UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
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APR 25 2002

Colonel David L. Hansen
District Engineer
Department of the Army
Norfolk District, Corps of Engineers
Fort Norfolk, 803 Front Street
Norfolk, Virginia 23510-1096

Dear Colonel Hansen:

Enclosed is the National Marine Fisheries Service's (NMFS) biological opinion on the impacts of the Army Corps of Engineers (ACOE) Norfolk District's dredging in the Thimble Shoal Channel and Atlantic Ocean Channel on threatened and endangered species under NMFS' jurisdiction. This biological opinion was prepared pursuant to the interagency consultation requirements of Section (7)(a)(2) of the Endangered Species Act.

The ACOE proposes to initiate the current deepening project as early as June, 2002 and construction of the entire project may take as long as four years to complete. Maintenance dredging of the Thimble Shoal and Atlantic Ocean Channels will occur approximately every two years. The existing biological opinion for Thimble Shoal Channel does not address deepening activities or dredging in the Atlantic Ocean Channel. However, an amendment was issued on March 30, 2001 which stated that the potential impacts of dredging in the Atlantic Ocean Channel on listed species are similar to those expected in Thimble Shoal Channel. The Virginia Beach Hurricane Protection Project biological opinion does not cover maintenance dredging, and the time frame for the completion of the project was one to two calendar years. Therefore, as a result of conversations between ACOE and NMFS, it was determined that a single biological opinion was needed to address all dredging activities (both deepening and maintenance) in the Thimble Shoal and Atlantic Ocean Channels.

This biological opinion is based on information provided in the NMFS February 7, 2001 biological opinion on maintenance dredging in the Thimble Shoal Federal Navigation Channel, the September 6, 2001 biological opinion that assessed dredging operations in the Thimble Shoal Channel and the Atlantic Ocean Channel as related to the Virginia Beach Hurricane Protection Project, correspondence with Mr. Craig Seltzer and Ms. Betty Grey Waring, ACOE, and other sources of information. It has been determined by NMFS that the dredging projects in the Thimble Shoal and Atlantic Ocean Channels may adversely affect, but are not likely to jeopardize the continued existence of listed species under NMFS' jurisdiction.

The enclosed biological opinion provides an Incidental Take Statement (ITS) for threatened and endangered sea turtles, as well as reasonable and prudent measures and terms and conditions necessary for ACOE to minimize impacts to these species. The anticipated level of take for dredging in Thimble Shoal and Atlantic Ocean Channels was determined based upon the greatest estimated amount of material to be dredged during deepening operations and the maximum and minimum amounts to be dredged in both channels during maintenance

operations:

- During any given year, if the amount of dredged material to be removed is less than or equal to 5 million cy, NMFS anticipates that dredging in the two channels may result in the observed take of 18 loggerhead and 4 Kemp's ridley sea turtles.

- During any given year, if the amount of dredged material to be removed is less than or equal to 3 million cy, NMFS anticipates that dredging operations in the two channels may result in the observed take of 10 loggerhead and 2 Kemp's ridley sea turtles.

- During any given year, if the amount of dredged material to be removed is less than or equal to 1 million cy, NMFS anticipates that dredging operations in the two channels may result in the observed take of 4 loggerhead and 1 Kemp's ridley sea turtle.

The incidental level of turtle take is anticipated to be fresh dead. No incidental take for hawksbill or leatherback sea turtles is anticipated as these species are relatively unlikely to be prevalent in the action area and interactions with the dredge are expected to be low.

NMFS also expects that the deepening operations and maintenance dredging may take an additional unquantifiable number of previously dead sea turtle parts. A sea turtle take may not be considered related to dredge operations and count towards the above referenced anticipated take level if the condition of the specimen is in a severely decomposed or advanced state of decay and if the specimen is a turtle part. Provided that NMFS concurs with the ACOE'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.

Additionally, NMFS also expects that relocation trawling in either of the channels may take an additional unquantifiable number of live loggerhead and Kemp's ridley sea turtles. As stated in the reasonable and prudent measures and terms and conditions of the Incidental Take Statement, relocation trawling may occur under certain circumstances prior to dredging. This trawling will result in sea turtle takes, but these takes are not expected to be lethal due to the short duration of the tow times (15 to 30 minutes per tow). While relocating sea turtles may invoke a degree of stress on the animals, the level of stress should be minimized by an expedited and proper handling time. Additionally, the capture of a live turtle in a trawl is likely less harmful to the species as compared to a sea turtle being entrained in a dredge draghead. Thus, an unquantifiable number of live loggerhead and Kemp's ridley sea turtles are anticipated to be taken during any relocation trawling deemed necessary during dredging in both channels.

The distribution of shortnose sturgeon in Virginia waters is relatively unknown and the furthest recorded capture of shortnose sturgeon is in the mouth of the York River. While NMFS must employ a conservative approach to management and consider the species to be in the area, it is difficult to determine the abundance of this species in the action area and how the proposed project will impact shortnose sturgeon. Due to the lack of information about distribution in Virginia waters and the low likelihood that the dredge activities will interact with shortnose sturgeon, no incidental take will be designated for shortnose sturgeon at this time. No incidental take of any listed marine mammal is anticipated for this project.

The NMFS expects ACOE to implement the reasonable and prudent measures and terms and conditions as outlined in the ITS. The measures of the ITS are non-discretionary and must be undertaken by ACOE for the incidental take exemption to apply. For example, if hopper dredging is conducted from April 1 through November 30, dredges must have trained NMFS-approved observers on board, be equipped with rigid deflector dragheads, and follow designated equipment specifications.

This biological opinion concludes consultation for the dredging projects in the Thimble Shoal and Atlantic Ocean Channels. Reinitiation of this consultation is required if: (1) the amount or extent of taking specified in the ITS is exceeded; (2) new information reveals effects of these actions that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) project activities are subsequently modified in a manner that causes an effect to the listed species that was not considered in this biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified actions. As identified in the biological opinion, NMFS Northeast Regional staff should be contacted immediately should an interaction with a sea turtle occur.

For further information regarding any consultation requirements, please contact Mary Colligan, Assistant Regional Administrator for Protected Resources, NMFS Northeast Regional Office, at (978) 281-9116. I look forward to continued cooperation with ACOE during future Section 7 consultations.

Sincerely,

Patricia A. Kurkul
Regional Administrator

Enclosure

cc: ACOE - Seltzer, Waring
F/NER3 - Colligan
F/NER-OXF - Nichols
F/PR - Williams
GCNE - Williams

File Code: 1514-05 (A) ACOE - Thimble Shoal/Atlantic Ocean Channels

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

Agency: Army Corps of Engineers, Norfolk District

Activity: Consultation on Dredging in the Thimble Shoal Federal Navigation Channel and Atlantic Ocean Channel

Conducted by: National Marine Fisheries Service
Northeast Regional Office

Date Issued: April 25, 2002

Approved by: [signature]

This constitutes the National Marine Fisheries Service's (NMFS) biological opinion on the effects of the Army Corps of Engineers (ACOE) Norfolk District's dredging projects in Thimble Shoal Channel and Atlantic Ocean Channel on threatened and endangered species in accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). This biological opinion is based on information provided in the NMFS February 7, 2001 biological opinion on maintenance dredging in the Thimble Shoal Federal Navigation Channel, the September 6, 2001 biological opinion that assessed dredging operations in the Thimble Shoal Channel and the Atlantic Ocean Channel as related to the Virginia Beach Hurricane Protection Project, correspondence with Mr. Craig Seltzer and Ms. Betty Grey Waring, ACOE, and other sources of information. A complete administrative record of this consultation is on file at the NMFS Northeast Regional Office. Formal consultation was initiated on December 4, 2001.

CONSULTATION HISTORY

This biological opinion assesses the impacts of the dredging in the Thimble Shoal Channel and Atlantic Ocean Channel. This dredging includes the proposed deepening of the Thimble Shoal and Atlantic Ocean Channels and the anticipated maintenance dredging in the Thimble Shoal Channel and Atlantic Ocean Channel. The deepening of the Thimble Shoal and Atlantic Ocean Channels is proposed as part of the Norfolk Harbor and Channels 50-foot inbound channel project. The ACOE and NMFS have previously considered the impacts of Thimble Shoal maintenance dredging on threatened and endangered species, including marine mammals, sea turtles, and shortnose sturgeon. Previous consultations regarding maintenance dredging in the Thimble Shoal Channel (April 16, 1984; December 28, 1984; March 14, 1985; March 20, 1985; March 10, 1986) were concluded informally based on dredging schedules which were proposed during months when sea turtles were not likely to be present. Based on existing information, NMFS concluded that these dredging events were not likely to adversely affect listed species. Subsequently, the ACOE has conducted deepening and periodic maintenance dredging of the Thimble Shoal Channel during winter months

without incident. However, on December 15, 1998, the ACOE informed NMFS that the 1999 Thimble Shoal maintenance dredging was delayed due to funding and would be conducted from July to September, during a period when turtles may be migrating out of the Chesapeake Bay. On February 8, 1999, NMFS informed ACOE that this dredging was likely to adversely affect listed sea turtles in the lower Chesapeake Bay and formal consultation was necessary. The ACOE submitted the BA, Biological Assessment of Potential Impacts to Endangered and Threatened Species of Sea Turtles and Whales in the Vicinity of Thimble Shoal Channel, Chesapeake Bay, Virginia, to NMFS on April 14, 1999.

The 1999 maintenance dredging cycle actually began in December 1999. Again, due to funding constraints, dredging had to be curtailed in January 2000. Once the budget process was finalized, the ACOE resumed dredging in late July 2000 in order to remove all of the shoaled sediment for that dredging cycle.

After the effects of the action were analyzed but before the consultation process was complete, two loggerheads and one unidentified turtle were incidentally taken during maintenance dredging operations in Thimble Shoal Channel. One unidentified turtle was taken on July 24, 2000, one loggerhead was taken on August 22, 2000, and another loggerhead was recovered in three parts on August 25 and August 27, 2000. Since the final biological opinion had not yet been signed, it was imperative to re-assess the impacts of the dredging project in light of the take of these three turtles. On September 19, 2000, NMFS informed Betty Grey Waring of this situation in a phone conversation. NMFS issued the final biological opinion on maintenance dredging in the Thimble Shoal Federal Navigation Channel and associated ocean disposal on February 7, 2001. NMFS' biological opinion concluded that the maintenance dredging operations at Thimble Shoal Channel, in conjunction with ocean placement, may adversely affect, but are not likely to jeopardize, the continued existence of the right, humpback, or fin whale; loggerhead, leatherback, Kemp's ridley, green, or hawksbill sea turtle; or shortnose sturgeon.

On March 30, 2001, the ACOE informed NMFS that an upcoming hurricane protection project at Virginia Beach, Virginia would require dredging in the Thimble Shoal Channel, as well as in the Atlantic Ocean Channel. The borrow site was originally intended to be a portion of the Thimble Shoal Channel, but it was discovered that the Thimble Shoal Channel alone would not provide the required volume of sand. The ACOE stated that the required sand for the beach berm work would need to be supplemented by sand derived from several areas within the Atlantic Ocean Channel, lying approximately 3-4 miles east of the Thimble Shoal Channel. The project was to be conducted from the end of May through November 2001. It was determined that the proposed dredging in the Thimble Shoal Channel for the Virginia Beach project would fall within the scope of the February 7, 2001 biological opinion on maintenance dredging, as the location and impacts to the species could be considered the same. On May 30, 2001, NMFS informed the ACOE that the potential impacts of dredging in the Atlantic Ocean Channel

on listed species would be the same as those in Thimble Shoal Channel due to the nature of the dredging and location of the project. All of the reasonable and prudent measures and terms and conditions of the Incidental Take Statement in the February 2001 biological opinion applied equally to the dredging at the Atlantic Ocean Channel. The level of anticipated take authorized in the previous biological opinion did not change due to the additional dredging in the Atlantic Ocean Channel. A NMFS letter dated May 30, 2001, served as an amendment to the February 2001 biological opinion to cover dredging in the Atlantic Ocean channel for the 2001 Virginia Beach Hurricane Protection project.

On August 7 and 8, 2001, two loggerheads were taken during dredging in the Thimble Shoal Channel for the Virginia Beach project. After contacting NMFS, the ACOE coordinated with Glynn Banks of the ACOE Engineer Research and Development Center to ensure that Thimble Shoal dredging operations were employing appropriate sea turtle protection measures. Mr. Banks was able to observe the operations, ensure all reasonable and prudent measures were being implemented, and suggest additional measures to minimize potential sea turtle takes. On August 15, 2001, the ACOE sent NMFS a letter indicating as such and requesting reinitiation of consultation pursuant to Section 7 of the ESA. Due to the take of two loggerhead turtles in hopper dredging activities, the ACOE also requested that the incidental take limit for Thimble Shoal Channel be increased from four loggerhead sea turtles (as authorized in the Incidental Take Statement accompanying the February 7, 2001 biological opinion) to ten loggerhead sea turtles. In this letter, it was apparent that the dredging associated with the Virginia Beach project was much larger in scope than the Thimble Shoal Channel maintenance dredging on which NMFS previously consulted.

After receiving the ACOE's letter dated August 15, 2001, there were an additional seven incidents of sea turtles and/or turtle parts observed taken during Thimble Shoal Channel hopper dredging. Thus, from August 7 to August 28, there were a total of nine days in which turtles were taken. Five of the incidentally captured turtles were considered to be fresh dead turtles, and the remaining incidents involved decomposed turtle flippers and/or carapace parts. As the dredging associated with the Virginia Beach project was previously determined to fall within the scope of the February 2001 Thimble Shoal maintenance dredging biological opinion, and the anticipated incidental take level for this project was determined to be four loggerhead and one Kemp's ridley sea turtle, the incidental take level was exceeded.

In a letter dated August 30, 2001, NMFS concurred with ACOE's request to reinitiate consultation on dredging in Thimble Shoal Channel and Atlantic Ocean Channel as related to the Virginia Beach project. The September 6, 2001 biological opinion assessed dredging in the Atlantic Ocean Channel and Thimble Shoal Channel (up to authorized depths of 55 feet) to acquire an additional 2.7 million cubic yards of sand for the Virginia Beach Hurricane Protection project. The NMFS' biological opinion again concluded that the dredging operations at Thimble Shoal Channel and Atlantic Ocean Channel, as related to the Virginia Beach

Hurricane Protection project, may adversely affect, but are not likely to jeopardize, the continued existence of the threatened and endangered species mentioned previously. Relocation trawling was included in the biological opinion as a term and condition of the reasonable and prudent measures to minimize impacts of incidental take of sea turtles. Relocation trawling is performed prior to hopper dredging in order to minimize the number of turtles taken in hopper dredges by displacing sea turtles that may be in the dredging channel. As of October 4, 2001, 9 loggerhead turtles and 3 Kemp's ridleys were captured and relocated during trawling operations.

On September 26, 2001, a decomposed piece of an unknown turtle's plastron was found in the overflow screening basket, and on October 23, a carapace piece from an unknown species of turtle was found in the overflow screening basket. A piece of Kemp's ridley carapace was recovered from the inflow screening basket on November 4. On November 11, two separate incidents were documented at different times, including a portion of a flipper and two ribs without attached tissue from an unknown species of turtle, and a portion of the plastron (with no tissue) from an unknown species of turtle. On November 20, two carapace fragments and associated tissue from a fresh loggerhead were taken. These takes resulted in a total of 15 incidents when turtles and/or turtle parts were taken in association with dredging in Thimble Shoal Channel.

