NATIONAL MARINE FISHERIES SERVICE
ENDANGERED SPECIES ACT SECTION 7 CONSULTATION
BIOLOGICAL OPINION

Agency: US Department of the Navy, Mid-Atlantic Region
Norfolk, Virginia

Activity: Reinitiation of consultation on dredging by hopper dredge and beach renourishment along the U.S. Navy Fleet Combat Training Center at Dam Neck Annex, Virginia Beach, Virginia
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This constitutes the National Marine Fisheries Service's (NOAA Fisheries) biological opinion (BO) on the effects of the United States Navy's (Navy) dredging by hopper dredge from a borrow area off Sandbridge Beach, Virginia, and subsequent beach renourishment along the Fleet Combat Training Center at Dam Neck Annex, Virginia on threatened and endangered species, in accordance with section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 et seq.). This BO is based on information provided in the 1996 Environmental Assessment (EA) Project Number P-994 Seawall (Shoreline Protection) Fleet Combat Training Center, Atlantic, Virginia Beach, Virginia; the previous BO dated January 25, 1996, on dredging by hopper dredge and beach replenishment along the Fleet Combat Training Center at Dam Neck Annex, Virginia; recent correspondence with the Navy, and other sources of information. A complete administrative record of this consultation is on file at the NOAA Fisheries Northeast Regional Office. Formal consultation was reinitiated on June 27, 2003.

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CONSULTATION HISTORY

Naval facilities located at Dam Neck Annex, Virginia Beach, Virginia, are threatened by persistent beach erosion, storm surge, and high wave conditions. As such, the Navy initiated a beach erosion control project, which consisted of the construction of a buried seawall to promote dune rebuilding, combined with periodic beach nourishment. NOAA Fisheries reviewed the Environmental Assessment (EA) for this project in 1995, and indicated that formal consultation pursuant to section 7 of the Endangered Species Act of 1973 (ESA), as amended, was necessary due to the selection of a hopper dredge as the preferred dredging equipment. The Navy agreed and initiated consultation on July 7, 1995. During this consultation, NOAA Fisheries assessed the impacts of dredging by hopper dredge on endangered and threatened sea turtles and marine mammals at the proposed borrow site, which was the same Minerals Management Service borrow site used for the Army Corps of Engineers' (ACOE) Sandbridge Beach renourishment project in Virginia Beach, VA. NOAA Fisheries issued a BO on January 25, 1996, which concluded that the initial and subsequent dredging by hopper dredge on a 12-year cycle at the borrow area off Sandbridge Beach may lethally take threatened loggerhead sea turtles, but was not likely to jeopardize the continued existence of the loggerhead population (NOAA Fisheries 1996). Additionally, the BO concluded that endangered Kemp's ridley, green, hawksbill, and leatherback sea turtles, and humpback and fin whales were not likely to be adversely affected by the project. Along with the BO, NOAA Fisheries issued an Incidental Take Statement (ITS) exempting the take of one documented Kemp's ridley or green sea turtle by injury or mortality, and ten loggerhead turtle mortalities.

The Navy began dredging on August 7, 1996 and completed dredging on November 7, 1996. In a summary report of the dredging operation submitted to NOAA Fisheries on November 20, 1996, NOAA Fisheries observers reported that no incidents of sea turtle mortality were detected (REMSA 1996). Three dead loggerhead turtles were spotted either floating in the water or washed up on the beach south of Dam Neck, but the turtles had apparently been dead for quite some time and the mortalities could not be linked to the dredging activity. Observers also reported that no whales had been spotted throughout the dredge cycle.

Following completion of the beach nourishment activity, the Navy initiated a three-year study in November 1996 to monitor the performance of the beach erosion control project and use the results to develop a more comprehensive Beach Management Plan. The results of the study indicated the need to re-nourish the beach with an additional 700,000 cubic yards (cy) of sand in 2003-2004. Accordingly, on March 4, 2003, the Navy requested affirmation from NOAA Fisheries that the proposed 2004 dredge cycle could be conducted under the same ITS and Terms and Conditions (T&C) specified in the 1996 BO. In a letter dated April 22, 2003, NOAA Fisheries informed the Navy that reinitiation of formal consultation would be required for the 2004 renourishment cycle. The projected nourishment cycle had been escalated from 12 years to eight years and the volume of dredged material had increased from 635,000 cy to 700,000 cy, constituting a project modification that might cause an effect not previously considered in the BO and triggering the need for reinitiation as provided in the section 7 regulations (50 CFR 402.16). In addition, NOAA Fisheries indicated that new information regarding the status of the

loggerhead sea turtle had become available since the 1996 BO was written, and thus the project may affect loggerheads in a manner or to an extent not previously considered. In a letter dated June 27, 2003, the Navy acknowledged the need to reinitiate formal consultation and submitted a complete reinitiation package which included an updated project description. In a letter dated July 27, 2003, NOAA Fisheries confirmed June 27, 2003 as the date of reinitiation of consultation.

DESCRIPTION OF THE PROPOSED ACTION

The Navy proposes to begin a new cycle of dredging and sand nourishment as part of ongoing beach maintenance activities at Naval Air Station (NAS) Oceana, Dam Neck Annex, Virginia Beach, Virginia. These activities are necessary to protect the Navy's $95 million beachfront assets from damage or relocation due to persistent beach erosion. Dam Neck Annex is located about nine miles south of Cape Henry along a 3.2-mile stretch of the Atlantic Ocean shoreline and is positioned between Sandbridge Beach to the south and the Navy's Camp Pendleton Annex to the north. The sand will be mined from an approved Minerals Management Service dredge site known as the Sandbridge Shoal, which is located approximately three miles offshore of Sandbridge Beach.

The initial nourishment cycle for this project took place in 1996 and involved the dredging and placement of 760,000 cubic yards of sand. The 1996 BO on this beach maintenance plan was issued with the understanding that renourishment would require 635,000 cy of sand on a 12-year cycle. However, the October 2000 Beach Monitoring Results and Management Plan for FCTCLANT, Dam Neck, Virginia Beach, VA called for a 2003-2004 renourishment of 700,000 cy of sand. This recommendation was the result of a 3-year study that revealed accelerated erosion rates, most likely due to unusually strong storms in the winter of 1998. Engineers estimated that 75,000 cy of sand beyond a "normal" winter season had been lost, resulting in the loss of 65% of the original sand volume placed in 1996.

The current project cycle entails dredging by hopper dredge of 700,000 cubic yards of sand and placement of this sand along 9,280 feet of beachfront. Sand slurry will be directly pumped through drag arms onto a holding ship and then onto the Dam Neck Annex beach. There will not be a permanent stockpile point on the beach. Rather, the sand will be pumped along the entire beachfront. Movement of dredge pipes and beach sand will be accomplished using a bulldozer and front-end loader. Dredge operations will continue 24 hours a day and are anticipated to require 120 days. Dredging is scheduled to begin on January 1, 2004 and should be completed by April 30, 2004. However, a delay in project award or unforeseen circumstances may require operations beyond the projected time period.

In its request for reinitiation of consultation, the Navy also incorporated the terms and conditions from the January 1996 BO into the project description for the proposed action. These include the following measures to minimize impacts on endangered and threatened species:

a. The Navy will confer with local institutions that monitor whale distribution in Virginia Coastal waters (such as the Virginia Museum of Marine Science and the

Virginia Institute of Marine Science) to determine whale presence when dredge operations start. The Navy will also utilize data prepared in the October 2001, Marine Resource Assessment for the Virginia Capes (VACAPES) Operating Area and November 2002, Technical Report of Estimation of Marine Mammal and Sea Turtle Densities in the VACAPES Operating Area.

b. NOAA Fisheries-approved observers will be required on hopper dredges once surface waters reach 11°C or May 1, whichever comes first, through December 31, of any year to monitor the hopper spoil, overflow, screening, and dragheads for sea turtles and their remains. These observers shall be aboard the dredges for a minimum of 25% coverage of all screened material. Weekly summary reports should be submitted to the NOAA Fisheries' Northeast Regional Office by the observers for review. The Navy will utilize the incident report of sea turtle mortality and dredging activity report previously supplied.

c. It will be the goal of hopper dredging operations to establish operating procedures that are consistent with those that have been utilized in other regions of the coastal United States, and which have proven effective in reducing turtle/dredge interactions. In the unlikely event that a turtle survives entrainment in a hopper dredge, there will be adherence to procedures for handling live turtles.

d. The hopper dredge shall be equipped with screening or baskets to better monitor the intake and overflow of the dredged materials for sea turtles and their remains. These screens should sample at least 70 percent of the overflow area and should be installed at the applicable area. Every effort will be made to effectively sample the turtle parts that travel through the hopper and exit in the overflow material.

e. For dredging occurring May 1 to December 31, the dredge must be equipped with the rigid deflector draghead as designed by the US Army Corp of Engineers (ACOE) Waterway Experimental Station (WES), or if that is unavailable, a rigid deflector attached to the draghead. Operators will be properly instructed in use of these deflectors. The deflector will be checked after every load throughout the dredge operation to ensure proper installation is maintained.

f. If dredging occurs during May 1 to December 31, the suction in the draghead must be turned off when it is lifted off the bottom to prevent possible entrainment of turtles. Any technical difficulties with this request will be included in the dredging summary report.

g. A final report summarizing the results of the dredging and the sea turtle take will be submitted by the Navy, ACOE, and NOAA Fisheries within 20 working days of completion of each cycle of the project.

h. To minimize risks from vessel operations around endangered whales, disposal vessels will not intentionally approach listed species closer than 100 yards when in transit.

When species are present, vessels should, except when precluded by safety issues, follow the advice of the onboard NOAA Fisheries-approved observer to avoid direct impacts to individuals.

i. If whales are present during dredging or materials transport, vessels transiting the area should post watch for whales, avoid intentional approaches closer than 100 yards when in transit, and reduce speeds to below four knots.

Since these mitigation measures were taken from the 1996 BO, some may change as a result of new information obtained since the previous analysis was conducted. However, they are considered a part of the Navy's proposed action, and will thus be taken into account in the effects analysis throughout the BO.

Action Area
The action area for this consultation includes the Dam Neck Annex beach and the Sandbridge Shoal offshore borrow site. Both sites are located on the Virginia coast about nine miles south of Cape Henry. The action area also includes the waters between and immediately adjacent to these areas for transit between the borrow site and the beach.

STATUS OF AFFECTED SPECIES

NOAA Fisheries has determined that the action being considered in this biological opinion may affect the following endangered or threatened species under NOAA Fisheries' jurisdiction:

Cetaceans

Right whale (*Eubalaena glacialis*)	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered

Sea Turtles

Loggerhead sea turtle (*Caretta caretta*)	Threatened
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered
Green sea turtle (*Chelonia mydas*[1])	Endangered/Threatened
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered

Although the federally endangered shortnose sturgeon (*Acipenser brevirostrum*) is known to occur in the Chesapeake Bay, no shortnose sturgeon have been captured south of the Rappahannock River (Skjeveland et al. 2000). Shortnose sturgeon enter marine environments only occasionally, and their migrations are usually limited to within their natal river or estuary (Dadswell et al. 1984). Shortnose sturgeon are not known to participate in coastal migrations

[1] Pursuant to NOAA Fisheries regulations at 50 CFR 223.205, the prohibitions of Section 9 of the Endangered Species Act apply to all green turtles, whether endangered or threatened.

(Dadswell et al. 1984). As such, shortnose sturgeon are not likely to exit the mouth of the bay and transit the open ocean near the action area, and will not be considered further in this biological opinion.

This section will focus on the status of the various species within the action area, summarizing information necessary to establish the environmental baseline and to assess the effects of the proposed action. Background information on the range-wide status of these species and a description of critical habitat can be found in a number of published documents, including recent sea turtle status reviews and stock assessments (NOAA Fisheries and USFWS 1995, USFWS 1997, TEWG 2000, NOAA Fisheries SEFSC 2001), Recovery Plans for the humpback whale (NOAA Fisheries 1991a), right whale (NOAA Fisheries 1991b), and fin whale (NOAA Fisheries 1998a), loggerhead sea turtle (NOAA Fisheries and USFWS 1991) and leatherback sea turtle (NOAA Fisheries and USFWS 1992), and the marine mammal stock assessment reports (Waring et al. 1999, 2000, 2001, and 2002).

North Atlantic Right Whale

While NOAA Fisheries recognizes three major subgroups of right whales, the North Atlantic subpopulation of right whales occurs in the action area. Right whales are present in the Northeast Shelf Ecosystem throughout most months of the year, but are most abundant in nearshore waters between February and June, with concentrations observed in the critical habitat areas. On June 3, 1994, NOAA Fisheries designated three areas off the East Coast as right whale critical habitat (59 FR 28793); none of these areas overlap the action area for this consultation. However, the species uses mid-Atlantic waters as a migratory pathway from the winter calving grounds off the coast of Florida to spring and summer nursery/feeding areas in the Gulf of Maine.

While it is not possible to obtain an exact count of the number of western North Atlantic right whales, IWC participants from a 1999 workshop agreed that it is reasonable to state that the current number of western North Atlantic right whales is probably around 300 (+/- 10%) (IWC 2001). This conclusion was based, in large part, on a photo-id catalog comprising more than 14,000 photographed sightings of 396 individuals, 11 of which were known to be dead and 87 of which had not been seen in more than six years. In addition, it was noted that relatively few new non-calf whales (whales that were never sighted and counted in the population as calves) had been sighted in recent years (IWC 2001) suggesting that the 396 individuals is a close approximation of the entire population. Since the 1999 IWC workshop there have been at least 53 right whale births, one in 2000, 31 in 2001, and 21 in 2002 (data are not yet available for the 2003 season). In addition, one animal was "resurrected," meaning that it was seen after an absence of at least six years. However, at least four of the calves are known to be dead and a fifth was not re-sighted with its mother on the summer foraging grounds. Three adult right whales are known to have died and two are suspected of having died since the 1999 IWC workshop. Although the "count" of right whales is 342 animals based on the original count of 396 individually identified whales, the number of observed right whale births and the known and presumed mortalities, for the purposes of this BO, NOAA Fisheries considers the best approximation for the number of North Atlantic right whales to be approximately 300 +/- 10% given that all mortalities are not known.

The sighting data and genetics data also support the conclusion that, as found previously, calving intervals have increased (from 3.67 years in 1992 to 5.8 years in 1998) and the survival rate has declined (IWC 2001). Even more alarming, the mortality of mature, reproductive females has increased, causing declines in population growth rate, life expectancy, and the mean lifetime number of reproductive events between the period 1980-1995 (Fujiwara and Caswell 2001). In addition, for reasons which are unknown, many (presumed) mature females are not yet known to have given birth (an estimated 70% of mature females are reproductively active). Simply put, the western North Atlantic right whale population is declining because the trend over the last several years has been a decline in births coupled with an increase in mortality.

Anthropogenic impacts

The major known sources of anthropogenic mortality and injury of right whales include entanglement in commercial fishing gear and ship strikes. Right whales may also be adversely affected by habitat degradation, habitat exclusion, acoustic trauma, harassment, or reduction in prey resources due to trophic effects resulting from a variety of activities.

Anthropogenic mortality in the form of ship strikes and fishing gear entanglements does appear to be affecting the status of western North Atlantic right whales. Data collected from 1970 through 1999 indicate that anthropogenic interactions are responsible for a minimum of two-thirds of the confirmed and possible mortality of non-neonate animals (Knowlton and Kraus 2001). Of the 45 right whale mortalities documented during this period, 16 were due to ship collisions and three were due to entanglement in fishing gear (there were also 13 neonate deaths and 13 deaths of non-calf animals from unknown causes) (Knowlton and Kraus 2001). Based on the criteria developed by Knowlton and Kraus (2001), 56 additional serious injuries and mortalities from entanglement or ship strikes are believed to have occurred between 1970 and 1999: 9 from ship strikes and 28 from entanglement. Nineteen were considered to be fatal interactions (16 ship strikes, three entanglements). Ten were possibly fatal (two ship strikes, eight entanglements), and 27 were non-fatal (seven ship strikes, 20 entanglements) (Knowlton and Kraus 2001).

Scarification analysis also provides information on the number of right whales that have survived ship strikes and fishing gear entanglements. Based on photographs of catalogued animals from 1959 and 1989, Kraus (1990) estimated that 57 percent of right whales exhibited scars from entanglement and seven percent from ship strikes (propeller injuries). This work was updated by Hamilton *et al.* (1998) using data from 1935 through 1995. The new study estimated that 61.6 percent of right whales exhibit injuries caused by entanglement, and 6.4 percent exhibit signs of injury from vessel strikes. In addition, several whales have apparently been entangled on more than one occasion. Some right whales that have been entangled were subsequently involved in ship strikes. These scarring percentages are primarily based on sightings of free-swimming animals that initially survive the impact, which resulted in the scar. Because some animals may drown or be killed immediately, the actual number of interactions is expected to be higher. Eight new right whale entanglements and six right whale mortalities were observed in calendar year 2002. In 2003, three new confirmed entanglements and one unconfirmed entanglement have been observed as of November 10, 2003.

Based on recent reviews of the status of the right whales, their reproductive rate (the number of calves that are born in the population each year) appears to be declining, which could increase the whales' risk of extinction (Caswell *et al.* 1999, Fujiwara and Caswell 2001, IWC 2001). The best available population estimate and the best available data on right whale population trends suggests that the western North Atlantic subpopulation of right whales is declining. This conclusion is based on a combination of a low estimated population size, increased mortality rate (particularly among adult females), and decreased reproductive rate.

Humpback Whale

Humpback whales calve and mate in the West Indies and migrate to feeding areas in the northwestern Atlantic during the summer months. They feed on a number of species of small schooling fishes, particularly sand lance and Atlantic herring, by targeting fish schools and filtering large amounts of water for the associated prey. Humpback whales have also been observed feeding on krill (Wynne and Schwartz 1999). The whales use six separate feeding areas in these northern waters (Waring et al. 1999). These six regions represent relatively discrete subpopulations, fidelity to which is determined matrilineally (Clapham and Mayo 1987 in Waring et al. 2002). The Gulf of Maine stock was reclassified as a separate feeding stock for management purposes based on strong fidelity by individual whales to this region, and the attendant assumption that repopulation by immigration from adjacent areas would not occur on a reasonable management timescale if the subpopulation were wiped out. Recent genetic analyses have found significant differences in mtDNA haplotype frequencies of the four western feeding areas, including the Gulf of Maine, further supporting this reclassification.

Humpback whales use the mid-Atlantic primarily as a migratory pathway, but it may also serve as an important feeding area for juveniles. Since 1989, observations of juvenile humpbacks in the mid-Atlantic have been increasing during the winter months, with peak sightings from January through March (Swingle et al. 1993). Biologists theorize that non-reproductive animals may be establishing a winter feeding range in the mid-Atlantic since they are not participating in reproductive behavior in the Caribbean. Swingle et al. (1993) identified a shift in distribution of juvenile humpback whales in the nearshore waters of Virginia, primarily in winter months. Identified whales using the mid-Atlantic area were found to be residents of the Gulf of Maine and Atlantic Canada (Gulf of St. Lawrence and Newfoundland) feeding groups, suggesting a mixing of different feeding populations in the mid-Atlantic region. Humpback whale strandings have increased between New Jersey and Florida since 1985 consistent with the increase in mid-Atlantic whale sightings. Strandings were most frequent during September through April in North Carolina and Virginia waters, and were composed primarily of juvenile humpback whales of no more than 11 meters in length (Wiley *et al.* 1995).

Estimating the abundance of the Gulf of Maine stock has proved problematic. Three different approaches were investigated: mark-recapture estimates, minimum population size, and line-transect estimates. The line-transect estimate is considered the best estimate of abundance for Gulf of Maine humpback whales. The line-transect sighting survey took place between 28 July to 31 August 1999 and covered waters from Georges Bank to the mouth of the Gulf of St. Lawrence. The portions of the survey that covered Gulf of Maine waters were combined with 25% of the Scotian Shelf survey area (to reflect the match rate of 25% between the Scotian Shelf

and the Gulf of Maine populations), yielding an estimate of 902 whales (CV=0.41, Waring et al. 2002).

Photographic mark-recapture analyses from the Years of the North Atlantic Humpback (YONAH) project gave an ocean-basin-wide estimate of 11,570 for 1992/93 (CV=0.069, Stevick et al. 2001 in Waring et al. 2002). For management purposes under the MMPA, the estimate of 11,570 is regarded as the best available estimate for the North Atlantic population, although because YONAH sampling was not spatially representative in feeding grounds, this figure is negatively biased (Waring *et al.* 2002). Current data suggest that the Gulf of Maine humpback whale stock is steadily increasing in size. This is consistent with an estimated average trend of 3.2% (SE=0.005) in the North Atlantic population overall for the period 1979–1993 (Stevick *et al.* 2001 in Waring *et al.* 2002). A recent analysis of demographic parameters for the Gulf of Maine (Clapham *et al.* 2001a in Waring *et al.* 2002) suggested a lower rate of increase than the 6.5% reported by Barlow and Clapham (1997), but results may have been confounded by distribution shifts. With respect to the species overall, there are also indications of increasing abundance for the eastern and central North Pacific stocks. However, trend and abundance data is lacking for the western North Pacific stock, the Southern Hemisphere humpback whales, and the Southern Indian Ocean humpbacks. Given the best available information, changes in status of the North Atlantic humpback population are, therefore, likely to affect the overall survival and recovery of the species.

Anthropogenic impacts

The major known sources of anthropogenic mortality and injury of humpback whales include entanglement in commercial fishing gear and ship strikes. Sixty percent of mid-Atlantic humpback whale mortalities that were closely investigated showed signs of entanglement or vessel collision (Wiley *et al.* 1995). An updated analysis of humpback whale mortalities from the mid-Atlantic region indicates that between 1990 and 2000, there were 52 known humpback whale mortalities in the waters of the U.S. mid-Atlantic states (Barco *et al.* 2001 in Waring et al. 2002). Between 1992 and 2002, at least 103 humpback whale entanglements and ten ship strikes (this includes an interaction between a humpback whale and a 33' pleasure boat) were recorded. Because some whales may drown immediately, the actual number of interactions may be higher. There were also many carcasses that washed ashore or were spotted floating at sea for which the cause of death could not be determined. The disentanglement program helps to alleviate some of the effects of gear entanglements but cannot remove the risk of injury and death for entangled whales. For example, of the 11 humpback whales observed entangled in 2002, six were disentangled and one was able to shed its gear. However, one of the disentangled animals was found dead just days later. In 2003, as of November 9, there have been 21 observed humpback entanglements (although two of these reports may have been the same whale). Of these, nine were successfully disentangled, one was partially disentangled, one was able to shed its gear, and the fates of the remaining ten are currently unknown. In their study of entanglement rates estimated from caudal peduncle scars, Robbins and Mattila (2001) found that males were more likely to be entangled than females. The scarring data also suggested that yearlings were more likely than other age classes to be involved in entanglements. Finally, female humpbacks showing evidence of prior entanglements produced significantly fewer calves, suggesting that entanglement may significantly impact reproductive success.

Humpback whales may also be adversely affected by habitat degradation, habitat exclusion, acoustic trauma, harassment, or reduction in prey resources due to trophic effects resulting from a variety of activities, including the operation of commercial fisheries.

Fin Whale

The fin whale is ubiquitous in the North Atlantic and occurs from the Gulf of Mexico and Mediterranean Sea northward to the edges of the arctic ice pack (NOAA Fisheries 1998a). Fin whales may be found throughout the action area for this consultation in most months of the year. Hain *et al.* (1992), based on an analysis of neonate stranding data, suggested that calving takes place during approximately four months from October to January in latitudes of the US mid-Atlantic region; however, it is unknown where calving, mating, and wintering for most of the population occurs. The overall pattern of fin whale movement is complex, consisting of a less obvious north-south pattern of migration than that of right and humpback whales. Based on acoustic recordings from hydrophone arrays, however, Clark (1995) reported a general southward flow pattern of fin whales in the fall from the Labrador/Newfoundland region, south past Bermuda, and into the West Indies. The overall distribution may be based on prey availability, and this species preys opportunistically on both invertebrates and fish (Watkins et al. 1984). Similar to humpback whales, fin whales feed by filtering large volumes of water for the associated prey. Fin whales are larger and faster than humpback and right whales and are less concentrated in nearshore environments.

Various estimates have been provided to describe the current status of fin whales in western North Atlantic waters. One method used the catch history and trends in Catch Per Unit Effort to obtain an estimate of 3,590 to 6,300 fin whales for the entire western North Atlantic (Perry *et al.* 1999). Hain *et al.* (1992) estimated that about 5,000 fin whales inhabit the Northeastern United States continental shelf waters. The 2002 Stock Assessment Report (SAR) gives a best estimate of abundance for fin whales of 2,814 (CV = 0.21, Waring *et al.* 2002). The minimum population estimate for the western North Atlantic fin whale is 2,362 (Waring *et al.* 2002). However, these estimates must be considered conservative in view of the known range of the fin whale in the entire western North Atlantic, and uncertainties regarding population structure and exchange between surveyed and unsurveyed areas.

Anthropogenic impacts

The major known sources of anthropogenic mortality and injury of fin whales include entanglement in commercial fishing gear and ship strikes. The fin whale is believed to be the cetacean most commonly struck by large vessels (Laist *et al.* 2001). Of 18 fin whale mortality records collected between 1991 and 1995, four were associated with vessel interactions, although the proximal cause of mortality was not known. From 1996-July 2001, there were nine observed fin whale entanglements and at least four ship strikes. There were no documented fin whale entanglements in 2002, and as of November 10, 2003, there has been one reported fin whale entanglement in 2003. Fin whales may also be adversely affected by habitat degradation, habitat exclusion, acoustic trauma, harassment, or reduction in prey resources due to trophic effects resulting from a variety of activities.

Loggerhead Sea Turtle

Loggerhead sea turtles occur throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans in a wide range of habitats. These include open ocean, continental shelves, bays, lagoons, and estuaries (NOAA Fisheries and USFWS, 1995). The loggerhead is the most abundant species of sea turtle in U.S. waters, commonly occurring throughout the inner continental shelf from Florida through Cape Cod, Massachusetts. NOAA Fisheries Northeast Fisheries Science Center survey data (1999) has found that loggerheads may occur as far north as Nova Scotia when oceanographic and prey conditions are favorable. The loggerhead sea turtle was listed as threatened under the ESA on July 28, 1978, but is considered endangered by the World Conservation Union (IUCN).

Loggerhead sea turtles are generally grouped by their nesting locations. Nesting is concentrated in the north and south temperate zones and subtropics. Loggerheads generally avoid nesting in tropical areas of Central America, northern South America, and the Old World (Magnuson et al. 1990). The largest known nesting aggregations of loggerhead sea turtles occurs on Masirah and Kuria Muria Islands in Oman (Ross and Barwani 1982). However, the status of the Oman nesting beaches has not been evaluated recently, and their location in a part of the world that is vulnerable to extremely disruptive events (e.g., political upheavals, wars, and catastrophic oil spills) is cause for considerable concern (Meylan et al. 1995). The southeastern U.S. nesting aggregation is the second largest and represents about 35 percent of the nests of this species. From a global perspective, this U.S. nesting aggregation is, therefore, critical to the survival of this species.

