	*Observed	Alive/Dead	3	3	3	3	12
Green	*Observed	Alive/Dead	3	3	3	3	12
Loggerhead	*Observed	Alive/Dead	3	3	3	3	12
Hawksbill	*Observed	Alive/Dead	1	1	1	1	4
Leatherback	*Observed	Alive/Dead	1	1	1	1	4
Total			11	11	11	11	44

*Number of observed takes allowed (dead or alive) where interaction levels were too low to model

Updated Table 24. Annual requested takes (n = 8) for the small (<4 in) and large (≥4 in) mesh estuarine gill-net fisheries for management units A and C.

Species	Estimated/Observed	Disposition	Management Units		Total
			A	C	
All	*Observed	Alive/Dead	4	4	8

*Number of observed takes allowed (dead or alive) where interaction levels were too low to model

JUNE 12, 2013 – AMENDMENT TO THE SETTLEMENT AGREEMENT

Sea Turtle Lawsuit Settlement Agreement Amendment Items

1. Exempt gill nets (drift and anchored) in the Upper Cape Fear River targeting American shad (when shad season is open) from 55 degree Fahrenheit water temperature threshold. The anchored gill nets must be checked at least twice a day with an unattended soak time of no longer than 12 hours (Figure 1).
    - Observer data confirms no sea turtle interactions in this fishery (21 observed drift net trips and 41 observed anchored gill net trips, zero sea turtles)
    - Fishing effort limited by duration of American shad season in Cape Fear River
    - Observations will continue to ensure no sea turtle interactions occur and to document any Atlantic sturgeon interactions
2. Remove minimum observer coverage requirement from December through February when sea turtle abundance and gill net fishing effort are low (Table 3).
    - Safety concerns with Marine Patrol and observers searching for gill nets before sunrise during cold water months
    - Saves money and improves efficiency; much effort is spent looking for gill nets in the areas under the Settlement Agreement resulting in very few observations
    - Observer trips for Atlantic sturgeon will still occur during these months; this will allow the Observer Program to focus efforts where Atlantic sturgeon abundance and fishing effort is highest (Area A)
3. Allow an extra hour after sunrise to fish and retrieve gill nets
    - Safety concerns for fishermen
    - Accounts for extra time needed to retrieve nets during rough weather or when nets are fouled
    - Easy for Marine Patrol to enforce

- We can always go back to previous settlement agreement measures if increased turtle interactions occur from any of these amendment items

- Extra hour to fish nets for everyone could result in fishermen soaking their nets longer, but it is hard to fairly evaluate special conditions to allow fishermen another hour to fish their nets (i.e. how to define rough weather or fouled nets)

- Overnight soak time arguably the most effective measure in reducing sea turtle interactions so it's important not to advocate anything that greatly reduces the efficacy of this measure; this is why we are not requesting an extra hour before sunset for fishermen to set their nets

Table 3. Fishing effort, observer and Marine Patrol effort, observed trips, percent coverage, and number of unsuccessful large mesh gill-net trips from Programs 466 (onboard) and 467 (Alternative Platform) from 2011 through 2013 by month and management unit for the winter (December through February) season.

		Fishing Effort			**Observer/MP Effort			***Observed Trips			Coverage			Observer/MP Effort - Observed Trips		
Month	Management Unit	2011	2012	*2013	2011	2012	2013	2011	2012	2013	2011	2012	2013	2011	2012	2013
December	A	56	76	n/a	30	35	n/a	0	0	n/a	0.0	0.0	n/a	30	35	n/a
	B	3	24	n/a	22	24	n/a	0	0	n/a	0.0	0.0	n/a	22	24	n/a
	C	2	1	n/a	37	14	n/a	2	0	n/a	100.0	0.0	n/a	35	14	n/a
	D1	0	0	n/a	9	6	n/a	0	0	n/a	0.0	0.0	n/a	9	6	n/a
	D2	0	2	n/a	17	9	n/a	0	0	n/a	0.0	0.0	n/a	17	9	n/a
	E	1	0	n/a	52	50	n/a	0	0	n/a	0.0	0.0	n/a	52	50	n/a
January	A	183	169	192	59	42	47	0	0	5	0.0	0.0	2.6	59	42	42
	B	18	13	23	39	23	30	0	0	0	0.0	0.0	0.0	39	23	30
	C	8	45	12	26	53	41	4	10	5	50.0	22.2	41.7	22	43	36
	D1	0	0	0	18	4	7	0	0	0	0.0	0.0	0.0	18	4	7
	D2	0	1	0	15	20	15	0	0	1	0.0	0.0	0.0	15	20	14
	E	11	8	3	52	55	62	1	4	0	9.1	50.0	0.0	51	51	62
February	A	717	737	605	34	31	42	4	1	9	0.6	0.1	1.5	30	30	33
	B	152	46	37	30	22	19	0	3	1	0.0	6.5	2.7	30	19	18
	C	132	198	68	39	56	52	18	19	26	13.6	9.6	38.2	21	37	26
	D1	5	0	0	12	6	14	0	0	0	0.0	0.0	0.0	12	6	14
	D2	0	1	2	17	18	18	0	0	0	0.0	0.0	0.0	17	18	18
	E	49	36	24	49	63	49	2	8	0	4.1	22.2	0.0	47	55	49
Total		1,336	1,357	966	557	531	396	31	45	47	2.3	3.3	4.9	526	486	349

*2013 trip ticket data preliminary

**Observer/MP Effort includes all successful and unsuccessful large mesh gill-net trips

***Observed Trips is only the successful large mesh gill-net trips

Location of Potential Gillnet lines for the Cape Fear River

Figure 1. Map of the exempt areas requested for the upper Cape Fear River during the American shad season.