On December 4, 2001, the ACOE informed NMFS that deepening of the Norfolk Harbor and Channels 50-foot inbound channel is necessary. This proposed project will require the removal of a total of up to 7.5 million cubic yards of material. Dredging of approximately 2.5 million cubic yards from the inner harbor channels will likely be performed using a hydraulic pipeline dredge, placing the dredge material in a confined upland site. Dredging in the outer harbor channels will require the removal of up to 5 million cubic yards of material from the Thimble Shoal Channel and the Atlantic Ocean Channel to depths of approximately 50-55 feet with the dredged material placement in the Dam Neck Ocean Site. The Virginia Beach Hurricane Protection Project removed only beach quality sand from the two channels and did not remove all the shoaled areas. Therefore, there is an additional quantity of material that needs to be dredged in order to attain authorized project depths. The Norfolk Harbor and Channels project is authorized to 55 feet (65 feet in the Atlantic Ocean Channel). The project is proposed to begin in June 2002 and construction of the entire project is estimated to take as long as four years to complete. The existing biological opinion for Thimble Shoal Channel does not address deepening activities or dredging in the Atlantic Ocean Channel. However, an amendment was issued on March 30, 2001 which stated that the potential impacts of dredging in the Atlantic Ocean Channel on listed species are similar to those expected in Thimble Shoal Channel. The Virginia Beach Hurricane Protection Project biological opinion does not cover maintenance dredging, and the time frame for the completion of the project was one to two calendar years. Therefore, as a result of conversations between ACOE and NMFS, it was determined that a single biological opinion was needed to address all

dredging activities (both deepening and maintenance) in the Thimble Shoal and Atlantic Ocean Channels. In a letter dated January 4, 2001, NMFS responded to ACOE's request for reinitiation and advised the ACOE that no irreversible or irretrievable commitment of resources should be made that would prevent the NMFS from proposing or implementing any reasonable and prudent alternatives to avoid jeopardizing endangered or threatened species.

DESCRIPTION OF THE PROPOSED ACTION

The ACOE proposes to deepen the Norfolk Harbor and Channels 50-foot inbound Channel with the related removal of up to 7.5 million cubic yards from the Inner Harbor, Thimble Shoal, and Atlantic Ocean Channels; perform maintenance dredging of the Thimble Shoal Channel with up to two million cubic yards removed in any given year; and perform future maintenance dredging of the Atlantic Ocean Channel with up to one million cubic yards removed in any given year. Dredged material for both the maintenance and deepening projects will be placed at the Dam Neck Ocean Site. If warranted by ACOE, beach quality sand dredged from the Channels may be deposited as part of a beach renourishment activity.

Deepening of Norfolk Harbor and Channels
Dredging of the Norfolk Harbor and Channels 50-foot inbound project (inner harbor channels) will likely be performed using a hydraulic pipeline dredge. The dredged material will be placed at the Craney Island Dredged Material Management Area. The NMFS has previously determined that the use of mechanical and hydraulic dredging equipment other than hopper dredges is not expected to result in direct or indirect effects to sea turtles or marine mammals. Shortnose sturgeon are not likely to be present in the action area. While they have been previously taken in hydraulic dredging, due to the location of the proposed project, shortnose sturgeon are unlikely to be adversely affected by the deepening project. As such, the deepening of the inner harbor channels will not adversely affect any listed species in the action area, and this portion of the proposed project will not be further assessed.

The proposed deepening project for the Thimble Shoal and Atlantic Ocean Channels (outer harbor channels) is similar to the Virginia Beach Hurricane Protection project covered in the NMFS September 2001 biological opinion in that dredging will take place within the boundaries of the authorized Thimble Shoal and Atlantic Ocean Channels to similar depths (50-55 feet) previously used to obtain sand for Virginia Beach. However, the Virginia Beach project only removed beach quality sand from these channels and did not remove all of the shoaled areas. Therefore, an additional 5 million cubic yards will need to be removed to deepen these inbound channels to an interim depth of 50 plus feet.

Maintenance Dredging
Maintenance dredging of the Thimble Shoal and Atlantic Ocean Channels will occur approximately every two years. Whenever possible, dredging

will be conducted during winter months to avoid interactions with sea turtles. However, due to unforeseen circumstances and the potential delays in the federal budget process, dredging may need to be conducted during the warmer months when sea turtles are present in Virginia waters. This biological opinion addresses the impacts of dredging during this April 1 to November 30 period on listed species. Dredging during the remainder of the year is not likely to adversely affect turtles.

As engineered, the Thimble Shoal channel is 55 feet deep, 1,000 feet wide, and 13.4 miles long. During maintenance dredging, material will only be removed from discrete areas that have shoaled within the channel. Therefore, the amount of material to be removed from the channel varies for each dredging cycle.

The Atlantic Ocean Channel is an authorized Federal navigation channel as part of the Norfolk Harbor and Channels, Virginia and is located 3-4 miles east of the Thimble Shoal Channel. This channel is maintained at a depth of 55 feet, is 1,300 feet wide, and 11 miles long. It has not required dredging to date because the depths are adequate for current navigation purposes.

The type of dredge that will be used for both the deepening operations and the maintenance of the Thimble Shoal and Atlantic Ocean Channels is a hopper dredge. The ACOE has indicated that this type of dredge was chosen due to its ability to operate in strong currents and for maneuvering in rough seas. Speed during dredging will range from 1-7 knots.

The ACOE will require its contractor to comply with the Endangered Species Protection protocol, which has been developed in consultation with NMFS for use during dredging. This protocol is attached in Appendix B and summarized below:

- Whenever possible, dredging will be confined to the winter months.
- Contractor will develop a written operational plan to minimize turtle takes and whale collisions.
- Contractor will inform all dredge personnel of the possible presence of endangered species. A bridge watch will be conducted for whales at all times and for sea turtles from April 1 - November 30. Action will be taken to avoid collisions.
- NMFS-approved observers will be on board when dredging occurs during the April 1 - November 30 period. Observers will work a total of 12 hours per day in shifts of 6 hours on, 6 hours off, resulting in 50% observer coverage during the project period. Observer findings will be recorded after each shift and reported weekly. Takes of endangered species will be reported immediately. A final report on the project will be submitted within 20 days of the end of dredging.
- Hopper dredge dragheads will be equipped with a rigid sea turtle deflector approved by the ACOE.

- Screening baskets with openings of 4 inches or less will be installed over each hopper inflow. Screens and lighting will be approved by the ACOE Contracting officer for use on hopper dredges during endangered species watches.
- Control of suction in the various phases of hopper dredge operations will be conducted in a manner designed to minimize potential for entrainment of listed species at all times.

Disposal of Dredged Material
The dredge spoils will typically be deposited at the Dam Neck site, which was designated by the EPA on March 31, 1988 (53 FR 10382). This disposal site covers 9 square miles and has an average depth of 40 feet. The EPA has determined that the dredged material from the channels is suitable for ocean disposal at the Dam Neck site. If warranted by the ACOE, beach quality sand from the dredging operations in Thimble Shoal and Atlantic Ocean Channels may be used for beach renourishment.

A 300-foot hopper dredge will typically transport dredged material to the Dam Neck site. During transport, this dredge will be traveling at approximately 8 knots. The amount of material removed during maintenance dredging in the Thimble Shoal Channel and Atlantic Ocean Channel will be up to 2,000,000 cubic yards and 1,000,000 cubic yards, respectively. During the deepening project, the amount of material removed from the outer harbor channels will be up to 5,000,000 cubic yards. The dredge will make approximately 1650 round trips to the disposal site for this project. This number is contingent upon the size of the dredge and the total amount of material dredged. Future maintenance dredging may involve between 300 and 800 round trips, depending on the amount of shoaled sediment and the dredging in a particular maintenance cycle. Trips will cover approximately 4-25 miles each way from the channels to the disposal site.

Action Area
The action area for this consultation includes several areas near the mouth of the Chesapeake Bay. Specific project actions will take place in the Thimble Shoal Federal Navigation Channel (Appendix A), the Atlantic Ocean Channel, the Dam Neck Disposal Site, and the waters between and immediately adjacent to these areas.

STATUS OF AFFECTED SPECIES

NMFS has determined that the action being considered in this biological opinion may affect the following species provided protection under the ESA.

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 kempi*)	Endangered
Green sea turtle (*Chelonia mydas*[1])	Endangered/Threatened
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered

Fish

Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered

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 shortnose sturgeon (NMFS 1996) and sea turtle (NMFS and USFWS 1995, USFWS 1997) status reviews, Recovery Plans for the humpback whale (NMFS 1991a), right whale (NMFS 1991b), fin and sei whale (NMFS 1998a), shortnose sturgeon (NMFS 1998b), loggerhead sea turtle (NMFS and USFWS 1991) and leatherback sea turtle (NMFS and USFWS 1992), and the 2000 Marine Mammal Stock Assessment Report (Waring et al. 2001).

Right Whale

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, NMFS 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.

In the last several years, significant efforts have been made to determine the current status and trends of this very small population and to make valid recommendations on recovery requirements. Based on data from 1987 through 1992, Knowlton et al. (1994) concluded that the right whale population was growing at a net annual rate of 2.5 percent (CV=0.12). However, new information and modeling suggests that the population is not growing and may be declining. Using data on reproduction and survival through 1996, Caswell et al. (1999) determined that the right whale population was declining at a rate of 2.4 percent per year. One model suggested that the right whale population has undergone a five-fold increase in mortality rate in less than one generation. According to Caswell et al. (1999), if the mortality rate as of 1996 does not decrease and the population performance does not improve, extinction could occur within 100 years

[1] Pursuant to NMFS regulations at 50 CFR 227.71, the prohibitions of Section 9 of the Endangered Species Act apply to all green turtles, whether endangered or threatened.

and would be certain within 400 years. The mean time to extinction was calculated to be 191 years.

Recognizing the precarious status of the right whale, the continued threats in its coastal habitat throughout its range, and the uncertainty surrounding the attempts to characterize population trends, the International Whaling Commission (IWC) held a special meeting of its Scientific Committee in March 1998 to conduct a comprehensive assessment of right whales worldwide. At the 1998 IWC workshop, an inter-sessional Steering Group was established to review an early draft of Caswell et al. (1999) and several on-going assessment efforts to identify the best and most current scientific information on population status and trends. The IWC Scientific Committee met in May 1999 to discuss the Steering Group's report. Committee members noted that there were several potential negative biases in Caswell et al. (1999) but agreed that the results of the study should be considered in management actions. For the purposes of this biological opinion, NMFS will continue to adopt the risk averse assumption that the northern right whale population is declining.

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.

Based on photographs of catalogued animals from 1959 and 1989, Kraus (1990) estimated that 57% of right whales exhibited scars from entanglement and 7% from ship strikes (propeller injuries). Using data from 1935 through 1995, Hamilton et al. (1998) found that an estimated 61.6% of right whales exhibit injuries caused by entanglement, and 6.4% exhibit signs of injury from vessel strikes. In addition, several animals 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 may be slightly higher.

Many of the reports of mortality cannot be attributed to a particular source. The following injury/mortality events are those reported from 1996 to the present for which source was determined. These numbers should be viewed as absolute minimum numbers. The total number of mortalities and injuries cannot be estimated but is believed to be higher since it is unlikely that all carcasses will be observed. One right whale mortality resulting from a ship strike was recorded in 1996, and another whale that had become entangled in late 1995 was killed by a ship in 1996. In 1997, one ship strike mortality was reported from the Bay of Fundy, and eight entanglements were reported. Two adult female right whales were discovered in a weir off Grand

Manan Island in the Bay of Fundy in July 1998, and were released two days later. Also in July 1998, gear was removed from around the tail stock of a right whale, which was originally seen entangled in the Bay of Fundy in August 1997. This same whale, apparently debilitated from the earlier entanglement, became entangled in lobster pot gear twice in one week in Cape Cod Bay in September 1998. On August 15, 1998, a right whale was observed entangled in the Gulf of St. Lawrence; the animal apparently freed itself of most of the gear, but some gear may remain. Two right whale mortalities were documented for 1999; one attributed to a ship strike, and the second to a fishing gear entanglement. The first animal was found floating near Truro, Massachusetts, and was towed to the beach for necropsy. Evidence of pre-mortem ship strike injuries and disease were found, and scientists have determined that the whale died from complications of these injuries. In addition to these known mortalities, there were at least five new right whale entanglements in 1999. In 2000, a total of five confirmed North Atlantic right whale entanglements were sighted in the Gulf of Maine (both in US and Canada). One whale was completely disentangled, one whale was not a candidate for rescue due to its minor entanglement and one whale remained entangled and required further assessment. The disentanglement team was unable to respond to two entangled North Atlantic right whales. One was an unidentified North Atlantic right whale, sighted and lost by aerial survey in the Bay of Fundy, Canada. The other was sighted by aerial survey too far offshore on two occasions. It was determined that this whale had a minor entanglement.

A right whale calf is known to have died in late-January 2001, though the reasons for its death are unclear, as stranding personnel were unable to recover the carcass. A second confirmed right whale death in 2001 was a young male found washed up on the beach near Assateague Island, VA. A final report of the subsequent examination has not yet been released but several deep cuts consistent with injuries resulting from a boat's propeller were on the carcass. According to field reports, there was no indication that entanglement in fishing gear contributed to the death. On June 8, 2001, aircraft survey observers sighted a northern right whale (#1102) severely entangled in fishing gear about 80 miles off Massachusetts. The entangled whale, an adult male, had a single polypropylene line, estimated at ¾ inch, wrapped over its upper jaw. The line was cinched tight and was cutting into the tissue causing an infected wound. Several attempts were made to disentangle the whale. However, due to the challenging conditions, rescue efforts were unsuccessful, and on September 20, 2001, the satellite telemetry signal was lost. Despite the fact that the rescue efforts proved unsuccessful, significant information on right whales and procedures for safely sedating a large whale was obtained and can be used in future disentanglement endeavors.

Humpback Whale

Humpback whales calve and mate in the Caribbean and migrate to feeding areas in the northwestern Atlantic during the summer months. Six separate feeding areas are utilized in northern waters after their return (Waring et al. 1999). 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).

Humpback whales use the mid-Atlantic as a migratory pathway, but it may also be an important feeding area for juveniles. Since 1989, observations of juvenile humpbacks in the mid-Atlantic have been increasing during the winter months, peaking 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. .

New information has become available on the status and trends of the humpback whale population in the North Atlantic. Although current and maximum net productivity rates are unknown at this time, the population is apparently increasing. It has not yet been determined whether this increase is uniform across all six feeding stocks (Waring et al. 1999). The rate of increase has been estimated at 9.0% (CV=0.25) by Katona and Beard (1990), while a 6.5% rate was reported for the Gulf of Maine by Barlow and Clapham (1997) using data through 1991. The rate reported by Barlow and Clapham (1997) may roughly approximate the rate of increase for the portion of the population within the action area. The best estimate of abundance for the North Atlantic humpback whale population is 10,600 animals (CV=0.067; Smith et al. 1999) while the minimum population estimate used for NMFS management purposes is 10,019 animals (CV=0.067, Waring et al. 1999).

Anthropogenic impacts

The major known sources of anthropogenic mortality and injury of humpback whales include entanglement in commercial fishing gear and ship strikes. 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. Based on photographs of the caudal peduncle of humpback whales, Robbins and Mattila (1999) estimated that at least 48% -- and possibly as many as 78% -- of animals in the Gulf of Maine exhibit scarring caused by entanglement. Several animals have apparently been entangled on more than one occasion. These estimates are based on sightings of free-swimming animals that initially survive the scarring encounter. Because some animals may drown immediately, the actual number of interactions may be slightly higher.