In the western Atlantic, most loggerhead sea turtles nest from North Carolina to Florida and along the gulf coast of Florida. In 1996, the Turtle Expert Working Group (TEWG) met on several occasions and produced a report assessing the status of the loggerhead sea turtle population in the western North Atlantic. Based on analysis of mitochondrial DNA, which the turtle inherits from its mother, the TEWG theorized that nesting assemblages represent distinct genetic entities, and that there are at least four loggerhead subpopulations in the western North Atlantic separated at the nesting beach (TEWG 1998, 2000). A fifth subpopulation was identified in NOAA Fisheries SEFSC 2001. The subpopulations are divided geographically as follows: (1) a northern nesting subpopulation, occurring from North Carolina to northeast Florida, about 29° N (approximately 7,500 nests in 1998); (2) a south Florida nesting subpopulation, occurring from 29° N on the east coast to Sarasota on the west coast (approximately 83,400 nests in 1998); (3) a Florida panhandle nesting subpopulation, occurring at Eglin Air Force Base and the beaches near Panama City, Florida (approximately 1,200 nests in 1998); (4) a Yucatán nesting subpopulation, occurring on the eastern Yucatán Peninsula, Mexico (Márquez 1990; approximately 1,000 nests in 1998); and (5) a Dry Tortugas nesting subpopulation, occurring in the islands of the Dry Tortugas, near Key West, Florida (approximately 200 nests per year). Natal homing to the nesting beach is believed to provide the genetic barrier between these nesting aggregations, preventing recolonization by turtles from other nesting beaches. In addition, recent fine-scale analysis of mtDNA work from Florida rookeries indicate that population separations begin to appear between nesting beaches separated by more than 50-100 km of coastline that does not host nesting (Francisco et al. 1999). Tagging studies are consistent with this result (Richardson 1982, Ehrhart 1979, LeBuff 1990, CMTTP: in

NOAA Fisheries SEFSC 2001). Nest site relocations greater than 100 km occur, but are rare (Ehrhart 1979; LeBuff 1974, 1990; CMTTP; Bjorndal et al. 1983: in NOAA Fisheries SEFSC 2001).

Although NOAA Fisheries has not formally recognized subpopulations of loggerhead sea turtles under the ESA, based on the most recent reviews of the best scientific and commercial data on the population genetics of loggerhead sea turtles and analyses of their population trends (TEWG, 1998; TEWG 2000), NOAA Fisheries treats the loggerhead turtle nesting aggregations as nesting subpopulations whose survival and recovery are critical to the survival and recovery of the species. Any action that appreciably reduced the likelihood that one or more of these nesting aggregations would survive and recover would appreciably reduce the species' likelihood of survival and recovery in the wild. Consequently, this biological opinion will treat the five nesting aggregations of loggerhead sea turtles (which occur in the action area) as subpopulations for the purposes of this analysis.

The loggerhead sea turtles in the action area of this consultation likely represent turtles that have hatched from any of the five western Atlantic nesting sites, but are probably composed primarily of turtles that hatched from the northern nesting group and the south Florida nesting group. Although genetic studies of benthic immature loggerheads on the foraging grounds have shown the foraging areas to be comprised of a mix of individuals from different nesting areas, there appears to be a preponderance of individuals from a particular nesting area in some foraging locations. In general, south Florida turtles are more prevalent on southern foraging grounds and their concentrations decline to the north. Conversely, loggerhead turtles from the northern nesting group are more prevalent on northern foraging grounds and less so in southern foraging areas (Table 1; NOAA Fisheries SEFSC 2001; Bass et al. 1998).

Table 1. Contribution of loggerhead subpopulations to foraging grounds

	% CONTRIBUTION TO FORAGING GROUND				
SUBPOPULATION[a]	Western Gulf	Florida	Georgia	Carolinas	North of Cape Hatteras/Virginia[b]
South Florida	83%	73%	73%	65-66%	46%
Northern	10%	20%	24%	25-28%	46%
Yucatán	6-9%	6-9%	3%	6-9%	6-9%

[a] The Florida Panhandle population was not included because it contributes less than 1% in the overall nesting effort and including it could result in overestimating its contribution.

[b] Virginia was the most northern area sampled for the study (Bass *et al.* 1998)

Mixing trends have been found for loggerheads in pelagic waters. In the Mediterranean Sea, about 45 - 47 percent of the pelagic loggerheads can be traced to the South Florida subpopulation and about two percent are from the northern subpopulation, while only about 51 percent

originated from Mediterranean nesting beaches (Laurent et al., 1998). In the vicinity of the Azores and Madiera Archipelagoes, about 19 percent of the pelagic loggerheads are from the northern subpopulation, about 71 percent are from the South Florida subpopulation, and about 11 percent are from the Yucatán subpopulation (Bolten et al., 1998).

Further testing of loggerhead turtles from foraging areas north of Virginia is needed to assess the proportion of northern subpopulation turtles that occur on northern foraging grounds. A recent analysis (Rankin-Baransky *et al.*, 2001) of 79 loggerhead sea turtles that stranded from Virginia to Massachusetts determined that the turtles originated from three nesting areas; the northeast Florida/North Carolina (25% ± 10%), south Florida (59% ± 14%), and Quintana Roo, Mexico (16% ± 7%) (Rankin-Baransky *et al.*, 2001). However, these results should be reviewed with caution given that the majority (51) of the sampled turtles were obtained from the most northern point of the study (Barnstable County, Massachusetts). Nonetheless, they do provide new information on the complexity of loggerhead movements from the various nesting areas and suggest that the number of loggerhead turtles originating from the northern and south Florida subpopulations does not vary proportionally along the coast.

Loggerhead sea turtles originating from the western Atlantic nesting aggregations are believed to lead a pelagic existence in the North Atlantic Gyre for as long as 7-12 years before settling into benthic environments. Turtles in this life history stage are called "pelagic immatures" and are best known from the eastern Atlantic near the Azores and Madeira, and have been reported from the Mediterranean as well as the eastern Caribbean (Bjorndal et al., in press). Stranding records indicate that when pelagic immature loggerheads reach 40-60 cm straight-line carapace length (SCL) they move to coastal inshore and nearshore waters of the continental shelf throughout the U.S. Atlantic and Gulf of Mexico. However, recent studies have suggested that not all loggerhead sea turtles follow the model of circumnavigating the North Atlantic Gyre as pelagic immatures, after which they settle permanently into benthic environments. Some may not totally circumnavigate the north Atlantic before moving to benthic habitats, while others may either remain in the pelagic habitat longer than hypothesized or move back and forth between pelagic and coastal habitats (Witzell in prep.).

Benthic immatures have been found from Cape Cod, Massachusetts, to southern Texas, and occasionally strand on beaches in northeastern Mexico (R. Márquez-M., pers. comm.). Large benthic immature loggerheads (70-91 cm) represent a larger proportion of the strandings and in-water captures (Schroeder et al. 1998) along the southern and western coasts of Florida as compared with the rest of the coast, but it is not known whether the larger animals are actually more abundant in these areas or just more abundant within the area relative to the smaller turtles. Given an estimated age at maturity of 17-35 years (Frazer and Ehrhart 1985; B. Schroeder, pers. comm.), the benthic immature stage must be at least 10-25 years long. As discussed in the beginning of this section, adult loggerheads nest primarily from North Carolina southward to Florida with additional nesting assemblages in the Florida Panhandle and on the Yucatán Peninsula. Non-nesting, adult female loggerheads are reported throughout the U.S. and Caribbean Sea; however, little is known about the distribution of adult males who are seasonally abundant near nesting beaches during the nesting season.

Aerial surveys suggest that loggerheads (benthic immatures and adults) in U.S. waters are distributed in the following proportions: 54% in the southeast U.S. Atlantic, 29% in the northeast U.S. Atlantic, 12% in the eastern Gulf of Mexico, and 5% in the western Gulf of Mexico (TEWG 1998). Like other sea turtles, the movements of loggerheads are influenced by water temperature. Since they are limited by water temperatures, loggerhead sea turtles do not usually appear on the northern summer foraging grounds until June, but can be found in Virginia as early as April. The large majority leave the Gulf of Maine by mid-September but may remain in the Northeast and mid-Atlantic waters until as late as November or December (Epperly et al. 1995; Keinath 1993; Morreale 1999; Shoop and Kenney 1992). Aerial surveys of loggerhead turtles north of Cape Hatteras indicate that they are most common in waters from 22 to 49 m deep, although they range from the beach to waters beyond the continental shelf (Shoop and Kenney 1992). There is limited information regarding the activity of these offshore turtles. Loggerhead sea turtles are primarily benthic feeders, opportunistically foraging on crustaceans and mollusks (Wynne and Schwartz 1999). Under certain conditions they may also scavenge fish, particularly if they are easy to catch (e.g., caught in nets; NOAA Fisheries and USFWS 1991).

Status and trend of loggerhead sea turtles

Based on the data available, it is difficult to estimate the size of the loggerhead sea turtle population in the U.S. or its territorial waters. There is, however, general agreement that the number of nesting females provides a useful index of the species' population size and stability at this life stage. Nesting data collected on index nesting beaches in the U.S. from 1989-1998 represent the best dataset available to index the population size of loggerhead sea turtles. However, an important caveat is that a population trends analysis based on nesting beach data may reflect trends in adult nesting females, but may not reflect overall population growth rates. Given this, between 1989 and 1998, the total number of nests laid along the U.S. Atlantic and Gulf coasts ranged from 53,014 to 92,182 annually, with a mean of 73,751. Since a female often lays multiple nests in any one season, the average adult female population of 44,780 was calculated using the equation [(nests/4.1) * 2.5]. These data provide an annual estimate of the number of nests laid per year while indirectly estimating both the number of females nesting in a particular year (based on an average of 4.1 nests per nesting female; Murphy and Hopkins 1984) and of the number of adult females in the entire population (based on an average remigration interval of 2.5 years; Richardson et al. 1978). On average, 90.7% of these nests were of the south Florida subpopulation, 8.5% were from the northern subpopulation, and 0.8% were from the Florida Panhandle nest sites. There is limited nesting throughout the Gulf of Mexico west of Florida, but it is not known to what subpopulation the turtles making these nests belong. Based on the above, it is estimated that there are only approximately 3,800 nesting females in the northern loggerhead subpopulation. The status of this northern population based on number of loggerhead nests has been classified as stable, at best, or declining (TEWG 2000).

The role of males from the northern subpopulation also needs further investigation. Unlike the much larger south Florida subpopulation which produces predominantly females (80%), the northern subpopulation produces predominantly males (65%; NOAA Fisheries SEFSC 2001). New results from nuclear DNA analyses indicate that males do not show the same degree of site fidelity as do females. It is possible then that the high proportion of males produced in the northern subpopulation are an important source of males throughout the southeast U.S., lending

even more significance to the critical nature of this small subpopulation (NOAA Fisheries SEFSC 2001).

Several published reports have presented the problems facing long-lived species that delay sexual maturity (Crouse et al. 1987, Crowder et al. 1994, Crouse 1999). In general, these reports concluded that animals that delay sexual maturity and reproduction must have high annual survival as juveniles through adults to ensure that enough juveniles survive to reproductive maturity and then reproduce enough times to maintain stable population sizes. This general rule applies to sea turtles, particularly loggerhead sea turtles, as the rule originated in studies of sea turtles (Crouse et al. 1987, Crowder et al. 1994, Crouse 1999). Crouse (1999) concluded that relatively small decreases in annual survival rates of both juvenile and adult loggerhead sea turtles will adversely affect large segments of the total loggerhead sea turtle population. The survival of hatchlings seems to have the least amount of influence on the survivorship of the species, but historically, the focus of sea turtle conservation has been involved with protecting the nesting beaches. While nesting beach protection and hatchling survival are important, recovery efforts and limited resources might be more effective by focusing on the protection of juvenile and adult sea turtles.

Threats to loggerheads' recovery

The five major subpopulations of loggerhead sea turtles in the northwest Atlantic—northern, south Florida, Florida panhandle, Yucatán, and Dry Tortugas—are all subject to fluctuations in the number of young produced annually because of human-related activities as well as natural phenomena. Loggerhead sea turtles face numerous threats from natural causes. For example, there is a significant overlap between hurricane seasons in the Caribbean Sea and northwest Atlantic Ocean (June to November), and the loggerhead sea turtle nesting season (March to November). Sand accretion and rainfall that result from these storms as well as wave action can appreciably reduce hatchling success. Other sources of natural mortality include cold stunning and biotoxin exposure.

The diversity of the sea turtles' life history leaves them susceptible to many human impacts, including impacts while they are on land, in the benthic environment, and in the pelagic environment. On their nesting beaches in the U.S., adult female loggerheads as well as hatchlings are threatened with beach erosion, armoring, and nourishment; artificial lighting; beach cleaning; increased human presence; recreational beach equipment; beach driving; coastal construction and fishing piers; exotic dune and beach vegetation; predation by species such as exotic fire ants, raccoons (*Procyon lotor*), armadillos (*Dasypus novemcinctus*), and opossums (*Didelphus virginiana*); and poaching. Although sea turtle nesting beaches are protected along large expanses of the northwest Atlantic coast (in areas like Merrit Island, Archie Carr, and Hobe Sound National Wildlife Refuges), other areas along these coasts have limited or no protection and probably cause fluctuations in sea turtle nesting success. For example, Volusia County, Florida, allows motor vehicles to drive on sea turtle nesting beaches (the County has filed suit against the U.S. Fish and Wildlife Service to retain this right). Sea turtle nesting and hatching success on unprotected high density east Florida nesting beaches from Indian River to Broward County are affected by all of the above threats.

Loggerhead sea turtles are impacted by a completely different set of anthropogenic threats once they migrate to the ocean. Pelagic immature loggerhead sea turtles from these four subpopulations circumnavigate the North Atlantic over several years (Carr 1987, Bjorndal et al. 1994). During that period, they are exposed to a series of long-line fisheries that include the U.S. Atlantic tuna and swordfish longline fisheries, an Azorean long-line fleet, a Spanish long-line fleet, and various fleets in the Mediterranean Sea (Aguilar et al. 1995, Bolten et al. 1994, Crouse 1999). Observer records indicate that an estimated 6,544 loggerheads were captured by the U.S. Atlantic tuna and swordfish longline fleet between 1992-1998, of which an estimated 43 were dead (Yeung et al. 2000). Logbooks and observer records indicated that loggerheads readily ingest hooks (Witzell 1999).

In waters off the coastal U.S., loggerhead sea turtles are exposed to a suite of fisheries in Federal and State waters including trawl, purse seine, hook and line, gillnet, pound net, longline, and trap fisheries. For example, loggerhead sea turtles have been captured in fixed pound net gear in the Long Island Sound, in pound net gear and trawls in summer flounder and other finfish fisheries in the mid-Atlantic and Chesapeake Bay, and in gillnet fisheries (e.g., monkfish, spiny dogfish) in the mid-Atlantic and elsewhere. The take of sea turtles, including loggerheads, in shrimp fisheries off the Atlantic coast have been well documented. It has previously been observed that loggerhead turtle populations along the southeastern Atlantic coast declined where shrimp fishing was intense off the nesting beaches but, conversely, did not appear to be declining where nearshore shrimping effort was low or absent (Magnuson et al. 1990).

In addition to fishery interactions, loggerhead sea turtles also face other threats in the marine environment, including the following: oil and gas exploration, development, and transportation; marine pollution; underwater explosions; hopper dredging, offshore artificial lighting; power plant entrainment and/or impingement; entanglement in debris; ingestion of marine debris; marina and dock construction and operation; boat collisions; and poaching.

Leatherback Sea Turtle

The leatherback is the largest living turtle and ranges farther than any other sea turtle species, exhibiting broad thermal tolerances (NOAA Fisheries and USFWS 1995). Leatherback turtles feed primarily on cnidarians (medusae, siphonophores) and tunicates (salps, pyrosomas) and are often found in association with jellyfish. These turtles are found throughout the action area of this consultation and, while predominantly pelagic, they occur annually in places such as Cape Cod Bay and Narragansett Bay during certain times of the year, particularly the fall.

Although leatherbacks are a long lived species (> 30 years), they mature at a younger age than loggerhead turtles, with an estimated age at sexual maturity of about 13-14 years for females, and an estimated minimum age at sexual maturity of 5-6 years, with nine years reported as a likely minimum (Zug and Parham 1996) and 19 years as a likely maximum (NOAA Fisheries SEFSC 2001). In the U.S. and Caribbean, female leatherbacks nest from March through July. They nest frequently (up to seven nests per year) during a nesting season and nest about every 2-3 years. During each nesting, they produce 100 eggs or more in each clutch and thus can produce 700 eggs or more per nesting season (Schultz 1975). However, a significant portion (up to approximately 30%) of the eggs can be infertile. Thus, the actual proportion of eggs that can

result in hatchlings is less than this seasonal estimate. The eggs will incubate for 55-75 days before hatching. Based on a review of all sightings of leatherback sea turtles of <145 cm curved carapace length (ccl), Eckert (1999) found that leatherback juveniles remain in waters warmer than 26°C until they exceed 100 cm ccl.

Nest counts are the only reliable population information available for leatherback turtles. Recent declines have been seen in the number of leatherbacks nesting worldwide (NOAA Fisheries and USFWS 1995). The 1995 status review notes that it is unclear whether this observation is due to natural fluctuations or whether the population is at serious risk. Globally, leatherback populations have been decimated worldwide. The population was estimated to number approximately 115,000 adult females in 1980 and only 34,500 by 1995 (Spotila et al. 1996). The decline can be attributed to many factors including fisheries and intense exploitation of the eggs (Ross 1979). Spotila et al. (1996) record that adult mortality has also increased significantly, particularly as a result of driftnet and longline fisheries. The Pacific population appears to be in a critical state of decline, now estimated to number less than 3,000 total adult and subadult animals (Spotila et al. 2000). The status of the Atlantic population is less clear. In 1996, it was reported to be stable, at best (Spotila et al. 1996), but numbers in the Western Atlantic at that writing were reported to be on the order of 18,800 nesting females. According to Spotila (pers. comm.), the Western Atlantic population numbered about 15,000 nesting females in 2000, whereas current estimates for the Caribbean (4,000) and the Eastern Atlantic (i.e., off Africa, numbering ~ 4,700) have remained consistent with numbers reported by Spotila et al. in 1996. With regard to repercussions of these observations for the U.S. leatherback populations in general, it is unknown whether they are stable, increasing, or declining, but it is certain that some nesting populations (e.g., St. John and St. Thomas, U.S. Virgin Islands) have been extirpated.

The nesting population of leatherback sea turtles in the Suriname-French Guiana trans-boundary region has been declining since 1992 (Chevalier and Girondot 1998). Poaching and fishing gear interactions are, once again, believed to be the major contributors to the decline of leatherbacks in the area (Chevalier *et al.* in press, Swinkels *et al.* in press). While Spotila et al. (1996) indicated that turtles may have been shifting their nesting from French Guiana to Suriname due to beach erosion, analyses show that the overall area trend in number of nests has been negative since 1987 at a rate of 15.0 -17.3 % per year (NOAA Fisheries SEFSC 2001). If turtles are not nesting elsewhere, it appears that the Western Atlantic portion of the population is being subjected to mortality beyond sustainable levels, resulting in a continued decline in numbers of nesting females. Tag return data emphasize the global nature of the leatherback and the link between these South American nesters and animals found in U.S. waters. For example, a nesting female tagged May 29, 1990, in French Guiana was later recovered and released alive from the York River, VA. Another nester tagged in French Guiana on June 21, 1990, was later found dead in Palm Beach, Florida (STSSN database).

Anthropogenic impacts

Anthropogenic impacts to the leatherback population are similar to those discussed above for the loggerhead sea turtle. However, of the Atlantic turtle species, leatherbacks seem to be the most vulnerable to entanglement in fishing gear. This susceptibility may be the result of their body type (large size, long pectoral flippers, and lack of a hard shell), and their attraction to gelatinous

organisms and algae that collect on buoys and buoy lines at or near the surface, and perhaps to the lightsticks used to attract target species in longline fisheries. Sea turtles entangled in fishing gear generally have a reduced ability to feed, dive, surface for air, or perform other behaviors essential to survival (Balazs 1985). They may be more susceptible to boat strikes if forced to remain at the surface, and entangling lines can constrict blood flow resulting in tissue necrosis.

At a workshop held in the Northeast in 1998 to develop a management plan for leatherbacks, experts expressed the opinion that incidental takes in fisheries were likely higher than is being reported. From 1990-2000, 92 entangled leatherbacks in lines associated with trap/pot gear were reported from New York through Maine (Dwyer *et al.* 2002). Anecdotal accounts by fishermen suggest that they have many more encounters than are reported. Entanglement in other pot gear set for other species of shellfish and finfish in the action area has also been documented. Prescott (1988) reviewed stranding data for Cape Cod Bay and concluded that for those turtles where cause of death could be determined (the minority), entanglement is the leading cause of death followed by capture in trawls, cold stunning, or collision with boats. Leatherbacks have also been documented entangled in crab pot gear in the Virginia Chesapeake Bay (e.g., 3 instances in 2002 alone).

Leatherbacks are taken as bycatch in several fisheries including the pelagic longline, coastal trawl, anchored gillnet, and pelagic gillnet. For instance, according to observer records, an estimated 6,363 leatherback sea turtles were caught by the U.S. Atlantic tuna and swordfish longline fisheries between 1992-1999, of which 88 were released dead (NOAA Fisheries SEFSC 2001). Leatherbacks are foul hooked by longline gear (*e.g.*, on the flipper or shoulder area) rather than mouth or throat hooked like loggerheads.

Kemp's Ridley Sea Turtle

The Kemp's ridley is the most endangered of the world's sea turtle species. Of the world's seven extant species of sea turtles, the Kemp's ridley has declined to the lowest population level. Kemp's ridleys nest primarily on Rancho Nuevo in Tamaulipas, Mexico, where nesting females emerge synchronously during the day to nest in aggregations known as arribadas. Most of the population of adult females nest in this single locality (Pritchard 1969).

Kemp's ridley nesting occurs from April through July each year. Little is known about mating but it is believed to occur at or before the nesting season in the vicinity of the nesting beach. Hatchlings emerge after 45-58 days. Once they leave the beach, neonates presumably enter the Gulf of Mexico where they feed on available sargassum and associated infauna or other epipelagic species (USFWS and NOAA Fisheries 1992). Research conducted by Texas A&M University has resulted in the intentional live-capture of hundreds of Kemp's ridleys at Sabine Pass and the entrance to Galveston Bay. Between 1989 and 1993, 50 of the Kemp's ridleys captured were tracked (using satellite and radio telemetry) by biologists with the NOAA Fisheries Galveston Laboratory. The tracking study was designed to characterize sea turtle habitat and to identify small and large scale migration patterns. Preliminary analysis of the data collected during these studies suggests that subadult Kemp's ridleys stay in shallow, warm, nearshore waters in the northern Gulf of Mexico until cooling waters force them offshore or south along the Florida coast (Renaud, NOAA Fisheries Galveston Laboratory, pers. comm.).

Ogren (1988) suggests that the Gulf coast, from Port Aransas, Texas, through Cedar Key, Florida, represents the primary habitat for subadult ridleys in the northern Gulf of Mexico. However, at least some juveniles will travel northward as water temperatures warm to feed in productive coastal waters of Georgia through New England (USFWS and NOAA Fisheries 1992).

Juvenile Kemp's ridleys use northeastern and mid-Atlantic coastal waters of the U.S. Atlantic coastline as primary developmental habitat during summer months, with shallow coastal embayments serving as important foraging grounds. Ridleys found in mid-Atlantic waters are primarily post-pelagic juveniles averaging 40 cm in carapace length, and weighing less than 20 kg (Terwilliger and Musick 1995). Next to loggerheads, they are the second most abundant sea turtle in mid-Atlantic waters, arriving in these areas during late May and June (Keinath et al. 1987; Musick and Limpus 1997). In the Chesapeake Bay, where the juvenile population of Kemp's ridley sea turtles was estimated to be 211 to 1,083 turtles (Musick and Limpus 1997), ridleys frequently forage in shallow embayments, particularly in areas supporting submerged aquatic vegetation (Lutcavage and Musick 1985; Bellmund et al., 1987; Keinath et al., 1987; Musick and Limpus 1997). Other studies have found that post-pelagic ridleys feed primarily on crabs, consuming a variety of species. Mollusks, shrimp, and fish are consumed less frequently (Bjorndal 1997).

With the onset of winter and the decline of water temperatures, Kemp's ridleys migrate to more southerly waters from September to November (Keinath et al. 1987; Musick and Limpus 1997). Turtles that do not head south before water temperatures drop rapidly face the risk of cold-stunning. Although cold stunning can occur throughout the range of the species, cold stunning can be a significant natural cause of mortality for sea turtles in Cape Cod Bay and Long Island Sound. For example, in the winter of 1999/2000, there was a major cold-stunning event in which 218 Kemp's ridleys, 54 loggerheads, and five green turtles were found on Cape Cod beaches (Prescott, pers. comm.). Annual cold stun events only occasionally occur at this magnitude; the extent of episodic major cold stun events may be associated with numbers of turtles utilizing Northeast waters in a given year, oceanographic conditions and the occurrence of storm events in the late fall. Cold stunned turtles have also been reported on beaches in New York and New Jersey (Morreale and Standora 1992). Although cold stunned turtles can survive if found early enough, cold stunning events can represent a significant cause of natural mortality.

From telemetry studies, Morreale and Standora (1994) determined that Kemp's ridleys are sub-surface animals that frequently swim to the bottom while diving. The generalized dive profile showed that the turtles spend 56% of their time in the upper third of the water column, 12% in mid-water, and 32% on the bottom. In water shallower than 15 m (50 ft), the turtles dive to depth, but spend a considerable portion of their time in the upper portion of the water column. In contrast, turtles in deeper water dive to depth, spending as much as 50% of the dive on the bottom.