Many of the reports of mortality cannot be attributed to a particular impact source. The following injury/mortality events are those reported from 1996 to the present for which impact source was determined. These numbers should be viewed as absolute minimum numbers. The total number of mortalities and injuries cannot be estimated but it is believed to be higher since it is unlikely that all carcasses will be observed. In 1996, three humpback whales were killed in collisions with vessels and at least five were seriously

injured by entanglement. Three confirmed humpback whale entanglements were reported in 1997. For 1998, 14 confirmed humpback whale entanglements resulting in injury (n=13) or mortality (n=1) were reported. One injury from a vessel interaction was reported in 1998; the whale was seen several times after the injury, and exhibited some healing. A total of eight whales were observed entangled in 1999. In 2000, a total of eleven confirmed reports of entangled humpback whales were reported. Three were not located as no one was available to respond. Two were too far from shore for response. Two were at large and not assessed. One was at large and was assessed as a not life threatening entanglement. Two were found and, although disentanglement was not possible, the animals were later seen free of gear. One was successfully disentangled by the Network.

Preliminary data for 2001, indicate that there were a total of six reports of entangled humpback whales - four in the Mid-Atlantic and two in the Northeast. On February 12, a juvenile humpback was sighted entangled in gillnet gear near Cape Hatteras, NC. However, after being caught in the gear for about an hour, the whale was able to free itself. On April 8, two humpbacks were reported stranded in South Carolina, both had evidence of previous entanglements with gear. On April 9, a dead juvenile humpback was found floating in coastal gillnet gear off Virginia Beach, VA. A humpback whale was reported in Southwest Stellwagen Bank on July 25, 2001, with a minor entanglement, which the team assessed was not life threatening and, therefore, disentanglement was not attempted, but the team will continue to monitor the whale. Finally, on August 15, 2001, another entangled humpback was sighted in Southwest Stellwagen Bank, which the disentanglement team responded to and completely freed.

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 (NMFS 1998a). Fin whales are found throughout the action area for this consultation in most months of the year. 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). As with humpback whales, they 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 near-shore environments.

Insufficient data are available to determine status and trends of the Western North Atlantic stock of the fin whale population (Waring et al. 1999). Hain et al. (1992) estimated that about 5,000 fin whales inhabit the northeastern United States continental shelf waters. Shipboard surveys of the northern Gulf of Maine and lower Bay of Fundy provided an estimate of 2,200 (CV=0.24) fin whales, from which the

current minimum population estimate of 1,803 animals was derived (Waring et al. 1999).

Anthropogenic impacts
The major known sources of anthropogenic mortality and injury of fin whales include entanglement in commercial fishing gear and ship strikes. 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.

Many of the reports of mortality cannot be attributed to a particular source. The following injury/mortality events are those reported from 1996 to the present for which source was determined. These numbers should be viewed as absolute minimum numbers; the total number of mortalities and injuries cannot be estimated but is believed to be higher. One mortality due to a ship strike and one entanglement report were received in 1996. Five confirmed reports of entangled fin whales were received by NMFS in 1997. In 1998, one ship strike mortality and one entanglement mortality were reported. A total of three fin whales were observed entangled in 1999. Data for 2000 indicate two fin whale mortalities, one of which was an apparent ship strike. There were no reports of entangled fin whales in 2000. Two dead fin whales were reported in 2001, both of which were possibly involved in ship strikes (one had a broken jaw and the other displayed bruising and broken bones). Also in 2001, one fin whale was reported with a minor entanglement, which was not serious, and the whale was expected to free itself.

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 (NMFS and USFWS, 1995). It 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. NMFS 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 aggregations 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 NMFS 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 from 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) and tagging studies are consistent with this result (Richardson 1982, Ehrhart 1979, LeBuff 1990, CMTTP: in NMFS SEFSC 2001). Nest site relocations greater than 100 km occur, but are rare (Ehrhart 1979; LeBuff 1974, 1990; CMTTP; Bjorndal et at. 1983: in NMFS SEFSC 2001).

Although NMFS 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), NMFS treats the loggerhead turtle nesting aggregations as nesting subpopulations whose survival and recovery is 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 as subpopulations (which occur in the action area) 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. For example, although the northern nesting group (North Carolina to northeast Florida) produces only about 9 percent of the loggerhead nests, loggerheads from this nesting area comprise between 25 and 59 percent of the loggerhead sea turtles found in foraging areas from the northeastern U.S. to Georgia (NMFS SEFSC 2001; Bass et al., 1998; Norrgard, 1995; Rankin-Baransky, 1997; Sears 1994, Sears et al., 1995). Loggerheads that forage from Chesapeake Bay southward to Georgia are nearly equally divided in origin between south Florida and the northern nesting group (TEWG, 1998). In the Carolinas, the northern subpopulation is estimated to make up from 25 to 28 percent of the loggerheads (NMFS SEFSC 2001; Bass *et al.* 1998). About 10 percent of the loggerhead sea turtles in foraging areas off the Atlantic coast of central Florida are from the northern subpopulation (Witzell, in prep). In the Gulf of Mexico, most of the loggerhead sea turtles in foraging areas will be from the South Florida subpopulation, although the northern subpopulation may represent about 10 percent of the loggerhead sea turtles in the Gulf (Bass, pers. comm.).

Similar 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 2 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).

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, followed by permanent settlement 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 south 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. NMFS SEFSC (2001) analyses conclude that juvenile stages have the highest elasticity and maintaining or decreasing current sources of mortality in those stages will have the greatest impact on maintaining or increasing population growth rates.

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 (e.g., in the action area) 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; NMFS and USFWS, 1991).

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 for population trends analysis based on nesting beach data is that this may reflect trends in adult nesting females, but it 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, there are only an estimated 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 or declining (TEWG 2000). Another consideration adding to the vulnerability of the northern subpopulation is that NMFS scientists estimate, using genetics data from Texas, South Carolina, and North Carolina in combination with juvenile sex ratios from those states, that the northern subpopulation produces 65% males, while the south Florida subpopulation is estimated to produce 80% females (NMFS SEFSC 2001, Part I).

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.

Anthropogenic impacts

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. In 1992, Hurricane Andrew affected turtle nests over a 90-mile length of coastal Florida; all of the eggs were destroyed by storm surges on beaches that were closest to the eye of this hurricane (Milton et al., 1992). On Fisher Island near Miami, Florida, 69 percent of the eggs did not hatch after Hurricane Andrew, probably because they were drowned by the storm surge. Nests from the northern nesting group were destroyed by hurricanes which made landfall in North Carolina in the mid to late 1990's. Other sources of natural mortality include cold stunning and biotoxin exposure.

The diversity of the sea turtle's 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*), 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 threats from human activities 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. in prep.). 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 (NMFS 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.

Nest counts are the only reliable population information available for leatherback turtles. Recent declines have been seen in the number of leatherbacks nesting worldwide (NMFS 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 as well as 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 2000). The status of the Atlantic population is less clear. In 1996, it was reported to be stable, at best (Spotila 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 currently numbers about 15,000 nesting females, 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.

Anthropogenic impacts

Anthropogenic impacts to the leatherback population are similar to those discussed above for the loggerhead sea turtle. 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. Two to three leatherbacks are reported entangled in the buoy lines of lobster pot gear every year. 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 by trawl, cold stunning, or collision with boats. More leatherback-fishery interactions seem to be indicative of entanglement in buoy lines and longline gear than are documented for gillnets and trawl gear. However, this may be an artifact of the lesser likelihood of finding marks from gillnets or trawl gear on stranded animals.

Leatherbacks are taken as bycatch in several fisheries including the pelagic longline, anchored gillnet, and pelagic gillnet. From 1992 to 1998, the pelagic longline fishery captured/entangled/hooked an estimated 5,003 leatherbacks, of which an estimated 39 were moribund or dead prior to release (NMFS 2000). Additional turtles may have been seriously injured or died following release. Leatherbacks were also taken in the temporary experimental pelagic pair trawl fishery for tunas, which is no longer authorized. Sea sampling coverage in the southeast shrimp fishery and shark bottom longline fishery has also recorded takes of leatherback turtles. Shrimp trawlers in the southeastern U.S. are required to use TEDs, which reduce a trawler's turtle capture rate by 97%. Even so, NMFS estimated that 4,100 turtles may be captured annually by shrimp trawling, including 650 leatherbacks that cannot be released through TEDs.

Kemp's Ridley Sea Turtle

The Kemp's ridley is the most endangered of the world's sea turtle species. The only major nesting site for ridleys is a single stretch

of beach near Rancho Nuevo, Tamaulipas, Mexico (Carr 1963). 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 (TEWG 2000). For example, nesting data 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. 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. First-time nesting adults increased from 6 to 28% from 1981 to 1989, and from 23 percent to 41 percent from 1990 to 1994, indicating that the Kemp's ridley population may be in the early stages of exponential growth (TEWG 1998).

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. Post-pelagic ridleys feed primarily on crabs, consuming a variety of species, including *Callinectes* sp., *Ovalipes* sp., *Libinia* sp., and *Cancer* sp. Mollusks, shrimp, and fish are consumed less frequently (Bjorndal 1997). Juvenile ridleys migrate south as water temperatures cool in fall, and are predominantly found in shallow coastal embayments along the Gulf Coast during fall and winter months.

Kemp's ridleys found in mid-Atlantic waters are primarily post-pelagic juveniles averaging 40 centimeters in carapace length, and weighing less than 20 kilograms (Terwilliger and Musick 1995). Next to loggerheads, they are the second most abundant sea turtle in Virginia and Maryland waters, arriving in the Chesapeake Bay during May and June, and migrating to more southerly waters in September to November (Keinath et al. 1987; Musick and Limpus 1997). In the Chesapeake Bay, 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). The juvenile population in Chesapeake Bay is estimated to be 211 to 1,083 turtles (Musick and Limpus 1997).

Juvenile ridleys follow regular coastal routes during spring and fall migrations to and from developmental foraging grounds along the mid-Atlantic and northeastern coastlines. Consequently, many ridleys occurring in coastal waters off Virginia and Maryland are transients involved in seasonal migrations. However, Maryland and Virginia coastal embayments - which contain an abundance of crabs, shrimp, and other prey as well as preferred foraging habitat such as shallow subtidal flats and submerged aquatic vegetation beds - are likely used as a foraging ground by Kemp's ridley sea turtles (John Musick, Virginia Institute of Marine Science, 1998 personal communication; Sherry Epperly, National Marine Fisheries Service, 1998 personal communication; Molly Lutcavage, New England Aquarium, 1998 personal communication). No known established nesting sites occur on Virginia or Maryland beaches.

Anthropogenic impacts
Anthropogenic impacts to the Kemp's ridley population are similar to those discussed above for the loggerhead sea turtle. Mortality in the large juvenile and adult life stages would have the greatest impact to the Kemp's ridley population (TEWG 1998). The vast majority of ridleys identified along the Atlantic Coast have been juveniles and subadults. Loss of individuals, particularly large juveniles, in the Atlantic resulting from human activities may therefore impede recovery of the Kemp's ridley sea turtle population.

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. As with loggerheads, a large number of Kemp's ridleys are taken in the southeast shrimp fishery each year. This species may also be taken in the Northeast shrimp fishery and bottom longline fisheries. An estimate of the number of Kemp's ridley turtles that can be removed by fishery mortality without compromising recovery cannot be provided at this time due to data deficiencies (TEWG 1998).

Green Sea Turtle
Green turtles are distributed circumglobally, mainly in waters between the northern and southern 20° C isotherms (Hirth 1971). In the western Atlantic, several major nesting assemblages have been identified and studied (Peters 1954; Carr and Ogren 1960; Duellman 1961; Carr et al. 1978). However, most green turtle nesting in the continental United States 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). Most green turtle nesting activity occurs on Florida index beaches. These 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 six years of regular monitoring since establishment of the index beaches in 1989. There is evidence that green turtle nesting has been on the increase during the past decade. For example, increased nesting has 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 the western Atlantic area are not available.

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). Post-pelagic green turtles feed primarily on sea grasses and benthic algae, but also consume jellyfish, salps, and sponges. Known feeding habitats along U.S. coasts of the western Atlantic include shallow lagoons and embayments in Florida, and similar shallow inshore areas elsewhere. Some of the principal feeding pastures in the western Atlantic Ocean include the

upper west coast of Florida, the northwestern coast of the Yucatan Peninsula, 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).

Although no green turtle foraging areas or major nesting beaches have been identified on the Atlantic Coast, evidence provided by Mendonca and Ehrhart (1982) indicates that immature green turtles may utilize lagoonal systems for foraging. These authors identified a population of young green turtles (carapace length 29.5-75.4 cm) believed to be resident in Mosquito Lagoon, Florida. The Indian River system, of which Mosquito Lagoon is a part, supported a green turtle fishery during the late 1800s (Ehrhart 1983), and these turtles may be remnants of this historical colony. The summer developmental habitat for green turtles encompasses estuarine and coastal waters as far north as Long Island Sound, Chesapeake Bay, and the North Carolina sounds, and south throughout the tropics (Musick and Limpus 1997). Most of the individuals reported in U.S. waters are immature (Thompson 1988). Individuals that use waters north of Florida during the summer must return to southern waters in autumn, or face the risk of cold stunning. In North Carolina, green turtles are known to occur in estuarine and oceanic waters and to nest in low numbers along the entire coast. No information is available regarding the occurrence of green turtles in the Chesapeake Bay, although they are presumably present in very low numbers.

Anthropogenic impacts

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 (NMFS and USFWS 1991a). Green turtles were traditionally highly prized for their flesh, fat, eggs, and shell, and fisheries in the United States and throughout the Caribbean are largely responsible for the decline of the species. Green turtles continue to be heavily exploited by man, with the degradation of nesting and feeding habitats, incidental capture in fisheries, and marine pollution acknowledged as serious hindrances to species recovery.

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. The shrimp fishery has been estimated as taking as many as 300 turtles a year. Stranding reports indicate that between 200-300 green turtles strand annually from a variety of causes (Sea Turtle Stranding and Salvage Network, unpublished data). Green turtle takes have been documented in gillnet, trawl and longline gear. A preliminary sea sampling data summary (1994-1998) shows the following takes of green turtles in the Atlantic: 1 (anchored gillnet), 2 (pelagic driftnet), 2 (pelagic longline).

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. Although there have been no reports of hawksbills in the Chesapeake Bay, one has been observed taken incidentally in a fishery just south of the 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.

Shortnose Sturgeon

Shortnose sturgeon occur in large rivers along the western Atlantic coast from the St. Johns River, Florida (possibly extirpated from this system), to the Saint John River in New Brunswick, Canada. The species is anadromous in the southern portion of its range (i.e., south of Chesapeake Bay), while northern populations are amphidromous (NMFS 1998b). Population sizes vary across the species' range. From available estimates, smallest populations occur in the Cape Fear (~8 adults; Moser and Ross 1995) and Merrimack Rivers (~100 adults; M. Kieffer, United States Geological Survey, personal communication), while the largest populations are found in the Saint John (~100,000; Dadswell 1979) and Hudson Rivers (~61,000; Bain et al. 1998). Welsh et al. (1999) summarizes historical and recent evidence of shortnose sturgeon presence in the Chesapeake Bay. Fish have been found as far north as the Susquehanna River and as far south as the York River.

Total instantaneous mortality rates (Z) are available for the Saint John River (0.12 - 0.15; ages 14-55; Dadswell 1979), Upper Connecticut River (0.12; Taubert 1980), and Pee Dee-Winyah River (0.08-0.12; Dadswell et al. 1984). Total instantaneous natural mortality (M) for shortnose sturgeon in the lower Connecticut River was estimated to be 0.13 (T. Savoy, Connecticut Department of Environmental Protection, personal communication). There is no recruitment information available for shortnose sturgeon because there are no commercial fisheries for the species. Estimates of annual egg production for this species are difficult to calculate because females do not spawn every year (Dadswell et al. 1984). Further, females may abort

spawning attempts, possibly due to interrupted migrations or unsuitable environmental conditions (NMFS 1998b). Thus, annual egg production is likely to vary greatly in this species.

Shortnose sturgeon are benthic fish that mainly occupy the deep channel sections of large rivers. They feed on a variety of benthic and epibenthic invertebrates including molluscs, crustaceans (amphipods, chironomids, isopods), and oligochaete worms (Vladykov and Greeley 1963; Dadswell 1979). Shortnose sturgeon are long-lived (30 years) and, particularly in the northern extent of their range, mature at late ages. In the north, males reach maturity at 5 to 10 years, while females mature between 7 and 13 years.

In the northern extent of their range, shortnose sturgeon exhibit three distinct movement patterns that are associated with spawning, feeding, and overwintering periods. In spring, as water temperatures rise above 8° C, pre-spawning shortnose sturgeon move from overwintering grounds to spawning areas. Spawning occurs from mid/late April to mid/late May. Post-spawned sturgeon migrate downstream to feed throughout the summer. As water temperatures drop below 8° C again in the fall, shortnose sturgeon move to overwintering concentration areas and exhibit little movement until water temperatures rise again in spring (Dadswell et al. 1984; NMFS 1998b). Young-of-the-year shortnose sturgeon are believed to move downstream after hatching (Dovel 1981) but remain within freshwater habitats. Older juveniles tend to move downstream in fall and winter as water temperatures decline and the salt wedge recedes. Juveniles move upstream in spring and feed mostly in freshwater reaches during summer.

Shortnose sturgeon spawn in freshwater sections of rivers, typically below the first impassable barrier on the river (e.g., dam). Spawning occurs over channel habitats containing gravel, rubble, or rock-cobble substrates (Dadswell et al. 1984; NMFS 1998b). Additional environmental conditions associated with spawning activity include decreasing river discharge following the peak spring freshet, water temperatures ranging from 9 - 12° C, and bottom water velocities of 0.4 to 0.7 m/sec (Dadswell et al. 1984; NMFS 1998b).

The NMFS recovery plan indicates reports of shortnose sturgeon occurrence in the Chesapeake system as early as 1876. Other historical records include the Potomac River (Smith and Bean 1899), the upper Bay near the mouth of the Susquehanna River in the early 1980's, and the lower Bay near the mouths of the James and Rappahannock rivers in the late 1970's (Dadswell et al. 1984). According to the United States Fish and Wildlife Service (USFWS), as of March, 2002, 49 shortnose sturgeon were captured via the reward program, which began in 1996, in the Chesapeake Bay and its tributaries - three from the lower Susquehanna River, two in the Bohemia River, two south of the Bay Bridge near Kent Island, six in the Potomac River and one just north of Hoopers Island. In addition, one was captured in the Elk River and two in Fishing Bay. The remaining sturgeon were captured in the upper

Bay north of Hart-Miller Island. Nevertheless, distribution and movements of shortnose sturgeon in the Bay are poorly understood, in part because this species is often confused with Atlantic sturgeon. No population estimates for shortnose sturgeon in the Chesapeake Bay area are available at this time.

Anthropogenic impacts

The major known sources of anthropogenic mortality and injury of shortnose sturgeon include entrainment in dredges and entanglement in fishing gear. Injury and mortality can also occur at power plant cooling water intakes and structures associated with dams in rivers inhabited by this species. Shortnose sturgeon may also be adversely affected by habitat degradation or exclusion associated with riverine maintenance and construction activities and operation of power plants. Entanglement could include incidental catch in commercial or recreational gear as well as directed poaching activities. Shortnose sturgeon are most likely to interact with fisheries in and around the mouths of rivers where they are found. Thus, interactions are more likely to occur in state fisheries or unregulated fisheries than in the EEZ. Interactions are also most likely to occur during the spring migration (NMFS 1998b). According to information summarized by NMFS (1998b), operation of gillnet fisheries for shad may result in lethal takes of as many as 20 shortnose sturgeon per year in northern rivers. Shortnose sturgeon may be taken in ocean fisheries near rivers inhabited by this species. No comprehensive analysis of entanglement patterns is available at this time, in part due to the difficulty of distinguishing between shortnose and Atlantic sturgeon with the similarity in appearance of these two species. For example, several thousand pounds of "sturgeon" were reported taken in the squid/mackerel/butterfish fishery in 1992. However, this information is not broken down by species. NMFS sea sampling coverage has recorded takes of shortnose sturgeon in the monkfish sink gillnet fishery.

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 generally fall into the following three categories: vessel operations, fisheries, and recovery activities associated with reducing those impacts. Other environmental impacts include effects of discharges, dredging, ocean dumping, and sonic activity.

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 and sturgeon. 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

NMFS has undertaken several ESA Section 7 consultations to address the effects of 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 large whales and sea turtles. Similarly, recovery actions NMFS 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.

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 EPA, the National Oceanic and Atmospheric Administration (NOAA), and the ACOE. NMFS has conducted formal consultations with the USCG, the USN (described below), and is currently in early phases of consultation with the other federal agencies on their vessel operations. In addition to operation of ACOE vessels, NMFS 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, NMFS 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 potential for some level of interaction. Refer to the biological opinions for the USCG (September 15, 1995; July 22, 1996; and June 8, 1998) and the USN (May 15, 1997) for detail on the scope of vessel operations for these agencies and conservation measures being implemented as standard operating procedures.

Since the USN consultation only covered operations out of Mayport, Florida, potential remains for USN vessels to adversely affect large whales when they are operating in other areas within the range of these species. Similarly, operations of vessels by other federal

agencies within the action area (NOAA, EPA, ACOE) may adversely affect whales. However, the in-water activities of those agencies are limited in scope, as they operate a small number of vessels or are engaged in research/operational activities that are unlikely to contribute a large amount of risk. Through the consultation process, conservation recommendations will be provided to further reduce the potential for adverse impacts.

Federal Fishery Operations
Several commercial fisheries operating in the action area use gear that 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 are known to impact whales 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 and Red Crab fisheries. These consultations are summarized below; for more detailed information, refer to the respective Biological Opinions.

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. Participation in this fishery declined from 399 to 341 permit holders in 1993 and has declined further since extensive groundfish conservation measures have been implemented. Based on 1996 data, NMFS estimated that there were 273 participants in the northeast sink gillnet fishery as defined under the MMPA, which includes not only multispecies vessels, but also those using sink gillnet gear to target other species such as monkfish and dogfish. The fishery operates throughout the year with peaks in the spring and from October through February. Data indicate that gear used in this fishery has seriously injured or killed northern right whales, humpback whales, fin whales, and/or loggerhead and leatherback sea turtles.

The 1997 formal consultation on the Multispecies FMP concluded that the fishery, with modification under the ALWTRP, was not likely to jeopardize listed species or adversely modify critical habitat. However, serious injuries and at least one mortality of a right whale have occurred as a result of entanglements in gillnet gear since the 1997 Opinion. The gillnet gear entanglements may or may not be attributable to the multispecies gillnet fishery. In most cases, NMFS

is unable to assign responsibility for a gillnet gear entanglement to a particular fishery since entangling gear is not often retrieved or, when retrieved, lacks adequate identifiers to determine the fishery from which it originated. Since NMFS has been unable to determine the origin of the gillnet gear involved in the whale entanglements, including the gear involved in the 1999 right whale mortality, NMFS could not assume that these entanglements were not the result of the multispecies gillnet fishery.

As a result of gillnet entanglements in 1999, including one mortality of a right whale, NMFS reinitiated consultation on the Multispecies FMP on May 4, 2000, in order to reevaluate the ability of the RPA to avoid the likelihood of jeopardy to right whales. The Opinion also considered new information on the status of the northern right whale and new ALWTRP measures. The Opinion, signed on June 14, 2001, concluded that continued implementation of the Multispecies FMP is likely to jeopardize the existence of the northern right whale. A new RPA has been provided that is expected to remove the threat of jeopardy to northern right whales as a result of the gillnet sector of the multispecies fishery.

The *Monkfish Fishery Management Plan* was recently completed by the New England and Mid-Atlantic Fishery Management Councils. This fishery uses several gear types that may entangle protected species, and takes of shortnose sturgeon and sea turtles have been recorded from monkfish trips. The monkfish gillnet sector is included in either the northeast sink gillnet or mid-Atlantic coastal gillnet fisheries and is therefore regulated by the Atlantic Large Whale and Harbor Porpoise Take Reduction Plans. NMFS completed a formal consultation on the Monkfish FMP on December 21, 1998, which concluded that the fishery, with modification under the take reduction plans, is not likely to jeopardize listed species or adversely modify critical habitat.

However, as a result of gillnet entanglements in 1999, including one mortality of a right whale, NMFS reinitiated consultation on the Monkfish FMP on May 4, 2000, in order to reevaluate the ability of the RPA to avoid the likelihood of jeopardy to right whales. The Opinion also considered new information on the status of the northern right whale and new ALWTRP measures. The Opinion, signed on June 14, 2001, concluded that continued implementation of the Monkfish FMP is likely to jeopardize the existence of the northern right whale. A new RPA has been provided that is expected to remove the threat of jeopardy to northern right whales as a result of the gillnet sector of the monkfish fishery.

The *Summer Flounder, Scup and Black Sea Bass fisheries* are also known to interact with sea turtles. Based on occurrence of gillnet entanglements in other fisheries, the gillnet portion of this fishery could also entangle endangered whales, particularly humpback whales. The pot gear and staked trap sectors could entangle whales and sea turtles as well. 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 (which would include

fisheries for other species like scup and black sea bass) by requiring TEDs in nets in the area of greatest bycatch off the North Carolina coast. NMFS is considering a more geographically inclusive regulation to require TEDs in trawl fisheries that overlap with sea turtle distribution to reduce the impact from this fishery. Developmental work is also ongoing for a TED that will work in the flynets used in the weakfish fisheries. The gillnet sector of this fishery is subject to the requirements of the ALWTRP and Harbor Porpoise Take Reduction Plan as appropriate through restrictions on the MMPA listings for the northeast sink gillnet fishery and/or mid-Atlantic coastal gillnet fishery. The most recent (February 29, 1996) 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. Expected annual incidental take for this fishery includes 15 threatened loggerhead sea turtles and no more than 3 cumulative endangered Kemp's ridley, hawksbill, leatherback, or green sea turtles.

Formal consultation on the *Atlantic Bluefish fishery* was completed on July 2, 1999. NMFS concluded that operation of the fishery under the FMP, as amended, is not likely to jeopardize the continued existence of listed species and not likely to adversely modify critical habitat. Of listed species under NMFS jurisdiction, the fishery is most likely to interact with loggerhead and Kemp's ridley sea turtles and shortnose sturgeon. Although there is a high degree of overlap between the bluefish fishery and other regulated fisheries, observer data suggests that takes of sea turtles 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. A small number of takes of sea turtles and shortnose sturgeon was authorized in the Incidental Take Statement issued with the July 1999 Biological Opinion.

Formal consultation on the *Spiny dogfish fishery* was completed on August 13, 1999. NMFS concluded that the operation of the fishery under the FMP may adversely affect but is not likely to jeopardize the continued existence of listed species and not likely to adversely modify critical habitat, provided operation of the gillnet portion of the fishery was conducted in accordance with ALWTRP measures to reduce entanglements with right whales. However, serious injuries and at least one mortality of a right whale have occurred as a result of entanglements in gillnet gear since the 1999 Opinion. The gillnet gear entanglements may or may not be attributable to the spiny dogfish gillnet fishery. In most cases, NMFS is unable to assign responsibility for a gillnet gear entanglement to a particular fishery since entangling gear is not often retrieved or, when retrieved, lacks adequate identifiers to determine the fishery from which it originated. Since NMFS has been unable to determine the origin of the gillnet gear involved in the whale entanglements, including the gear involved in the 1999 right whale mortality, NMFS could not assume that these entanglements were not the result of the spiny dogfish

The dogfish fishery may also interact with sea turtles (all species) given the time and locations where the fishery occurs. The primary spiny dogfish gear types are sink gillnets, otter trawls, bottom longline, and driftnet gear; the capture of sea turtles could occur in all gear sectors of the fishery. Turtle takes in 2000 included one dead and one live Kemp's ridley. Since the ITS issued with the August 13, 1999 opinion only allows for the take of one lethal or non-lethal take of a Kemp's ridley, the incidental take level for the dogfish FMP was exceeded.

As a result of continuing gillnet entanglements, including one mortality of a right whale, and turtle takes in excess of the spiny dogfish ITS, NMFS 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 Opinion also considered new information on the status of the northern right whale and new ALWTRP measures. The Opinion, signed on June 14, 2001, concluded that continued implementation of the Spiny Dogfish FMP is likely to jeopardize the existence of the northern right whale. A new RPA has been provided that is expected to remove the threat of jeopardy to northern right whales as a result of the gillnet sector of the spiny dogfish fishery. In addition, a new ITS has been provided for the take of sea turtles in the fishery.

The FMP for spiny dogfish calls for a 30% reduction in quota allocation levels for 2000 and a 90% reduction beginning in 2001. Although there have been delays in implementing the plan, quota allocations are expected to be substantially reduced over the 4 ½ year rebuilding schedule which should result in a substantial decrease in effort directed at spiny dogfish. For the last four years of the rebuilding period, dogfish landings are likely to be limited to incidental catch in other fisheries. The reduction in effort should be of benefit to protected species by reducing the number of gear interactions that occur.

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. Nevertheless, the take of sea turtles in this fishery is possible.

It was previously believed that the *Scallop dredge fishery* was unlikely to take sea turtles given the slow speed at which the gear operates. However, the NMFS Northeast Fisheries Science Center has documented the take of thirteen sea turtles in this fishery from 1996 through October 2001. Therefore, the take of sea turtles in the scallop fishery (in both dredge and net gear) is possible when turtles

are present at the times and in the areas where the sea scallop fishery operates. Due to the potential for takes, NMFS is currently conducting section 7 consultation for the scallop fishery.

The *Red crab fishery* is a pot/trap fishery that occurs in deep waters along the continental slope. An FMP for the fishery is in development. 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.

Fishing vessel effects
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. State or private actions

Private and Commercial Vessels
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 northern right whale population (Kraus 1990) and are also known to impact all other endangered whales. Small vessel traffic is also known to take sea turtles. 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 3 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 C 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 is not currently known. NMFS and the USCG are in early consultation on these events, but a thorough analysis has not been completed. The Sea Turtle Stranding and Salvage Network also reports regular incidents of vessel interaction (propeller injury) with sea turtles off the New Jersey coast.

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.

State 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 and shortnose sturgeon from state fisheries may be greater than those 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. NMFS 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. 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, 3 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 NMFS.