Status and trends of Kemp's ridley sea turtles

When nesting aggregations at Rancho Nuevo were discovered in 1947, adult female populations were estimated to be in excess of 40,000 individuals (Hildebrand 1963), but the population has

been drastically reduced from these historical numbers. However, the TEWG (1998; 2000) indicated that the Kemp's ridley population appears to be in the early stage of exponential expansion. Nesting data, estimated number of adults, and percentage of first time nesters have all increased from lows experienced in the 1970's and 1980's. From 1985 to 1999, the number of nests observed at Rancho Nuevo and nearby beaches has increased at a mean rate of 11.3% per year, allowing cautious optimism that the population is on its way to recovery. For example, data from nests at Rancho Nuevo, North Camp and South Camp, Mexico, have indicated that the number of adults declined from a population that produced 6,000 nests in 1966 to a population that produced 924 nests in 1978 and 702 nests in 1985 then increased to produce 1,940 nests in 1995 and about 3,400 nests in 1999. Estimates of adult abundance followed a similar trend from an estimate of 9,600 in 1966 to 1,050 in 1985 and 3,000 in 1995. The increased recruitment of new adults is illustrated in the proportion of neophyte, or first time nesters, which has increased from 6% to 28% from 1981 to 1989 and from 23% to 41% from 1990 to 1994.

The TEWG (1998) developed a population model to evaluate trends in the Kemp's ridley population through the application of empirical data and life history parameter estimates chosen by the TEWG. Model results identified three trends in benthic immature Kemp's ridleys. Benthic immatures are those turtles that are not yet reproductively mature but have recruited to feed in the nearshore benthic environment where they are available to nearshore mortality sources that often result in strandings. Benthic immature ridleys are estimated to be 2-9 years of age and 20-60 cm in length. Increased production of hatchlings from the nesting beach beginning in 1966 resulted in an increase in benthic ridleys that leveled off in the late 1970s. A second period of increase followed by leveling occurred between 1978 and 1989 as hatchling production was further enhanced by the cooperative program between the USFWS and Mexico's Instituto Nacional de Pesca to increase the nest protection and relocation program in 1978. A third period of steady increase, which has not leveled off to date, has occurred since 1990 and appears to be due to the greatly increased hatchling production and an apparent increase in survival rates of immature turtles beginning in 1990 due, in part, to the introduction of TEDs.

The population model in the TEWG report projected that Kemp's ridleys could reach the intermediate recovery goal identified in the Recovery Plan, of 10,000 nesters by the year 2020 if the assumptions of age to sexual maturity and age specific survivorship rates plugged into their model are correct. The TEWG (1998) identified an average Kemp's ridley population growth rate of 13% per year between 1991 and 1995. Total nest numbers have continued to increase. However, the 1996 and 1997 nest numbers reflected a slower rate of growth, while the increase in the 1998 nesting level has been much higher and decreased in 1999. The population growth rate does not appear as steady as originally forecasted by the TEWG, but annual fluctuations, due in part to irregular inter-nesting periods, are normal for other sea turtle populations. Also, as populations increase and expand, nesting activity would be expected to be more variable.

One area for caution in the TEWG findings is that the area surveyed for ridley nests in Mexico was expanded in 1990 due to destruction of the primary nesting beach by Hurricane Gilbert. Because systematic surveys of the adjacent beaches were not conducted prior to 1990, there is no way to determine what proportion of the nesting increase documented since that time is due to the increased survey effort rather than an expanding ridley nesting range. The TEWG (1998)

assumed that the observed increases in nesting, particularly since 1990, were true increases rather than the result of expanded beach coverage. As noted by TEWG, trends in Kemp's ridley nesting even on the Rancho Nuevo beaches alone suggest that recovery of this population has begun but continued caution is necessary to ensure recovery and to meet the goals identified in the Kemp's Ridley Recovery Plan.

Threats to Kemp's ridleys' recovery
Like other turtle species, the severe decline in the Kemp's ridley population appears to have been heavily influenced by a combination of exploitation of eggs and impacts from fishery interactions. From the 1940's through the early 1960's, nests from Ranch Nuevo were heavily exploited (USFWS and NOAA Fisheries 1992), but beach protection in 1966 helped to curtail this activity (USFWS and NOAA Fisheries 1992). Currently, anthropogenic impacts to the Kemp's ridley population are similar to those discussed above for other sea turtle species. Sea sampling coverage in the Northeast otter trawl fishery, pelagic longline fishery, and southeast shrimp and summer flounder bottom trawl fisheries have recorded takes of Kemp's ridley turtles. Following World War II, there was a substantial increase in the number of trawl vessels, particularly shrimp trawlers, in the Gulf of Mexico where the adult Kemp's ridley turtles occur. Information from fishers helped to demonstrate the high number of turtles taken in these shrimp trawls (USFWS and NOAA Fisheries 1992). Subsequently, NOAA Fisheries has worked with the industry to reduce turtle takes in shrimp trawls and other trawl fisheries, including the development and use of Turtle Excluder Devices (TEDs).

Kemp's ridleys may also be affected by large-mesh gillnet fisheries. In the spring of 2000, a total of five Kemp's ridley carcasses were recovered from the same North Carolina beaches where 277 loggerhead carcasses were found. Cause of death for most of the turtles recovered was unknown, but the mass mortality event was suspected to have been from a large-mesh gillnet fishery operating offshore in the preceding weeks. The five ridley carcasses that were found are likely to have been only a minimum count of the number of Kemp's ridleys that were killed or seriously injured as a result of the fishery interaction since it is unlikely that all of the carcasses washed ashore. It is possible that strandings of Kemp's ridley turtles in some years have increased at rates higher than the rate of increase in the Kemp's ridley population (TEWG 1998).

Green Sea Turtle
Green turtles are the largest chelonid (hard-shelled) sea turtle, with an average adult size of 91 cm SCL and weight of 150 kg. Ninety percent of green turtles found in Long Island Sound are between 25 and 40 cm SCL, with the largest reported being 68 cm (Burke et al. 1991). Based on growth rate studies of wild green turtles, greens have been found to grow slowly with an estimated age of sexual maturity ranging from 18 to 40 years (Balazs 1982, Frazer and Ehrhard 1985 in NOAA Fisheries and USFWS 1991a, B. Schroeder pers. comm.).

Green turtles are distributed circumglobally. In the western Atlantic they range from Massachusetts to Argentina, including the Gulf of Mexico and Caribbean (Wynne and Schwartz, 1999). As is the case for loggerhead and Kemp's ridley sea turtles, green sea turtles use mid-Atlantic and northern areas of the western Atlantic Ocean as important summer developmental habitat. Green turtles are found in estuarine and coastal waters as far north as Long Island

Sound, Chesapeake Bay, and North Carolina sounds (Musick and Limpus 1997). Limited information is available regarding the occurrence of green turtles in the Chesapeake Bay, although they are presumably present in very low numbers. Like loggerheads and Kemp's ridleys, green sea turtles that use northern waters during the summer must return to warmer waters when water temperatures drop, or face the risk of cold stunning. Cold stunning of green turtles may occur in southern areas as well (i.e., Indian River, Florida), as these natural mortality events are dependent on water temperatures and not solely upon geographical location.

In the continental United States, green turtle nesting occurs on the Atlantic coast of Florida (Ehrhart 1979). Occasional nesting has been documented along the Gulf coast of Florida, at southwest Florida beaches, as well as the beaches on the Florida Panhandle (Meylan et al. 1995). Certain Florida nesting beaches where most green turtle nesting activity occurs have been designated index beaches. Index beaches were established to standardize data collection methods and effort on key nesting beaches. The pattern of green turtle nesting shows biennial peaks in abundance, with a generally positive trend during the ten years of regular monitoring since establishment of the index beaches in 1989, perhaps due to increased protective legislation throughout the Caribbean (Meylan et al. 1995). Recently, green turtle nesting occurred on Bald Head Island, North Carolina just east of the mouth of the Cape Fear River, on Onslow Island, and on Cape Hatteras National Seashore. Increased nesting has also been observed along the Atlantic Coast of Florida, on beaches where only loggerhead nesting was observed in the past (Pritchard 1997). Recent population estimates for green turtles in the western Atlantic area are not available.

While nesting activity is obviously important in assessing population trends, the remaining portion of the green turtle's life is spent on the foraging and breeding grounds. Juvenile green sea turtles occupy pelagic habitats after leaving the nesting beach. Pelagic juveniles are assumed to be omnivorous, but with a strong tendency toward carnivory during early life stages. At approximately 20 to 25 cm carapace length, juveniles leave pelagic habitats and enter benthic foraging areas, shifting to a chiefly herbivorous diet (Bjorndal 1997). Green turtles appear to prefer marine grasses and algae in shallow bays, lagoons and reefs (Rebel 1974), but also consume jellyfish, salps, and sponges. Some of the principal feeding pastures in the western Atlantic Ocean include the upper west coast of Florida and the northwestern coast of the Yucatan Peninsula. Additional important foraging areas in the western Atlantic include the Mosquito and Indian River Lagoon systems and nearshore wormrock reefs between Sebastian and Ft. Pierce Inlets in Florida, Florida Bay, the Culebra archipelago and other Puerto Rico coastal waters, the south coast of Cuba, the Mosquito Coast of Nicaragua, the Caribbean Coast of Panama, and scattered areas along Colombia and Brazil (Hirth 1971). The preferred food sources in these areas are *Cymodocea, Thalassia, Zostera, Sagittaria,* and *Vallisneria* (Carr 1952). In North Carolina, green turtles are known to occur in estuarine and oceanic waters and to nest in low numbers along the entire coast. The summer developmental habitat for green turtles also encompasses estuarine and coastal waters of Chesapeake Bay and as far north as Long Island Sound (Musick and Limpus 1997).

Threats to green turtles' recovery

In 1978, the green turtle was listed as threatened under the ESA, except for the breeding

populations in Florida and on the Pacific coast of Mexico, which were listed as endangered (NOAA Fisheries and USFWS 1991a). Green turtles were traditionally highly prized for their flesh, fat, eggs, and shell, and directed fisheries in the United States and throughout the Caribbean are largely to blame for the decline of the species. In the Gulf of Mexico, green turtles were once abundant enough in the shallow bays and lagoons to support a commercial fishery. In 1890, over one million pounds of green turtles were taken in the Gulf of Mexico green sea turtle fishery (Doughty 1984). However, declines in the turtle fishery throughout the Gulf of Mexico were evident by 1902 (Doughty 1984).

Fibropapillomatosis, an epizootic disease producing lobe-shaped tumors on the soft portion of a turtle's body, has been found to infect green turtles, most commonly juveniles. The occurrence of fibropapilloma tumors, most frequently documented in Hawaiian green turtles, may result in impaired foraging, breathing, or swimming ability, leading potentially to death.

Green turtles continue to be heavily exploited by humans, with the degradation of nesting and foraging habitats, incidental capture in fisheries, and marine pollution acknowledged as serious hindrances to species recovery. As with the other sea turtle species, fishery mortality accounts for a large proportion of annual anthropogenic mortality outside the nesting beaches, while other activities like dredging, pollution, and habitat destruction account for an unknown level of mortality. Sea sampling coverage in the pelagic driftnet, pelagic longline, scallop dredge, southeast shrimp trawl, and summer flounder bottom trawl fisheries has recorded takes of green turtles. Stranding reports indicate that between 200-400 green turtles strand annually along the Eastern U.S. coast from a variety of causes, most of which are unknown (Sea Turtle Stranding and Salvage Network, unpublished data).

Hawksbill Sea Turtle

The hawksbill turtle is relatively uncommon in the waters of the continental United States. Hawksbills prefer coral reefs, such as those found in the Caribbean and Central America. However, there are accounts of hawksbills in south Florida and a surprising number are encountered in Texas. Most of the Texas records report small turtles, probably in the 1-2 year class range. Many captures or strandings are of individuals in an unhealthy or injured condition (Hildebrand 1982). The lack of sponge-covered reefs and the cold winters in the northern Gulf of Mexico probably prevent hawksbills from establishing a viable population in this area. In the north Atlantic, small hawksbills have stranded as far north as Cape Cod, Massachusetts (STSSN database). Many of these strandings were observed after hurricanes or offshore storms. One hawksbill turtle has been observed taken incidentally in a fishery just south of the Chesapeake Bay (Anonymous 1992).

Hawksbills feed primarily on a wide variety of sponges but also consume bryozoans, coelenterates, and mollusks. The Culebra Archipelago of Puerto Rico contains especially important foraging habitat for hawksbills. Nesting areas in the western North Atlantic include Puerto Rico and the Virgin Islands.

No takes of hawksbill sea turtles have been recorded in northeast or mid-Atlantic fisheries covered by the NEFSC observer program.

ENVIRONMENTAL BASELINE

Environmental baselines for biological opinions include the past and present impacts of all state, federal or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions that are contemporaneous with the consultation in process (50 CFR 402.02). The environmental baseline for this biological opinion includes the effects of several activities that may affect the survival and recovery of threatened and endangered species in the action area. The activities that shape the environmental baseline in the action area of this consultation include vessel operations, fisheries, discharges, dredging, ocean dumping, sonic activities, and recovery activities associated with reducing those impacts. However, the five species of sea turtles that occur in the action area are all highly migratory and can thus be affected by activities anywhere in a wide range that encompasses areas throughout the North Atlantic Ocean, Gulf of Mexico, and the Caribbean Sea.

Due to logistical difficulties associated with most marine activities and the significant amount of resources necessary to design effective monitoring programs, monitoring the effects of the various federal actions on threatened and endangered species has not been consistent for all species groups and all projects. For example, the most reliable method for monitoring fishery interactions is the sea sampling program, which provides random sampling of commercial fishing activities. However, due to the size, power, and mobility of whales, sea sampling is only effective for sea turtles. Although takes of whales are occasionally observed by the sea sampling program, levels of interaction between whales and fishing vessels and their gear is derived from data collected opportunistically. It is often impossible to assign gear found on stranded or free-swimming animals to a specific fishery. Consequently, the total level of interaction between fisheries and whales is unknown.

A. Federal Actions that have Undergone Formal or Early Section 7 Consultation

NOAA Fisheries has undertaken several ESA section 7 consultations to address the effects of dredging, vessel operations and gear associated with federally-permitted fisheries on threatened and endangered species in the action area. Each of those consultations sought to develop ways of reducing the probability of adverse impacts of the action on listed species. Similarly, recovery actions NOAA Fisheries has undertaken under both the Marine Mammal Protection Act (MMPA) and the ESA are addressing the problem of take of whales in the fishing and shipping industries.

Dredging

In addition to the Navy's Dam Neck Annex renourishment project, the Sandbridge Shoal borrow site has been used for other beach nourishment projects in Virginia, and is likely to be used for future projects as well. In April 1993, NOAA Fisheries completed section 7 consultation on the Sandbridge Beach Erosion and Hurricane Protection Project, which involved hopper dredging of approximately 972,000 cy of sand during the first year of the project and an anticipated 500,000

cy every two years thereafter (NOAA Fisheries 1993a). NOAA Fisheries anticipated the take of eight loggerhead turtles or one Kemp's ridley or green turtle. Actual dredging did not begin until May 1998, and no sea turtle takes were observed during the 1998 dredge cycle. In June 2001, the ACOE indicated that the next dredge cycle, which was scheduled to begin in the summer of 2002, would require 1.5 million cy of sand initially, with an anticipated 1.1 million cy every two years thereafter. Although the volume of sand had increased from the previous cycle, NOAA Fisheries reduced the ITS to five loggerheads and one Kemp's ridley or green turtle due to the lack of observed takes in the previous cycle, along with the levels of anticipated and observed take in hopper dredging projects in nearby locations.

Several channels in the nearby Chesapeake Bay are also dredged on a regular basis. Although these activities do not take place directly within the action area, the population of turtles that transits the Sandbridge Shoal borrow site are likely to belong to the same population that enters the Chesapeake Bay to forage. Dredging in the surrounding areas could influence the distribution of sea turtles and/or disrupt potential foraging habitat.

Vessel Operations

Potential adverse effects from federal vessel operations in the action area of this consultation include operations of the U.S. Navy (USN) and the U.S. Coast Guard (USCG), which maintain the largest federal vessel fleets, the Environmental Protection Agency (EPA), the National Oceanic and Atmospheric Administration (NOAA), and the ACOE. NOAA Fisheries has conducted formal consultations with the USCG, the USN, and is currently in early phases of consultation with the other federal agencies on their vessel operations (e.g., NOAA research vessels). In addition to operation of ACOE vessels, NOAA Fisheries has consulted with the ACOE to provide recommended permit restrictions for operations of contract or private vessels around whales. Through the section 7 process, where applicable, NOAA Fisheries has and will continue to establish conservation measures for all these agency vessel operations to avoid adverse effects to listed species. At the present time, however, they represent some level of potential interaction. Refer to the biological opinions for the USCG (NOAA Fisheries 1995a; July 22, 1996; and NOAA Fisheries 1998c) and the USN (NOAA Fisheries 1997b) for detail on the scope of vessel operations for these agencies and conservation measures being implemented as standard operating procedures.

Federal Fishery Operations

Several commercial fisheries operating in the action area use gear which is known to take listed species. Efforts to reduce the adverse effects of commercial fisheries are addressed through both the MMPA take reduction planning process and the ESA section 7 process. Federally regulated gillnet, longline, trawl, seine, dredge, and pot fisheries have all been documented as interacting with either whales or sea turtles or both. Other gear types may impact whales and sea turtles as well. For all fisheries for which there is a federal fishery management plan (FMP) or for which any federal action is taken to manage that fishery, impacts have been evaluated through the section 7 process.

Formal ESA section 7 consultation has been conducted on the following fisheries which may adversely affect threatened and endangered species in the action area: Multispecies, Monkfish,

Summer Flounder/Scup/Black Sea Bass, Atlantic Bluefish, Spiny Dogfish, Tilefish, Scallop, Red Crab, and Skate fisheries. These consultations are summarized below.

The *Multispecies sink gillnet fishery* occurs in the action area and is known to entangle whales and sea turtles. This fishery has historically occurred along the northern portion of the Northeast Shelf Ecosystem from the periphery of the Gulf of Maine to Rhode Island in water depths to 60 fathoms. In recent years, more of the effort in this fishery has occurred in offshore waters and into the Mid-Atlantic. The fishery operates throughout the year with peaks in the spring and from October through February. NOAA Fisheries reinitiated consultation on the Multispecies FMP on May 4, 2000, in order to reevaluate the ability of the Reasonable and Prudent Alternative (RPA) to avoid the likelihood of jeopardy to right whales. The BO concluded that continued implementation of the Multispecies FMP may adversely affect loggerhead, Kemp's ridley and green sea turtles and is likely to jeopardize the existence of the North Atlantic right whale (NOAA Fisheries 2001c). A new RPA was also included to avoid the likelihood that the operation of the gillnet sector of the multispecies fishery would result in jeopardy to North Atlantic right whales. The ITS exempted the lethal or non-lethal take of one loggerhead sea turtle, and one green, leatherback, *or* Kemp's ridley turtle annually.

The federal *Monkfish fishery* occurs in all waters under federal jurisdiction from Maine to the North Carolina/South Carolina border. The monkfish fishery uses several gear types that may entangle protected species. In 1999, observers documented that turtles were taken in excess of the ITS as a result of entanglements in monkfish gillnet gear. NOAA Fisheries reinitiated consultation on the Monkfish FMP on May 4, 2000, in part, to reevaluate the effect of the monkfish gillnet fishery on sea turtles. The BO also considered new information on the status of the northern right whale and new Atlantic Large Whale Take Reduction Plan (ALWTRP) measures, and the ability of the RPA to avoid the likelihood of jeopardy to right whales. The BO concluded that continued implementation of the Monkfish FMP was likely to jeopardize the existence of the North Atlantic right whale. A new RPA was provided that was expected to remove the threat of jeopardy to North Atlantic right whales. In addition, a new ITS was provided for the take of sea turtles in the fishery. However, consultation was once again reinitiated on the Monkfish FMP as of February 12, 2003, to consider the effects of Framework Adjustment 2 measures on ESA-listed species. This consultation was completed on April 14, 2003, and concluded that the proposed action is not likely to result in jeopardy to any ESA-listed species under NOAA Fisheries jurisdiction (NOAA Fisheries 2003a). However, takes of sea turtles are still expected to occur, which was reflected in the ITS. The ITS anticipated the take of three loggerheads and one non-loggerhead species (green, leatherback, or Kemp's ridley) in monkfish gillnet gear, and one sea turtle (loggerhead, green, leatherback, or Kemp's ridley) in monkfish trawl gear.

The *Summer Flounder, Scup and Black Sea Bass fisheries* are known to interact with sea turtles. Significant measures have been developed to reduce the take of sea turtles in summer flounder trawls and trawls that meet the definition of a summer flounder trawl by requiring the use of TEDs throughout the year for trawl nets fished from the North Carolina/South Carolina border to Oregon Inlet, NC, and seasonally (March 16-January 14) for trawl vessels fishing between Oregon Inlet, NC and Cape Charles, VA. Takes may still occur with this gear type in other areas

however. Based on the occurrence of gillnet entanglements in other fisheries, the gillnet portion of this fishery could entangle endangered whales. The pot gear and staked trap sectors could also entangle whales and sea turtles. The most recent formal consultation on this fishery concluded that the operation of the fishery may adversely affect but is not likely to jeopardize the continued existence of listed species (NOAA Fisheries 2001e). The ITS anticipated that 19 loggerhead or Kemp's ridley takes (up to five lethal) and two green turtle takes (lethal or non-lethal) may occur annually. However, as a result of new information not considered in previous consultations, NOAA Fisheries has recently reinitiated section 7 consultation on this FMP to consider the effects of the fisheries on ESA-listed whales and sea turtles.

The *Atlantic Bluefish fishery* may pose a risk to protected marine mammals, but is most likely to interact with sea turtles (primarily Kemp's ridleys and loggerheads) given the time and locations where the fishery occurs. Gillnets are the primary gear used to commercially land bluefish. Whales and turtles can become entangled in the buoy lines of the gillnets or in the net panels. Formal consultation on this fishery was completed on July 2, 1999, and NOAA Fisheries concluded that operation of the fishery under the FMP, as amended, is not likely to jeopardize the continued existence of listed species (NOAA Fisheries 1999a). The ITS exempted the annual take of six loggerheads (no more than three dead), six Kemp's ridleys (dead or alive), and one shortnose sturgeon. Although there is a high degree of overlap between the bluefish fishery and other regulated fisheries, observer data suggests that sea turtle takes may be occurring in unregulated fisheries that also harvest bluefish. Takes by vessels harvesting bluefish while fishing for unregulated species have not been previously addressed under the section 7 process.

The primary gear types for the *Spiny dogfish fishery* are sink gillnets, otter trawls, bottom longline, and driftnet gear. Sea turtles can be incidentally captured in all gear sectors of this fishery. Turtle takes in 2000 included one dead and one live Kemp's ridley. Since the ITS issued with the August 13, 1999 BO (NOAA Fisheries 1999c) anticipated the take of only one Kemp's ridley (lethally or non-lethally), the incidental take level for the dogfish FMP was exceeded. In addition, a right whale mortality occurred in 1999 as a result of entanglement in gillnet gear that was thought to be attributed to the spiny dogfish fishery (but was later determined not to be). NOAA Fisheries therefore reinitiated consultation on the Spiny Dogfish FMP on May 4, 2000, in order to reevaluate the ability of the RPA to avoid the likelihood of jeopardy to right whales, and the effect of the spiny dogfish gillnet fishery on sea turtles. The BO also considered new information on the status of the North Atlantic right whale and new ALWTRP measures. The BO, signed on June 14, 2001, concluded that continued implementation of the Spiny Dogfish FMP is likely to jeopardize the existence of the North Atlantic right whale (NOAA Fisheries 2001d). A new RPA was provided that was expected to remove the threat of jeopardy to North Atlantic right whales as a result of the gillnet sector of the spiny dogfish fishery. In addition, the ITS anticipated the annual take of three loggerheads (no more than two lethal), one green (lethal or non-lethal), one leatherback (lethal or non-lethal), or one Kemp's ridley (lethal or non-lethal).

Effective July 18, 2003, however, NOAA Fisheries has closed the federal spiny dogfish fishery for the remainder of the spiny dogfish fishing year (through April 30, 2004). The closure was the result of an action by the Spiny Dogfish and Coastal Shark Management Board of the Atlantic

States Marine Fisheries Commission (ASMFC), in which an annual quota of 8.8 million pounds and a coastwide trip limit of 7,000 pounds for the commercial spiny dogfish fishery in state waters was approved under the new Spiny Dogfish Interstate Fishery Management Plan. This was contrary to the quota and trip limit set by NOAA Fisheries for the 2003 fishing year (four million pounds with 600 and 300 pound trip limits). Vessel owners with Federal spiny dogfish permits are prohibited from landing spiny dogfish regardless of whether they are fishing in state or federal waters. Federally permitted dealers are also prohibited from purchasing spiny dogfish from federally permitted spiny dogfish vessels for the remainder of the fishing year. The states are proceeding with the fishery in state waters at the higher quota and trip limits (68 FR 11346, March 10, 2003; ASMFC Press Release February 26, 2003).

The management unit for the *Tilefish* FMP is all golden tilefish under U.S. jurisdiction in the Atlantic Ocean north of the Virginia/North Carolina border. Tilefish have some unique habitat characteristics, and are found in a warm water band (47-651 F) at approximately 250 to 1200 feet deep on the outer continental shelf and upper slope of the U.S. Atlantic coast. Because of their restricted habitat and low biomass, the tilefish fishery in recent years has occurred in a relatively small area in the Mid-Atlantic Bight, south of New England and west of New Jersey. Section 7 consultation was completed on this newly regulated fishery on February 7, 2001 (NOAA Fisheries 2001g). An incidental take statement was provided for loggerhead and leatherback sea turtles, anticipating the annual take of six loggerheads (up to three lethal) and one leatherback (lethal or non-lethal).

It was previously believed that the *Scallop dredge fishery* was unlikely to take sea turtles given the slow speed and location at which the gear operates. However, 40 hard shelled turtles were observed or reported captured in the scallop dredge fishery from 1996 to October 2002. Most of these animals were captured in the Hudson Canyon Closed Area, and 23 of 40 turtles were alive with no apparent injuries. Section 7 consultation was completed on this fishery, and the BO, dated February 24, 2003, concluded that the fishery was not likely to jeopardize listed species (NOAA Fisheries 2003b). The ITS anticipated the annual take of 88 loggerheads (up to 25 lethal), seven Kemp's ridleys (up to two lethal), and one green turtle (lethal or non-lethal) in scallop dredge gear, and one loggerhead, Kemp's ridley, green or leatherback turtle (lethal or non-lethal) in scallop trawl gear. NOAA Fisheries has recently reinitiated consultation on the Atlantic sea scallop fishery following the receipt of Amendment 10 to the FMP from the New England Fishery Management Council (NEFMC), and as a result of more sea turtle takes than previously considered in dredge gear operated outside the Hudson Canyon and Virginia Beach Closed Areas. Research is underway to explore gear technology solutions aimed at reducing turtle interactions.