In 1998, East Coast states from Maine through North Carolina began implementing regulations pursuant to the Year 1 requirements of *Amendment 3 to the Coastal Fishery Management Plan for American Lobster* (ASMFC 1997). The federal ACFCMA plan is designed to be parallel and complementary to the ASMFC plan. Regulations are geared toward reducing lobster fishing effort by 2005 to reverse the overfished status of the resource. Amendment 3 contained the outline of a long-term plan with annual targets during the rebuilding period and initial effort reduction measures for some areas. However, the development of most of the specific effort reduction measures necessary to meet the annual targets was left to the deliberations of the Lobster Conservation Management Teams (LCMT) established for each of the 7 lobster management areas. States in the 6 coastal areas must implement regulations according to a compliance schedule established in Amendment 3. Effort reduction measures will be similar to those discussed in the federal ACFCMA plan. Several states implemented trap caps in 1998. Further trap limits, which the compliance schedule requires for Area 1 and the Outer Cape Lobster Management Area in 1999, will generate some localized risk reduction for protected species in those areas. If all states elect to implement a significant trap reduction program, the overall entanglement risk from lobster pot gear could be substantially reduced. For the Amendment 3 measures not yet implemented, the ASMFC has recently conducted public hearings on the first half of the area-based effort reduction measures developed by LCMTs. The ASMFC will conduct public hearings and develop the second part of the remaining measures in the fall of 1999. As the definition of the fishery in the MMPA includes state water effort, vessels fishing in state waters will be required to comply with MMPA take reduction plan regulations designed to reduce entanglement risk to whales.

Pulses of greatly elevated sea turtle strandings occur with regularity in the Mid-Atlantic area, particularly along North Carolina through southern Virginia in the early spring/late fall, coincident with turtle migrations. For example, in the last weeks of April through early May 2000, approximately 300 turtles, mostly loggerheads, stranded north of Oregon Inlet, NC. Gillnets were found with four of the carcasses. These strandings are likely caused by state fisheries as well as federal fisheries, although not any one fishery has been identified as the major cause. Fishing effort data indicate that fisheries targeting monkfish, dogfish, and bluefish were operating in the area of the strandings. Strandings in this area represent at best, 7-13% of the actual nearshore mortality (Epperly et al. 1996).

Strandings in Virginia are also high in May and June, with an average of 157 turtles stranding in 1997-2000. Specifically, from May 19 to June 11, 2001, an estimated 160 sea turtles washed ashore dead in Virginia. Loggerhead turtles comprised the majority of the strandings (137), but 16 Kemp's ridley, 1 green, and 6 unidentified sea turtles also stranded during this time. Based upon the available observer information, 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 were considered to be a likely cause of these high sea turtle strandings. On June 18, 2001, NMFS issued a temporary 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 for a period of 30 days.

Studies by Bass et al. (1998), Norrgard (1995) and Rankin-Baransky (1997) indicate that the percentage of northern loggerheads in this area is highly over-represented in the strandings when compared to the ~9% representation from this subpopulation in the overall U.S. sea turtle nesting populations. Specifically, the genetic composition of sea turtles in the action area is 25-54% from the northern subpopulation, 46-64% from the South Florida sub-population, and 3-16% from the Yucatan subpopulation. The cumulative removal of these turtles on an annual basis would severely impact the recovery of this species.

C. Conservation and recovery actions shaping the environmental baseline

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 risk of collision represented 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.

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 NMFS regulations.

Whales

In 1994, NMFS established the NEIT for the northern 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, NMFS 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. The Commonwealth of Massachusetts was a key collaborator in the SAS pilot effort and has continued the partnership. The USCG has also played a vital role in this effort, providing both air and sea support as well as a commitment of resources to the NMFS operations. The State of Maine and Canada Department of Fisheries and Oceans have expressed interest in conducting this type of program in their coastal waters. It is expected that other potential sources of sightings such as the U.S. Navy may contribute regularly to this effort following NMFS' commitment to support the program over the long term. Due to increased awareness, U.S. Navy vessels have begun to contribute sightings of entangled and dead floating animals in recent years. NMFS' Maine ALWTRP Coordinator is also working with local aquaria to collect information on whale sightings from fishing vessels in the Gulf of

Maine. All this cooperation will increase the chance of success of this program in diverting potential impacts in the environmental baseline.

In one recovery action aimed at reducing vessel-related impacts, including disturbance, NMFS 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 Northern Right Whale identified anthropogenic disturbance as one of many factors that had some potential to impede right whale recovery (NMFS 1991b). Following public comment, NMFS 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. Exceptions are made for emergency situations and where certain authorizations are provided. In addition, all aircraft, except those involved in whale watching activities, are excepted from these approach regulations. The regulations are consistent with the Commonwealth of Massachusetts' approach regulations for right whales. This rule is expected to reduce the potential for vessel collisions and other adverse vessel-related effects in the environmental baseline.

As part of NEIT activities, a Ship Strike Workshop was held in December 1996 to inform the shipping community of the need to participate in efforts to reduce the impacts of commercial vessel traffic on northern right whales. The workshop summarized current research efforts using new shipboard and moored technologies as deterrents, and a report was given on ship design studies currently being conducted by the New England Aquarium and Massachusetts Institute of Technology. This workshop increased awareness in the shipping community, which is expected to further contribute to reducing the threat of ship strikes of right whales. In addition, a Cape Cod Canal Tide Chart that included information on critical habitat areas and the need for close watch during peak right whale activity was distributed widely to professional mariners and ships passing through the canal. A radio warning transmission was also transmitted by Canal traffic managers to vessels transiting the Canal during peak Northern right whale activity periods. Follow-up meetings were held with New England Port Authority and pilots to notify commercial ship traffic to keep a close watch during peak right whale movement periods.

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 NMFS 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 will 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, NMFS and the National Ocean Service (NOS) recently revised the whale watch guidelines for the Northeast, including the Studds-Stellwagen National Marine Sanctuary. Additional NEIT recommendations regarding whale watching activities are under discussion.

The NEIT also has a Habitat Committee, which deals with issues of habitat quality. The Committee was actively involved in commenting on several activities such as a new sewage outfall system. In addition, planning is underway for a food web study to provide better understanding of whale prey resource requirements and how activities such as the sewage outfall might affect the availability of plankton resources to feeding right whales.

Sea Turtles

NMFS has implemented a series of regulations aimed at reducing the potential for incidental mortality of sea turtles in commercial fisheries. In particular, NMFS 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. However, with the expansion of fisheries to previously underutilized species of fish, trawl effort directed at species other than 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.

In 1993 (with a final rule implemented 1995), NMFS established a Leatherback Conservation Zone to restrict shrimp trawl activities from off the coast of Cape Canaveral, Florida, to the North Carolina/Virginia border. This provides for short-term closures when high concentrations of normally pelagically distributed leatherbacks are recorded in more coastal waters where the shrimp fleet operates. This measure is necessary because, due to their size, adult leatherbacks are larger than the escape openings of most NMFS-approved TEDs. Two-week closures were implemented four times in 1998 in the Leatherback Conservation Zone to protect migrating turtles.

NMFS is also working to develop a TED which can be effectively 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. 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 developed.

In addition, NMFS has been active in public outreach efforts to educate fishermen regarding sea turtle handling and resuscitation techniques. In addition to making this information widely available to all fishermen, NMFS has conducted workshops with longline fishermen to discuss incidental take issues and to provide guidance on handling and release procedures. NMFS intends to continue these outreach efforts and hopes to reach all fishermen participating in the pelagic longline fishery over the next one to two years.

There is an extensive array of Sea Turtle Stranding and Salvage Network (STSSN) participants along the Atlantic and Gulf of Mexico coasts which not only collects data on dead sea turtles, but also rescues and rehabilitates 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 the small subpopulation of northern nesting loggerheads. 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.

There is currently no organized, formal program for at-sea disentanglement of sea turtles. However, recommendations for such programs are being considered by NMFS pursuant to conservation recommendations issued with several recent Section 7 consultations. Entangled sea turtles found at sea in recent years have been disentangled on an ad hoc basis by STSSN members, the whale disentanglement team, the USCG, and fishermen.

NMFS regulations require fishermen to handle sea turtles in such a manner as to prevent injury. 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 which were recently published.

D. Other potential sources of impacts in the action area

A number of anthropogenic activities are likely to directly or indirectly affect listed species in the action area of this consultation. These sources of potential impact include previous dredging projects, 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.

Close coordination is occurring through the Section 7 process on both dredging and disposal sites to develop monitoring programs and to minimize the potential for vessel-related impacts. As mentioned previously, whole sea turtles and sea turtle parts have been taken in hopper dredging operations in Thimble Shoal Channel. Several of these takes involved decomposed turtle parts, but a significant number of these takes involved fresh dead animals. Dredging in the surrounding area could have influenced the distribution of sea turtles and/or disrupted potential foraging habitat.

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. While the effects of contaminants on turtles is relatively unclear, pollution may be linked to the fibropapilloma virus that kills many turtles each year (NMFS 1997). If pollution is not the causal agent, it may make sea turtles more susceptible to disease by weakening their immune systems.

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).

NMFS and the U.S. Navy have been working cooperatively to establish a policy for monitoring and managing acoustic impacts from anthropogenic sound sources in the marine environment. Acoustic impacts can include temporary or permanent injury, habitat exclusion, habituation, and disruption of other normal behavior patterns. 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.

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

In summary, the potential for activities that may have previously impacted listed species (dredging, vessel operations, military

activities, commercial and state fisheries, etc.), to affect whales, sea turtles, and shortnose sturgeon remains throughout the action area of this consultation on the ACOE's dredging of the Thimble Shoal Channel and Atlantic Ocean Channel. However, recovery actions have been undertaken as described and continue to evolve. Although those actions have not been in place long enough for a detectable change in the right whale population (or other listed species populations) to have occurred, those actions are expected to benefit the right whale and other listed species in the foreseeable future. These 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 Opinion (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 right whale population continues to be declining. Based on recent estimates this population currently numbers fewer than 300 individuals and only one calf was observed in 1999. Losses of adult whales due to ship strikes and entanglements in fishing gear continue to depress the recovery of this species.

- The leatherback sea turtle is declining worldwide. Not considering takes associated with the NMFS managed fisheries, other sources of mortality incurred by this population exceed the 1% sustainable level projected by Spotila et al. (1996).

- The northern subpopulation of loggerhead sea turtles is 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 (especially trawl and gillnet fisheries), are high.

EFFECTS OF THE 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 directly or indirectly by the dredging and/or transport phases of this project. The primary concern for sea turtles and shortnose sturgeon is entrainment in the draghead of the hopper dredge, while the main concern for endangered whales involves the potential for vessel collisions.

The Thimble Shoal Channel and Atlantic Ocean Channel areas are part of the coastal corridor through which sea turtles migrate. In addition, the Chesapeake Bay is apparently an important foraging area for juvenile sea turtles. Turtles are likely to be in the area from April to November, and interactions could occur during migrations into or out of the Bay or while sea turtles are foraging in the area.

The two most common sea turtle species in the action area are the loggerhead and Kemp's ridley sea turtles. Leatherback sea turtles may also be present in the more offshore areas of the project. Hawksbill and green turtles may occasionally enter the area and may therefore interact with the project activities. However, these instances would be extremely rare. Endangered whales, including humpback, fin, and right whales, could migrate through the action area. As these species are found more frequently in deeper offshore waters rather than in shallow nearshore or inshore waters, they would be more likely to occur in the vicinity of Atlantic Ocean Channel.

The project under consideration is the deepening and the maintenance dredging of the Thimble Shoal Federal Navigation Channel and Atlantic Ocean Channel. Sea turtles may occur in the action area at various times of the year and may therefore be adversely affected directly or indirectly by the dredging operations. Sea turtles are likely to be feeding on or near the bottom of the Chesapeake Bay during the warmer months, with loggerheads and Kemp's ridleys being the most common species in these waters. One of the main factors influencing sea turtle presence in northern 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. If sea turtles are expected to be more common in the action area during the warmer months, the likelihood that dredging activities would affect sea turtles is greater at this time than in other times of the year.

The presence of shortnose sturgeon in the Chesapeake Bay has recently been documented (Welsh et al. 1999). Within the Chesapeake Bay, this species has been more frequently documented in Maryland waters, but has historically been found as far south as the Rappahannock River. Distribution and movements of shortnose sturgeon in the Bay are poorly understood at this time, in part because this species is often confused with Atlantic sturgeon. Therefore, the NMFS must implement a conservative approach and conclude that shortnose sturgeon may be present in the project area and that the species may be vulnerable to project impacts.

Although there is currently no evidence of shortnose sturgeon presence

in the Thimble Shoal Channel or Atlantic Ocean Channel, the occurrence in other areas of the Bay and rivers to the south suggests that this species may be present on rare occasions. No information is currently available on which times of the year this species could be present. However, because of the rarity of the species in the Virginia waters of the Chesapeake Bay, NMFS anticipates the level of interaction, if any, to be extremely low or discountable. Likewise, shortnose sturgeon are unlikely to make frequent use any of the areas targeted for dredging for feeding, spawning or overwintering purposes.

Dredging of approximately 2.5 million cubic yards from the inner harbor channels will likely be performed using a hydraulic pipeline dredge, and the dredged material will be placed in the Craney Island upland disposal site. The use of mechanical and hydraulic dredging equipment other than hopper dredges is not expected to adversely affect sea turtles or marine mammals. Hopper dredges will be used to dredge in the Thimble Shoal and Atlantic Ocean Channels. NMFS has determined that dredging of the Thimble Shoal Channel and Atlantic Ocean Channel may adversely affect threatened and endangered species in three different ways: (1) the proposed action can alter foraging habitat; (2) the dredges can entrain and kill sea turtles and shortnose sturgeon; and (3) the proposed action can increase the number of species (turtles and whales in particular) injured or killed in collisions with vessels by increasing vessel traffic in the action area. Biological interactions result from disturbance of normal foraging behavior and changes in the composition of the marine community.

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 down to a specified depth, the benthic environment could be severely impacted by dredging operations. Dredging would likely cause indirect effects on sea turtles by reducing prey species through the alteration of the existing biotic assemblages. The most common sea turtles found in the action area, the loggerhead and Kemp's ridley, forage mainly on benthic species, namely crabs and mollusks (Morreale and Standora 1992, Bjorndal 1997). The loss of foraging habitat could be especially detrimental to sea turtles because these species primarily enter shallow harbors and bays to forage (NMFS 1995). 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).

Of the listed species considered in this Opinion, loggerhead sea turtles are the most likely to utilize these areas for feeding. However, it is important to note that some of prey species targeted by turtles and shortnose sturgeon are mobile and are likely to avoid the dredge. In addition, the proposed dredging is not located in an area

identified as critical habitat or a major foraging area. Sea turtles are not likely to be more attracted to the Thimble Shoal or Atlantic Ocean channel area than to other foraging areas in the Bay and should be able to find sufficient prey in alternate areas. The absence of sightings of shortnose sturgeon in Virginia waters of the Chesapeake Bay suggests that this species is unlikely to detect or be affected by any changes in the density of prey in the areas proposed for dredging. Thus, NMFS anticipates that the maintenance dredging of both the Thimble Shoal Channel and the Atlantic Ocean Channel are not likely to disrupt normal feeding behaviors for sea turtles or shortnose sturgeon and are not likely to remove critical amounts of prey resources from the Bay.

Entrainment is the most imminent danger for sea turtles and shortnose sturgeon during selected dredging operations because hopper dredges are known to entrain these species (Magnuson et al. 1990, Slay 1995). 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 rare cases, animals may be entrained if suction is created in the draghead by current flow while the device is being placed or removed. 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 B).

There is more documentation of entrained sea turtles than shortnose sturgeon, likely as a result of the turtle's larger size. 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 mortalities associated with hopper dredging were recorded during 1991 in three ports located in Brunswick, Georgia, Savannah, Georgia, and Charleston, South Carolina (Slay 1995).

Documented mortalities are more common in the southeastern U.S. probably due to the greater abundance of turtles in these waters, but the potential for an individual sea turtle to be entrained in hopper dredges would be the same for turtles present in the Northeast and Mid-Atlantic. Sea turtle mortality in dredging activities has been documented in the Northeast; 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 1,200,000 cy of sediment from Delaware Bay in 1994, a loggerhead turtle was entrained in a hopper dredge.

As mentioned previously, maintenance dredging of Thimble Shoal was conducted in the summer of 2000. During this time, three sea turtles were taken in the hopper dredge. In all of these cases, a draghead deflector was used and the water temperature was 25° C. On July 24,

2000, three unidentifiable pieces of plastron were recovered from the discharge screening. On August 22, 2000, a fresh loggerhead was recovered from the port draghead. Only the head, front flippers, 1/3 of the carapace, and 1/2 of the plastron was recovered. This turtle's neck was broken, the muscles were still pink, and the barnacles on the carapace were alive, indicating that the dredge was the likely cause of death. On August 25, 2000, a piece of loggerhead carapace and attached tissue was removed, and in a subsequent load, a section of digestive tract was recovered. On August 27, 2000, a decomposed loggerhead with a missing section of carapace and many broken bones was recovered. These 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.

Sea turtles were also taken during dredging in the Thimble Shoal Channel in the initial stages of the Virginia Beach project in August 2001. On August 7, 2001, a fresh, whole loggerhead with a cracked carapace was discovered from the draghead, and on August 9, a fresh loggerhead was found lodged in the port draghead, inboard side of the visor. Only the carapace and right front flipper was present. On August 16, the decomposed right front flipper from an unknown species of sea turtle was recovered from the inflow starboard fore screening basket, and on August 17, sections of a loggerhead's carapace, plastron, muscle, and digestive tract were found in the inflow fore port screening basket. Several small veins and arteries still had a bright red coloration, indicating that the turtle likely died recently. On August 20, in the inflow port aft screening basket, the rear left flipper, femoral scutes, and additional skin, muscle and bone, from a loggerhead turtle were found. The turtle was determined to be a fresh dead turtle due to the condition of the specimens. The decomposed front flippers of a loggerhead were recovered from the port draghead (a portion partially underneath the draghead and a portion pinched in the hinge on outside of draghead) on August 21, and on August 22, a severely decomposed portion of a loggerhead carapace was found in the inflow mid screening basket. While it is difficult to determine conclusively, it is possible that the decomposed parts taken on August 21 and August 22 were from the same turtle. On August 24, the decomposed rear flipper of a loggerhead was recovered from the inflow fore screening basket, and on August 28, a fresh loggerhead, missing only a portion of its carapace, was found lodged in the bottom of the starboard draghead. Fragments of this loggerhead's carapace were also removed from the intake screening basket. On September 26, 2001, a decomposed piece of an unknown turtle's plastron was found in the overflow screening basket, and on October 23, a carapace piece from an unknown species of turtle was found in the overflow screening basket. A piece of Kemp's ridley carapace was recovered from the inflow screening basket on November 4. On November 11, two separate incidents were documented at different times, including a portion of a flipper and two ribs without attached tissue from an unknown species of turtle, and a portion of the plastron (with no tissue) from an unknown species of turtle. On November 20, two carapace fragments and associated tissue from a fresh loggerhead were taken. These takes

resulted in a total of 15 incidents when turtles and/or turtle parts were taken in association with dredging in Thimble Shoal Channel.

Thus, during dredging for the Virginia Beach project, there were fifteen instances in which sea turtles or sea turtle parts were taken. Five of the incidentally captured turtles were considered to be fresh dead turtles, and the remaining incidents involved decomposed turtle flippers and/or carapace parts. As mentioned, it is difficult to determine if the decomposed turtle parts found on the dredge screening on August 21 and 22 represent one or two separate turtles. It is also possible that the four instances of decomposed turtles and turtle parts found in the screening baskets died from other causes, not related to dredging activities. NMFS does consider decomposed animals taken in Federal operations (dredging, power plant operations, etc.) to be takes, as the possession of a listed species is considered a take. As NMFS factors in these instances in the development of an anticipated incidental take level, these incidental takes of decomposed animals would count against a Federal action agency's Incidental Take Statement, unless the biological opinion and Incidental Take Statement indicate otherwise.

During the Virginia Beach Hurricane Protection Project, relocation trawling was performed prior to hopper dredging in order to minimize the number of turtles taken in hopper dredges by displacing sea turtles that were in the dredging channel. As of October 4, 2001, 9 loggerhead turtles and 3 Kemp's ridleys were captured and relocated during trawling operations.

The level of effort in the Virginia Beach Hurricane Protection project is comparable to the proposed deepening project. Therefore, the interactions with sea turtles during the proposed deepening would be expected to be relatively the same as the interactions during the Virginia Beach Hurricane Protection Project. Typical maintenance dredging generally involves a smaller magnitude of material to be removed than deepening projects, and sea turtle interactions, therefore, would be expected to be less. As such, the level of sea turtle interactions would depend on the extent, duration, and magnitude of dredging anticipated.

It is also possible that certain environmental conditions increased the numbers of turtles in the Thimble Shoal Channel in August of 2001. However, those environmental conditions are unknown at this time and water column temperatures were relatively typical for August in Virginia (ranging from 26 to 28°C on the days when takes occurred). It is also possible that more turtles were taken in August 2001 due to the methods of operating the dredge. It appears that the Endangered Species Protection Protocol was followed and measures to reduce turtle takes were implemented. However, these operations should be verified (and training to reduce future takes should be conducted) by the dredge inspectors who will be onboard future dredging activities in the Thimble Shoal Channel and Atlantic Ocean Channel.

Shortnose sturgeon prefer deeper waters, which would magnify the potential for dredging interactions occurring in the deep channels. While turtles primarily forage in shallow environments, they have been found resting in deeper waters which could cause additional impacts from dredging activities. Marine mammals are highly unlikely to be entrained by the dredge. 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 turtles being buried in the mud, but this is the only area on the East Coast where this is known to 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. Leatherbacks have been shown to dive to great depths, often spending a considerable amount of time on the bottom (NMFS 1995). Regardless, crushing of sea turtles is unlikely to happen in the action area because turtles are not expected to burrow into the sediment and become dormant as they apparently do further south. In the rare event that shortnose sturgeon are in the area, individuals of this species could incur crushing injuries (i.e., injuries other than from actual entrainment).

Contact injuries resulting from dredge movements would occur at or near the water surface and could therefore involve any of the listed species present in the area. Because the dredge is unlikely to be moving at speeds greater than 7 knots during dredging operations, blunt trauma injuries resulting from contact with the hull are unlikely. It is more likely that contact injuries would involve the propeller of the vessel. In general, vessel strikes are rare events but a number of stranded turtles do exhibit wounds consistent with vessel interactions.

There have not been any reports of dredge vessels colliding with listed species, but contact injuries with the dredge are more likely to occur when the dredge is moving from the dredging area to the disposal site. While the distance between these areas is only approximately 4 to 25 miles, the dredge at transit would be moving at faster speeds than during dredging operations, particularly when empty while returning to the channel. Dredges which have been used in the past can operate at speeds of at least 12.1 knots when loaded and 13.4 knots when empty. Thus, vessel strikes are a greater concern during the transit phase of the project. However, the ACOE's proposal to institute a bridge watch during peak abundance periods of turtles, and for whales year-round, reduces the potential for interactions. If animals are sighted and the dredge operator is alerted immediately, the dredge operator should be able to avoid most collisions. Due to these precautions, NMFS does not believe that collisions between sea turtles and dredge vessels will occur. Since it is unlikely that right, humpback, or fin whales will occur in the areas proposed for dredging, and shortnose sturgeon are unlikely to be on the surface where they are vulnerable to a ship strike, NMFS does not anticipate

that shortnose sturgeon, or right, humpback, or fin whales will be injured by any collisions with the dredge vessels.

Estimating the Number of Turtles Taken in Dredging Activities

NMFS has anticipated the amount of incidental take that may occur during the proposed dredging activities for a range of dredged material quantities. The amount of incidental take will likely be dependent on the magnitude of the project, but as it is difficult to know the exact amount of material that will be dredged in any given year in the future, the anticipated take amount was determined for several different magnitudes of dredge material. As stated previously, the project to deepen the two channels could take up to four years to complete. However, it is possible that this dredging could be completed in less than one year., A large hopper dredge can potentially remove up to 20,000 cy in one day. If this were the case, dredging of 5 million cy would be completed in 250 days. ACOE has indicated that, for this project, this is unlikely due to possible funding constraints. However, because the potential exists to dredge this quantity in one year, the NMFS has set the upper limit of the amount of material to be dredged in the Thimble Shoal and Atlantic Ocean Channels annually used to determine take as 5 million cy. Based on previous dredging activities and takes in the project area, NMFS anticipates that up to 18 loggerhead and 4 Kemp's ridley sea turtles could be entrained during Thimble Shoal and Atlantic Ocean Channels dredging operations that involve removing up to 5 million cy of material. For dredging of the Thimble Shoal and Atlantic Ocean Channels that will remove up to 3 million cy in one or both of the channels in any given year, NMFS anticipates that up to 10 loggerhead and 2 Kemp's ridley sea turtles could be entrained. NMFS further anticipates that 4 loggerhead and 1 Kemp's ridley sea turtle could be entrained during dredging activities that combined will remove up to 1 million cy in any given year in the Thimble Shoal and Atlantic Ocean Channels.

This anticipated take level considered the level of previous sea turtle takes in Thimble Shoal Channel, the previous incidental take levels for other dredging projects in the vicinity of the action area including Cape Henry, York Spit, York River entrance, and Rappahannock Shoal Channels maintenance dredging (which would dredge up to 5 million cy of material) and the Virginia Beach Project (which would dredge up to 2.7 million cy of material), and the anticipated magnitude of dredging. While decomposed turtle parts are considered to be takes, NMFS is most concerned with the takes that appeared to be fresh dead sea turtles and therefore directly attributable to the dredging activities. Thus, the anticipated level of take refers to those turtles which NMFS confirms as freshly dead.

Due to their rare occurrence in the action area, NMFS does not anticipate shortnose sturgeon to be taken regardless of the time of the year the dredging occurs. If in the future, new information suggests otherwise, NMFS will re-assess the anticipated amount of shortnose sturgeon take during these maintenance dredging and deepening operations.

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 9 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 most of the loggerheads which may be taken during the ACOE's proposed dredging activities may originate from the northern subpopulation of loggerheads. Conversely, turtles originating from the southern subpopulation could likewise be taken in large numbers.

Based on previous dredging activities which have employed the same protocols proposed for use by the ACOE for dredging during warmer months, the magnitude of the project, and previous levels of incidental take in Virginia channels, NMFS anticipates up to 18 loggerheads and 4 Kemp's ridleys could be entrained, seriously injured, or killed in any given year during deepening operations in which up to 5 million cy of material may be removed. For maintenance dredging involving up to 3 million cy of material in one or both of the channels, NMFS anticipates that up to 10 loggerhead and 2 Kemp's ridley sea turtles could be taken. NMFS further anticipates that 4 loggerhead and 1 Kemp's ridley sea turtle could be entrained during maintenance dredging activities that will remove up to 1 million cy in any given year in one or both of the channels considered in this opinion.

The death of up to 18 loggerheads during the course of maintenance dredging in these channels would represent a loss of less than 0.49 percent of the estimated number of nesting females in the northern subpopulation. This level of take represents the high end of the spectrum for the proposed project because typical deepening or

maintenance dredging would not likely involve the maximum amount of material for each channel in the same year. If 10 loggerheads were killed during the course of deepening or maintenance dredging in these channels, this would represent a loss of less than 0.27 percent of the estimated number of nesting females in the northern subpopulation, and if 4 loggerheads were killed, 0.1 percent of the estimated number of nesting females in the northern subpopulation would be lost. These are conservative estimates, however, since the loss of loggerhead turtles during these dredging activities are not likely limited to adult females, the only segment of the population, or subpopulation, for which NMFS has any population estimates. Although unlikely to occur, a worse case scenario could occur if all of the loggerheads killed were juvenile females from the northern subpopulation. It is more likely that some turtles taken by dredging activities will be from the northern subpopulation and some from the southern subpopulation.

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 18 loggerheads during the annual maintenance dredging of the Thimble Shoal and Atlantic Ocean Channels 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. Again note that this maximum magnitude of take is not anticipated to occur on a regular basis, but instead, the level of dredging (and thus incidental take) is likely to be smaller in any given year.

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 death of 4 Kemp's ridley sea turtles during the course of annual dredging in the channels considered in this opinion would represent a loss of less than 0.13 percent of the population. This level of take would represent the high end of the spectrum for the proposed project because typical deepening or maintenance dredging would not likely involve the maximum amount of material for each channel in the same year. If 2 Kemp's ridleys were killed during the course of dredging in these channels, this would represent a loss of less than 0.07 percent of the population, and if 1 Kemp's ridley was killed, 0.03 percent of the estimated number of nesting females in the population would be lost. Similar to information available for loggerheads, these are conservative estimates since the loss of Kemp's ridley sea turtles during these dredging activities are not likely limited to adult females, the only segment of the population for which NMFS has any population estimates. Although unlikely to occur, a worse case scenario could occur if all Kemp's ridleys killed were juvenile females. Even if all Kemp's ridley sea turtles anticipated to be 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.

In summary, this biological opinion considered the effects of dredging in the Thimble Shoal Channel and Atlantic Ocean Channel from April to November in order to accurately assess the impacts to listed species. The primary concern for sea turtles and shortnose sturgeon is entrainment in the draghead of the hopper dredge, while the main concern for endangered whales involves the potential for vessel collisions.

Sea turtle takes have occurred in the action area with the same type of hopper dredge and operational protocol as will be employed in the deepening and maintenance projects. In July and August 2000, three turtles were taken in a hopper dredge during Thimble Shoal Channel maintenance dredging. From August 7 to November 20, 2001, dredging in Thimble Shoal Channel encountered 15 instances of turtle takes during the dredging operations. During this time, in which turtles were documented during the dredge operations, only six were considered to be fresh dead turtles. The remainder were decomposed turtle flippers and/or carapace parts. As of October 4, 2001, 9 loggerhead turtles and 3 Kemp's ridleys were captured and relocated during trawling operations. Additionally, in nearby Cape Henry Channel, on September 26, 2001, a fresh loggerhead turtle was taken during dredging and on October 10, 2001, a fresh Kemp's ridley turtle was found in the forward port basket. After the take of these two turtles, measures were initiated by the ACOE to minimize the take of additional sea turtles, but on October 17, another loggerhead turtle was taken during dredging activities.