The *Red crab fishery* is a pot/trap fishery that occurs in deep waters along the continental slope. There have been no recorded takes of ESA-listed species in the red crab fishery. However, given the type of gear used in the fishery, takes may be possible where gear overlaps with the distribution of ESA-listed species. Section 7 consultation was completed on the proposed implementation of the Red Crab FMP, and the BO, issued on February 6, 2002, concluded that the action is not likely to result in jeopardy to any ESA-listed species under NOAA Fisheries jurisdiction (NOAA Fisheries 2002a). Takes of loggerhead and leatherback sea turtles are

considered possible. As such, the ITS anticipated the annual take of one loggerhead and one leatherback sea turtle (lethal or non-lethal).

NOAA Fisheries recently completed section 7 consultation on the *skate fishery*. The Northeast skate complex is comprised of seven different related skate species. The seven species of skate are distributed along the coast of the northeast U.S. from the tide line to depths exceeding 700m (383 fathoms). Traditionally, the main gear types used in the skate fishery include mobile otter trawls, gillnet gear, hook and line, and scallop dredges, although bottom trawling is by far the most common gear type, accounting for 94.5% of skate landings. Gillnet gear is the next most common gear type, accounting for 3.5% of skate landings. Although no takes have been observed in the skate fishery, both trawls and gillnets are known to interact with sea turtles. Thus, in the BO for the skate fishery management plan, NOAA Fisheries anticipated that one loggerhead, leatherback, green, or Kemp's ridley sea turtle (one turtle only of any of these four species) may be taken annually in the directed skate fishery (NOAA Fisheries 2003c). However, NOAA Fisheries determined that the skate fishery was not likely to jeopardize the continued existence of any ESA listed species under NOAA Fisheries' jurisdiction.

Consultation on the *Atlantic Mackerel/Squid/Atlantic Butterfish fishery* was completed on April 28, 1999. This fishery is known to take sea turtles and may occasionally interact with whales. Several types of gillnet gear may be used in the mackerel/squid/butterfish fishery. Other gear types that may be used in this fishery include midwater and bottom trawl gear, pelagic longline/hook-and-line/handline, pot/trap, dredge, poundnet, and bandit gear. Entanglements or entrapments of whales, sea turtles, and sturgeon have been recorded in one or more of these gear types. (NOAA Fisheries 1999b)

Components of the *Highly Migratory Species (HMS) Atlantic pelagic fishery for swordfish/tuna/shark/billfish* in the EEZ have occurred within the action area for this consultation. Use of pelagic longline, pelagic driftnet, bottom longline, hand line (including bait nets), and/or purse seine gear in this fishery has resulted in the take of sea turtles and whales. The Northeast swordfish driftnet portion of the fishery was prohibited during an emergency closure that began in December 1996, extended through May 31, 1997, and was subsequently extended for another six months. An extensive environmental assessment was prepared to evaluate this fishery from both a fisheries and a protected species perspective. The Northeast swordfish driftnet segment was reopened on August 1, 1998, but a final rule to prohibit the use of driftnet gear in the swordfish fishery was published on January 27, 1999 (64 FR 4055). A final rule implementing a new comprehensive FMP for the whole pelagic fishery, which incorporates the driftnet closure, was published on May 28, 1999 (64 FR 29090).

NOAA Fisheries completed the most recent BO on the FMP for the Atlantic HMS fisheries for swordfish, tuna, and shark on June 8, 2001 (NOAA Fisheries 2001f). The BO concluded that the pelagic longline and bottom longline fisheries for shark could capture as many as 1,417 pelagic, immature loggerhead turtles each year and could kill as many as 381 of them. The BO also concluded that these fisheries would be expected to capture 875 leatherback turtles each year, killing as many as 183 of them. After considering the status and trends of populations of these two species of sea turtles, the impacts of the various activities that constituted the baseline, and

adding the effects of this level of incidental take in the fisheries, the BO concluded that the Atlantic HMS fisheries, particularly the pelagic longline fisheries, were likely to jeopardize the continued existence of loggerhead and leatherback sea turtles.

The BO outlined one reasonable and prudent alternative, which required NOAA Fisheries to promulgate regulations that close the entire NED area to fishing with pelagic longline gear for US vessels. The BO estimated that this closure would reduce the number of loggerhead and leatherback turtles captured in the fishery by 51% and 49% respectively each year (NOAA Fisheries SEFSC 2001; Yeung et al. 2000). Based on logbook data from 1997-1999, this closure would reduce the number of loggerhead and leatherback turtles captured in the fishery by 76% and 65% respectively, assuming no redistribution of the fishing effort displaced out of the NED. Other elements of the RPA required NOAA Fisheries to promulgate regulations to modify gear used in the pelagic longline fisheries to reduce the likelihood of interactions between the gear and sea turtles and to reduce the probability of sea turtles being injured or killed during any interactions that occurred. After considering the benefits of the measures contained in the RPA, the BO expected that 438 leatherback sea turtles, 402 loggerhead sea turtles, and 35 green, hawksbill, and Kemp's ridley turtles might be captured in the fisheries per year.

NOAA Fisheries has conducted several section 7 consultations on the operation of the *shrimp trawl fishery* in the southeastern United States (NOAA Fisheries 1992, 1994, 1996b, 1996c, 1998d, and 2002c). Although the shrimp trawl fishery occurs primarily in the southeast (south of the Virginia/North Carolina border), some shrimp trawling activity does occur in Virginia waters, and shrimp trawls are a significant source of mortality to sea turtles. The 1992 BO concluded that the shrimp trawl fishery was not likely to jeopardize the continued existence of listed species under NOAA Fisheries' jurisdiction, but indicated that leatherback mortality remained an issue that needed to be addressed in order to avoid jeopardizing the recovery of the species. Consultation was reinitiated in 1994 due to an extraordinarily high number of sea turtle strandings, particularly Kemp's ridleys, which corresponded with periods of heavy nearshore shrimping effort. The BO concluded that sea turtle mortality at the rates observed in 1994 was likely to jeopardize the continued existence of the Kemp's ridley population. The BO proposed an RPA with several components, all of which NOAA Fisheries ultimately implemented. Consultations in 1996 and 1998 evaluated the effects of proposed and final rules that implemented the RPA from the 1994 consultation, and each concluded that the operation of the shrimp trawl fishery under the proposed rules was not likely to jeopardize the continued existence of listed sea turtles. The most recent consultation was reinitiated in 2002 to address NOAA Fisheries' proposed implementation of a final rule that would amend TED regulations, primarily to address the inefficiency of TEDs for the release of large loggerhead and leatherback turtles. The 2002 BO also incorporated new evidence and analyses that allowed NOAA Fisheries to update estimates of turtle-trawl interactions and the effects of the interactions on sea turtles. The 2002 BO anticipated the take of up to 163,160 loggerheads (3,948 lethal), 155,503 Kemp's ridleys (4,208 lethal), 18,757 greens (514 lethal), 3,090 leatherbacks (80 lethal), and 640[2] hawksbills. The BO concluded that this level of take was not likely to appreciably reduce the

2 Actual hawksbill mortality was expected to be much lower. This number represents the estimated total mortality of hawksbill turtles from all sources in areas where shrimp trawling takes place.

likelihood of survival and recovery of listed sea turtles.

Other than entanglement in fishing gear, effects of *fishing vessels* on listed species may involve disturbance or injury/mortality due to collisions or entanglement in anchor lines. Listed species or critical habitat may also be affected by fuel oil spills resulting from fishing vessel accidents. No collisions between commercial fishing vessels and listed species or adverse effects resulting from disturbance have been documented. However, the commercial fishing fleet represents a significant portion of marine vessel activity. For example, more than 280 commercial fishing vessels fish on Stellwagen Bank in the Gulf of Maine. In addition, commercial fishing vessels may be the only vessels active in some areas, particularly in cooler seasons. Therefore, the potential for collisions exists. Due to differences in vessel speed, collisions during fishing activities are less likely than collisions during transit to and from fishing grounds. Because most fishing vessels are smaller than large commercial tankers and container ships, collisions are less likely to result in mortality. Although entanglement in fishing vessel anchor lines has been documented historically, no information is available on the prevalence of such events. Fuel oil spills could affect animals directly or indirectly through the food chain. Fuel spills involving fishing vessels are common events. However, these spills typically involve small amounts of material that are unlikely to adversely affect listed species. Larger spills may result from accidents, although these events would be rare and involve small areas. No direct adverse effects on listed species or critical habitat resulting from fishing vessel fuel spills have been documented. Given the current lack of information on prevalence or impacts of interactions, there is no basis to conclude that the level of interaction represented by any of the various fishing vessel activities discussed in this section would be detrimental to the recovery of listed species.

B. Non-Federally Regulated Actions

Private and Commercial Vessel Operations

Private and commercial vessels operate in the action area of this consultation and also have the potential to interact with whales and sea turtles. Ship strikes have been identified as a significant source of mortality to the North Atlantic right whale population (Kraus 1990) and are also known to impact all other endangered whales. A whale watch enterprise focusing on humpback whales has developed in the Virginia Capes area in the winter months. In addition, an unknown number of private recreational boaters frequent coastal waters; some of these are engaged in whale watching or sportfishing activities. These activities have the potential to result in lethal (through entanglement or boat strike) or non-lethal (through harassment) takes of listed species that could prevent or slow a species' recovery. Effects of harassment or disturbance which may be caused by whale watch operations are currently unknown. Shipping traffic in Massachusetts Bay is estimated at 1,200 ship crossings per year with an average of three per day. Sportfishing contributes more than 20 vessels per day from May to September on Stellwagen Bank in the Gulf of Maine. Information is not currently available on how comparable these figures are to the level of vessel activity in the action area. The advent of new technology resulting in high-speed catamarans for ferry services and whale watch vessels operating in congested coastal areas contributes to the potential for impacts from privately operated vessels in the environmental baseline. Recent federal efforts regarding mitigating impacts of the whale watch and shipping industries on endangered whales are discussed in Section D below.

In addition to commercial traffic and recreational pursuits, private vessels participate in high-speed marine events concentrated in the southeastern U.S. that are a particular threat to sea turtles. The magnitude of these marine events in the action area is not currently known. The Sea Turtle Stranding and Salvage Network (STSSN) also reports regular incidents of likely vessel interactions (e.g., propeller-type injuries) with sea turtles. Interactions with these types of vessels and sea turtles could occur in the action area, and it is possible that these collisions would result in mortality.

Other than injuries and mortalities resulting from collisions, the effects of disturbance caused by vessel activity on listed species is largely unknown. Although the difficulty in interpreting animal behavior makes studying the effects of vessel activities problematic, attempts have been made to evaluate the impacts of vessel activities such as whale watch operations on whales in the Gulf of Maine. However, no conclusive detrimental effects have been demonstrated.

Non-Federally Regulated Fishery Operations

Very little is known about the level of take in fisheries that operate strictly in state waters. However, depending on the fishery in question, many state permit holders also hold federal licenses; therefore, section 7 consultations on federal actions in those fisheries address some state-water activity. Impacts on sea turtles from state fisheries may be greater than the impacts from federal activities in certain areas due to the distribution of these species. Impacts of state fisheries on endangered whales are addressed as appropriate through the MMPA take reduction planning process. NOAA Fisheries is actively participating in a cooperative effort with the Atlantic States Marine Fisheries Commission (ASMFC) and member states to standardize and/or implement programs to collect information on level of effort and bycatch of protected species in state fisheries. When this information becomes available, it can be used to refine take reduction plan measures in state waters. Additionally, the June 2001 Strategy for Sea Turtle Conservation and Recovery in Relation to Atlantic Ocean and Gulf of Mexico Fisheries will assess the fishery impacts to turtles on a gear based approach, so this initiative will also better quantify and attempt to minimize sea turtle takes in state water fisheries.

With regard to whale entanglements, vessel identification is occasionally recovered from gear removed from entangled animals. With this information, it is possible to determine whether the gear was deployed by a federal or state permit holder and whether the vessel was fishing in federal or state waters. In 1998, three entanglements of humpback whales in state-water fisheries were documented. Nearshore entanglements of turtles have been documented; however, information is not available on whether the vessels involved were permitted by the state or by NOAA Fisheries.

Nearshore and inshore gillnet fisheries occur in state waters from Connecticut through North Carolina—areas where sea turtles also occur. Captures of sea turtles in these fisheries have been reported (NOAA Fisheries SEFSC 2001). Two 10-14 inch mesh gillnet fisheries, the *black drum* and *sandbar shark gillnet fisheries*, occur in Virginia state waters, along the tip of the eastern shore. These fisheries may take sea turtles given the gear type, but no interactions have been observed. NOAA Fisheries is currently undertaking efforts to observe these fisheries during the

spring. Similarly, *small mesh gillnet fisheries* occurring in Virginia state waters are suspected to take sea turtles but no interactions have been observed. During May - June 2001, NOAA Fisheries observed two percent of the Atlantic croaker fishery and 12 percent of the dogfish fishery (which represent approximately 82% of Virginia's total small mesh gillnet landings from offshore and inshore waters during this time), and no turtle takes were observed.

A *whelk fishery* using pot/trap gear is known to occur offshore Virginia. This fishery operates when sea turtles may be in the area. Sea turtles (loggerheads and Kemp's ridleys in particular) are believed to become entangled in the top bridle line of the whelk pot, given a few documented entanglements of loggerheads in whelk pots, the configuration of the gear, and the turtles' preference for the pot contents. Research is underway to determine the magnitude of these interactions and to develop gear modifications to reduce these potential entanglements. In New England waters, leatherbacks have been found entangled in whelk pot lines, so if leatherback turtles overlap with this gear in the action area, entanglement may occur. The *blue crab fishery* using pot/trap gear also occurs in the action area. The magnitude of interactions with these pots and sea turtles is unknown, but loggerheads and leatherbacks have been found entangled in this gear. For instance, in May and June 2002, three leatherbacks were documented entangled in crab pot gear in various areas of the Chesapeake Bay. Given the plethora of crab pot gear throughout the action area, it is possible that these interactions are more frequent than what has been documented.

NOAA Fisheries is also concerned about the take of sea turtles in the *pound net fishery* in Virginia. Pound nets with large mesh and stringer leaders set in the Chesapeake Bay have been observed to lethally take turtles as a result of entanglement in the leader. Although the pound net fishery is limited to the waters of the Chesapeake Bay, which are not part of the action area for this project, the sea turtles that traverse the action area are likely to represent the same population of turtles that enters the Bay to forage. Virginia sea turtle strandings during the spring are consistently high and, given the best available information, including observer reports, the nature and location of the turtle strandings, the type of fishing gear in the vicinity of the greatest number of strandings, and the known interactions between sea turtles and large mesh and stringer pound net leaders, pound nets are considered to be a likely contributor to the high sea turtle strandings. Therefore, while not a feature of the action area itself, the pound net fishery is a significant concern for sea turtles in Virginia waters.

C. Other Potential Sources of Impacts in the Action Area

A number of anthropogenic activities have likely directly or indirectly affect listed species in the action area of this consultation. These sources of potential impacts include pollution, water quality, and sonic activities. However, the impacts from these activities are difficult to measure. Where possible, conservation actions are being implemented to monitor or study impacts from these elusive sources.

Within the action area, sea turtles and optimal sea turtle habitat most likely have been impacted by pollution. Marine debris (e.g., discarded fishing line or lines from boats) can entangle turtles in the water and drown them. Turtles commonly ingest plastic or mistake debris for food, as

observed with the leatherback sea turtle. The leatherback's preferred diet includes jellyfish, but similar looking plastic bags are often found in the turtle's stomach contents (Magnuson et al. 1990).

Chemical contaminants may also have an effect on sea turtle reproduction and survival, although the effects of contaminants on turtles are relatively unclear. Pollution has been suggested as a possible contributing factor to the fibropapilloma virus that kills many turtles each year (Aguirre et al. 1994). However, the disease has not yet been linked to any particular contaminant. If pollution is not the causal agent, it may make sea turtles more susceptible to disease by weakening their immune systems. However because the Sandbridge Shoal borrow site is located offshore in open ocean, the impacts of pollutants in the action area may be slightly reduced.

Excessive turbidity due to coastal development and/or construction sites could influence sea turtle foraging ability. Turtles are not very easily affected by changes in water quality or increased suspended sediments, but if these alterations make habitat less suitable for turtles and hinder their capability to forage, eventually they would tend to leave or avoid these less desirable areas (Ruben and Morreale 1999).

NOAA Fisheries and the U.S. Navy have been working cooperatively to establish a policy for monitoring and managing acoustic impacts on marine mammals from anthropogenic sound sources in the marine environment. Acoustic impacts can include auditory trauma, temporary or permanent loss of hearing sensitivity, habitat exclusion, habituation, and disruption of other normal behavior patterns such as feeding, migration, and communication. It is expected that the policy on managing anthropogenic sound in the oceans will provide guidance for programs such as the use of acoustic deterrent devices in reducing marine mammal-fishery interactions and review of federal activities and permits for research involving acoustic activities.

D. Conservation and Recovery Actions Reducing Threats to Listed Species

Education and Outreach Activities

A number of activities are in progress that ameliorate some of the adverse effects on listed species posed by activities summarized in the Environmental Baseline. Education and outreach activities are considered one of the primary tools to reduce the threats to all protected species. NOAA Fisheries has been active in public outreach to educate fishermen regarding sea turtle handling and resuscitation techniques. For example, NOAA Fisheries has conducted workshops with longline fishermen to discuss bycatch issues including protected species, and to educate them regarding handling and release guidelines. NOAA Fisheries intends to continue supplementing outreach efforts in an attempt to increase the survival of protected species through education on proper release techniques. Education and outreach activities are also methods to reduce the risk of collision presented by the operation of private and commercial vessels. The USCG educates mariners on whale protection measures and uses its programs -- such as radio broadcasts and notice to mariner publications -- to alert the public to potential whale concentration areas. The USCG also participates in international activities (discussed below) to decrease the potential for commercial ships to strike a whale. Recently, an educational video on the ship strike problem was produced and is being distributed to mariners. In addition, outreach

efforts under the ALWTRP for fishermen are also increasing awareness among fishermen that is expected in the long run to help reduce the adverse effects of vessel operations on threatened and endangered species in the action area.

Whales

In addition to the ESA measures for federal activities mentioned in the previous section, numerous recovery activities are being implemented to decrease the adverse effects of private and commercial vessel operations on the species in the action area and during the time period of this consultation. These include the Sighting Advisory System (SAS), other activities recommended by the Northeast Recovery Plan Implementation Team for the Right and Humpback Whale Recovery Plans (NEIT) and Southeast Recovery Plan Implementation Team for the Right Whale Recovery Plan (SEIT), and NOAA Fisheries regulations.

In 1994, NOAA Fisheries established the NEIT for the North Atlantic right whale and humpback whale recovery plans. Membership of the NEIT consists of representatives from federal and state regulatory agencies and is advised by a panel of scientists with expertise in right and humpback whale biology. The Recovery Plans describe steps to reduce impacts to levels that will allow the two species to recover and rank the various recovery actions in order of importance. The NEIT provides advice to the various federal and state agencies or private entities on achieving these national goals within the Northeast Region. The NEIT agreed to focus on habitat and vessel related issues and rely on the take reduction planning process under the MMPA for reducing takes in commercial fisheries. Through the deliberations of the NEIT, NOAA Fisheries has implemented a number of activities that reduce the potential for adverse effects to endangered whales from the aforementioned state, federal, and private activities. For example, the NEIT was the driving force behind the outreach activities described above which promote awareness of the right whale ship strike problem among commercial ship operators.

The Northeast Sighting Advisory System (SAS), originally called the Early Warning System, was designed to document the presence of right whales in and around critical habitat and nearby shipping/traffic separation lanes in order to avert ship strikes. Through a fax-on-demand system, fishermen and other vessel operators can obtain SAS sighting reports and, in some cases, make necessary adjustments in operations to decrease the potential for interactions with right whales. The SAS activity has also served as the only form of active entanglement monitoring in the critical habitat areas, and several entanglements in both the Cape Cod Bay and Great South Channel areas have been reported by SAS flights. Some of these sighting efforts have resulted in successful disentanglement of right whales. SAS flights have also contributed to sightings of dead floating animals that can occasionally be retrieved to increase our knowledge of the biology of the species and effects of human impacts.

In one recovery action aimed at reducing vessel-related impacts, including disturbance, NOAA Fisheries published a proposed rule in August 1996 restricting vessel approach to right whales (61 FR 41116) to a distance of 500 yards. The Recovery Plan for the North Atlantic Right Whale identified anthropogenic disturbance as one of many factors that had some potential to impede right whale recovery (NOAA Fisheries 1991b). Following public comment, NOAA Fisheries published an interim final rule in February 1997 codifying the regulations. With certain

exceptions, the rule prohibits both boats and aircraft from approaching any right whale closer than 500 yds. Exceptions for closer approach are provided for the following situations: when (a) compliance would create an imminent and serious threat to a person, vessel, or aircraft; (b) a vessel is restricted in its ability to maneuver around the 500-yard perimeter of a whale; (c) a vessel is investigating or involved in the rescue of an entangled or injured right whale; or (d) the vessel is participating in a permitted activity, such as a research project. If a vessel operator finds that he or she has unknowingly approached closer than 500 yds, the rule requires that a course be steered away from the whale at slow, safe speed. In addition, all aircraft, except those involved in whale watching activities, are excepted from these approach regulations. This rule is expected to reduce the potential for vessel collisions and other adverse vessel-related effects in the environmental baseline.

In April 1998, the USCG submitted, on behalf of the United States, a proposal to the International Maritime Organization (IMO) requesting approval of a mandatory ship reporting system (MSR) in two areas off the east coast of the United States. The USCG worked closely with NOAA Fisheries and other agencies on technical aspects of the proposal. The package was submitted to the IMO's Subcommittee on Safety and Navigation for consideration and submission to the Marine Safety Committee at IMO and approved in December 1998. The USCG and NOAA play important roles in helping to operate the MSR system, which was implemented on July 1, 1999.

Through deliberations of the NEIT and its Ship Strike Committee, NOAA Fisheries and the National Ocean Service (NOS) recently revised the whale watch guidelines for the Northeast, including the Studds-Stellwagen National Marine Sanctuary.

Sea Turtles

NOAA Fisheries has implemented a series of regulations aimed at reducing the potential for incidental mortality of sea turtles in commercial fisheries. In particular, NOAA Fisheries has required the use of TEDs in southeast U.S. shrimp trawls since 1989 and in summer flounder trawls in the Mid-Atlantic area (south of Cape Henry, Virginia) since 1992. It has been estimated that TEDs exclude 97% of the turtles caught in such trawls. These regulations have been refined over the years to ensure that TED effectiveness is maximized through proper placement and installation, configuration (e.g., width of bar spacing), floatation, and more widespread use. For instance, on February 21, 2003, NOAA Fisheries issued a final rule to amend the sea turtle protection regulations to enhance their effectiveness in reducing sea turtle mortality resulting from trawling in the Atlantic and Gulf Areas of the southeastern United States (68 FR 8456). These regulations included modifications to the TED design in order to exclude leatherbacks and large, sexually mature loggerhead and green turtles. Note that with the expansion of fisheries to previously underutilized species of fish, trawl effort directed at species other than shrimp or summer flounder -- and that does not meet the definition of a summer flounder trawl as specified in the TED regulations -- may be an undocumented source of mortality for which TEDs should be considered.

NOAA Fisheries has also developed a TED which can be used in a type of trawl known as a flynet, which is sometimes used in the mid-Atlantic and northeast fisheries for summer flounder,

scup, and black sea bass. This TED is currently being tested in flynets. If observer data conclusively demonstrate a need for such TEDs, regulations will be formulated to require use of TEDs in this fishery, once such a device has been perfected.

On December 3, 2002, NOAA Fisheries published restrictions on the use of gillnets with larger than 8 inch stretched mesh, in federal waters (3-200 nautical miles) off of North Carolina and Virginia (67 FR 71895). These restrictions were implemented to reduce the impact of the monkfish and other large-mesh gillnet fisheries on endangered and threatened sea turtles in areas where sea turtles are known to concentrate. As a result, gillnets with larger than 8 inch stretched mesh are prohibited in federal waters north of the North Carolina/South Carolina border at the coast to Oregon Inlet at all times; north of Oregon Inlet to Currituck Beach Light, NC from March 16 through January 14; north of Currituck Beach Light, NC to Wachapreague Inlet, VA from April 1 through January 14; and, north of Wachapreague Inlet, VA to Chincoteague, VA from April 16 through January 14. Federal waters north of Chincoteague, VA are not affected by these new restrictions, although NOAA Fisheries is looking at additional information to determine whether expansion of the restrictions are necessary to protect sea turtles as they move into northern Mid-Atlantic and New England waters. These measures are in addition to Harbor Porpoise Take Reduction Plan measures that prohibit the use of large-mesh gillnets in southern Mid-Atlantic waters (territorial and federal waters from Delaware through North Carolina out to 72E 30'W longitude) from February 15-March 15, annually.

Existing information indicates that pound nets with large mesh and stringer leaders as used in the Virginia Chesapeake Bay incidentally take sea turtles. Based on the available information, NOAA Fisheries determined that fishing with this gear is likely a major contributor to spring sea turtle strandings in the Virginia Chesapeake Bay. To address the high and increasing level of sea turtle strandings, on June 17, 2002, NOAA Fisheries published an interim final rule that restricted the use of all pound net leaders of 8 inches or greater stretched mesh and all pound net leaders with stringers in Virginia waters of the mainstem Chesapeake Bay and tributaries from May 8 to June 30 each year (67 FR 41196). The pound net fishery is limited to the waters of the Chesapeake Bay and, as such, this particular protective measure does not apply specifically in the action area of this project. However, the turtles that traverse the action area are likely to represent the same population of turtles that enters the Bay to forage, and will thus benefit from the pound net rules.

The NOAA Fisheries has also developed specific sea turtle handling and resuscitation techniques for sea turtles that are incidentally caught during scientific research or fishing activities to prevent injury. The Sea Turtle Handling and Resuscitation Techniques are regulations which were published (revised) in the Federal Register on December 31, 2001. As stated in 50 CFR 223.206(d)(1), any sea turtle taken incidentally during fishing or scientific research activities must be handled with due care to prevent injury to live specimens, observed for activity, and returned to the water according to a series of procedures.

While this does not refer to a specific regulation, there is an extensive array of Sea Turtle Stranding and Salvage Network (STSSN) participants along the Atlantic and Gulf of Mexico coasts who not only collect data on dead sea turtles, but also rescue and rehabilitate live stranded

turtles. Data collected by the STSSN are used to monitor stranding levels and compare them with fishing activity in order to determine whether additional restrictions on fishing operations are needed. These data are also used to monitor incidence of disease, study toxicology and contaminants, and conduct genetic studies to determine population structure. All of the states that participate in the STSSN are collecting tissue for and/or conducting genetic studies to better understand the population dynamics of sea turtle species. These states also tag live turtles when encountered (either via the stranding network through incidental takes or in-water studies). Tagging studies help provide an understanding of sea turtle movements, longevity, and reproductive patterns, all of which contribute to our ability to reach recovery goals for the species.

There is no organized, formal program for at-sea disentanglement of sea turtles as there is for cetaceans. However, NOAA Fisheries is considering disentanglement guidelines pursuant to conservation recommendations issued with several recent section 7 consultations. Entangled sea turtles found at sea in recent years have been disentangled by STSSN members, the whale disentanglement team, the USCG, and fishermen. Staff of the Maine Department of Marine Resources (DMR) has received anecdotal reports from fishermen who have disentangled leatherbacks from their lobster pot gear (J. Lewis, pers. comm.).

Summary and Synthesis of the Status of the Species and Environmental Baseline

In summary, the activities that may have previously impacted listed whales and sea turtles in the vicinity of the Sandbridge Shoal offshore borrow site and Dam Neck Annex beach disposal site (dredging, vessel operations, military activities, commercial and state fisheries, etc.), persist throughout the action area of this consultation. However, recovery actions have been undertaken as described and continue to evolve. Although these actions have not been in place long enough to manifest detectable changes in most endangered or threatened populations, they are expected to benefit listed species in the foreseeable future. The recovery actions should not only improve conditions for listed whales and sea turtles, they are expected to reduce sources of human-induced mortality as well.

However, a number of factors in the existing baseline for the large whales considered in this BO (especially right whales), and sea turtles (especially loggerheads and leatherbacks) leave cause for considerable concern regarding the status of these populations, the current impacts upon these populations, and the impacts associated with future activities planned by the state and federal agencies.

- The North Atlantic right whale population continues to be declining. Based on recent estimates, NOAA Fisheries considers the best approximation for the number of North Atlantic right whales to be 300 +/- 10%. Losses of adult whales due to ship strikes and entanglements in fishing gear continue to depress the recovery of this species.

- The population of leatherback sea turtles in the Atlantic Ocean does not appear to be increasing; it is either declining or stable depending on whether we accept conservative or optimistic estimates, respectively.

- The northern subpopulation of loggerhead sea turtles is stable, at best, or declining, and currently numbers only about 3,800 nesting females. The percent of northern loggerheads represented in sea turtle strandings in northern U.S. Atlantic states is over-representative of their total numbers in the overall loggerhead population. Current take levels from other sources, particularly fisheries, are high.

EFFECTS OF THE PROPOSED ACTION

This section of a biological opinion assesses the direct and indirect effects of the proposed action on threatened and endangered species or critical habitat, together with the effects of other activities that are interrelated or interdependent (50 CFR 402.02). Indirect effects are those that are caused later in time, but are still reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend upon the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration (50 CFR 402.02).

Several listed species are likely to be present in the action area at various times of the year and may therefore be adversely affected either directly or indirectly by the dredging and/or transport phases of this project. The primary concern for sea turtles is entrainment in the draghead of the hopper dredge, while the main concern for endangered whales involves the potential for vessel collisions during transit between the offshore borrow site and Dam Neck Beach.

The Chesapeake Bay is apparently an important summer foraging area for juvenile sea turtles, and interactions could occur as turtles move past the project area when migrating into or out of the Bay. As mentioned, sea turtles are distributed throughout the action area in the warmer months, generally from April through November. For instance, an offshore Virginia aerial survey conducted in May 2002 documented sea turtles in the mouth of the Chesapeake Bay and around the Dam Neck disposal site (Coastwise Consulting 2002). Loggerhead and Kemp's ridley sea turtles are the most common turtle species along the coast of Virginia. Green turtles are not present in detectable numbers in the Chesapeake Bay, but their occurrence has been documented on numerous occasions and as such, this species may be impacted by the proposed project. Leatherback sea turtles may also be present in the action area, but would be subject more to vessel collisions than dredge entrainment due to their size and behavioral characteristics. Hawksbill turtles may occasionally enter the area and may therefore interact with the project operations; however, these instances would be extremely rare.

One of the primary factors influencing sea turtle presence in Virginia waters is seasonal temperature patterns (Ruben and Morreale 1999). Temperature is correlated with the time of year, with the warmer waters in the late spring, summer, and early fall being the most suitable for cold-blooded sea turtles. The Navy has acknowledged the seasonal distribution of sea turtles in the project area and has scheduled the majority of the work to be completed when sea turtles are not likely to be present (January through March) in order to minimize any impacts. However, dredging may continue throughout April, and recent temperature data suggest that turtles may be

present in Virginia waters as early as April 1 (Epperly and Braun-McNeill 2002). In addition, the Navy has acknowledged the possibility that contract delays or other unforeseeable circumstances could require that dredging continue into May or possibly into the summer months when turtle abundance is highest. Should dredging take place from April through November, the likelihood that dredging activities would affect sea turtles is greater during this period than during other times of the year.

To some extent, water depth also dictates the number of sea turtles occurring in a particular area. Water depth at the borrow site ranges from approximately 27 to 45 ft deep. Satellite tracking studies of sea turtles in the Northeast found that turtles mainly occurred in areas where the water depth was between approximately 16 and 49 ft (Ruben and Morreale 1999). This depth was interpreted not to be as much an upper physiological depth limit for turtles, as a natural limiting depth where light and food are most suitable for foraging turtles (Morreale and Standora 1990). The depths at the borrow site and the depths preferred by sea turtles overlap, suggesting that loggerheads and Kemp's ridleys are likely to be present in the project area.

Endangered whales could also migrate through the action area at various times of the year. In general, right whales can be anticipated to be off Virginia from November to April, humpback whales can be found off Virginia from September to April, and fin whales may be in the action area from October to January. These species are found more frequently in deeper offshore waters than in shallow nearshore or inshore waters, and would be more likely to occur in the vicinity of the Sandbridge Shoal borrow site than at points closer to the Dam Neck Annex beach disposal site. The exception would be juvenile humpback whales, which are believed to be using nearshore (within 2.5 miles of shore) Virginia waters as a winter feeding ground (Swingle et al. 1993). Sightings of large whales in the vicinity of the Sandbridge Shoal borrow site are infrequent, although this may be due in part to limited survey effort in the mid-Atlantic region. Nonetheless, North Atlantic right, humpback, and fin whales have all been sighted on occasion off the coast of Virginia (NOAA Fisheries unpublished data 2002). NOAA Fisheries thus considers that while right, humpback, and fin whales may be present in the vicinity of the action area, their presence would be unlikely. Juvenile humpbacks would be the whales most likely to be present in the vicinity of the action area.

As mentioned, this consultation was reinitiated due to an increase in the amount of dredged material required to nourish the Dam Neck Annex beach and an escalation in the dredge cycle. The magnitude of dredging at the Sandbridge borrow site is expected to remain relatively consistent at 700,000 cy from cycle to cycle. However, this quantity represents the amount of material required to nourish the Dam Neck beach following unusual storm activity in 1998. Thus, it is possible that a smaller amount of material could be dredged in the future. As such, this BO considers the potential effects of dredging up to 700,000 cy on an 8-year cycle.
The consultation will consider whether a new ITS or other measures to monitor or reduce sea turtle takes are warranted. While it is anticipated that the majority of dredging activity will take place when sea turtles are not present in the action area, this BO considers the effects of dredging on sea turtles and other listed species during the time when they occur in the action area.

Effects of Dredging and Associated Activities

NOAA Fisheries has determined that dredging and beach renourishment at Dam Neck Annex, Virginia Beach (and associated activities) may affect threatened and endangered species in three ways: (1) the proposed action can alter foraging habitat; (2) dredges can entrain and kill sea turtles; and (3) sea turtles and whales can be injured or killed by collisions with vessels transiting from the Sandbridge borrow site to the Dam Neck beach disposal site.

Alteration of foraging habitat
The sea turtle recovery plans identify the impacts of dredging as both the destruction or degradation of habitat and the incidental take of sea turtles. The proposed project involves both types of impacts. Since dredging involves removing the bottom material, dredging operations can severely impact the benthic environment, thus causing indirect effects to sea turtles by reducing prey species through the alteration of the existing biotic assemblages. Turtles are not very easily affected by changes in water quality, increased suspended sediments, or even by moderate alterations of flow regimes. Nevertheless, if these changes make the habitat less suitable for turtles, in the long run sea turtles would tend to leave or avoid these less desirable areas, especially if they became food limited (Ruben and Morreale 1999).

Although there is no evidence to suggest that the Sandbridge Shoal borrow site contains bottom characteristics that would attract aggregations of foraging turtles, the water depth at the site (27-45 feet) is appropriate for the benthic species upon which turtles may prey. Endangered Species Observer Reports from the 1996 dredging cycle at Sandbridge Shoal report the presence of spider crabs, clams, whelks, and other shellfish in the hopper spoil. Loggerhead and Kemp's ridley sea turtles, which are the most likely species to be present in the action area, prey primarily on crabs and mollusks (Morreale and Standora 1992, Bjorndal 1997). Turtles migrating into or out of the Bay may thus opportunistically forage at or near the Sandbridge borrow site.

The loss of foraging habitat could be especially detrimental to sea turtles because these species primarily enter Northeast/mid-Atlantic shallow harbors and bays to forage (NOAA Fisheries and USFWS 1995). However, there is no information to indicate that unique concentrations of preferred prey or better foraging habitat exists at the Sandbridge borrow site as opposed to neighboring shoals or the nearby Chesapeake Bay. Therefore, it can be assumed that sea turtles are not likely to be more attracted to the Sandbridge Shoal borrow site than to other foraging areas and should be able to find sufficient prey in surrounding areas. It is also important to note that some of the prey species targeted by turtles are mobile and are likely to avoid the dredge. In addition, the proposed dredging is not located in an area identified as critical habitat. The bottom type remaining in the borrow area after dredging will be similar to the bottom type present prior to dredging, and organisms from adjacent areas would be able to recolonize the newly exposed bottom areas. Thus, while available foraging habitat may be reduced temporarily, long-term effects to listed species' benthic prey are expected to be minimal. Actual benthic recovery rates vary according to sediment type, time of year, and the stability of the substrate due to natural conditions such as waves and currents. In the 1996 EA for the Dam Neck beach nourishment (US Navy 1996), the Navy indicated that the Sandbridge Shoal borrow site is similar to the Norfolk Disposal Site to the north. Studies of this site found it was populated by predominantly opportunistic organisms, which would be expected to rapidly repopulate any excavated areas in

less than one year. Some studies have indicated reduced species richness or changes in community structure following recolonization (e.g., Rakocinski et al. 1996). Nonetheless, foraging habitat in surrounding areas is present in sufficient quantities such that removal of a relatively small portion of potential foraging habitat will not measurably impact prey availability for sea turtle species.

Based on the above information, NOAA Fisheries anticipates that the maintenance dredging activities are not likely to disrupt normal sea turtle feeding behaviors and are not likely to remove critical amounts of prey resources from the Virginia offshore habitat.

Entrainment

Entrainment is the most imminent danger for sea turtles during selected dredging operations because hopper dredges are known to kill these species (Magnuson et al. 1990, Slay 1995). The National Research Council's Committee on Sea Turtle Conservation (1990) estimated that mortality due to dredging, along with boat strikes, was second only to fishery interactions as a source of probable lethal takes of sea turtles. Experience has shown that injuries sustained by sea turtles entrained in the hopper dredge dragheads are usually fatal. Mortality in hopper dredging operations occurs when the species are sucked into the dredge draghead, pumped through the intake pipe and then killed as they cycle through the centrifugal pump and into the hopper. Because entrainment is believed to occur primarily while the draghead is operating on the bottom, it is likely that only those species feeding or resting on or near the bottom would be vulnerable to entrainment. In relatively rare cases, animals may be entrained if suction is created in the draghead by current flow while the device is being placed or removed, or if the dredge is operating on an uneven or rocky substrate and raises off the bottom. However, it is possible to operate the dredge in a manner that minimizes potential for such incidents as noted in the Monitoring Specifications for Hopper Dredges (Appendix C).

Documented turtle mortality is more common in the southeastern US, probably due to the greater abundance of turtles in these waters. In King's Bay, Georgia, turtle parts were found at the mouth of the hopper dredge draghead (Slay and Richardson 1988), and at least 38 sea turtle deaths associated with hopper dredging were recorded during 1991 in three ports located in Brunswick, Georgia, Savannah, Georgia, and Charleston, South Carolina (Slay 1995). However, sea turtle mortality in dredging activities has also been documented in the Northeast, and in spite of the lower overall turtle density, an individual sea turtle in the Northeast or Mid-Atlantic would have the same potential to become entrained in a hopper dredge as would an individual turtle in the Southeast. A loggerhead turtle was taken by a hopper dredge off the coast of Sea Girt, New Jersey during an ACOE beach renourishment project on August 23, 1997. This turtle was closed up in the hinge between the draghead and the dragarm as the dragarm lifted off the bottom. Additionally, during the dredging of 1.2 million cy of sediment from Delaware Bay in 1994, a loggerhead turtle was entrained in a hopper dredge.

Dredge-related sea turtle mortalities have also occurred in the vicinity of the site proposed for dredging, as evidenced by the whole sea turtles and fresh sea turtle parts that have been recovered from screening baskets and dredge dragheads. In nearby Thimble Shoals Channel in the mouth of the Chesapeake Bay, maintenance dredging killed several turtles during the warmer months of

2000-2003. In 2000, fragments from three individual turtles were recovered in five different loads. In 2001, a total of 15 dead turtles and/or turtle parts were recovered, of which nine mortalities were considered fresh dead and thus directly attributed to the dredging activity. One turtle was killed in the spring of 2002, and as of October 23, 2003, 11 turtles have been recovered in 2003, of which ten were considered fresh dead. The following table depicts the various incidents in Thimble Shoal Channel from 2000 through October 2003.

Table 2. Incidental sea turtle takes during maintenance dredging activities in Thimble Shoals Channel, Virginia, from 2000 through October 2003.

Date	Species	Comments
7-24-00	Unidentified species	Three unidentifiable pieces of plastron recovered from the discharge screening.
8-22-00	Loggerhead	Fresh loggerhead recovered from the port draghead. Turtle's neck was broken, the muscles were still pink, and the barnacles on the carapace were alive.
8-25-00	Loggerhead	Piece of loggerhead carapace and attached tissue was recovered.
8-25-00	Presumably loggerhead	In a load immediately after the other August 25 take, a section of digestive tract was recovered.
8-27-00	Loggerhead	Decomposed loggerhead with a missing section of carapace and many broken bones recovered. The three takes (two on August 25 and one on August 27) were believed to be the same animal given the size of animal, species, location, state of decomposition, and sections of missing carapace.
8-7-01	Loggerhead	Fresh, whole loggerhead with a cracked carapace discovered in the draghead
8-9-01	Loggerhead	Carapace and right front flipper of a fresh loggerhead found lodged in the port draghead
8-16-01	Unidentified species	Decomposed right front flipper recovered from the inflow screening basket
8-17-01	Loggerhead	Sections of a loggerhead's carapace, plastron, muscle, and digestive tract found in the inflow screening basket. Several small veins and arteries still had a bright red coloration, indicating fresh take.
8-20-01	Loggerhead	Rear left flipper and parts of a fresh loggerhead turtle found.
8-21-01	Loggerhead	Decomposed front flippers of a loggerhead recovered from the port draghead (a portion partially underneath the draghead and a portion pinched in the hinge on outside of draghead).
8-22-01	Loggerhead	Severely decomposed portion of a loggerhead carapace found in the inflow mid screening basket. While difficult to determine conclusively, it is

		possible that the decomposed parts taken on August 21 and August 22 were from the same turtle.
8-24-01	Loggerhead	Decomposed rear flipper of a loggerhead recovered from the inflow fore screening basket.
8-28-01	Loggerhead	Fresh loggerhead, missing only a portion of its carapace, found lodged in the bottom of the starboard draghead. Fragments of this loggerheads carapace were also removed from the intake screening basket.
9-26-01	Unidentified species	Decomposed piece of an unknown turtle's plastron found in the overflow screening basket.
10-23-01	Unidentified species	Carapace piece from an unknown species of turtle found in the overflow screening basket.
11-4-01	Kemp's ridley	Piece of Kemp's ridley carapace recovered from the inflow screening basket.
11-11-01	Unidentified species	Portion of a flipper and two ribs without attached tissue from an unknown species of turtle recovered.
11-11-01	Unidentified species	Portion of the plastron (with no tissue) from an unknown species of turtle recovered.
11-20-01	Loggerhead	Two carapace fragments and associated tissue from a fresh loggerhead were taken.
4-24-02	Loggerhead	Fresh carapace fragment found with skin attached in inflow starboard forward basket. Turtle taken while observer was off shift at night.
9-11-03	Loggerhead	Fresh turtle, carapace split down middle. Head found wedged under port side dragarm. Turtle alive when found, died on deck. Taken to VMSM for necropsy.
9-13-03	Loggerhead	Fresh, carapace crushed and scutes detached. Both humerus bones exposed/detached. Alive for 3 hours and died on deck (2250 hrs). Turtle taken from underside of port draghead. Frozen for necropsy.
9-14-03	Loggerhead	Fresh vertebrae and vertebral scute found from starboard aft screen. Fused vertebrae eith either pelvic or pectoral girdle. Fresh tissue present. **Trawling started after this take.** Began on 9/14/03 at 2130, stopped for hurricane, began again on 9/20. Stopped on 9/23/03
9-15-03	Unknown	Tissue and underlayered skin of plastron with broken bones found in port forward and starboard aft basket. Joint and socket with tissue found. Mangled and torn tissue. Pungent odor. White coloration.
9-26-03	Unknown (prob. Loggerhead)	Carapace fragment and intestines found in starboard stern basket. Appeared fresh--intestines pink with no odor, vascular tissue present, carapace fragment had scute and smooth, membranous underside. Broken hypoplastron in bow basket, freshness unknown.
9-28-03	Unknown (prob.	Carapace fragment very similar to fragment found on 9/26/03. Scutes peeling off. No odor. Recovered

	Loggerhead)	from port-side stern basket.
10-16-03	Loggerhead	Fresh kill--blood still draining on deck. Most of carapace missing. Entire plastron present, head intact, all four flippers present, cluster of 20 barnacles on posterior segment of carapace. Recovered from port draghead.
10-20-03	Loggerhead	Live turtle recovered from starboard draghead. Large cracks in carapace and head. Bled profusely. Virginia Science Museum euthanized turtle.
10-21-03	Loggerhead	Fresh kill recovered from port draghead--half of carapace, both hind flippers, and posterior section of plastron missing. Head intact.
10-22-03	Kemp's ridley	Head, foreflippers, anterior 2"-3" segments of carapace and 4"-5" section of plastron present. Posterior flippers and shell missing. Immature turtle with ridges on vertebral scutes. Recovered from overflow.
10-22-03	Loggerhead	Rough break of inframarginal and plastron scute. Fleshy but worn, odor present. Recovered from aft port basket.

Sea turtles and sea turtle parts have been recovered during dredging in the Cape Henry Channel and further up the Chesapeake Bay in the York Spit Channel as well. In 2001 and 2002, turtle parts were recovered on 25 documented occasions, with 21 of these incidents involving fresh dead animals. Greater than 3 million cy of material (but less than 5 million cy) were dredged from these channels in 2001 and 2002 combined. Table 3 (pp. 60-64) provides details on each of these incidents. There were no documented incidents of turtle mortality or recovery of turtle parts during dredging activities in the Cape Henry or York Spit Channels prior to 2001; however, most of the previous dredging activity was conducted in the winter when turtles were not likely to be present.

The Final Report for the Endangered Species Monitoring Program for beach nourishment at Dam Neck beach between August 7, 1996 and November 7, 1996 indicates that no injury or mortality of sea turtles was witnessed during the Navy's dredging of 760,000 cy of sand from the Sandbridge Shoal borrow site (REMSA 1996). However, dead loggerhead turtles were spotted on three occasions during dredging, indicating that turtles were indeed present in the project area. The deaths of these turtles were not attributed to the dredging activity. There were also no incidents of take during the ACOE's dredging of 1.5 million cy of material from the same Sandbridge Shoal borrow site in 1998.

It should also be noted that the observed takes may not be representative of all the turtles killed during dredge operations. During the 1996 Dam Neck nourishment cycle, only 25% of screened material was observed. As such, a turtle could have been taken by the dredge and gone unnoticed if the observer was off watch and the dredge company either did not report or was unable to identify the turtle incident. In addition, it should be noted that several sea turtles have stranded on Virginia shores with crushing type injuries while dredge operations were taking place nearby. From May 25 to October 15, 2002, the Virginia Marine Science Museum (VMSM) found ten

loggerheads, two Kemp's ridleys, and one leatherback exhibiting injuries and structural damage consistent with what they have seen in animals that were known dredge takes (W.Walton, VMSM, pers. comm.). In October 2003, three loggerheads stranded in the vicinity of dredging activity that also exhibited crushing-type injuries. While it cannot be conclusively determined that these strandings were the result of dredge interactions, the link is possible given the location of the strandings (e.g., in the southern Bay near the dredging activity, or with the dredge visible from the stranding site), the time of the documented strandings in relation to dredge operations, the lack of other ongoing activities which may have caused such damage, and the nature of the injuries (e.g., crushed or shattered carapaces and/or flipper bones, black mud in mouth). A dredge could crush an animal as the draghead was being set on the bottom, or if the draghead was lifting on and off the bottom due to uneven terrain, but the actual cause of these crushing injuries cannot be determined at this time. Further analyses need to be conducted to better understand the link between crushed strandings and dredging activities, and if those strandings need to be factored into an incidental take level. Regardless, it is possible that dredges are taking animals that are not observed on the dredge (in the inflow or outflow screens), which may result in strandings on nearby Virginia beaches.

While turtles primarily forage in shallow environments, they have been found resting in deeper waters, which could render them more susceptible to impacts from dredging activities. In 1981, observers documented the take of 71 loggerheads by a hopper dredge at the Port Canaveral Ship Channel, Florida (Slay and Richardson 1988). This channel is a deep, low productivity environment in the Southeast Atlantic that encourages turtles to rest on the bottom, making them extremely vulnerable to entrainment. The large number of turtle mortalities at the Port Canaveral Ship Channel in the early 1980s resulted in part from the turtles burying themselves in the soft bottom mud, a behavior known as brumation. While brumation is not a common behavior everywhere sea turtles occur, chelonid turtles have been found to make use of deeper, less productive channels as resting areas that afford protection from predators because of the low energy, deep water conditions. More research needs to be conducted to determine if sea turtles are in fact undergoing brumation in Virginia waters. However, in the absence of any evidence that turtles burrow into the sediment and become dormant as they apparently do further south, NOAA Fisheries considers that the crushing of sea turtles due to brumation is not likely to happen in the action area.

The Navy's proposed mitigation measures (a)-(f) provide operating, monitoring, and reporting requirements that attempt to reduce the impacts of dredging on sea turtles. However, similar measures were in place during each of the projects listed above in which takes were documented. Therefore, entrainment in the dredge remains a likely adverse effect for the action as proposed.

Humpback, fin, and right whales are highly unlikely to be entrained by the dredge due to their size and offshore distribution.

Collisions with dredges

Contact injuries resulting from dredge movements would occur at or near the water surface and could therefore involve any of the marine mammals or turtles present in the area. There has only been one report of a hopper dredge colliding with a whale (Laist et al. 2001), which involved a

southern right whale calf in East London Harbor, South Africa in 1984. There have been no documented instances of dredges colliding with sea turtles. In general, vessel strikes are rare events, but whales and sea turtles have been documented with injuries consistent with vessel interactions and it is reasonable to believe that the dredge vessels considered in this BO could inflict such injuries should they collide with marine mammals and sea turtles. Because the dredge is unlikely to be moving at speeds greater than seven knots during dredging operations, blunt trauma injuries resulting from contact with the hull are unlikely during dredging. It is more likely that contact injuries during actual dredging would involve the propeller of the vessel. Contact injuries with the dredge are more likely to occur when the dredge is moving between the dredge site and the beach placement site. While the distance between the dredge location and the placement site is relatively short, the dredge in transit would be moving at faster speeds than during dredging operations, particularly when empty while returning to the borrow site. Dredges typically transit at speeds between 10-15 knots.

While vessel strikes represent a notable threat to marine mammals and sea turtles, there is currently no rule or regulation that implements a requirement for vessel speed. However, NOAA Fisheries has prepared a draft Ship Strike Reduction Strategy that outlines a number of measures to reduce the threat of ship strikes to right whales. One such measure calls for establishing speed restrictions to minimize collisions. Information included with this strategy suggests that collisions with vessels (greater than or equal to 65 feet in length) traveling at speeds of less than 14 knots are less likely to result in serious injury and mortality to whales. The dredges that have been used in Virginia waters in the past have not exceeded 13.4 knots when empty. This falls within the range considered by NOAA Fisheries to reduce the risk of serious injury and mortality to whales. Therefore, while these listed whale species have been sighted in the area where the dredge will be transiting, it is reasonable to believe that, should a collision at a speed of 12 to 13 knots occur, it would be unlikely to result in serious injury or mortality.

Furthermore, the Navy's proposed mitigation measures provide increased protection against vessel collisions. Specifically, mitigation (h) limits intentional approach of listed species to within 100 yards, and requires dredge operators to follow the advice of the NOAA Fisheries-approved observer to avoid impacts to individual animals. With these precautions in place, NOAA Fisheries considers collisions between sea turtles and dredge vessels to be unlikely. If animals are sighted and the dredge operator is alerted immediately, the dredge operator should be able to avoid most collisions. When NOAA Fisheries-approved observers are not required to be present (December-March), mitigation (i) calls for a bridge watch to be posted for whales and a speed restriction of four knots or less when whales are present during dredging or materials transport. Laist et al. (2001) reports that of 41 ship strike accounts that reported vessel speed, no lethal or severe injuries occurred at speeds below ten knots, and no collisions have been reported for vessels traveling less than six knots. Although increased use of the area by juvenile humpback whales has been documented, operational guidelines such as the four knot speed restriction and the additional precaution of posting a dedicated bridge watch reduce to a discountable level the potential for the dredge to collide with marine mammals.

Estimating the Number of Turtles Taken in Dredging and Associated Activities

For the proposed action, NOAA Fisheries must anticipate the amount of incidental take that may occur during the dredging of up to 700,000 cy of material on an eight-year cycle. The previous BO issued for the initial 1996 cycle of 760,000 cy of material and an additional 635,000 cy thereafter on a 12-year cycle anticipated that up to ten loggerhead and one documented Kemp's ridley or green turtle could be taken by injury or mortality. However, since there were no observed sea turtle takes during the initial dredge cycle and the currently proposed volume of sand is lower than the initial volume dredged, NOAA Fisheries believes the level of take anticipated in the 1996 BO can be reduced. Additional data on sea turtle takes during dredging projects in the vicinity of the Sandbridge Shoal borrow site also suggest that the take level anticipated in 1996 was unnecessarily high. For instance, the level of take anticipated in the 1996 BO for the Dam Neck Annex Beach nourishment project (ten loggerheads) was observed during the removal of 2.7 million cy of material from the Thimble Shoal and Atlantic Ocean Channels for the Virginia Beach Hurricane Protection project (NOAA Fisheries 2001b), which is a far greater amount of material than the currently proposed 700,000 cy. More comparable volumes of sand were dredged from Thimble Shoals in 2000 (less than 1 million cy) and 2001 (1.3 million cy), resulting in the take of three turtles and five turtles respectively. Four loggerheads and one Kemp's ridley were estimated to be taken in Thimble Shoals Channel dredging with the removal of 1 million cy of material (NOAA Fisheries 2002b). Two fresh loggerheads and one fresh Kemp's ridley were taken during the dredging of 350,000 cy of material from Cape Henry Channel in 2001.

Thus, based on the level of previous sea turtle takes during the initial renourishment cycle at Dam Neck Annex, the observed incidental take levels for other dredging projects in the vicinity of the action area, and the volume of material dredged during these previous activities, NOAA Fisheries estimates that four loggerheads and one Kemp's ridley or green turtle will be taken with the removal of up to 700,000 cy from the Sandbridge Shoal borrow site. Unlike for loggerheads and Kemp's ridleys, the level of anticipated take for green sea turtles during the proposed dredging project is not a reflection of the dredging effort because based upon previous capture rates in the action area, the take of a green turtle in these dredging operations may only periodically occur regardless of the magnitude of dredging. No hawksbill or leatherback sea turtles are anticipated to be taken, due to the rarity of their presence in the action area, their behavioral and foraging characteristics, and, for leatherbacks, their size and the lack of documented takes in hopper dredges. If in the future, new information suggests otherwise, NOAA Fisheries will re-assess the anticipated amount of leatherback or hawksbill take during these dredging operations.

While decomposed turtle parts are considered to be takes, NOAA Fisheries is most concerned with the takes that appear to be fresh dead sea turtles and are therefore directly attributable to the dredging activities. Thus, the aforementioned anticipated level of take refers to those turtles which NOAA Fisheries confirms as freshly dead. While this definition is subject to some interpretation by the observer, a fresh dead animal may exhibit the following characteristics: little to no odor; fresh blood present; fresh (not necrotic, pink/healthy color) tissue, muscle, or skin; no bloating; color consistent with live animal; and live barnacles. A previously (non-fresh) dead animal may exhibit the following characteristics: foul odor; necrotic, dark or decaying tissues; sloughing of scutes; pooling of old blood; atypical coloration; and opaque eyes. NOAA Fisheries

does expect that the maintenance dredging may take an additional unquantifiable number of previously dead sea turtle parts. While decomposed animals taken in federal operations are considered to be takes, as the possession of a listed species is considered a take, NOAA Fisheries recognizes that takes of decomposed sea turtles during dredging operations may not necessarily be related to the dredging activity itself. Theoretically, if dredging operations are conducted properly, no takes of sea turtles should occur as the turtle draghead deflector should push the turtles to the side and the suction pumps should be turned off whenever the dredge draghead is away from the substrate. However, due to certain environmental conditions (e.g., rocky bottom, uneven substrate), the dredge draghead may periodically lift off the bottom and entrain previously dead sea turtle parts (as well as live turtles) that may be on the bottom through the high level of suction.

Loggerhead sea turtles. Like other long-lived sea turtles, loggerheads delay maturity to allow individuals to grow larger and produce more offspring. As discussed in the Environmental Baseline section, more offspring may compensate for the high natural mortality in the early life stages; i.e., mortality rates of eggs and hatchling are generally high and decrease with age and growth. The risks of delayed maturity are that annual survival of the later life stages must be high in order for the population to grow. Studies demonstrate that population growth is highly sensitive to changes in annual survival of the juvenile and adult stages. Crouse (1999) reports, "not only have large juveniles already survived many mortality factors and have a high reproductive value, but there are more large juveniles than adults in the population. Therefore, relatively small changes in the annual survival rate impact a large segment of the population, magnifying the effect."

The loggerhead sea turtles in the action area are likely to represent differing proportions of the five western Atlantic subpopulations. Although the northern nesting subpopulation produces about nine percent of the total loggerhead nests, they comprise more of the loggerhead sea turtles found in foraging areas from the northeastern U.S. to Georgia: between 25 and 59 percent of the loggerhead sea turtles in this area are from the northern subpopulation (Sears 1994, Norrgard 1995, Sears et al. 1995, Rankin-Baransky 1997, Bass et al. 1998). The northern subpopulation may be experiencing a significant decline (2.5 - 3.2% for various beaches) due to a combination of natural and anthropogenic factors, demographic variation, and a loss of genetic viability. As discussed in the status of the species section, it is possible that a large amount of the loggerheads which may be taken during the Navy's proposed dredging activities may originate from the northern subpopulation of loggerheads. However, turtles originating from the southern subpopulation could likewise be taken in large numbers.

NOAA Fisheries anticipates that up to four loggerheads could be entrained, seriously injured, or killed during each 700,000 cy dredge cycle. The death of up to four loggerheads would represent a loss of less than 0.11 percent of the estimated number of nesting females in the northern subpopulation (3,800). This level of take represents the high end of the spectrum for the proposed project because dredging is scheduled to occur during January-April when turtles are less likely to be present in the action area. This estimate is also conservative since the loss of loggerhead turtles during dredging activities is not likely to be limited to adult females, the only segment of the population, or subpopulation, for which NOAA Fisheries has any population

estimates. In the 1996 EA for this project, the Navy projected a 50-year project life for these beach nourishment activities (from 1996-2046). Although unlikely, a worst case scenario could occur if all 24 loggerheads killed (four turtles per cycle; six cycles over a 50-year period) were juvenile females from the northern subpopulation. However, it is more likely that some turtles taken will be from the northern subpopulation and some from the south Florida subpopulation. For example, based on the origin of turtles as reported by Bass et al. (1998), approximately 46% of the loggerheads found in Virginia waters originate from the northern subpopulation and 46% originate from the south Florida subpopulation.

It could be argued that any amount of lethal take will reduce the numbers of a population. As such, the lethal removal of up to four loggerheads in one year would be expected to reduce the number of loggerheads from the respective subpopulation as compared to the number of loggerheads that would have been present in the absence of the proposed action. However, given the status of the loggerhead subpopulations and the estimated number of females, even if all of the loggerhead turtles anticipated to be entrained and killed were juvenile or reproductive females from the northern subpopulation, the loss of up to four loggerheads every eight years during the dredging activities in the Sandbridge Shoal is not anticipated to have a detectable effect on the numbers or reproduction of the affected subpopulation, and therefore is not expected to appreciably reduce the likelihood of survival and recovery of the species.

Kemp's ridley sea turtles. The biology of Kemp's ridleys also suggests that losses of juvenile turtles can have a magnified effect on the survival of this species. The worst case scenario for this situation would be if the Kemp's ridley killed was a juvenile female. However, the death of one Kemp's ridley sea turtle would represent a loss of 0.03 percent of the population (3,000). As with loggerheads, this is a conservative estimate since the majority of dredging is scheduled to take place when sea turtles are not present. Although unlikely, a worse case scenario could occur if, over the course of a 50-year project life, all six Kemp's ridleys killed were juvenile females. However, given the estimated number of females in the population, even if all six turtles entrained and killed were reproductive females, this loss is not anticipated to have a detectable effect on the numbers or reproduction of the affected population, and therefore is not expected to appreciably reduce the likelihood of survival and recovery of the species.

Green sea turtles. While green turtles are not as common in the action area as loggerheads and Kemp's ridleys, one fresh dead green turtle was taken by a hopper dredge in Cape Henry Channel and one live green was relocated from Cape Henry Channel in 2002. Due to these occurrences, NOAA Fisheries anticipates that one green turtle could be entrained during each 700,000 cy dredge cycle at the Sandbridge Shoal borrow site. At this time, population estimates for the western Atlantic green sea turtle are not available. However, the pattern of green turtle nesting shows biennial peaks in abundance, with a generally positive trend during the ten years of regular monitoring since establishment of the index beaches in 1989 (Meylan *et al.* 1995). This positive trend has been observed despite the natural and anthropogenic losses to the population described in the environmental baseline and status of the species sections. Therefore, since the potential loss of one green turtle every eight years is insignificant among the total of all these natural and anthropogenic mortalities, the Dam Neck dredging operations are not expected to appreciably reduce the species' likelihood of surviving and recovering in the wild.

In summary, this biological opinion considered the effects of maintenance dredging and associated activities in the Sandbridge Shoal borrow site and Dam Neck Annex Beach disposal site in order to accurately assess the impacts to listed species. The primary concern for sea turtles is entrainment in the draghead of the hopper dredge, while the primary concern for endangered whales is the potential for vessel collisions.

Sea turtle takes have occurred in the vicinity of the action area with the same type of hopper dredge and operational protocol that will be employed in the Dam Neck Annex Beach nourishment project. In 2001 and 2002, 16 loggerheads, three Kemp's ridleys, and one green turtle were taken by maintenance dredging in Cape Henry and York Spit Channels (all fresh takes). Additionally, in nearby Thimble Shoal Channel, turtles were taken in hopper dredges from 2000 to 2003. However, there have been no observed incidental takes in previous dredging operations in the Sandbridge Shoal borrow site that will be used for the proposed action.

NOAA Fisheries assessed the project's impacts on listed species and the anticipated level of incidental take for the dredging of up to 700,000 cy of material on an 8-year cycle. Based on incidental take levels observed during previous dredging activities and the volume of sand being dredged, NOAA Fisheries anticipates that four loggerheads and one Kemp's ridley or green turtle could be taken during each dredge cycle. Due to the nature of the injuries expected as a result of entrainment, most of the takes are expected to be lethal takes. Under the worst case scenario, if the Navy is unable to schedule dredging activities when sea turtles are not present, the proposed activities could result in the death of 24 loggerheads and six Kemp's ridley or green turtles between 2004 and 2046.

Right, humpback, and fin whales may be affected by the vessels transiting between the borrow site and the disposal site, given the potential for vessels to collide with these large whales. However, given the rarity of dredge collisions with marine mammals, the presence of a bridge watch when whales are expected to be present, speed restrictions of four knots or less when whales are present, and the low likelihood of encountering whales in the action area, right, humpback, and fin whales are not likely to be adversely affected by the dredging activities.

CUMULATIVE EFFECTS

Cumulative effects, as defined in the ESA, are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Natural mortality of endangered species, including disease (parasites) and predation, occurs in Mid-Atlantic waters. In addition to dredging activities, sources of anthropogenic mortality, injury, and/or harassment of listed species in the action area include incidental takes in state-regulated fishing activities, private vessel interactions, marine debris and/or contaminants.

Future commercial fishing activities in state waters may take several protected species. However, it is not clear to what extent these future activities would affect listed species differently than the current state fishery activities described in the Environmental Baseline section. The Atlantic Coastal Cooperative Statistics Program (ACCSP) and the NOAA Fisheries sea turtle/fishery strategy, when implemented, are expected to provide information on takes of protected species in state fisheries and systematically collected fishing effort data which will be useful in monitoring impacts of the fisheries. NOAA Fisheries expects these state water fisheries to continue in the future, and as such, the potential for interactions with listed species will also continue.

As noted in the Environmental Baseline section, private vessel activities in the action area may adversely affect listed species in a number of ways, including entanglement, boat strike, or harassment. It is not possible to predict whether additional impacts from these private activities will occur in the future, but it appears likely that they will continue, especially if actions are not taken to minimize these impacts.

Excessive turbidity due to coastal development and/or construction sites could also influence sea turtle foraging ability. As mentioned previously, turtles are not very easily affected by changes in water quality or increased suspended sediments, but if these alterations make habitat less suitable for turtles and hinder their capability to forage, eventually they would tend to leave or avoid these less desirable areas (Ruben and Morreale 1999).

Marine debris (e.g., discarded fishing line, lines from boats, plastics) can entangle turtles in the water and drown them. Turtles commonly ingest plastic or mistake debris for food, as observed with the leatherback sea turtle. The leatherback's preferred diet includes jellyfish, but similar looking plastic bags are often found in the turtle's stomach contents (Magnuson et al. 1990). It is anticipated that marine debris will continue to impact listed species in the action area.

Sources of contamination in the action area include atmospheric loading of pollutants, stormwater runoff from coastal development, groundwater discharges, and industrial development. Chemical contamination may have an effect on listed species reproduction and survival. While the effects of contaminants on sea turtles are relatively unclear, pollution may also make sea turtles more susceptible to disease by weakening their immune systems.

INTEGRATION AND SYNTHESIS OF EFFECTS

NOAA Fisheries has determined that the Navy's dredging at the Sandbridge Shoal borrow site for renourishment of the Dam Neck Annex Beach may adversely affect loggerhead, leatherback, green, Kemp's ridley, and hawksbill sea turtles by either removing and altering the availability of the prey resources they utilize, physically entraining them in the dredge, and/or colliding with them during vessel operations. NOAA Fisheries has further determined that the Navy's dredging and beach nourishment activities may also affect right, humpback, and fin whales through potential collisions with vessels during transit between the borrow and disposal sites.

Based on past dredging activities and other available information, NOAA Fisheries has anticipated that loggerhead and Kemp's ridley sea turtles are the most likely species to be injured and killed as a result of these activities. Green turtles are rare in the project area and are unlikely to interact with the dredge equipment; however, a green turtle has been taken previously during dredging activities in nearby areas. Therefore, based on incidental turtle takes in previous dredging activities, NOAA Fisheries anticipates that four loggerheads and one Kemp's ridley or green turtle could be taken during each 700,000 cy dredge cycle. NOAA Fisheries does not anticipate that leatherbacks or hawksbill sea turtles will be captured by the dredge.

While operational measures should be implemented to minimize the take of sea turtles to the extent possible, the loss of a maximum of four loggerheads and one Kemp's ridley or green sea turtle during dredging would represent a small percentage of these populations. This is also the worst case scenario, as the majority of dredging activity is scheduled to take place during the winter months when sea turtles are not expected to be present. Further, the estimation of the amount of take on the population is conservative since the loss of turtles during these dredging activities are not likely to be limited to adult females, the only segment of the population or subpopulation for which NOAA Fisheries has any population estimates. Even if all of the turtles anticipated to be entrained and killed were juveniles or reproductive females, NOAA Fisheries does not anticipate these losses will appreciably reduce the likelihood of survival and recovery of loggerhead, Kemp's ridley, green, or leatherback sea turtles.

It is possible that dredge vessels could collide with listed species. In particular, right, humpback, and fin whales may be affected by the vessels transiting the action area between the borrow site and the beach placement site. However, given the rarity of documented collisions between dredges and marine mammals, combined with the Navy's proposed mitigation measures, the vessel activity associated with this project is not likely to adversely affect listed whales.

The physical removal of sediments and associated epifauna from the dredge sites could reduce the availability of prey in the dredged areas, but NOAA Fisheries believes these reductions will be localized and temporary, and foraging turtles will not be limited by the reductions.

CONCLUSION

After reviewing the best available information on the status of endangered and threatened species under NOAA Fisheries jurisdiction, the environmental baseline for the action area, the effects of the action, and the cumulative effects in the action area, it is NOAA Fisheries' biological opinion that the dredging operations at the Sandbridge Shoal borrow site and beach nourishment activities at the Dam Neck Annex Beach may adversely affect but are not likely to jeopardize the continued existence of the loggerhead, leatherback, Kemp's ridley, green, or hawksbill sea turtles. In addition, NOAA Fisheries concludes that this action is not likely to adversely affect North Atlantic right, humpback, and fin whales. Because no critical habitat is designated in the action area, none will be affected by the project.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by NOAA Fisheries to include any act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns including breeding, spawning, rearing, migrating, feeding, or sheltering. Harass is defined by FWS as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Navy so that they become binding conditions for the exemption in section 7(o)(2) to apply. The Navy has a continuing duty to regulate the activity covered by this Incidental Take Statement. If the Navy (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Navy must report the progress of the action and its impact on the species to the NOAA Fisheries as specified in the Incidental Take Statement [50 CFR '402.14(I)(3)].

Amount or extent of take

During any given renourishment cycle involving the dredging of up to 700,000 cy of material, NOAA Fisheries anticipates that up to four loggerheads and one Kemp's ridley or green sea turtle may be taken. While it is difficult to ascertain future take of sea turtles, NOAA Fisheries based the anticipated take level on previous sea turtle takes during 2001/2002 Cape Henry Channel maintenance dredging, 2000/2001 Thimble Shoal Channel dredging, and 1996 Sandbridge Shoal/Dam Neck Annex dredging; the level of take anticipated in previous BOs; the distribution and number of sea turtles along the Virginia coast; the magnitude of the dredging project; and the operational measures to be employed during the dredging project.

The level of incidental turtle take in the hopper dredge is anticipated to be fresh dead. No incidental take for hawksbill or leatherback sea turtles is anticipated in the dredging operations as these species are unlikely to be present in the action area and interactions with the dredge are not expected.

NOAA Fisheries also expects that the dredging may take an additional unquantifiable number of previously dead sea turtle parts. While decomposed animals taken in federal operations are considered to be takes, as the possession of a listed species is considered a take, NOAA Fisheries

recognizes that decomposed sea turtles may be taken in dredging operations that may not necessarily be related to the dredging activity itself. A sea turtle take will not be considered related to dredge operations and count towards the above referenced anticipated take level if the condition of the specimen is in an advanced state of decay[3] and if the specimen is a turtle part. Provided that NOAA Fisheries concurs with the Navy's determination regarding the stage of decomposition, condition of the specimen, and likely cause of mortality, the take will not be attributed to the incidental take level for this project.

As required by the reasonable and prudent measures and terms and conditions of this Incidental Take Statement, relocation trawling may occur under certain circumstances prior to or during dredging. Although relocation trawling is intended to minimize the amount of lethal take associated with dredging, the capture of live, uninjured turtles would also be considered a take under the ESA. Relocating sea turtles may invoke a degree of stress on the animals; however, the capture of a live turtle in a trawl would likely be less harmful to the species than would the entrainment of a sea turtle in a dredge draghead. Further, the level of stress should be minimized through the expedited and proper handling procedures specified in Appendix D and Appendix E.

Nonetheless, NOAA Fisheries recognizes that a small percentage of turtles captured by relocation trawlers may die or suffer injury during trawling, while on deck, or after release, particularly if the animals involved have been previously stressed or are diseased or unhealthy. On November 3, 2002, during relocation trawling conducted in York Spit Channel (with 15-30 minute tows), a Kemp's ridley sea turtle was recovered. The fresh dead turtle was bleeding with wounds to the head (REMSA 2002a). VMSM conducted a necropsy and concluded that the animal appeared to be a healthy, fresh dead juvenile Kemp's ridley with the only noted abnormalities to the head (REMSA 2002b), which suggested that the cause of death was likely trawl-related. This single incident represents a limited number of lethal turtle takes during relocation trawling compared to the number of successful live captures; however, the best available evidence on mortality during relocation trawling is based on the results of only two years of relocation trawling efforts in Virginia. Therefore, NOAA Fisheries is taking a precautionary approach and assuming that relocation trawling is reasonably likely to result in injury or death to a small number of sea turtles.

Pursuant to the above information, NOAA Fisheries expects that, in addition to the take associated with dredging operations, relocation trawling at the Sandbridge Shoal borrow site may annually take an additional 120 sea turtles without causing injury or death (either loggerheads, Kemp's ridleys, leatherbacks, or greens, or a combination thereof). The number of live takes anticipated was based upon the maximum number of sea turtles taken in 2002 trawling operations in Cape Henry and York Spit Channels (15 turtles in approximately one month) and

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[3]While subject to some interpretation by the observer, a non-fresh dead animal may exhibit the following characteristics: foul odor; necrotic, dark or decaying tissues; sloughing of scutes; evident bloating; pooling of old blood; atypical coloration; and opaque or sunken eyes. A fresh dead animal may exhibit the following characteristics: little to no odor; fresh blood present; fresh (not necrotic, pink/healthy color) tissue, muscle, or skin; no bloating; color consistent with live animal; eyes clear; and live barnacles.

the number of months when sea turtles may be present in Virginia (eight months total). This estimate assumes that trawling will take place for 12 hours/day (as specified in Appendix E), that trawling will take place each week in each month from April through November, and that sea turtle presence in Virginia waters remains consistent from April through November. Therefore, this estimate represents a worst-case scenario. NOAA Fisheries further anticipates that one sea turtle take during relocation trawling may result in death or injury (either a loggerhead, Kemp's ridley, leatherback, or green).

No incidental take of any listed marine mammal is anticipated for this project.

Effect of the take
In the accompanying BO, NOAA Fisheries evaluated the effects of this level of anticipated take on the above listed species. NOAA Fisheries has determined that these interactions, should they occur, are not likely to jeopardize the continued existence of these species, or the destruction or adverse modification of critical habitat.

Reasonable and Prudent Measures
NOAA Fisheries has determined that the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of sea turtles. Although no takes of other listed species are authorized at this time, these measures must be undertaken in a manner which ensures detection of takes of these other species so that appropriate reinitiation action can be taken.

1. The Navy shall minimize dredging activities from April 1 to November 30.

2. The Navy shall ensure that between April 1 and November 30, hopper dredges are outfitted with state-of-the-art sea turtle deflectors on the draghead and operated in a manner that will reduce the risk of interactions with sea turtles which may be present in the dredge area.

3. The Navy shall ensure that dredges are equipped and operated in a manner that provides endangered/threatened species observers with a reasonable opportunity for detecting interactions with listed species and that provides for handling, collection, and resuscitation of turtles injured during project activity. Full cooperation with the endangered/threatened species observer program is essential for compliance with the ITS.

4. The Navy shall enact measures that would reduce the number of sea turtles in the dredging channel so that the possibility of entrainment would be minimized.

5. The Navy shall develop and follow a system to provide timely reporting to NOAA Fisheries on any takes of protected species.

Terms and Conditions
In order to be exempt from the prohibitions of Section 9 of the ESA, the Navy must comply with the following terms and conditions, which implement the reasonable and prudent measures

described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. When possible, dredging must not be completed from April 1 to November 30, that is, the time period when turtle abundance is highest in Virginia waters. If dredging occurs during this time frame, the Navy should take particular care to minimize activity during the sea turtles' migration period into the Bay during the spring (approximately May 1 to June 30) and fall (approximately September 1 to October 30), the time frame when most of the Chesapeake Bay resident turtles are believed to be passing through the mouth of the Bay and in the vicinity of the dredging activity. If dredging is to be conducted from April 1 to November 30 (the impacts of which were analyzed in this BO), the Navy must inform NOAA Fisheries at least three months before dredging commences, noting the anticipated amount to be dredged, explaining why dredging must occur during the anticipated time frame, and identifying the specific measures to be taken to reduce potential sea turtle takes. The Navy must also inform NOAA Fisheries of the commencement of operations three days prior to the actual start date and of the completion date within three days after the actual end of operations.

2. If dredging occurs between April 1 and November 30, hopper dredges must be equipped with the rigid deflector draghead as designed by the ACOE Engineering Research and Development Center, formerly the Waterways Experimental Station (WES), or if that is unavailable, a rigid sea turtle deflector attached to the draghead. Deflectors must be checked and/or adjusted by a designated expert prior to a dredge operation to insure proper installment and operation during dredging. The deflector must be checked after every load throughout the dredge operation to ensure that proper installation is maintained. Since operator skill is important to the effectiveness of the WES-developed draghead, operators must be properly instructed in its use. Dredge inspectors must ensure that all measures to protect sea turtles related to installation, maintenance, and operation of the deflector and the draghead (as specified in Appendix C, section B, "Draghead") are being followed during dredge operations.

3. If dredging occurs during the period of April 1 through November 30, the Navy must adhere to the attached "Monitoring Specifications for Hopper Dredges" with trained NOAA Fisheries-approved sea turtle observers, in accordance with the attached "Observer Protocol" and "Observer Criteria" (Appendix C). NOAA Fisheries-approved observers must be on hopper dredges once surface waters reach or exceed 11° C, or during the period of April 1 through November 30 (whichever occurs first), of any year to monitor the hopper spoil, inflow, screening and dragheads for sea turtles and their remains.

4. As stated in Appendix C, observer coverage must be sufficient for 100% monitoring of hopper dredging operations. All biological material found in the intake screens must be documented by the observer.

5. As with any incidental take, if a decomposed turtle or turtle part is taken in dredging operations, an incident report must be completed and the specimen must be photographed (Appendix H). Any turtle parts that are considered "not fresh" (i.e., they were obviously dead

prior to the dredge take and will not be counted towards the ITS) must be frozen and transported to a nearby stranding or rehabilitation facility for review. The Navy must submit the incident report for the decomposed turtle part, as well as photographs, to NOAA Fisheries within 24 hours of the take (see Appendix C) and request concurrence that this take should not be attributed to the Incidental Take Statement. NOAA Fisheries shall have the final say in determining if the take should count towards the Incidental Take Statement.

6. The Navy must ensure that all contracted personnel involved in operating hopper dredges receive thorough training on measures of dredge operation that will minimize takes of sea turtles. Training shall include measures discussed in Appendix C. It shall be the goal of each hopper dredging operation to establish operating procedures that are consistent with those that have been used during hopper dredging in other regions of the coastal United States, and which have proven effective in reducing turtle/dredge interactions. Therefore, Glynn Banks (ACOE, Vicksburg, MS, [601] 634-3597), or a person with a similar level of expertise on this matter, shall be involved both in dredge operation training, and the installation, adjustment and monitoring of the rigid deflector draghead assembly.

7. It is unlikely that sea turtles will survive entrainment in a hopper dredge, as the turtles found in the dragheads are almost always dead, dying, or dismembered. However, a few turtles have escaped hopper dredges without apparent injuries. A sub-adult loggerhead was removed from dredge gear unharmed in Savannah, Georgia and an occasional small green turtle has been known to survive (Slay 1995, Magnuson et al. 1990). The procedures for handling live sea turtles are outlined in Appendices C and D in case the unlikely event should occur. All individuals handling sea turtles must follow these procedures.

8. A sea turtle trawling and relocation survey must be initiated following the take of two (2) turtles (any species) in a 24-hour time period or in other circumstances that NOAA Fisheries deems appropriate. Such circumstances may include unseasonably warm water temperatures (greater than 11° C), or other evidence indicating that protected species presence may be high (e.g., aerial or in-water surveys documenting a large number of sea turtles in the borrow area). All trawls must follow the standard protocol developed and used by the ACOE South Atlantic Division (Appendix E). The trawling and relocation survey must be initiated within 24 hours of the incidental take or the Navy must suspend dredging operations until such trawling can be initiated. Trawling must continue for at least five consecutive days, unless precluded by inclement weather, after which NOAA Fisheries may require that the survey be continued or suspended. After the trawling survey is completed, NOAA Fisheries and the Navy shall immediately discuss the results of the trawling to determine if additional measures are needed to relocate turtles found in the borrow area.

9. The results of each turtle take from the trawling survey must be recorded on the Sea Turtle Tagging Data Report (Appendix F), or a similar form including the same information. The preliminary results of the trawling survey must be submitted to NOAA Fisheries immediately after the survey is completed so that NOAA Fisheries can determine if additional trawling is warranted. A final report summarizing the results of the trawling and any takes of listed

species must be submitted to NOAA Fisheries within 30 working days of completion of the trawling survey.

10. A final report summarizing the results of the dredging and any takes of listed species must be submitted to NOAA Fisheries (at the addresses specified in Appendix C) within 30 working days of completion of each cycle of the project.

11. Vessels must comply with the ESA 500-yard approach regulations for right whales. To minimize risks from vessel operations around other listed species, the dredge vessel must not intentionally approach such other listed species closer than 100 yards when in transit. When NOAA Fisheries-approved observers are present, vessel operators must, except when precluded by safety requirements, follow the advice of the observer to avoid collisions.

12. If sea turtles are present during dredging or material transport (i.e., between April 1-November 30), vessels transiting the area must post a bridge watch, avoid intentional approaches closer than 100 yards when in transit, and reduce speeds to below four knots.

13. If the take of loggerhead sea turtles approaches 75% of the anticipated incidental take level (i.e., three turtles) during any project cycle, the Navy must immediately contact NOAA Fisheries at (978) 281-9328, ext. 6531, to review the situation. At that time, the Navy must provide NOAA Fisheries with information on the amount of material dredged thus far and the amount remaining to be dredged. Also at that time, the Navy should discuss with NOAA Fisheries whether any new management measures could be implemented to prevent the total incidental take level from being reached.

NOAA Fisheries anticipates that no more than four loggerheads and one Kemp's ridley or green turtle will be incidentally taken during each dredging cycle involving up to 700,000 cy of material in the Sandbridge Shoal borrow site. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of and monitor incidental take that is expected from the proposed action. If, during the course of the project, this level of incidental take is exceeded, the additional level of take would represent new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided above.

CONSERVATION RECOMMENDATIONS

In addition to section 7(a)(2), which requires agencies to ensure that proposed projects will not jeopardize the continued existence of listed species, section 7(a)(1) of the ESA places a responsibility on all federal agencies to "utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species". Conservation Recommendations are discretionary activities designed to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. When endangered species observers are required on hopper dredges (April 1 to November 30), 100% overflow screening is recommended. While monitoring 100% of the inflow screening is required as a term and condition of this project's Incidental Take Statement, observing 100% of the overflow screening would ensure that any takes of sea turtles are detected and reported.

2. To facilitate future management decisions on listed species occurring in the action area, the Navy should maintain a database mapping system to: 1) create a history of use of the geographic areas affected; and, 2) document endangered/threatened species presence/interactions with project operations.

3. The Navy should support ongoing and/or future research to determine the abundance and distribution of sea turtles in Virginia waters.

4. The Navy should investigate, support, and/or develop additional technological solutions to further reduce the potential for sea turtle takes in hopper dredges. For instance, NOAA Fisheries recommends that the Navy coordinate with other Southeast Districts, the Association of Dredge Contractors of America, and dredge operators regarding additional reasonable measures they may take to further reduce the likelihood of sea turtle takes. The diamond-shaped pre-deflector, or other potentially promising pre-deflector designs such as tickler chains, water jets, sound generators, etc., should be developed and tested and used where conditions permit as a means of alerting sea turtles and sturgeon of approaching equipment. New technology or operational measures that would minimize the amount of time the dredge is not in contact with the bottom in conditions of uneven terrain should be explored. Pre-deflector use should be noted on observer daily log sheets, and annual reports to NOAA Fisheries should note what progress has been made on deflector or pre-deflector technology and the benefits of or problems associated with their usage. NOAA Fisheries believes that development and use of effective pre-deflectors could reduce the need for sea turtle relocation trawling.

5. New approaches to sampling for turtle parts should be investigated. The Navy should seek continuous improvements in detecting takes and should determine, through research and development, a better method for monitoring and estimating sea turtle takes by hopper dredges. Observation of overflow and inflow screening appears to be only partially effective and may provide only minimum estimates of total sea turtle mortality. NOAA Fisheries believes that some listed species taken by hopper dredges may go undetected because body parts are forced through the sampling screens by the water pressure (as seen in 2002 Cape Henry dredging) and are buried in the dredged material, or animals are crushed or killed but not entrained by the suction and so the takes may go unnoticed (or may subsequently strand on nearby beaches). The only mortalities that are documented are those where body parts float or are large enough to be caught in the screens, and can be identified to the species level.

6. NOAA Fisheries recommends that all sea turtles entrained in hopper dredge dragheads, and sea turtles captured during relocation trawling, be sampled for genetic analysis by a

NOAA Fisheries laboratory. Any genetic samples from live sea turtles must be taken by trained and permitted personnel. Copies of NOAA Fisheries genetic sampling protocols for live and dead turtles are attached as Appendix I.

7. The Navy should consider devising and implementing some method of significant economic incentives to hopper dredge operators such as financial reimbursement based on their satisfactory completion of dredging operations, or a certain number of cubic yards of material removed, or hours of dredging performed, *without taking turtles*. This may encourage dredging companies to research and develop "turtle friendly" dredging methods, more effective deflector dragheads, pre-deflectors, top-located water ports on dragarms, etc.

8. For every year when dredging activities are planned for winter months (i.e., December 1-March 31), the Navy should contact the marine mammal staff at the Virginia Marine Science Museum in order to obtain information on whale sightings in the area.

9. A NOAA Fisheries-approved endangered species observer should be present from December 1-March 31 to document species-specific information about marine mammal presence in the area.

10. During darkness or in periods of low visibility, the Navy should consider implementing procedures to suspend or delay transits to and from the borrow site when whales are spotted in the vicinity of the dredge.

REINITIATION OF CONSULTATION

This concludes formal consultation on dredging by hopper dredge and beach nourishment at the Sandbridge Shoal borrow site and Dam Neck Annex Beach in Virginia Beach, VA. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) a new species is listed or critical habitat designated that may be affected by the action; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered. In instances where the amount or extent of incidental take is exceeded, the Navy must immediately request reinitiation of formal consultation.

TABLE 3: Incidents of dredge related takes in Cape Henry and York Spit Channels

Project	*Location*	*Date/Time*	*Temp (surface unless noted otherwise)*	*Spp*	*Length/width**	*Condition of screening*	*Comments***
Cape Henry Channel, VA	lat/long not reported	9/26/01 1930 hrs	73 F	Cc	~46 cm SCL; plastron ~28 cm L; head width 12 cm	Good, draghead deflector used	**Fresh** turtle in inflow forward starboard basket. Most of carapace missing, no viscera, fresh tissues with blood inside, no odor, live hogchoker in back of mouth behind tongue.
Cape Henry Channel, VA	lat/long not reported	10/10/01 1532 hrs	63 F	Lk	16 in SCL; 15 in SCW; plastron 15 in L, 15 in W; head width 3.5 in.	Good, draghead deflector used	**Fresh** turtle in inflow forward port basket. Internal organs missing, carapace and plastron cracked, unexposed muscle healthy, no odor, live small flatfish in mouth.
Cape Henry Channel, VA	lat/long not reported	10/17/01 1420 hrs	65 F	Cc	63 cm SCL; 58 cm SCW	Good, draghead deflector used	Pieces of carapace and attached skin, intestine, found in inflow forward starboard basket. Skin appears healthy, no odor. Considered **fresh** take.
Cape Henry Channel, VA	36 58 N, 75 59.5 W	11/2/01 1315 hrs	62 F	Un	n/a	Good, draghead deflector used	Rib bone found in inflow forward starboard basket. Appeared old, no tissue attached. **Determined not related to dredge activity.**
Cape Henry Channel, VA	36 59 N, 76 00 W	4/24/02 1114 hrs	57 F (surface) 56 F (column)	Cc	~68.6 cm SCL; plastron ~38.1 cm L; head W 7.8 cm	Good, draghead deflector used	**Fresh** take in 3 major pieces, included head, 3 flippers. Majority of carapace missing, cavity mostly empty. Recovered from aft inflow screening basket.
Cape Henry Channel, VA	36 59 N, 76 01 W	5/13/02 1000 hrs	66 F (surface)	Cc	~64 cm SCL; plastron ~56 cm; head width ~16 cm	Good, draghead deflector used	**Fresh** take of subadult/adult, short tail. Fragmented specimen, all flippers present, some pieces of carapace and plastron, head damaged and major trauma to dorsal side.
Cape Henry Channel, VA	36 59N, 76 01W (location at end of load)	5/18/02 2100 hrs	65 F (surface)	Cc	~72 cm SCL; plastron ~52 cm L, ~49 cm W; head width ~16 cm	Good, draghead deflector used	**Fresh** take with good color, no bloating, no odor. Most plastron present, 65% of carapace but had to be pieced together. Head whole, short tail. Mud filled, mascerated specimen. At least 20 rocks found with turtle.

Cape Henry Channel, VA	36 59.91 N, 76 01.29 W	5/23/02 0615 hrs	61 F (surface and column)	Cc	~70 cm SCL; ~60 cm SCW	Good, draghead deflector used	**Fresh** dead animal, only portion of carapace/plastron recovered. Some fresh muscle attached, no odor. Several cracks in carapace. Uncertain if could have been a recent ship strike.
Cape Henry Channel, VA	36 59.91 N, 76 01.29 W	6/1/02 2112 hrs	72 F (surface), 71 F (column)	Cm	27 cm SCL; 24 cm SCW; plastron 24 cm L, 22 cm W; head width 5 cm	Good, draghead deflector used	**Fresh** dead animal, entire turtle recovered except for few small portions of carapace. Long crack down carapace, abraded regions on plastron and head. Blood present, internal organs intact, first exam found minimal eye reflex and muscular contraction (stopped 1 hour later). Turtle likely taken in last 2 cuts (~2015-2115).
Cape Henry Channel, VA	36 59.9 N, 76 01.2 W	6/4/02 2230 hrs	71 F	Cc	~60 cm SCL, ~40-50 cm SCW	Good, draghead deflector used	Recovered 32x30 cm piece of carapace. **Fresh** take determined due to pink tissue and blood near vertebrae, lack of odor. Sharp protusions of bone.
Cape Henry Channel, VA	36 59.8 N, 76 01.2 W	8/16/02 2110 hrs	79 F (surface) 78 F (column)	Cc	n/a	Good, draghead deflector used	Front flippers only, length ~15 in. width ~4 in. Strong odor, probably **dead prior to take**. Pale yellow/white color. No blood and attached tissue black. Species ID confirmed by VMSM.
York Spit Channel, VA	37 14.2 N, 76 08.3 W	8/26/02 1850 hrs	82.5 F	Cc	68.6 cm SCL; 53.3 cm SCW; plastron 49.5 cm L, 41.9 cm W; head width 14 cm	Good, draghead deflector used	Recovered from starboard draghead and inflow. **Fresh** take, specimen virtually intact. Fresh blood, no odor/bloating. Large crack running entire length of carapace. Barnacles present and alive. Some internal organs missing; digestive tract recovered separately.
York Spit Channel, VA	37 14.1 N, 76 08.2 W	9/3/02 0645 hrs	77 F	Cc (sub-adult)	~59.7 cm SCL; ~52.1 cm SCW; plastron 48.3 cm L, 29.2 cm W; head width 13.3 cm	Good, draghead deflector used	Recovered from overflow ("weir"). **Fresh** take, specimen in 3 parts. Fresh blood/tissue, no odor. Only part of carapace and internal organs missing. Some intestine recovered. VMSM picked up animal. Modified dredge (chained inflow doors) to prevent future takes in same manner.

York Spit Channel, VA	37 12.5 N, 76 08.7 W	9/13/02 0700 hrs	75 F	Lk	47.5 cm SCL; 46 cm SCW; plastron 37.5 cm L, 48.1 cm W; head width 10.6 cm	Good, draghead deflector used	Turtle **still alive** but in poor condition. Most of right side of carapace missing; deep wound inside right flipper. Multiple cracks on carapace and plastron; turtle bleeding profusely. Transported to VMSM within 2 1/2 hrs; at that time turtle was limp and not breathing. Recovered from fore inflow box.
York Spit Channel, VA	36 11.5 N, 76 09.2 W	9/18/02 0830 hrs	76 F	Cc	~70 cm SCL; ~57 cm SCW; plastron ~53 cm L, ~57 cm W; head length ~18 cm	Good, draghead deflector used	Small part of carapace/plastron, lung, intestine, and stomach recovered from fore starboard inflow box. Bright red blood from intestines, indicating **fresh** take. Stomach contained fresh horseshoe crabs, and live worms in intestines.
York Spit Channel, VA	~37 13.4 N, 76 08.4 W	9/25/02 1945 hrs	76 F	Cc	~72 cm SCL; ~56 cm SCW	Good, draghead deflector used	Two small pieces of carapace with tissue attached recovered from fore starboard inflow box. Tissue not necrotic, no odor, live barnacles on carapace, indicating **fresh** take.
York Spit Channel, VA	~37 12.4 N, 76 08.8 W	9/28/02 0805 hrs	76 F	Cc	~74 cm SCL; ~64 cm SCW	Good, draghead deflector used	Two consecutive loads took same turtle. First load recovered piece of carapace with tissue, ribs, intestine, stomach. No odor, no necrotic tissue, live barnacles, blood, indicating **fresh** take. Second load recovered posterior section. Marginal scutes matched previously identified ones, identifying as same turtle.
York Spit Channel, VA	37 13.12 N, 76 08.58 W	10/3/02 1930 hrs	75 F	Cc	~47 cm SCL; ~35 cm SCW; plastron ~45 cm L, ~30 cm W	Good, draghead deflector used	Right portion of carapace and plastron, tissue, and portions of intestine recovered from port inflow box and aft wier. Good condition, not necrotic, no odor, live barnacles, indicating **fresh** take. Plastron contained several notable scratches.
York Spit Channel, VA	~37 10.67 N, 76 09.20 W	10/8/02 1835 hrs	75 F	Cc	not able to be estimated	Good, draghead deflector used	Small section of central and lateral scutes, tissue, internal organs, portion of rib, backbone, 1 attached flipper bone, recovered from starboard forward inflow screen. Good condition, not necrotic, no odor, fresh blood, live barnacles, indicating **fresh** take. Specimen too small to give accurate size.

York Spit Channel, VA	37 9.84 N, 76 9.08 W	10/9/02 0920 hrs	75 F	Cc	~43.6 cm SCL; ~49 cm SCL	Good, draghead deflector used	Several parts of turtle found in consecutive loads. Same coloration and recovered parts fit together. Good condition, not necrotic, no odor, live barnacles, indicating **fresh** take.
York Spit Channel, VA	37 09.45 N, 76 08.99 W	10/16/02 1950 hrs	69 F	Cc	plastron 48 cm L, ~31 cm W	Good, draghead deflector used	Plastron and attached internal organs recovered from starboard forward inflow screen. Intestines recovered on aft wier. Good condition, not necrotic, no odor, live barnacles, indicating **fresh** take.
York Spit Channel, VA	37 09.97 N, 76 09.06 W	10/19/02 1840 hrs	66 F	Cc	plastron ~60 cm L, ~43 cm W, head W 15 cm, 115 cm from upper tomium to tail.	Good, draghead deflector used	Plastron, flippers, head, portions of carapace recovered from starboard forward inflow box. **Determined not to be a fresh take** due to severe slothing of scutes on head and plastron, decayed white carapace fragments, foul odor, necrotic tissue with pooling of blood, opaque and swollen eyes.
York Spit Channel, VA	37 10.43 N, 76 09.13 W	10/20/02 0926 hrs	65 F	Cc	head W 15 cm	Good, draghead deflector used	Head (upper tomium) with encrusted barnacles recovered from starboard forward inflow screen. **Determined not to be a fresh take** due to slothing of scales, decaying composition, foul odor, opaque eyes.
Cape Henry Channel, VA	36 59.68 N, 76 0.87 W	10/27/02 1845 hrs	64 F	Lk	38.2 cm SCL; 32 cm SCW; plastron 36.1 cm L, 32 cm W; head width ~8 cm	Good, draghead deflector used	Intact specimen, except for missing portion of carapace and internal organs, recovered from port forward inflow screen. Head and right front flipper detached from body. No odor, tissue not necrotic, blood around eyes and carapace, indicating **fresh** take.

Cape Henry Channel, VA	36 59.76 N, 76 01.15 W	10/30/02 1100 hrs	60 F (surface) 58 F (column)	Cc	n/a	Good, draghead deflector used	Two front flippers and one partial rear flipper connected by skin and tissue observed at aft overflow. No other body parts observed. Observed after load was dumped. Specimen hung between columns of aft overflow pipes, which is typically subsurface. Weight of specimen resulted in dislodge into water and was not recovered. Passed through inflow and overflow screening, apparently from force of water. Determined to be a **fresh** take due to observed condition of flippers and tissue.

* SCL = straight carapace length; SCW = straight carapace width; CCL = curved carapace length

** The Comments section includes information provided by the observer contractor, and not necessarily observations by NOAA Fisheries.

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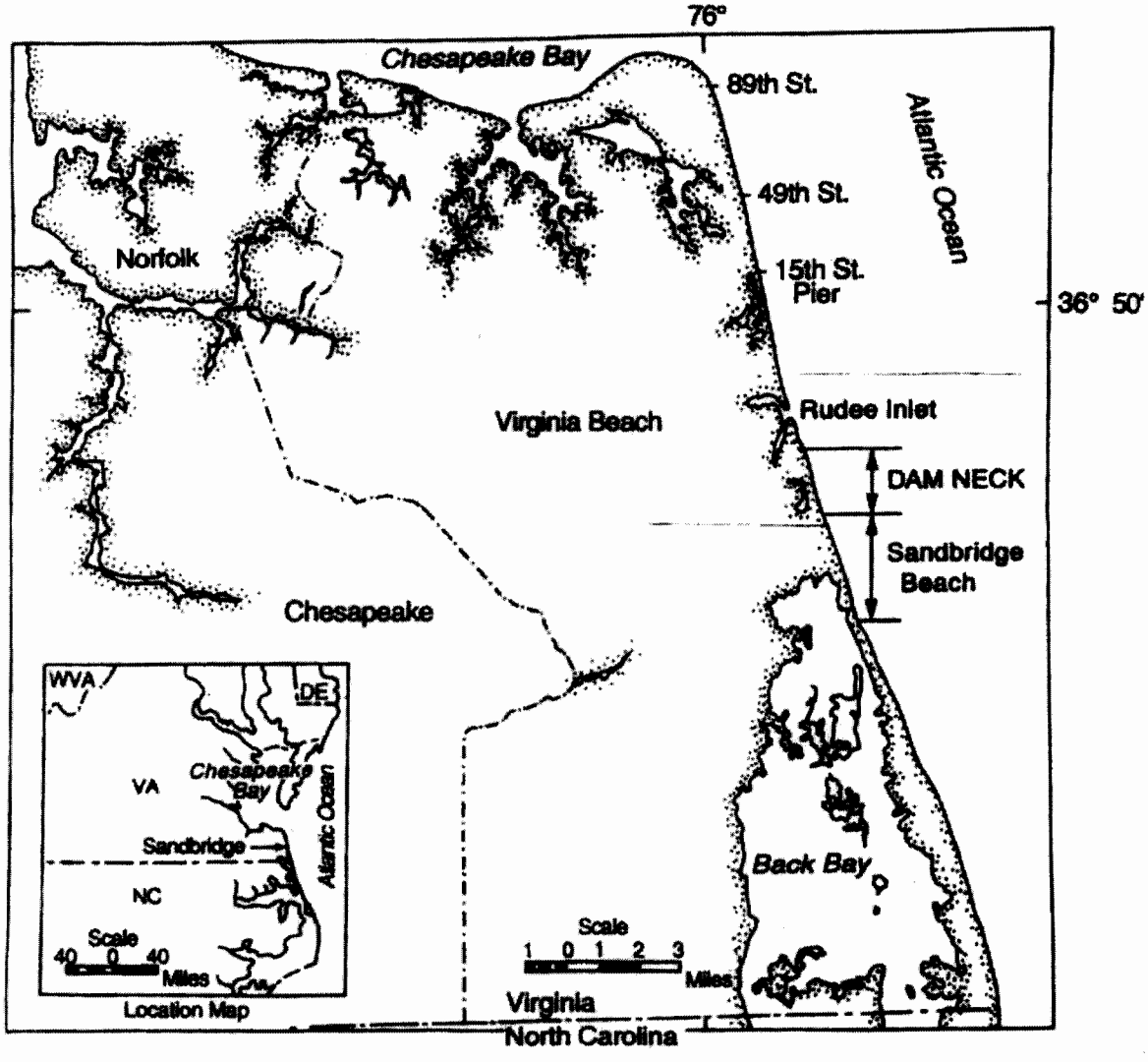
APPENDIX A

Map of Project Location – Dam Neck Annex Beach



APPENDIX B
Map of Dredge Site – Sandbridge Shoal

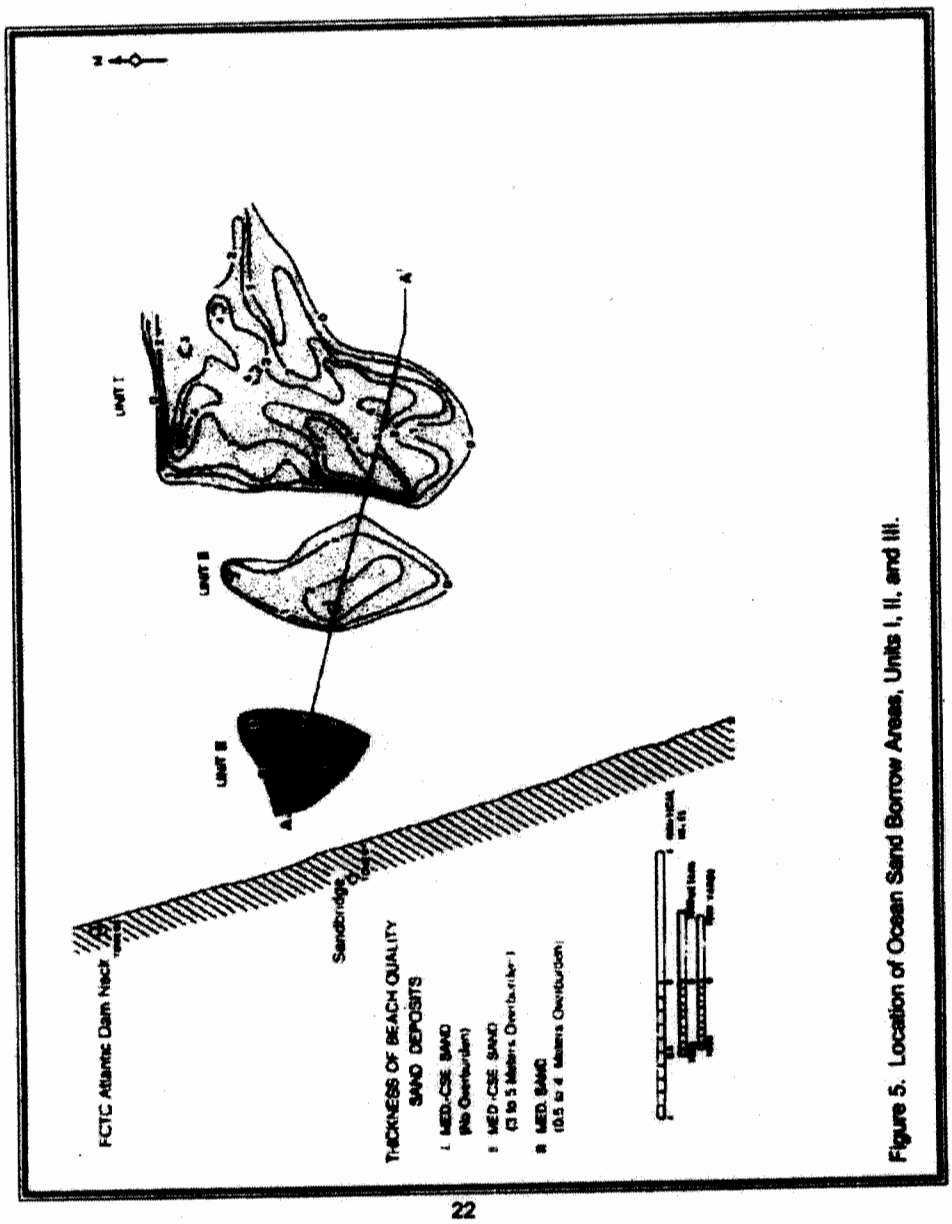


Figure 5. Location of Ocean Sand Borrow Areas, Units I, II, and III.

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APPENDIX C.
MONITORING SPECIFICATIONS FOR HOPPER DREDGES

I. EQUIPMENT SPECIFICATIONS

A. Baskets or screening

Baskets or screening must be installed over the hopper inflows with openings no smaller than 4 inches by 4 inches to provide 100% coverage of all dredged material and shall remain in place during all dredging operations between April 1 and November 30 of any calendar year. Baskets/screening will allow for better monitoring by observers of the dredged material intake for sea turtles and their remains. The baskets or screening must be safely accessible to the observer and designed for efficient cleaning.

B. Draghead

The draghead of the dredge shall remain on the bottom **at all times** during a pumping operation, except when:

1) the dredge is not in a pumping operation, and the suction pumps are turned completely off;

2) the dredge is being re-oriented to the next dredge line during borrow activities; and

3) the vessel's safety is at risk (i.e., the dragarm is trailing too far under the ship's hull).

At initiation of dredging, the draghead shall be placed on the bottom during priming of the suction pump. If the draghead and/or dragarm become clogged during dredging activity, the pump shall be shut down, the dragarms raised, whereby the draghead and/or dragarm can be flushed out by trailing the dragarm along side the ship. If plugging conditions persist, the draghead shall be placed on deck, whereby sufficient numbers of water ports can be opened on the draghead to prevent future plugging.

Upon completion of a dredge track line, the drag tender shall:

1) throttle back on the RPMs of the suction pump engine to an idling speed (e.g., generally less than 100 RPMs) **prior to** raising the draghead off the bottom, so that no flow of material is coming through the pipe into the dredge hopper. Before the draghead is raised, the vacuum gauge on the pipe should read zero, so that no suction exists both in the dragarm and draghead, and no suction force exists that can impinge a turtle on the draghead grate;

2) hold the draghead firmly on the bottom with no flow conditions for approximately 10 to 15 seconds before raising the draghead; then, raise the draghead quickly off the bottom and up to

a mid-water column level, to further reduce the potential for any adverse interaction with nearby turtles;

3) re-orient the dredge quickly to the next dredge line; and

4) re-position the draghead firmly on the bottom prior to bringing the dredge pump to normal pumping speed, and re-starting dredging activity.

C. Floodlights

Floodlights must be installed to allow the NOAA Fisheries-approved observer to safely observe and monitor the baskets or screens.

D. Intervals between dredging

Sufficient time must be allotted between each dredging cycle for the NOAA Fisheries-approved observer to inspect and thoroughly clean the baskets and screens for sea turtles and/or turtle parts and document the findings. Between each dredging cycle, the NOAA Fisheries-approved observer should also examine and clean the dragheads and document the findings.

II. OBSERVER PROTOCOL

A. Basic Requirement

Beginning April 1, or once water temperatures reach 11°C (whichever comes first), a NOAA Fisheries-approved observer with demonstrated ability to identify sea turtle species must be placed aboard the dredge(s) being used to monitor for the presence of listed species in the vicinity of dredge operations and/or parts being entrained during dredge operations. Observers will be onboard until project completion or November 30, whichever comes first.

B. Duty Cycle

While onboard, observers shall provide the required inspection coverage on a rotating basis so that combined monitoring periods represent 100% of total dredging through the project period.

C. Inspection of Dredge Spoils

During the required inspection coverage, the trained NOAA Fisheries-approved observer shall inspect the galvanized screens and baskets at the completion of each loading cycle for evidence of sea turtles. The Endangered Species Observation Form shall be completed for each loading cycle, whether listed species are present or not (Appendix G). If any whole turtles (alive or dead) or turtle parts are taken incidental to the project(s), Carrie Upite (978) 281-9328 ext. 6525 or Pat Scida (978) 281-9208 must be contacted within 24 hours of the take. An incident report for sea turtle take (Appendix H) shall also be completed by the observer and sent to Carrie Upite via

FAX (978) 281-9394 within 24 hours of the take. Incident reports shall be completed for every take regardless of the state of decomposition. NOAA Fisheries will determine if the take should be attributed to the incidental take level, after the incident report is received. Every incidental take (alive or dead, decomposed or fresh) should be photographed, and photographs shall be sent to NOAA Fisheries either electronically (Carrie.Upite@noaa.gov) or through the mail. Weekly reports, including all completed load sheets, photographs, and relevant incident reports, as well as a final report, shall be submitted to NOAA Fisheries NER, Protected Resources Division, One Blackburn Drive, Gloucester, MA 01930-2298.

D. Information to be Collected

For each sighting of any endangered or threatened marine species (including whales as well as sea turtles), record the following information on the Endangered Species Observation Form (Appendix G):

1) Date, time, coordinates of vessel
2) Visibility, weather, sea state
3) Vector of sighting (distance, bearing)
4) Duration of sighting
5) Species and number of animals
6) Observed behaviors (feeding, diving, breaching, etc.)
7) Description of interaction with the operation

E. Disposition of Parts

If any whole turtles (alive or dead, decomposed or fresh) or turtle parts are taken incidental to the project(s), Carrie Upite (978) 281-9328 ext. 6525 or Pat Scida (978) 281-9208 must be contacted within 24 hours of the take. All whole, dead sea turtles or turtle parts should be photographed, placed in plastic bags, labeled with location, load number, date, and time taken, and placed in cold storage. Dead turtles or turtle parts will be further labeled as recent or old kills based on evidence such as fresh blood, odor, and length of time in water since death. The incident should also be described in detail on the Incident Report of Sea Turtle Mortality (Appendix H). The photographs and reports should be submitted to Carrie Upite, NOAA Fisheries, Protected Resources Division, One Blackburn Drive, Gloucester, MA 01930-2298. After NOAA Fisheries is notified of the take, the observer should deliver specimens to the Virginia Marine Science Museum [(757) 437-4949] for further analysis, unless otherwise instructed by NOAA Fisheries. If NOAA Fisheries determines that disposal is appropriate, sea turtles or turtle parts should be disposed of (after a photograph is taken and a reporting form has been completed) by attaching a weight to the animal and dumping the specimen outside of the dredge site. If possible, a mark or tag (e.g., Inconel tag) should be placed on the carcass or part in the event that the animal is recaptured or stranded.

Live turtles (both injured and uninjured) should be held onboard the dredge until transported as soon as possible to the appropriate stranding network personnel for rehabilitation (Appendix D).

No live turtles should be released back into the water without first being checked by a qualified veterinarian or a rehabilitation facility. Virginia stranding network members (for rehabilitating turtles) include Mark Swingle and/or Susan Barco at the Virginia Marine Science Museum [(757)437-4949] and Jack Musick at the Virginia Institute of Marine Science [(804)684-7313]. Mark Swingle/Susan Barco and Dana Hartley (NOAA Fisheries Stranding Network Coordinator: (508) 495-2090) should also be contacted immediately upon any marine mammal injury or mortality incidents.

III. OBSERVER REQUIREMENTS

Submission of resumes of endangered species observer candidates to NOAA Fisheries for final approval ensures that the observers placed onboard the dredges are qualified to document takes of endangered and threatened species, to confirm that incidental take levels are not exceeded, and to provide expert advice on ways to avoid impacting endangered and threatened species. NOAA Fisheries does not offer certificates of approval for observers, but approves observers on a case-by-case basis.

A. Qualifications

Observers must be able to:

1) differentiate between leatherback (*Dermochelys coriacea*), loggerhead *Caretta caretta*), Kemp's ridley *(Lepidochelys kempii*), green (*Chelonia mydas*), and hawksbill *(Eretmochelys imbricata*) turtles and their parts;

2) handle live sea turtles and resuscitate and release them according accepted procedures;

3) correctly measure the total length and width of live and whole dead sea turtle species;

4) observe and advise on the appropriate screening of the dredge's overflow, skimmer funnels, and dragheads; and

5) identify marine mammal species and behaviors.

B. Training

Ideally, the applicant will have educational background in marine biology, general experience aboard dredges, and hands-on field experience with the species of concern. For observer candidates who do not have sufficient experience or educational background to gain immediate approval as endangered species observers, the observer training described below is necessary to be considered admissible by NOAA Fisheries. We can assist the Navy by identifying groups or individuals capable of providing acceptable observer training. At a minimum, observer training must include:

1) instruction on how to identify sea turtles and their parts;

2) instruction on appropriate screening on hopper dredges for the monitoring of sea turtles (whole or parts);

3) demonstration of the proper handling of live sea turtles incidentally captured during project operations. Observers may be required to resuscitate sea turtles according to accepted procedures prior to release;

4) instruction on standardized measurement methods for sea turtle lengths and widths;

5) instruction on how to identify marine mammals; and

6) instruction on dredging operations and procedures, including safety precautions onboard a vessel.

APPENDIX D
Sea Turtle Handling and Resuscitation

It is unlikely that sea turtles will survive entrainment in a hopper dredge, as the turtles found in the dragheads are usually dead, dying, or dismantled. However, the procedures for handling live sea turtles follow in case the unlikely event should occur. These guidelines are adapted from 50 CFR '223.206(d)(1).

Please photograph all turtles (alive or dead) and turtle parts found during dredging activities and complete the Incident Report of Sea Turtle Take (Appendix H).

Dead sea turtles

The procedures for handling dead sea turtles and parts are described in Appendix C-II-E.

Live sea turtles

When a sea turtle is found in the dredge gear, observe it for activity and potential injuries.

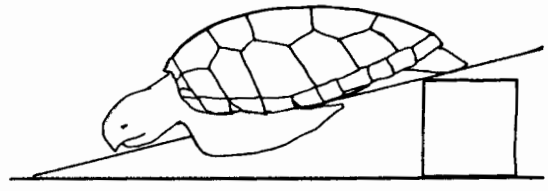
- **If the turtle is actively moving**, it should be retained onboard until evaluated for injuries by a permitted rehabilitation facility. Due to the potential for internal injuries associated with hopper entrainment, it is necessary to transport the live turtle to the nearest rehabilitation facility as soon as possible, following these steps:
  1) Contact the nearest rehabilitation facility to inform them of the incident. If the rehabilitation personnel cannot be reached immediately, please contact Carrie Upite at (978) 281-9328 ext. 6525, or Kara Dodge at (508) 495-2274.
  2) Keep the turtle shaded and moist (e.g., with a water-soaked towel over the eyes, carapace, and flippers), and in a confined location free from potential injury.
  3) Contact the crew boat to pick up the turtle as soon as possible from the dredge (within 12 to 24 hours maximum). The crew boat should be aware of the potential for such an incident to occur and should develop an appropriate protocol for transporting live sea turtles.
  4) Transport the live turtle to the closest permitted rehabilitation facility able to handle such a case.

  Do not assume that an inactive turtle is dead. The onset of rigor mortis and/or rotting flesh are often the only definite indications that a turtle is dead. Releasing a comatose turtle into any amount of water will drown it, and a turtle may recover once its lungs have had a chance to drain.

- **If a turtle appears to be comatose** (unconscious), contact the designated stranding/rehabilitation personnel immediately. Once the rehabilitation personnel has been informed of the incident, attempts should be made to revive the turtle at once. Sea turtles have been known to revive up to 24 hours after resuscitation procedures have been followed.
  - Place the animal on its bottom shell (plastron) so that the turtle is right side up and

elevate the hindquarters at least 6 inches for a period of 4 up to 24 hours. The degree of elevation depends on the size of the turtle; greater elevations are required for larger turtles.

- Periodically, rock the turtle gently left to right and right to left by holding the outer edge of the shell (carapace) and lifting one side about 3 inches then alternate to the other side.
- Periodically, gently touch the eye and pinch the tail (reflex test) to see if there is a response.
- Keep the turtle in a safe, contained place, shaded, and moist (e.g., with a water-soaked towel over the eyes, carapace, and flippers) and observe it for up to 24 hours.
- If the turtle begins actively moving, retain the turtle until the appropriate rehabilitation personnel can evaluate the animal. The rehabilitation facility should eventually release the animal in a manner that minimizes the chances of re-impingement and potential harm to the animal (i.e., from cold stunning).
- Turtles that fail to move within several hours (up to 24) must be handled in the manner described in Appendix C-II-E, or transported to a suitable facility for necropsy (if the condition of the sea turtle allows and the rehabilitation facility wants to necropsy the animal).



Stranding/rehabilitation contacts

Sea Turtles in Virginia

- Mark Swingle and/or Susan Barco, Virginia Marine Science Museum
  Phone: (757) 437-4949
- Jack Musick, Virginia Institute of Marine Science
  Phone: (804) 684-7313

Marine Mammals

- Mark Swingle/Susan Barco (VA)
- Dr. Whitaker/Mr. Schofield (MD)
- Dana Hartley (NOAA Fisheries Stranding Network Coordinator: (508) 495-2090)

APPENDIX E
Sea Turtle Trawling and Relocation Guidelines
(as derived from ACOE South Atlantic Division protocol)

Sea turtle trawling procedures

1. Trawling shall be conducted under the supervision of a biologist approved by the NOAA Fisheries. A letter of approval from NOAA Fisheries will be provided prior to the commencement of trawling.

2. Sea turtles captured pursuant to relocation trawling shall be handled in a manner designed to ensure their safety and viability, and shall be released over the side of the vessel, away from the propeller, and only after ensuring that the vessel's propeller is in the neutral, or disengaged, position (i.e., not rotating). Captured turtles shall be kept moist, and shaded whenever possible, until they are released. Resuscitation guidelines can be found at 50 CFR 223.206(d)(1) and are included in part in Appendix D.

3. Any turtles captured during the survey shall be measured in accordance with standard biological sampling procedures prior to release, and weighed when possible. Captured sea turtles shall be tagged prior to release with external flipper tags, which shall be obtained prior to the project from the University of Florida's Archie Carr Center for Sea Turtle Research. Sampling data and any external tags shall be recorded on the Sea Turtle Relocation Report (Appendix F).

4. Turtles shall be kept no longer than 12 hours prior to release and shall be released at least 3 miles away from the dredge site (if it can be done safely, turtles may be transferred onto another vessel for transport to the release area to enable the relocation trawler or relative abundance trawler to keep sweeping the dredge site without interruption).

5. External or internal sampling procedures (e.g., flipper tagging, PIT tagging, blood letting, skin tag sampling, laparoscopies, gastric lavages, mounting satellite or radio transmitters, genetics sampling, etc.) performed on live sea turtles are not permitted under this BO unless the observer holds a valid sea turtle research permit authorizing sampling (obtained pursuant to section 10 of the ESA, from the NOAA Fisheries' Office of Protected Resources, Permits Division), either as the permit holder, or as designated agent of the permit holder.

6. This BO serves as the authority for any NOAA Fisheries-approved endangered species observer aboard a relocation trawlers or hopper dredge to conduct genetic sampling on dead turtles, without the need for a Section 10 permit, if following the genetics sampling protocol in Appendix I.

7. The trawler will be equipped with two 60-foot nets constructed from 8-inch mesh

(stretch) fitted with mud rollers and flats as specified in the Turtle Trawl Nets Specifications. Paired net tows will be made for 10 to 12 hours per day or night. Trawling will be conducted with the tidal flow using repetitive 15-30 minute (total time) tows. Positions at the beginning and end of each tow will be determined from GPS Positioning equipment. Trawl speeds shall not exceed 3.5 knots. Tow speed will be recorded at the approximate midpoint of each tow.

8. Methods and equipment will be standardized including data sheets, nets, trawling direction to tide, length of station, length of tow, and number of tows per station. Water temperature measurements will be taken at the water surface each day using a laboratory thermometer. Data on each tow, including weather conditions, air temperature, wind velocity and direction, sea state-wave height, and precipitation, will be recorded on the Sea Turtle Trawling Report.

9. Before trawling begins, the necessary state permits for trawling in Virginia state waters must be obtained from the appropriate party (e.g., State of Virginia, Virginia Marine Resources Commission).

Turtle Trawl Nets Specifications

DESIGN: 4 seam, 4 legged, 2 bridal trawl net
WEBBING: 4 inch bar, 8 inch stretch
top - 36 gauge twisted nylon dipped
side - 36 gauge twisted nylon dipped
bottom - 84 gauge braided nylon dipped
NET LENGTH: 60 ft from cork line to cod end
BODY TAPER: 2 to 1
WING END HEIGHT: 6 ft
CENTER HEIGHT: Dependent on depth of trawl 14 to 18 ft
COD END: Length 50 meshes x 4" = 16.7 ft
Webbing 2 inch bar, 4 inch stretch, 84 gauge braid nylon dipped, 80 meshes around, 40 rigged meshes with 1/4 x 2 inch choker rings, 1 each 2 x 4 inch at end
cod end cover - none
chaffing gear - none
HEAD ROPE: 60 ft 2 inch combination rope (braid nylon with stainless cable center)
FOOT ROPE: 65 ft 2 inch combination rope
LEG LINE: top - 6 ft, bottom 6 - ft
FLOATS: size - tuna floats (football style), diameter - 7 inch length - 9 inch, number - 12 each, spacing - center on top net 2 inches apart
MUD ROLLERS: size 5 inch diameter 5.5 inch length, number - 22 each, spacing - 3 ft attached with 3/8 inch polypropelene rope (replaced with snap on rollers when broken)
TICKLER CHAINS: NONE (discontinued- but previously used 1/4 inch x 74 ft galvanized chain)
WEIGHT: 20 ft of 1/4 inch galvanized chain on each wing, 40 ft per net looped and tied

DOOR SIZE: 7 ft x 40 inches (or 8 ft x 40 inches), Shoe - 1 inch x 6 inch, bridles - 3/8 inch high test chain
CABLE LENGTH (bridle length, total): 7/16 inch x 240-300 ft varies with bottom conditions
FLOAT BALL: none
LAZY LINES: 1 inch nylon
PICKUP LINES: 3/8 inch polypropelene
WHIP LINES: 1 inch nylon

APPENDIX F
Sea Turtle Relocation Report

(*Note that any other reporting form submitted for turtles taken in trawling activities related to dredging should include the following information.*)

Channel: _____ Date: _____
Tow #:_____ Net (circle): Port Starboard
Day of trawling effort (e.g., 3rd day) _____ Hour of trawling effort (that day) _____
Water depth_____ Water temperature _____
Other environmental conditions_____
Describe capture location (include state, county, lat and long): _____
_____
Describe capture method and/or type of gear in use when turtle was caught:_____
_____

Species Information: *(please designate cm/m or inches.)*
Species _____ Weight (kg or lbs)_____
Sex (circle): Male Female Unknown How was sex determined? _____
Straight carapace length _____ Straight carapace width _____
Curved carapace length _____ Curved carapace width _____
Plastron length _____ Plastron width _____
Tail length _____ Head width _____
Condition of specimen/description of animal_____
_____

Flipper Tag Information
Left _____ Right _____
PIT Tag # _____

Miscellaneous:
Blood taken: YES NO _____# of vials Genetic biopsy taken: YES NO
Photos Taken: YES NO Is this a Recapture: YES NO
Organization Tagging _____
Personnel _____ Phone _____

Turtle Release Information:
Date _____ Time _____
Lat _____ Long _____
State _____ County _____

Remarks: (note if turtle was involved with tar or oil, gear or debris entanglement, wounds or mutilations, propeller damage, papillomas, old or new tag locations, etc.)
_____
_____

APPENDIX G
ENDANGERED SPECIES OBSERVER FORM
Dredging for Renourishment of Dam Neck Annex Beach
Sandbridge Shoal Borrow Site, Virginia Beach, VA

Daily Report

Date: _____
Geographic Site: _____
Location: Lat/Long _____ Vessel Name _____

Weather conditions: _____
_____
Water temperature: Surface _____ Below midwater (if known) _____

Condition of screening apparatus: _____
_____
_____

Incidents involving endangered or threatened species? (Circle) Yes No
(*If yes, fill out Incident Report of Sea Turtle Mortality*)

Comments (type of material, biological specimens, unusual circumstances, etc:)
_____
_____
_____

Observer's Name: _____
Observer's Signature: _____

BRIDGE WATCH SUMMARY

Species	# of Sightings	# of Animals	Comments

APPENDIX H
Incident Report of Sea Turtle Take
Dredging at Sandbridge Shoal Borrow Site for Renourishment of Dam Neck Annex Beach

Species _____ Date _____ Time (specimen found) _____
Geographic Site _____
Location: Lat/Long _____
Vessel Name _____ Load # _____
Begin load time _____ End load time_____
Begin dump time _____ End dump time _____
Sampling method _____
Condition of screening _____
Location where specimen recovered_____
_____

Draghead deflector used? YES NO Rigid deflector draghead? YES NO
Condition of deflector _____
_____

Weather conditions_____
_____

Water temp: Surface _____ Below midwater (if known) _____

Species Information: *(please designate cm/m or inches.)*
Head width _____ Plastron length _____
Straight carapace length _____ Straight carapace width_____
Curved carapace length _____ Curved carapace width _____

Condition of specimen/description of animal (please complete attached diagram)
_____
_____
_____

Turtle Decomposed: NO SLIGHTLY MODERATELY SEVERELY

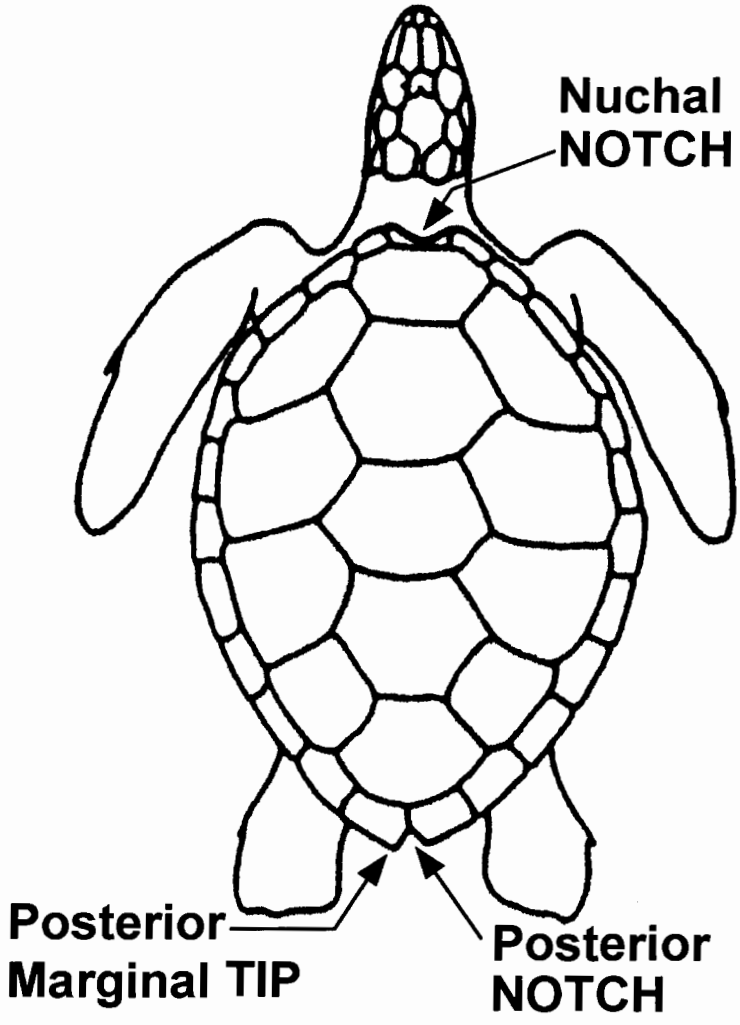
Turtle tagged: YES NO *Please record all tag numbers.* Tag # _____
Genetic sample taken: YES NO
Photograph attached: YES NO
(please label *species, date, geographic site* and *vessel name* on back of photograph)

Comments/other (include justification on how species was identified) _____
_____
_____
_____

Observer's Name _____
Observer's Signature _____

Incident Report of Sea Turtle Take
Dredging at Sandbridge Shoal Borrow Site for Renourishment of Dam Neck Annex Beach

Draw wounds, abnormalities, tag locations on diagram and briefly describe below.



Description of animal:

APPENDIX I.
Protocol for Collecting Tissue from Sea Turtles for Genetic Analysis

Materials for Collecting Genetic Tissue Samples

- surgical gloves
- alcohol swabs
- betadine swabs
- sterile disposable biopsy punches
- sterile disposable scalpels
- permanent marker to externally label the vials
- scotch tape to protect external labels on the vials
- pencil to write on internal waterproof label
- waterproof label, 1/4" x 4"
- screw-cap vial of saturated NaCl with 20% DMSO*, wrapped in parafilm
- piece of parafilm to wrap the cap of the vial after sample is taken
- vial storage box

* The 20% DMSO buffer within the vials is nontoxic and nonflammable. Handling the buffer without gloves may result in exposure to DMSO. This substance soaks into skin very rapidly and is commonly used to alleviate muscle aches. DMSO will produce a garlic/oyster taste in the mouth along with breath odor. The protocol requires that you wear gloves each time you collect a sample and handle the buffer vials. DO **NOT** store the buffer where it will experience extreme heat. The buffer must be stored at room temperature or cooler, such as in a refrigerator.

Please collect two small pieces of muscle tissue from all live[1], comatose[1], and dead[2] stranded loggerhead, green, leatherback, and hybrid sea turtles (and any hawksbills, although this would be a rare incident). A muscle sample can be obtained no matter what stage of decomposition a carcass is in. Please utilize the equipment in these kits for genetic sampling of **turtles only** and contact Kara Dodge when you need additional biopsy supplies.

Note that genetic samples are not required for the single stock of Kemp's ridleys.

Sampling Protocol for Live or Comatose turtles[1]

1. Stabilize the turtle on its plastron. When turtles are placed on their carapace they tend to flap their flippers aggressively and injuries can happen. Exercise caution around the head and jaws.

2. The biopsy location is the dorsal surface of the rear flipper, 5-10 cm from the posterior (trailing) edge and close to the body. Put on a pair of surgical gloves and wipe this area with a Betadine swab.

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[1] For any sampling activity on live or comatose turtles, the sampler must be operating under a valid ESA Section 10 research permit.

3. Wipe the hard surface (plastic dive slate, biopsy vial cap or other available clean surface) that will be used under the flipper with an alcohol swab and place this surface underneath the Betadine treated flipper.

4. Holding a new (sterile and disposable) plastic skin biopsy punch by the thumb and index finger, gently press the biopsy punch into the flesh, as close to the posterior edge of the rear flipper as possible. Press down with moderate force and rotate the punch one or two complete turns to make a circular cut all the way through the flipper. The biopsy tool has a sharp cutting edge so exercise caution at all times.

5. Repeat the procedure twice (one per rear flipper) with the same biopsy punch so that you now have two samples from this animal.

6. Remove the tissue plugs by knocking them directly from the biopsy punch into a single vial containing 20% DMSO saturated with salt. It is important to ensure that the tissue samples do not come into contact with any other surface or materials during this transfer.

7. Use a pencil to write the stranding ID, date, species ID and SCL on the waterproof label and place it in the vial with the samples.

8. Label the outside of the vial using the permanent marker with stranding ID, date, species ID and SCL .

9. Apply a piece of clear scotch tape over the what you have written on the outside of the vial to protect the label from being erased or smeared.

10. Wrap parafilm around the cap of the vial by stretching as you wrap.

11. Place the vial in the vial storage box.

12. Complete the Sea Turtle Biopsy Sample Collection Log.

13. Attach a copy of the STSSN form to the Collection Log - be sure to indicate on the STSSN form that a genetic sample was taken.

14. Wipe the biopsy area with another Betadine swab.

15. Dispose of the used biopsy punch and gloves. It is very important to use a new biopsy punch for each animal to avoid cross contamination.

Sampling Protocol for Dead Turtles[2]

1. Put on a pair of surgical gloves. The best place to obtain the muscle sample is on the ventral side where the front flippers insert near the plastron. It is not necessary to cut very deeply to get muscle tissue.

2. Using a new (sterile and disposable) scalpel cut out two pieces of muscle of a size that will fit in the vial.

3. Transfer both samples directly from the scalpel to a single vial of 20% DMSO saturated with salt.

4. Use the pencil to write the stranding ID, date, species ID and SCL on the waterproof label and place it in the vial with the samples.

5. Label the outside of the vial using the permanent marker with stranding ID, date, species ID and SCL .

6. Apply a piece of clear scotch tape over the what you have written on the outside of the vial to protect the label from being erased or smeared.

7. Wrap parafilm around the cap of the vial by stretching as you wrap.

8. Place the vial in the vial storage box.

9. Complete the Sea Turtle Biopsy Sample Collection Log.

10. Attach a copy of the STSSN form to the Collection Log - be sure to indicate on the STSSN form that a genetic sample was taken.

11. Dispose of the used scalpel and gloves. It is very important to use a new scalpel for each animal to avoid cross contamination.

At the end of the project cycle, submit all genetic samples to:

Kara Dodge
NOAA Fisheries/NEFSC
166 Water Street
Woods Hole, MA 02543
(508) 495-2274

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[2] NOAA Fisheries-approved endangered species observers are authorized to conduct genetic sampling activities on dead sea turtles without a separate ESA Section 10 permit, provided the observer adheres to the sampling protocol specified below.