As the deepening operations and future maintenance dredging in the channels could involve removing a range of dredge material, NMFS assessed the project's impacts on listed species and the anticipated level of incidental take for three different magnitudes of dredge material. As stated previously, the project to deepen the two channels could take up to four years to complete. However, it is possible that this dredging could be completed in less than one year. A large hopper dredge can remove up to 20,000 cy in one day. If this were the case, dredging of 5 million cy would be completed in 250 days. ACOE has indicated that, for this project, this is unlikely due to possible funding constraints. However, because the potential exists to dredge this quantity in one year, the NMFS has set the upper limit of the dredging range as 5 million cy. Based on previous dredging activities, NMFS anticipates that up to 18 loggerheads and 4 Kemp's ridleys could be taken in the dredging operations involving up to 5 million cy of material. For dredging involving up to 3 million cy of material in one or both of the channels, NMFS anticipates that up to 10 loggerhead and 2 Kemp's ridley sea turtles could be taken. NMFS further anticipates that 4 loggerhead and 1 Kemp's ridley sea turtle could be entrained during maintenance dredging activities that will remove up to 1 million cy in one or both of the channels in any given year. Due to the nature of the injuries expected by entrainment, most of the turtles are expected to die. These estimations of incidental take are based upon the number of turtles previously taken during dredging in the Cape Henry and Thimble Shoal Channels, the incidental take for sea turtles designated in previous biological opinions, and the amount of

material to be dredged for the channels considered in this opinion.

Seasonal differences in the potential for interactions with shortnose sturgeon cannot be predicted with the available data. However, due to the low occurrence of this species in the action area and its behavior, NMFS does not anticipate shortnose sturgeon to be entrained by the dredging activities, physically struck by the dredge vessel, or affected by any local reductions in prey.

Although right, humpback, and fin whales may be affected by the vessels transiting the action area during the disposal phase of these operations, the potential for collisions with these large whales, or with smaller turtles, is greatly reduced by the speed at which the vessels will be traveling and the ACOE's proposed practice of maintaining a bridge watch. NMFS does not expect right, humpback, or fin whales, or leatherback, loggerhead, green, Kemp's ridley, or hawksbill turtles, to be involved in collisions with vessels involved with the disposal operations associated with this project.

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 human-induced mortality 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), when implemented, is 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. NMFS expects these fisheries to continue in the future.

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. In other areas of the Northeast, various initiatives have been planned to expand or establish high-speed ferry service. At this time, NMFS is not aware

of high-speed ferry services planned for the action area. NMFS and other member agencies of the NEIT will continue to monitor the development of the high-speed vessel industry and its potential threats to listed species and critical habitat.

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 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).

Sources of contamination in the action area include atmospheric loading of pollutants (e.g., PCBs), stormwater runoff from coastal development, runoff into rivers emptying into the bays, groundwater discharges, and river input and runoff. Chemical contamination may have an effect on listed species reproduction and survival. While the effects of contaminants on sea turtles is relatively unclear, pollution may be linked to the fabropapilloma virus that kills many turtles each year (NMFS 1997). If pollution is not the causal agent, it may make sea turtles more susceptible to disease by weakening their immune systems.

INTEGRATION AND SYNTHESIS OF EFFECTS

NMFS has determined that the ACOE's deepening and maintenance dredging of the Thimble Shoal Channel and Atlantic Ocean Channel could adversely affect loggerhead, leatherback, green, Kemp's ridley, and hawksbill sea turtles, shortnose sturgeon, and right, humpback, and fin whales by physically entraining them in the dredge, colliding with them during vessel operations, and/or removing and altering the availability of the prey resources they utilize.

As the deepening operations and future maintenance dredging in the channels could involve removing a range of dredge material, NMFS assessed the project's impacts on listed species and the anticipated level of incidental take for three different magnitudes of dredge material. As stated previously, the project to deepen the two channels could take up to four years to complete. However, it is possible that this dredging could be completed in less than one year. A large hopper dredge can remove up to 20,000 cy in one day. If this were the case, dredging of 5 million cy would be completed in 250 days. ACOE has indicated that, for this project, this is unlikely due to possible funding constraints. However, because the potential exists to dredge this quantity in one year, the NMFS has set the upper limit of the

range used to determine take as 5 million cy. Based on previous dredging activities, NMFS anticipates that up to 18 loggerheads and 4 Kemp's ridleys could be taken in the dredging operations involving up to 5 million cy of material. For dredging involving up to 3 million cy of material in one or both of the channels, NMFS anticipates that up to 10 loggerhead and 2 Kemp's ridley sea turtles could be taken. NMFS further anticipates that 4 loggerhead and 1 Kemp's ridley sea turtle could be entrained during dredging activities that will remove up to 1 million cy in one or both of the channels in any given year. Due to their rare occurrence in the action area, and/or size and vulnerability to entrainment, NMFS does not anticipate right, humpback, or fin whales, or shortnose sturgeon to be taken by the dredging operations.

While operational measures should be implemented to minimize the take of sea turtles to the extent possible, the loss of a maximum of 18 loggerhead and 4 Kemp's ridley sea turtles during maintenance dredging would represent a small percentage of these populations. This is also the worse case scenario, as dredging activities are not likely to involve the maximum amount of dredged material stated in the project description section (and thus incidental take) during this project or in any given year in the future. It is probable that a smaller amount of dredging will occur. 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 limited to adult females, the only segment of the population, or subpopulation, for which NMFS has any population estimates. Even if all of the turtles anticipated to be entrained and killed were juveniles or reproductive females, NMFS does not anticipate these losses to have a detectable effect on the numbers or reproduction of the affected population or subpopulation, and therefore is not expected to appreciably reduce the likelihood of survival and recovery of loggerhead, Kemp's ridley, or green sea turtles.

Although dredge vessels could collide with sea turtles or large whales, the ACOE has initiated a bridge watch protocol which NMFS believes effectively reduces the potential for collisions between turtles and whales with operating dredges and dredges transiting to the pumping station. The physical removal of sediments and associated epifauna from the dredge sites could reduce the availability of prey in the dredged areas, but NMFS believes these reductions will be localized and foraging turtles and shortnose sturgeon will not be limited by the reductions.

CONCLUSION

After reviewing the best available information on the status of endangered and threatened species under NMFS jurisdiction, the environmental baseline for the action area, the effects of the action, and the cumulative effects, it is NMFS' biological opinion that the dredging operations in the Thimble Shoal Channel and Atlantic Ocean may adversely affect but are not likely to jeopardize the continued existence of the right, humpback, or fin whale; loggerhead,

leatherback, Kemp's ridley, green, or hawksbill sea turtle; or shortnose sturgeon. 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 NMFS 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 ACOE so that they become binding conditions for the exemption in section 7(o)(2) to apply. ACOE has a continuing duty to regulate the activity covered by this Incidental Take Statement. If ACOE (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, ACOE must report the progress of the action and its impact on the species to the NMFS as specified in the Incidental Take Statement [50 CFR §402.14(i)(3)].

Amount or extent of take

While it is difficult to ascertain future take of sea turtles, NMFS based the anticipated take levels on previous sea turtle takes during 2000/2001 Thimble Shoal Channel dredging and 2001 Cape Henry Channel maintenance dredging, the level of take anticipated in previous biological opinions, the distribution and number of sea turtles in the Chesapeake Bay, and the magnitude of and operational measures employed by the dredging projects. The anticipated level of take for dredging in Thimble Shoal and Atlantic Ocean Channels was determined based upon the greatest estimated amount of material to be dredged during deepening operations and the maximum and minimum amounts to be dredged in both channels during maintenance operations:

- During any given year, if the amount of dredged material to be removed is less than or equal to 5 million cy, NMFS anticipates that dredging in the two channels may result in the observed take of 18 loggerhead and 4 Kemp's ridley sea turtles.

- During any given year, if the amount of dredged material to be removed is less than or equal to 3 million cy, NMFS anticipates that dredging operations in the two channels may result in the observed take of 10 loggerhead and 2 Kemp's ridley sea turtles.

- During any given year, if the amount of dredged material to be removed is less than or equal to 1 million cy, NMFS anticipates that dredging operations in the two channels may result in the observed take of 4 loggerhead and 1 Kemp's ridley sea turtle.

The incidental level of turtle take is anticipated to be fresh dead. No incidental take for hawksbill or leatherback sea turtles is anticipated as these species are relatively unlikely to be prevalent in the action area and interactions with the dredge are expected to be low.

NMFS also expects that the deepening operations and 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, NMFS recognizes that decomposed sea turtles may be taken in dredging operations that 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 defector 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 turtles that may be on the bottom through the high level of suction. A sea turtle take may not be considered related to dredge operations and count towards the above referenced anticipated take level if the condition of the specimen is in a severely decomposed or advanced state of decay and if the specimen is a turtle part. Provided that NMFS concurs with the ACOE'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.

Additionally, NMFS also expects that relocation trawling in either of the channels may take an additional unquantifiable number of live loggerhead and Kemp's ridley sea turtles. As stated in the reasonable and prudent measures and terms and conditions of this Incidental Take Statement, relocation trawling may occur under certain circumstances prior to dredging. This trawling will result in sea turtle takes, but these takes are not expected to be lethal due to the short duration of

the tow times (15 to 30 minutes per tow). While relocating sea turtles may invoke a degree of stress on the animals, the level of stress should be minimized by an expedited and proper handling time. Additionally, the capture of a live turtle in a trawl is likely less harmful to the species as compared to a sea turtle being entrained in a dredge draghead. Thus, an unquantifiable number of live loggerhead and Kemp's ridley sea turtles are anticipated to be taken during any relocation trawling deemed necessary during dredging in both channels.

The distribution of shortnose sturgeon in Virginia waters is relatively unknown and the furthest recorded capture of shortnose sturgeon is in the mouth of the York River. While NMFS must employ a conservative approach to management and consider the species to be in the area, it is difficult to determine the abundance of this species in the action area and how the proposed project will impact shortnose sturgeon. Due to the lack of information about distribution in Virginia waters and the low likelihood that the dredge activities will interact with shortnose sturgeon, no incidental take will be designated for shortnose sturgeon at this time. No incidental take of any listed marine mammal is anticipated for this project.

Effect of the take

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

Reasonable and Prudent Measures

NMFS 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. ACOE 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.

2. ACOE 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.

3. ACOE must enact measures that would reduce the number of sea turtles in the dredging channel so that the possibility of entrainment would be minimized.

4. ACOE must develop and follow a system to provide timely reporting to the NMFS on any takes of protected species.

Terms and Conditions

In order to be exempt from the prohibitions of Section 9 of the ESA, the ACOE 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. If dredging occurs between April 1 and November 30, hopper dredges must be equipped with the rigid deflector draghead as designed by the ACOE 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 are being followed during dredge operations.

2. If dredging occurs during the period of April 1 through November 30, the ACOE must adhere to the attached "Monitoring Specifications for Hopper Dredges" with trained NMFS-approved sea turtle observers, in accordance with the attached "Observer Protocol" and "Observer Criteria" (Appendix B). NMFS-approved observers must be required 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, overflow, screening and dragheads for sea turtles and shortnose sturgeon and their remains.

3. 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 G). The ACOE must submit the incident report for the decomposed turtle part, as well as photographs, to NMFS and request concurrence that this take should not be attributed to the Incidental Take Statement. NMFS will have the final say in determining if the take should count towards the Incidental Take Statement.

4. The ACOE 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 B. 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, Waterways Experiment Station, 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 installation, adjustment and monitoring of the rigid deflector draghead assembly.

5. 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 dismantled. 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 case the unlikely event should occur. All permit holders must follow the sea turtle handling techniques specified in Appendix B-II-E and Appendix C.

6. 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 four (4) turtles within a two month period, or in other circumstances that NMFS deems appropriate. All trawls must follow the standard protocol developed and used by the ACOE South Atlantic Division (Appendix D). The trawling and relocation survey must be initiated within 24 hours of the incidental take or the ACOE must suspend dredging operations until such trawling can be initiated. Trawling should continue for at least 5 consecutive days, unless precluded by inclement weather, after which NMFS may continue or suspend the survey. After the trawling survey is completed, the NMFS and ACOE shall immediately discuss the results of the trawling to determine if additional measures are needed to relocate turtles found in the channel.

7. The results of each turtle take from the trawling survey must be recorded on the Sea Turtle Tagging Data Report (Appendix E). The preliminary results of the trawling survey must be submitted to NMFS immediately after the survey is completed (e.g., after 5 days) so that NMFS 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 the ACOE and NMFS within 30 working days of completion of the trawling survey.

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

9. 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 listed species closer than 100 yards when in transit. When species are present vessels must, except when

precluded by safety requirements, follow the advice of the onboard NMFS-approved observer to avoid collisions.

10. If listed species are present during dredging or material transport, vessels transiting the area must post a watch, avoid intentional approaches closer than 100 yards (or 500 yards in the case of right whales) when in transit, and reduce speeds to below 4 knots.

11. If the take of loggerhead sea turtles approaches 1/2 of the permitted incidental take level (e.g., 9 turtles for 5 million cy) during any project cycle, the ACOE must immediately contact NMFS at (978) 281-9112 to review the situation and determine whether any new management measures should be implemented to prevent the total incidental take level from being reached.

12. If warranted by ACOE, beach quality sand dredged from the Channels may be deposited as part of a beach renourishment activity. When decided upon, the ACOE must inform NMFS that this type of disposal has been selected.

NMFS anticipates that no more than 18 loggerheads and 4 Kemp's ridleys could be taken during the dredging of the Thimble Shoal and Atlantic Ocean Channels involving up to 5 million cy of material. For dredging involving up to 3 million cy of material in the Thimble Shoal and/or Atlantic Ocean Channels, NMFS anticipates that no more than 10 loggerhead and 2 Kemp's ridley sea turtles could be taken. NMFS further anticipates that no more than 4 loggerhead and 1 Kemp's ridley sea turtle could be entrained during dredging activities that will remove up to 1 million cy in one or both of the channels considered in this opinion in any given year. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might result 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. Where weather/sea conditions permit, hopper dredging should be conducted from December 1 to March 31, or when surface water

temperatures are below 11° C, when sea turtles are most likely not present in Virginia coastal waters.

2. 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.

3. To facilitate future management decisions on listed species occurring in the action area, ACOE 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.

4. New approaches to sampling for turtle parts should be investigated.

5. ACOE should investigate, support, and/or develop additional technological solutions to further reduce the potential for sea turtle takes in hopper dredges.

6. Because presence of shortnose sturgeon in the lower Chesapeake Bay could substantially affect the conclusions in future Section 7 consultations, the ACOE should contact the U.S. Fish and Wildlife Service to collaborate on sturgeon research efforts in Virginia.

7. For every year when dredging activities are planned for winter months, the ACOE Project Manager should contact the marine mammal staff at the Virginia Marine Science Museum in order to obtain information on whale sightings in the area.

REINITIATION OF CONSULTATION

This concludes formal consultation on the dredging activities conducted in Thimble Shoal Channel and Atlantic Ocean Channel. 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 ACOE must immediately request reinitiation of formal consultation.

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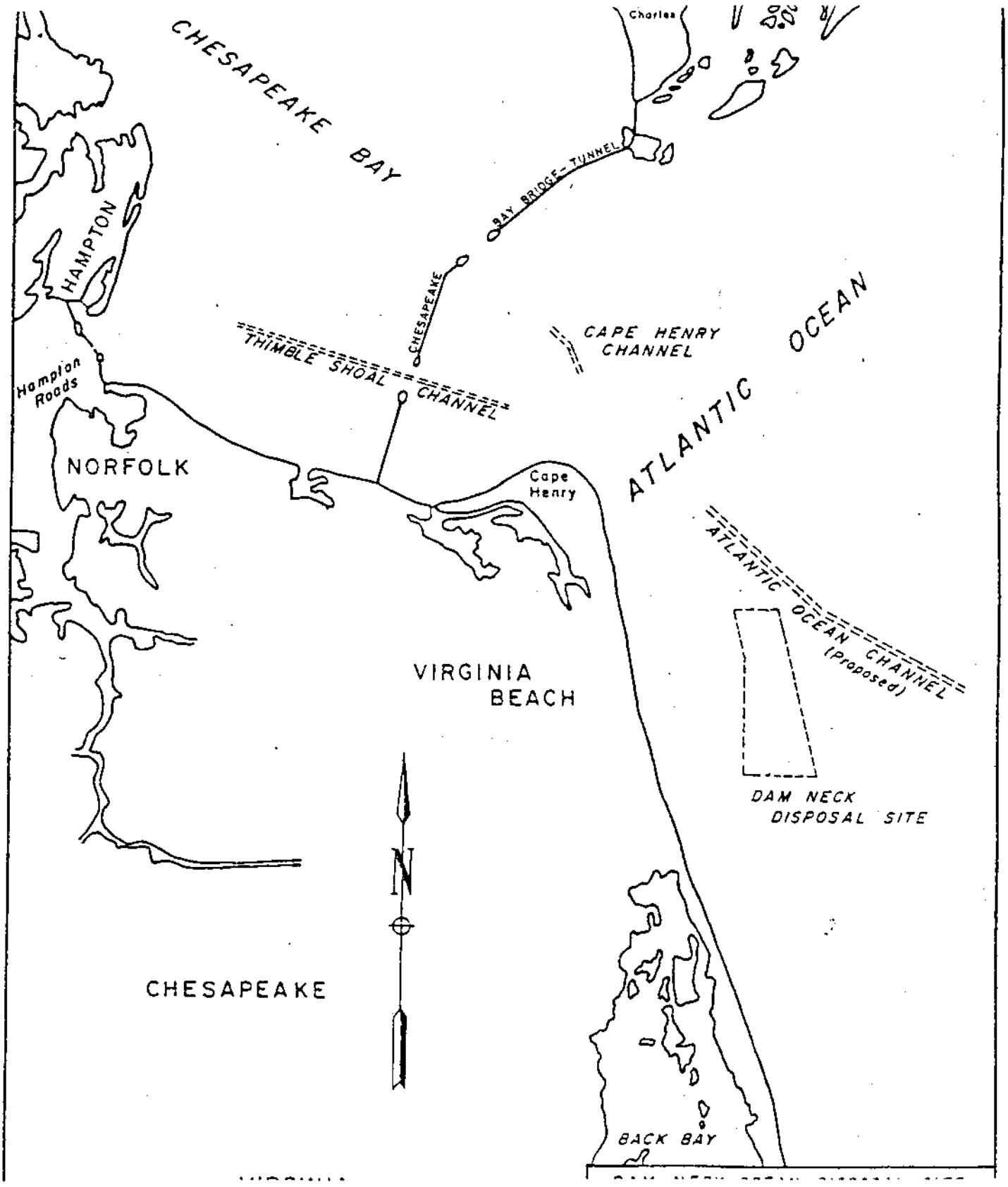
APPENDIX A

Map of Project Location

Thimble Shoal Channel and Atlantic Ocean Channel



APPENDIX B.

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 NMFS-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 NMFS-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 NMFS-approved observer should also examine and clean the dragheads and document the findings.

II. OBSERVER PROTOCOL

A. Basic Requirement

A NMFS-approved observer with demonstrated ability to identify sea turtle species must be placed aboard the dredge(s) being used; starting immediately upon project commencement to monitor for the presence of listed species and/or parts being entrained or present in the vicinity of dredge operations.

B. Duty Cycle

Beginning April 1, one NMFS-approved observer is to be onboard for every week of the dredging project until project completion or November 30, whichever comes first. While onboard, observers shall provide the required inspection coverage on a rotating basis of six hours on and six hours off each day. Combined monitoring periods would then represent 50% of total dredging time through the project period. If possible, the ACOE shall maintain 100% observer coverage during dredging operations in the Thimble Shoal and Atlantic Ocean Channels by employing 2 observers on board at any given time.

C. Inspection of Dredge Spoils

During the required inspection coverage, the trained NMFS-approved observer shall inspect the galvanized screens and baskets at the completion of each loading cycle for evidence of sea turtles or shortnose sturgeon. The Endangered Species Observation Form shall be completed for each loading cycle, whether listed species are present or not (Appendix F). If any whole turtles or shortnose sturgeon (alive or dead) or turtle or shortnose sturgeon parts are taken incidental to the project(s), Kim Damon-Randall (978) 281-9112 or Carrie McDaniel (978) 281-9388 must be contacted within 24 hours of

the take. An incident report for sea turtle/shortnose sturgeon take (Appendix G) shall also be completed by the observer and sent to Kim Damon-Randall 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. NMFS 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. Weekly reports, including all completed load sheets, photographs, and relevant incident reports, as well as a final report, are to be submitted to the attention of Kim Damon-Randall, NMFS, 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 F):

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 or shortnose sturgeon (alive or dead, decomposed or fresh) or turtle or shortnose sturgeon parts are taken incidental to the project(s), Kim Damon-Randall (978) 281-9112 or Carrie McDaniel (978) 281-9388 must be contacted within 24 hours of the take. All whole dead sea turtles or shortnose sturgeon, or turtle or shortnose sturgeon parts should be photographed and described in detail on the Incident Report of Sea Turtle/Shortnose Sturgeon Mortality (Appendix G). The photographs and reports should be submitted to Kim Damon-Randall, NMFS, Protected Resources Division, One Blackburn Drive, Gloucester, MA 01930-2298. Any dead **Kemp's ridley** sea turtles shall 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. Disposition of dead sea turtles/shortnose sturgeon will be determined by NMFS. Other sea turtle species (loggerhead, leatherback, or green turtles) taken either whole or in parts, or any shortnose sturgeon 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 at the dredge spoil disposal site. If the species is unidentifiable or if there are entrails that may have come from a turtle, the subject should be photographed, placed in plastic bags, labeled with location, load number, date and time taken, and placed in cold storage. Dead Kemp's ridley or unidentifiable species or parts will be collected by NMFS or NMFS-approved personnel (contact Kim Damon-Randall at (978) 281-9112).

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 C). No live turtles should be released back into the water without first being checked by a qualified veterinarian or a rehabilitation facility. Virginia and Maryland stranding network members (for rehabilitating turtles) include Mark Swingle and/or Susan Barco at the Virginia Marine Science Museum [(757)437-4949], Jack Musick at the Virginia Institute of Marine Science [(804)684-7313], and Dr. Brent Whitaker and/or David Schofield of the National Aquarium in Baltimore [(410)576-3853; FAX Number: (410)576-1080)]. Mark Swingle/Susan Barco, Brent Whitaker/David Schofield, and Dana Hartley (NMFS Stranding Network Coordinator: (508) 495-2090) should also be contacted immediately for any marine mammal injuries or mortalities.

III. OBSERVER REQUIREMENTS

Submission of resumes of endangered species observer candidates to NMFS 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. NMFS 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, and shortnose (*Acipenser brevirostrum*) and Atlantic (*Acipenser oxyrinchus oxyrinchus*) sturgeon and their parts;

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

3) correctly measure the total length and width of live and whole dead sea turtle and sturgeon 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, we note below the observer training necessary to be considered admissible by NMFS. We can assist the ACOE by identifying groups or individuals capable of providing acceptable observer training. Therefore, at a minimum, observer training must include:

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

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

3) demonstration of the proper handling of live sea turtles and sturgeon 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 and sturgeon lengths and widths; and

5) instruction on how to identify marine mammals; and

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

APPENDIX C

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.

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

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

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

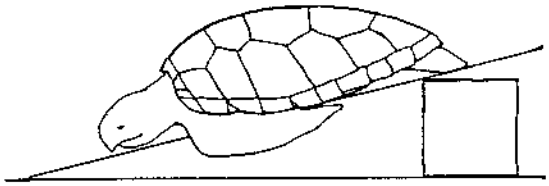
- **If the turtle is actively moving**, it should be retained onboard until evaluated for injuries by a permitted rehabilitation facility. Due to the potential for internal injuries associated with hopper entrainment, it is necessary to transport the live turtle to the nearest rehabilitation facility 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 Dana Hartley, NMFS Northeast Region Stranding Coordinator, at (508) 495-2090 or Carrie McDaniel at (978) 281-9388.
  2) Keep the turtle shaded and moist (e.g., with a water-soaked towel over the eyes, carapace, and flippers).
  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. The resuscitation regulations can be found at 50 CFR 223.206(d)(1).

- 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 conduct one of the above reflex tests 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 B-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

- Virginia and Maryland stranding network members (for rehabilitating turtles) include Mark Swingle and/or Susan Barco at the Virginia Marine Science Museum [(757)437-4949], Jack Musick at the Virginia Institute of Marine Science [(804)684-7313], and Dr. Brent Whitaker and/or David Schofield of the National Aquarium in Baltimore [(410)576-3853; FAX Number: (410)576-1080].
- Mark Swingle/Susan Barco, Dr. Whitaker/Mr. Schofield, and Dana Hartley (NMFS Stranding Network Coordinator: (508) 495-2090) should also be contacted immediately for any marine mammal injuries or mortalities.

APPENDIX D

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

Sea turtle trawling procedures

1. Trawling will be conducted under the supervision of a biologist approved by the NMFS. A letter of approval from NMFS will be provided prior to the commencement of trawling.
2. Any turtles captured during the survey will be measures and tagged in accordance with standard biological sampling procedures with sampling data recorded on the Sea Turtle Tagging and Relocation Report (Appendix E). Any captured sea turtles will be relocated south of the work area at least 3 miles from the location recorded on the Sea Turtle Tagging and Relocation Report.
3. 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 in the channel. Tows will be made in the center, green and red sides of the channel such that the total width of the channel bottom is sampled. Positions at the beginning and end of each tow will be determined from GPS Positioning equipment. Tow speed will be recorded at the approximate midpoint of each tow.
4. 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.
5. Before trawling begins, the necessary state permits for trawling in Virginia state waters will 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 E

Sea Turtle Tagging Data Report

(Note that any reporting form submitted for turtles taken by trawling activities related to the Thimble Shoal Channel and Atlantic Ocean Channel project should include the following information.)

Channel:_____ Date:_____
Tow #:_____ Net (circle): Port Starboard
Species: _____ Sex (circle): Male Female Unknown

Describe capture location and data of capture (include state, county, lat and long):_____
_____

Describe capture method and/or type of gear in use when turtle was caught:_____
_____

Flipper Tag Information
Left: _____
Right:_____
PIT Tag #:_____

Species Information: *(please designate cm/m or inches.)*
Weight (kg or lbs): _____
Plastron length _____ Plastron width _____
Straight carapace length _____ Straight carapace width _____
Curved carapace length _____ Curved carapace width _____
Tail length: _____ Head width:_____
Condition of specimen/description of animal_____
_____

Miscellaneous:
Blood taken: YES NO _____# of vials
Photos Taken: YES NO
Recapture: _____ this effort _____ previous effort
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, propellor damage, papillomas, tag locations, etc.)
_____
_____
_____
_____

APPENDIX F

ENDANGERED SPECIES OBSERVER FORM
Thimble Shoal and Atlantic Ocean Channels Project

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/Shortnose Sturgeon 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 G

Incident Report of Sea Turtle/Shortnose Sturgeon Take
Thimble Shoal and Atlantic Ocean Channels Project

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 (or total 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 # _____

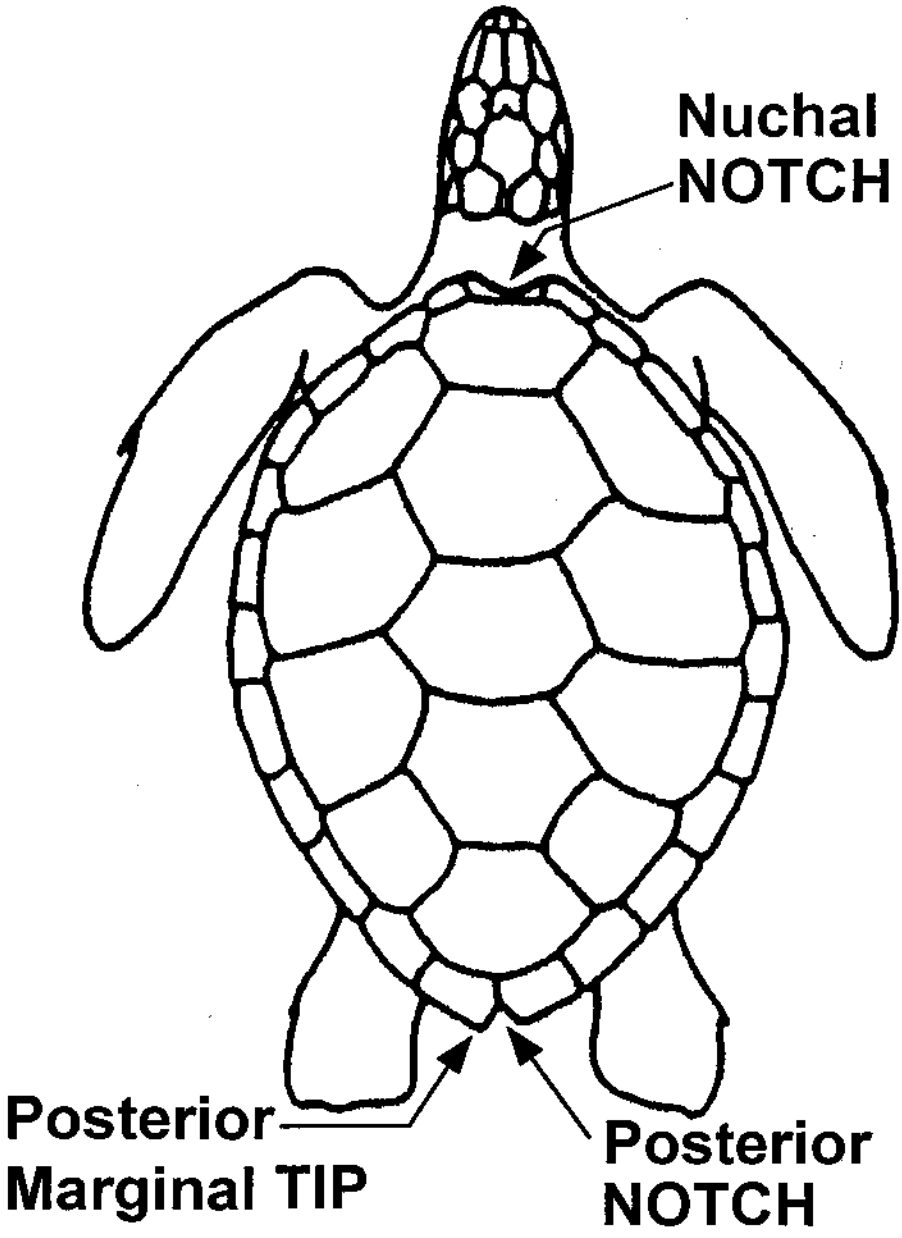
Photograph attached: YES / NO
(please label *species, date, geographic site* and *vessel name* on back of photograph)

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

Observer's Name _____
Observer's Signature _____

Incident Report of Sea Turtle Take - Thimble Shoal and Atlantic Ocean Channels Project

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



Description of animal: