UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1335 East-West Highway
Silver Spring, MD 20910
THE DIRECTOR

NOV 26 1996

Lt. Colonel Robert B. Keyser
District Engineer
Philadelphia District
U.S. Army Corps of Engineers
Wanamaker Building
100 Penn Square East
Philadelphia, Pennsylvania 19107-3390

Dear Colonel Keyser:

Enclosed is the National Marine Fisheries Service (NMFS) Biological Opinion for Dredging Activities within the Philadelphia District issued under the authority of Section (7)(a)(2) of the Endangered Species Act (ESA). Based on our review of the September 1995 Biological Assessment submitted by the Philadelphia District, Army Corps of Engineers (ACOE), and other available scientific information, we conclude that dredging projects within the Philadelphia District may adversely affect sea turtles and shortnose sturgeon, but are not likely to jeopardize the continued existence of any threatened or endangered species under our jurisdiction. While endangered whales may be present in the action area of these dredging projects, effects from increase dredging traffic are expected to be minimal.

Shortnose sturgeon may be adversely affected by entrainment and harassment during dredging projects that occur in the Delaware River. As a term and condition of the Incidental Take Statement included in this opinion, NMFS is requiring the ACOE to continue adherence to the seasonal dredging restrictions developed by the Delaware River Basin Fish and Wildlife Management Cooperative provided herein. NMFS is also requiring monitoring by trained endangered species observers of all hopper dredging conducted in the Kinkora to Trenton range of the Delaware River from November through February. For all other hydraulic dredging in the Kinkora to Trenton range during those months, NMFS is requiring weekly monitoring of the disposal area.

Sea turtles may also be adversely affected by dredging/disposal and beach nourishment projects in the lower Delaware River/Delaware Bay and along the eastern shores of southern New Jersey and Delaware. As a term and condition of the Incidental Take Statement included in this opinion, NMFS is requiring monitoring of all hopper dredge operations in areas

where sea turtles are present between June and November by trained endangered species observers. Data would then be submitted to NMFS at which time the information would be evaluated to determine if further monitoring is necessary for future cycles.

Reinitiation of consultation is required if: (1) the amount or extent of taking specified in the incidental take statement is exceeded; (2) new information reveals effects of this action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the identified action is subsequently modified in a manner that causes an effect to the listed species that was not considered in the biological opinion, or (4) a new species is listed or critical habitat designated that may be affected by the identified action.

I look forward to future cooperation during recovery plan implementation and future Section 7 consultations.

Sincerely,

PAMontanio

Patricia A. Montanio
Acting Director
Office of Protected Resources

Enclosure

ENDANGERED SPECIES ACT

SECTION 7 CONSULTATION

BIOLOGICAL OPINION

AGENCY:	U.S. Department of the Army Philadelphia District
ACTIVITY CONSIDERED:	Dredging Activities within the Philadelphia District
CONDUCTED BY:	National Marine Fisheries Service Northeast Regional Office
DATE ISSUED:	_____

A. BACKGROUND:

In September 1986, the Philadelphia District of the U.S. Army Corps of Engineers (ACOE) initiated formal consultation under section 7 (a)(2) of the Endangered Species Act of 1973, as amended (ESA), for maintenance dredging of the Delaware River Federal Navigation Projects from Trenton to the sea, and evaluated the potential impacts to shortnose sturgeon (Acipenser brevirostrum) by a letter to the National Marine Fisheries Service (NMFS) Northeast Region (NER) dated September 15, 1986. A biological assessment of the shortnose sturgeon (Acipenser brevirostrum) population in the upper tidal Delaware River (ACOE 1986) was provided for NMFS review.

The ACOE determined that maintenance dredging in the southern reaches of the Delaware River, from Philadelphia to the sea, would not impact shortnose sturgeon because their distribution was inhibited by poor water quality between Philadelphia and Wilmington, and higher salinity levels below Wilmington. The ACOE agreed to follow certain seasonal dredging windows recommended by the Delaware Basin Fish and Wildlife Management Cooperative (Coop.) (Coop. 1992, 1994) which was determined to be adequate to prevent impacts to shortnose sturgeon based upon the information available at the time. The ACOE has conducted informal consultations for individual dredging projects.

In 1990, NMFS reviewed the draft Interim Feasibility Report for the Delaware River Comprehensive Navigation Study, Main Channel Deepening project. New concerns arose about the impacts of the

dredging on endangered and threatened species other than shortnose sturgeon. In 1992, the Final Interim Feasibility Report indicated that the ACOE intended to use a hopper dredge for the maintenance dredging and deepening of the main channel in Delaware Bay. As a result, NMFS recommended that the ACOE reinitiate the formal Section 7 consultation for shortnose sturgeon to include potential impacts to sea turtles.

On August 17, 1992, NMFS met with the ACOE regarding the ESA consultation responsibilities on hopper dredging projects in the Philadelphia District. Due to the possibility of multiple ACOE projects using hopper dredges in both the lower and upper river, it was determined that a district-wide consultation on the cumulative effects of dredging in the Delaware River Basin should be conducted.

In response to NMFS' request, the ACOE prepared a second biological assessment to evaluate the impacts of dredging projects on all federally protected species occurring in the Delaware River Basin, and in the Atlantic coasts of New Jersey from the Manasquan Inlet to Cape May and Delaware. This biological assessment was submitted by the ACOE on September 29, 1995.

B. DESCRIPTION OF PROPOSED ACTIVITIES:

A detailed description of the project area and proposed activities was provided in the "Biological Assessment of the Federally Listed Threatened and Endangered Species of Sea Turtles, Whales and the Shortnose Sturgeon within the Philadelphia District Boundaries" (ACOE 1995). The dredging projects permitted, funded or conducted by the ACOE include the ones described below. They may involve using hydraulic dredges (hopper, pipeline), dustpan dredges and bucket type dredges. This consultation covers the use of these dredges for both navigation channels and for beach nourishment activities in the Delaware River Basin and the Atlantic coasts of New Jersey from the Manasquan Inlet to Cape May and the entire coast of Delaware. This consultation also covers private dredging permitted by the ACOE under their regulatory authorities.

1. Navigation. The ACOE maintains federally authorized navigation channels in waterways and inlets in New Jersey, Delaware and portions of Pennsylvania and Maryland including the Delaware River Main Channel, the Chesapeake and Delaware Canal (C&D canal), the Schuykill River, the Christina River, the Murderkill River, the Mispillion River, Cedar Creek, the Salem River, Cohansey River, Maurice River, the Intracoastal Waterway (IWW) of New Jersey from the Manasquan Inlet to Cape May and the IWW from Delaware to Maryland. The ACOE also maintains the Manasquan, Barnegat, Absecon, Cold Spring and Cape May Inlets in

New Jersey and Wilmington Harbor and the Indian River Inlet in Delaware.

Maintenance of these channels and inlets is generally done with a hydraulic pipeline dredge with the exception of the Delaware Main Channel for which a hopper dredge is likely to be used. However, a hopper dredge can be used at any time. Another exception is the Barnegat Inlet, which is maintained using the *CURRITUCK*, a special purpose dredge with a very small draghead opening (less than 12 inches) and low suction. Additional navigation projects presently being investigated by the ACOE include deepening the Delaware River Main Channel, widening and deepening the Salem River, deepening the C&D canal, and improvements to the Midstream Lighting and Transfer Area. Studies are also underway for improvements to Will's Hole Thorofare, Gardner's Basin, Middle Thorofare Harbor and Otten's Harbor.

For the smaller projects such as the maintenance dredging of small navigation channels or inlets, it is likely that a pipeline or specialty dredge would be used because of the narrow channels. However, private companies that own hopper dredges could bid on these projects. For the larger projects such as beach nourishment projects, there is some degree of uncertainty in predicting the type of dredge that will be chosen for the specific project. Hopper dredges can be used on these projects.

2. Coastal Engineering. The ACOE plans, designs and constructs federal coastal erosion and hurricane protection projects as authorized by Congress. Current and potential shore protection planning studies encompass virtually the entire Atlantic coasts of New Jersey and Delaware, as well as the Delaware Bay coastline. The purpose of these studies is to investigate the adverse impacts associated with storm damage along the coastline, and to determine the costs and benefits of potential federal projects. These studies may recommend beach nourishment as a project feature. If beach nourishment in proposed, hopper dredges may be used for the excavation and placement of suitable material from offshore or inlet borrow sources.

Other coastal engineering projects for which initial construction has been completed include: Cape May Inlet to Lower Township, Great Egg Harbor and Peck Beach, and the Delaware Coast Protection project. A hopper dredge and a hydraulic pipeline dredge were used for the initial construction of the Cape May Inlet to Lower Township beach nourishment project. Construction was completed in 1993, and periodic maintenance is scheduled for every two years. Both a hydraulic cutterhead pipeline dredge and a hydraulic dustpan dredge were used for the initial construction of the Great Egg Harbor and Peck beach nourishment project. Periodic maintenance is scheduled every three years beginning in 1995.

3. Regulatory. The ACOE is responsible for the administration of the federal regulatory program under the provisions of the Rivers and Harbors Act of 1899, the Clean Water Act, and the Marine Mammal Protection, Research and Sanctuaries Act. As a result, the ACOE has regulatory jurisdiction over dredging, filling and construction activities in waters of the United States within the Philadelphia District. Approximately 2500 permit actions are processed annually under the ACOE regulatory program (ACOE 1995).

A list of dredging projects authorized by the ACOE from 1982 to 1993 is included in the biological assessment (ACOE 1995) and is incorporated herein by reference. In general, the majority of the dredging projects permitted by the District involve the use of a bucket-type dredge, or a hydraulic pipeline dredge, but may use hopper dredges.

C. LISTED AND PROPOSED SPECIES LIKELY TO OCCUR IN THE PROJECT AREA

Listed species under the jurisdiction of the NMFS that occur in the project area and may be affected by the proposed activities include:

ENDANGERED:

Shortnose sturgeon *Acipenser brevirostrum*

Kemp's ridley sea turtle *Lepidochelys kempi*
Leatherback sea turtle *Dermochelys coriacea*
Green sea turtle *Chelonia mydas*

Humpback whale *Megaptera novaengliae*
North Atlantic right whale *Eubalaena glacialis*

THREATENED:

Loggerhead sea turtle *Caretta caretta*

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

D. SPECIES ACCOUNTS

1. The following species are known to use the project area extensively during certain seasons:

Shortnose sturgeon and dredge interactions have been discussed at

length in the Connecticut River Federal Navigation Channel Biological Opinion (NMFS 1992), the Biological Opinion for the Neshaminy Water Resource Authority's Point Pleasant Pumping Station (NMFS 1992) and the Biological Opinion for construction of the Merrill Creek Reservoir Pumphouse (NMFS 1983), and this information is incorporated herein by reference. Sea turtles have also been discussed in the Biological Opinion for the continued operation of the Oyster Creek Nuclear Generating Station (NMFS 1995) and the Biological Opinion for the Salem and Hope Creek Nuclear Generating Stations (NMFS 1991), this information is also incorporated herein by reference. Information on distribution and biology will be discussed below as appropriate to this consultation.

a. Shortnose Sturgeon

Population Information: Shortnose sturgeon occur in the Delaware Estuary from the lower bay upstream to at least Lambertville, New Jersey (river km 238). Preliminary population estimates by Hastings (1987) indicate that the adult populations of shortnose sturgeon in the upper tidal Delaware River are between 6,000 and 14,000. A draft recovery plan for shortnose sturgeon estimates the Delaware River population at 6,408 (adults only).

Tagging studies done by O'Herron et al. (1993) show that the most heavily used portion of the river appears to be between river km 190 below Burlington Island and the Trenton Rapids at river km 220.

Sturgeon overwinter from November to March in dense sedentary aggregations in the upper tidal reaches of the Delaware between river km 190 and river km 210, especially near Duck Island and Newbold Island. However, as opposed to shortnose sturgeon in Maine rivers, Delaware River shortnose sturgeon do not appear to remain as stationary during overwintering periods. Therefore, their use of the river is difficult to predict.

Spawning occurs in late March through April, between Trenton and at least the Scudders Falls area. During this period males appear to stay on the spawning grounds for a longer time than do the females, a week or so as opposed to a few days, respectively (O'Herron and Hastings 1985). In the late spring and early summer, after spawning, shortnose sturgeon move rapidly downstream at least as far as Philadelphia. Recent information (O'Herron pers. comm.) shows that improving water quality in the Philadelphia area has resulted in increase use of the lower river by shortnose sturgeon. Historically, they were rare in this area, possibly due to poor water quality. Many adult shortnose sturgeon return upriver to between river km 205 and 215 within a few weeks, while the others gradually move to the same area over the course of the summer (O'Herron et al. 1993). Unfortunately, little is known about the movements of larvae and young-of- year shortnose sturgeon in the Delaware River, and nursery habitat has not been identified. By November, adult shortnose sturgeon have returned to the overwintering grounds near Duck Island and Newbold Island.

Foraging: According to Dadswell (1984), shortnose sturgeon appear to be strictly benthic feeders. Adults eat mollusks, insects, crustaceans and small fish. Juveniles eat crustaceans and insects. In the Delaware River, Asiatic river clam (*Corbicula manilensis*) is considered to be the primary food source for the shortnose sturgeon (O' Herron and Hastings 1985). *Corbicula* is widely distributed at all depths in the upper tidal Delaware River, although it is considerably more numerous in the shallows on both sides of the river than in the channels.

Feeding in freshwater is largely confined to periods when water temperatures exceed 10° C (Dadswell 1979 and Marchette and Smiley 1982). In general, feeding is heavy immediately after spawning in the spring and during the summer and fall, and lighter in the winter.

Juveniles feed primarily in 10-20 m deep river channels, over sandy-mud or gravel-mud bottoms (Pottle and Dadswell 1979). However, little is known about the specific feeding habits of juvenile shortnose sturgeon in the Delaware River because attempts to located them in the upper tidal river have been unsuccessful.

Overwintering: In the Delaware River, shortnose sturgeon form dense overwintering aggregates between river km 190 and 210, especially in the Duck Island and Newbold Island area. During the winter of 1985-1986, O'Herron and Able (1986) found an overwintering aggregation off Duck Island Creek in the New Jersey side of the navigation channel. Tagging studies by Brundage (1985) also support this finding. According to O'Herron's study, the overwintering fish were generally active, appearing at the surface and even breaching through the skim ice. Tagging studies by O'Herron et al. (1993) found that the typical overwintering movements of the shortnose sturgeon are fairly localized. Based upon sonic survey data, they appear to remain within 2.0 km of the aggregation site (O'Herron 1986).

b. Loggerhead Sea Turtle

Population Information: Although detailed information on populations and sizes is difficult to obtain and to interpret, it is generally believed that there has been a historical decline in the numbers of loggerheads in several areas outside of the US based upon long-term studies of nesting females (NMFS and FWS 1995). In addition, recent information from long-term studies in the southeast U.S. indicate that the number of nests have declined dramatically in South Carolina and Georgia in recent years. The majority (over 90%) of the loggerhead nesting activity in the U.S. occurs in eastern Florida. However, population estimates are inconclusive. For example, according to a recent status review, (NMFS and FWS 1995) several recent studies reported no significant increase or decrease in the nesting areas in South Brevard County, Florida. Scientific views differ on why young sea turtles end up in northeastern waters, but it is now accepted that these waters provide important developmental habitat for a number of chelonid turtles, including loggerheads (Morreale and Standora 1994). Loggerhead turtles were the most frequently sighted species of turtle during the CeTAP surveys (1982). The peak average abundance in the study area was 7702 (+/- 1748). Most of the sightings were concentrated on the continental shelf and in estuaries from Long Island to the Chesapeake Bay.

Of all the sea turtles, the loggerhead is the most temperate and subtropical in its nesting habits, which would make it the best candidate for use of more northerly waters in general. Based upon recent observer reports from the ACOE dredging projects in New Jersey and Delaware, and New Jersey Marine Mammal Stranding Center (MMSC) and Delaware Department of Natural Resources and Environmental Control (DNREC) stranding reports, loggerhead turtles are the most common sea turtle in Philadelphia District waters. Public Service Electric and Gas Company (PSE&G) reports that juvenile loggerheads are also the most common species of sea turtle incidentally captured at the circulating water intake of the Salem Generating Station (Eckert et al. 1989). Loggerheads were also the most commonly reported species of sea turtles at the Oyster Creek Nuclear Generating Station (OCNGS) where five incidental captures (four individuals and one recapture) occurred between September 9, 1992 and June 19, 1994 (NMFS 1995). The loggerheads captured at OCNGS were juvenile or sub-adult, and they were taken at the facilities circulating and dilution water intakes (GPUN 1995).

According to DNREC and the MMSC, most of the strandings and sightings in New Jersey and Delaware waters occur in the spring and summer. Of the eight turtles reported taken by OCNGS (four loggerhead and four Kemp's ridley) from 1992 to 1994, two were taken in June, three in July, one in September and two in October (GPUN 1995). Loggerhead turtles taken at the facility during this time ranged in size from 35.5 cm to 61.4 cm with an average size of 44.1 cm.

Crouse et al. (1987) developed a population model of the loggerhead which suggests that the key to recovery of this species is in reducing mortality in later stages of life, particularly large juveniles. Trawl and gillnet fisheries remain a threat to loggerhead populations, as does the modification and destruction of nesting habitat.

Foraging: Loggerheads consume a wide variety of benthic organisms including gastropod and pelecypod mollusks, decapod crustaceans (crabs, shrimp), jellyfish, sea urchins, sponges, squids, basket stars and fishes (Nelson 1988, NMFS and USFWS 1991, Morreale and Standora 1994). In Long Island, NY waters, crabs made up 80% of the weight of loggerhead diets. The correlation between availability of different food items at the site and the items consumed by the turtles varied considerably, suggesting that the preferred food item was crabs (Morreale and Standora 1994). In Massachusetts waters, crabs also made up the major component of stomach contents of stranded animals, supplemented by clams, quahogs, moon snails, and squid. (Prescott 1982). Based upon stomach content analysis from dead turtles, is appears that the primary food source for loggerheads in the Philadelphia District is blue crabs and horseshoe crabs.

c. **Kemp's ridley sea turtle**

Population Information: The Kemp's ridley turtle is the most endangered species of sea turtle in northeastern U.S. waters. Kemp's ridley populations have suffered one of the most dramatic declines in population numbers observed for any animal (USFWS and NMFS 1992). In the recent status review (NMFS and FWS 1995), Rostal (1991) estimates that the population of nesting females at Ranch Nuevo, Mexico is 509 females, or a little more than one percent of the nesting population in 1947. There is no quantitative information on the abundance of adult males and only a little on juveniles.

As with the loggerhead sea turtle, juvenile Kemp's ridleys use northeastern waters as developmental habitat, foraging throughout the summer until decreasing temperatures send them southward in the fall. Although not as common as loggerheads, Kemp's ridleys have been incidentally captured at both the Salem Generating Station and the OCNGS in recent years. Most commonly, the turtles captured in the inshore waters of New Jersey and Delaware are juvenile or sub-adult. For example, the four juvenile or sub-adult Kemp's ridley were incidentally captured at OCNGS from 1992 to 1994 averaged 28.2 cm.

Crouse et al. (1987) illustrate the importance of juveniles to the stability of loggerhead populations and may have important implications for Kemp's ridleys as well. The vast majority of the Kemp's ridleys identified along the Atlantic coast of the U.S. have been juveniles. According to the recent status review (NMFS and FWS 1995), efforts to restore the species must concentrate upon protecting subadult and juvenile animals (NRC 1990) and must take place over a long period of time because of the species' slow maturation.

Foraging: The reported prey of Kemp's ridleys include benthic crustaceans, fish and mollusks. Morreale and Standora (1992) found Kemp's ridley turtles feeding primarily on crabs in New York waters. In their tracking studies, they determined that Kemp's ridleys are sub-surface animals that frequently swim to the bottom. The generalized dive profile they developed showed the turtles spending 56% of their time in the upper third of the water column, 12% in the middle, and 32% on the bottom. In water shallower than 15 m (50 ft), the turtles would dive to depth, but spend a considerable portion of their time in the upper portions of the water column. In contrast, turtles in deeper water would dive to depth, spending as much as 50% of the entire dive on the bottom. Analysis of stomach contents of Kemp's ridleys stranded in Cape Cod Bay indicate that they are feeding on fish, sand dollars, bay scallops and blue mussels (Prescott 1982).

d. **Green sea turtle**

Population Information: Green sea turtles are most common in tropical waters. But, a stranded individual was recovered in Cape Cod Bay in 1980, providing the first positive proof of its occurrence north of Nantucket Sound (Prescott 1982). NMFS and FWS (1991) concluded that more information is needed to produce distribution maps or population estimates for this species. The increasing number of nests observed in recent years in Florida may be an effect of increased survey effort and not an actual increase in nesting females. Green turtle populations worldwide have been severely depleted due to threats and practices of exploitation that are largely unchecked (NMFS and FWS 1995). Although some U.S. populations appear to stable, fibropapilloma disease, which can be debilitating to turtles, has been found to infect as much as 92 percent of some populations.

Most of the individuals reported in U.S. waters are immature (Thompson 1988). Adults of this species do not migrate from their regular habitat except to visit the nesting beaches. It is most abundant in areas such as the U.S. Virgin Islands (Agardy unpubl.). However, green turtles have been observed in Delaware Bay by both DNREC and PSE&G, and the MMSC has reported 3 green turtle strandings since 1988 (ACOE 1995). A 38 cm green turtle captured, tagged and released in New York was recaptured almost one year later only 13 km from the original capture site. This suggests that, during developmental stages, turtles may return to the same productive areas of the northwest North Atlantic for several years before establishing residency as adults in more tropical seagrass beds (Morreale and Standora 1994).

The most severe threat to green sea turtles is the harvesting of adult and subadult turtles on nesting beaches and in the water (NMFS and FWS 1995). Another major threat to green sea turtle populations are from trawl and gillnet fisheries. In addition, extensive trade in the animals and their products still exists in some areas, and effectively wiped out the population around the Bermuda Islands. Other threats include the modification and destruction of nesting and foraging habitat, disease and predation.

Foraging: Although adult green turtles are herbivorous, immature turtles go through an omnivorous stage (1-3 years) and may be feeding on different food items than the preferred vegetation consumed by adults. Data from dietary studies of juvenile green turtles in New York indicated they were feeding primarily on algae (Burke et al. 1992). Known feeding habitats in the U.S. include shallow lagoons and embayments in Florida. Similar inshore feeding areas may also occur, to a lesser extent, elsewhere along the Atlantic coast.

As mentioned, adults do not travel far from their regular habitat except to nest. Consequently, they have evolved a territorial behavior on seagrass beds. Because of this behavior, large

tracts of sea grass beds are needed to support an adult population (Agardy unpubl.).

2. The following species are known to occur in the project area, but are only present as occasional transients:

a. Leatherback Sea Turtle

Population Information: NMFS and USFWS (1992) cite sources estimating the worldwide population for leatherback turtles at 115,000 adult females. Because of the pelagic lifestyle of these turtles, the logistics of obtaining population information is difficult. Consequently, most estimates come from observations of females on nesting beaches. CeTAP (1982) provides conservative estimates of peak average abundance at 361 (+/- 181) for Mid and North Atlantic regions of the continental shelf. Water depths at sightings averaged 243 m (797 ft), but most sightings were at depths of less than 60 m (197 ft). New England waters (north of Nantucket Lightship, out to the 200 mile limit, and north to Canadian waters) are said to contain the largest concentrations of leatherback turtles in the Atlantic (Lazell 1980).

Leatherbacks have been sighted occasionally in the waters of New Jersey and Delaware. Between 1976 and 1988, DNREC reported one leatherback stranding in Delaware Bay and four along the Atlantic coast of Delaware (ACOE 1995). The MMSC reported 87 leatherback strandings along the Atlantic coast of New Jersey and four in Delaware Bay between 1980 and 1988 (ACOE 1995).

Foraging: Jellyfish, particularly arctic jellyfish (Cyanea capillata), are the main component of the leatherback's diet. Jellyfish are cosmopolitan in colder oceans, from Gulf of Mexico and Florida northward (Lazell 1980). The turtles are probably following their prey north along the western Atlantic to the Gulf of Maine, Georges and Brown Banks in summer, then traveling south through the bays and sounds in the fall. Meduseans are probably found in largest numbers in somewhat sheltered gulfs, like the Gulf of Maine. Stomach content analysis has shown that siphonophores and salpae are also consumed (NMFS and USFWS 1992).

Surface foraging is the most commonly observed feeding strategy, but evidence of deep water siphonophores detected in stomach contents suggest deep water feeding (NMFS and USFWS 1992). Data on turtles during their internesting period presented by Keinath and Musick (1993) shows that leatherbacks spend little time at the surface. While actively swimming they probably submerge to depths of at least three body diameters. But they also make short surfacings, probably breathing or resting between. Eckert, et al. (1986) found in similar work that leatherbacks are active deep divers and dive patterns are similar to other pelagic divers such as seals, sea lions, and penguins; turtles dive

frequently and continuously with maximum dive times between 27.8 and 37.4 min. Diving depth and surface time were greater during the day.

b. Northern Right Whale

Population Information: The northern right whale is considered the most endangered of the large whales. The most recent estimate the North Atlantic population, based on photo identification work representing a nearly complete census, indicates a population size of 295 (Blaylock et al. 1995). The most recent data (1994) shows a current population growth rate estimated at 2.5% (Blaylock et al. 1995). The slow recovery of the population is most likely due to human interaction (fishery entanglement/ship strikes), habitat degradation and inbreeding affect (NMFS 1991).

Right whales found in the waters off New Jersey and Delaware are primarily transiting the area on their way to more northerly feeding and concentration areas in the Great South Channel, Cape Cod Bay and Browns/Baccarro Banks. In late winter and early spring, they begin moving north along the coast past Cape Hatteras and near the Long Island coast before passing through the Great South Channel. In the fall they will again pass New Jersey and Delaware coastal areas on their migration south to the calving grounds off Georgia and Florida. One record of a right whale traveling into northern areas of the Delaware River itself exists for 1995, but this is considered a rare and unusual out-of-habitat situation, given current population distribution theories.

In recent years, two to six northern right whales have been sighted off Long Island and New Jersey beaches. In February 1983, an animal stranded in New Jersey was identified as a two-year old northern right whale first identified in the Bay of Fundy in 1981 (NMFS 1991). However, Cape Cod and Massachusetts Bays are more important areas for right whales than the waters of New Jersey and Delaware.

Foraging: The right whale is planktivorous, feeding primarily on calanoid copepods (Wishner et al. 1988). Right whale distribution is generally patchy and is probably due to the patchy distribution of their preferred forage, Calanus finmarchicus. Most of the surface feeding observations (36) during the CeTAP study, 1978-1982, were from Massachusetts and Cape Cod Bays (CeTAP 1982).

c. Humpback Whale

Population Information: The total population of humpback whales in the North Atlantic west of Iceland was estimated as 5,543 between 1979-1990 (Blaylock et al. 1995). The annual rate of increase for the North Atlantic population is estimated at 9%, but is uncertain. It may be closer to 4%.

NMFS/Northeast Region (NER) entanglement database reports 64 records of entangled humpback whales from 1975-1992. Of 20 stranded animals examined for cause of death, Wiley et al. (1995) reports that six out of the 20 (30%) had major injuries attributable to ship strikes and five out of 20 (25%) were indicative of entanglement in fishing gear.

The distribution of humpback whales in the northwestern Atlantic has varied over time, and is probably a response to changing distribution of preferred food sources. Until recently, humpback whales in the mid-Atlantic were considered transients. Few were seen during aerial surveys in the early 1980's (Shoop et al. 1982). However, since 1989, sightings of feeding juvenile humpbacks have increased along the coast of Virginia, peaking in the months of January through March in 1991 and 1992 (Swingle et al. 1993). In concert with the increased sightings, strandings of whales have also increased in the mid-Atlantic during this time, with 32 strandings reported between Florida and New Jersey since January 1989. During the Philadelphia District's Endangered Species monitoring program in September 1992, humpback whales were sighted near Fenwick Island and Bethany Beach, Delaware (ACOE 1995).

Foraging: Humpback whales are primarily piscivorous and seem to select prey opportunistically. Humpback whales have not used New Jersey and Delaware historically as a feeding area, but are concentrated in Gulf of Maine waters most years opportunistically exploiting prey species such as sand lance, herring and mackerel. During the summers of 1992-1993, whales were most abundant in areas such as Cultivator Shoal, Northeast Peak on George's Bank, and Jeffreys Ledge (Blaylock et al. 1995).

E. ASSESSMENT OF IMPACTS

The impacts of dredging on shortnose sturgeon, sea turtles and whales have been discussed at length in the aforementioned Biological Opinions and others including the December 1995 Biological Opinion for Beach Nourishment Projects - South Shore of Long Island and Northern New Jersey Shore, Sandy Hook to Manasquan and the 1993 Biological Opinion for the dredging of the York River Entrance Channel, Chesapeake Bay. The information contained in these documents is incorporated herein by reference.

1. **Shortnose sturgeon**. With the limited information available, it is not possible to identify ecological patterns of all age-classes and sexes of the shortnose sturgeon population in the Delaware River. Although several studies have tried to identify the migratory pattern of the shortnose sturgeon in the Delaware River (O'Herron et al. 1993, Hastings 1987), a great deal of life history information is still lacking. More information on the juvenile ecology is needed to assess impacts to this portion of the population. Knowledge of the sex ratio of shortnose sturgeon as well as the distribution and movements of the males and females in the Delaware River would allow us to forecast more realistic levels of impact to the population.

Dredging in known shortnose sturgeon concentration areas and during peak use of these areas may affect the species and its habitat by entrainment in the hydraulic dredges (pipeline and hopper), disruption of migratory movements and the destruction of habitat/prey resources.

The biological assessment (ACOE 1995) states that neither construction of the Delaware River Main Channel Deepening nor the maintenance dredging activities in the southern reaches of the Delaware River, specifically from Philadelphia to the Sea, are of concern with respect to impacting shortnose sturgeon. Due to higher salinity levels, the shortnose sturgeon population is limited south of the Wilmington area to the sea. In addition, the Biological assessment states a "pollution zone" in the Delaware River near Philadelphia limits the use if the area by shortnose sturgeon and that it is probable that this section of the river is only used as a migratory route by adult shortnose sturgeon during the spring and late fall. Dissolved oxygen levels in the river are relatively low in this region of the river from May to October. This pollution zone begins to dissipate near Wilmington, Delaware. However, this pollution zone no longer exists as it formerly did because of controls on non-point source pollution. In fact, water quality in this section of the river has improved such that American shad (Alosa sapidissima) are able to swim past this area even in the early summer. As a result, the use of this area by shortnose sturgeon has increased (O'Herron pers. comm.).

In the upper tidal portion of the Delaware River, dredging operations are conducted by a contractor-operated hydraulic pipeline dredge, or sometimes a hopper dredge, and the material is disposed of in upland disposal sites. The ACOE proposes to dredge the Trenton to Newbold Island section of the river only during the months of September through February. However, the ACOE's 1986 Biological assessment states that due to the potentially hazardous river conditions in the winter months (December to February), dredging is usually scheduled during September to November in this section of the river. This is definitely the preferred time period to avoid impacts to

shortnose sturgeon. Recent work by O'Herron et al (1993) identified the Trenton to Newbold Island area, especially the channel area immediately off of Duck Island as an important overwintering site. Shortnose sturgeon overwinter in this area from November to March. Consequently, it is likely that sturgeon will be in the area during the proposed time of dredging (September to February), and they may be impacted by the dredging activities.

In mid-march of this year, three sub-adult shortnose sturgeon were found in a dredge discharge pool on Money Island, near the Newbold Island range of the Delaware River adjacent to Tullytown, Pennsylvania. Two dredges were working simultaneously in the Newbold Reach during February. The hydraulic dredge *Osark* ceased operation in this reach on February 24, and moved to the Raritan - Duck Island Range from March 1 to 15. The hopper dredge *RV Weeks* also worked in the Newbold Range during February until moving below the Kinkora Range on February 29. 1996. The dead sturgeon were found in the side of the spoil area into which the hydraulic pipeline dredge was pumping. The hopper dredge which was pumping its contents into the other side of the spoil area. Therefore, it is probable that the shortnose sturgeon were taken by the pipeline dredge sometime in late February. The fish were necropsied, but were too decomposed to determine if they were alive or dead prior to going through the pipeline. However, the presence of large amounts of roe in two specimens would infer that the fish were alive and in good condition prior to entrainment. These takes confirm the results of several studies of shortnose sturgeon movements including O'Herron et al. (1993) regarding the presence of shortnose sturgeon in this region, and their susceptibility to entrainment during the winter months.

The available data suggested that shortnose sturgeon are present between Trenton and Newbold Island most of the year. Hastings (1983) studied the distribution of shortnose sturgeon before, during and after maintenance dredging by the ACOE in the Delaware River in the fall of 1983. Based upon attempted catches made in the vicinity of the dredge site, Hastings found that shortnose sturgeon were temporarily displaced from the concentration areas.

The migratory movements of shortnose sturgeon in the Delaware River could be disrupted by dredging during the peak upstream migration period. In March, shortnose sturgeon begin moving from their overwintering grounds upstream to spawn. Spawning occurs in the Scudders Falls region in late March to early April. In accordance with the Coop.'s dredging restrictions (1994), the ACOE proposes to dredge hydraulically only between September and February. This dredging window will minimize disruption of shortnose sturgeon migration and spawning.

The removal of benthic food sources is another potential impact to shortnose sturgeon that may result from dredging. As

previously stated, Corbicula appears to be the primary food source of shortnose sturgeon in the Delaware River. Benthic sampling done by O'Herron and Hastings (1985) in association with past ACOE maintenance dredging in the Delaware River found that Corbicula recolonized the dredged areas. However, the post-dredge individuals collected were smaller than pre-dredge individuals, and provided less biomass. O'Herron (pers comm) suggests that food resources do not have sufficient time to recover during the current dredging interval and suggests that the dredging schedule should be revised as further information becomes available.

2. **Sea turtles**. The sea turtle recovery plans identify the impacts of dredging as both the direct destruction or degradation of habitat and incidental take of sea turtles. Since dredging involves removing the bottom material down to a specified depth, the benthic environment could be severely impacted by dredging operations. Hopper dredges are known to entrain sea turtles, while impacts to sea turtles from cutterhead pipeline, clamshell bucket, and similar dredges that are usually stationary or extremely slow moving and involve dropping a bucket on a single point for extended periods of time, have not documented impacts in the northeast. A dust pan dredge has also been used for beach nourishment projects in the Philadelphia District. The effects of the this type of dredge on sea turtles is unclear, although based on observation and the information available, it appears that this type of dredge is not likely to entrain sea turtles due to its slow forward movement and low suction power. In the Philadelphia District, the majority of the dredging is performed by hydraulic pipeline or bucket dredge. Hopper dredges are most likely to be used only for beach nourishment projects and the maintenance and deepening of the lower portion of the Delaware River Main Channel. This is where impacts to sea turtles are most likely to occur. Work in the inlets, back bays and rivers within the Philadelphia District is generally accomplished using a hydraulic pipeline dredge.

While there is a greater risk of lethal and non-lethal impacts as a result of ship strikes from increases in boat and barge traffic as a result of multiple dredging projects, the small size of the chelonid turtles using the waters of New Jersey and Delaware makes them unlikely to be susceptible to commercial vessel traffic. Leatherbacks are transient in Philadelphia District waters, and the potential for impacts from any additional vessel/barge traffic created by these projects is low.

From 1979 - 1988, boat kills (predominantly small speed boats) represented the most prevalent human-related cause of death for turtles in the waters of New Jersey and Delaware, followed by impingement in intake systems for power plants, entanglements in fishing gear and ingestion of plastics. These projects are not expected to increase recreational vessel traffic.

Although dredging has not been implicated as a major cause of death or injury to sea turtles in the Northeast, several turtles have been taken by hopper dredges in the Philadelphia District over the last several years. In August 1993, endangered species observers on the ACOE's hopper dredge *MACFARLAND* reported two incidences involving loggerhead turtles taken offshore of Cape May by the dredge. However, the on-board observers were unable to determine if one or two turtles were taken by the dredge due to the obscurity of parts recovered. (ACOE 1995). During the summer, 1994, dredging of the federal navigation channel in Delaware Bay, the ACOE initiated its "Protective Relocation and Assessment of Sea Turtle Abundance Program" in response to the taking of two loggerheads during the early stages of the dredging. During the course of the turtle relocation program, eight loggerheads were captured and relocated and one loggerhead was taken by the dredge. Only one of the loggerheads captured through this program could be classified as an adult with the remaining seven classified as juveniles (ACOE 1995). Despite the relocation efforts, one loggerhead turtle was taken by the dredge on June 22, 1994. A juvenile loggerhead was also taken by a hopper dredge working in lower Delaware Bay on November 3, 1995.

A definite seasonal window exists for the presence of turtles in the New Jersey and Delaware waters that extends from the first of June through the end of November. Cold-stunned turtles are known to occur into December in some years. However, any work to be performed using offshore borrow sites off the New Jersey and Delaware coasts, and in the lower portions of Delaware Bay may not be feasible during the winter months due to the vagaries of winter weather. Rough seas in these areas preclude operations during a large portion of the winter months. Thus, the possibility of impacts during the season when turtles are present is clear.

Sea turtles in New Jersey and Delaware waters are mostly subsurface animals, foraging in the shallows or the edges of channels during summer. Most sea turtles found in waters deeper than 15m in New York waters were swimming to or from another location as opposed to being resident. In New York, turtles found in waters deeper than 15 meters spent more time on the bottom, surfacing less often. The reason for this is probably because they are occupying New York waters as important feeding habitat for growth and development--these resources are predominantly found in the benthic zone in shallower waters but also occur along channel edges and at some of the offshore borrow areas as indicated by observer data from dredge loads (discussed below). It is likely that New Jersey and Delaware waters also provide similar foraging and development habitat for sea turtles. However, little is known about the specific distribution and habitat use in this area. Studies are currently being conducted to improve knowledge of the population (Plotkin, pers comm).

Because turtles may stay on the bottom and surface infrequently in areas with water depths greater than 15 meters, they are susceptible to entrainment by dredges operating in some channels and borrow areas. In addition, Morreale and Standora (1994) found that turtles mostly rested on the bottom at night. This also increases their susceptibility to entrainment because many hopper dredges operate 24 hours an day.

As mentioned, the chelonid turtles studied in New York rarely dove deeper than 15 m (50 ft) while feeding. Although leatherbacks dive to much greater depths they are unlikely to interact with dragheads because they are feeding in the water column. The same evidence suggests that when the chelonid turtles do dive deeper (>15 m (50ft)), they are more likely to spend a considerable amount of time on the bottom, surfacing infrequently. Chelonid turtles also make use of deeper, less productive channels as resting areas that afford protection from predators because of low energy, deep water conditions. In addition, these species may be in transit through the borrow areas at any time. All these species characteristics could place them in the path of the dredge.

In addition to entrainment, the destruction of habitat is also a threat to sea turtles in New Jersey and Delaware waters. Researchers note that an important concern is the need to protect benthic food resources within the shallow embayments that serve as feeding grounds (Morreale and Standora 1994). A report completed on "Use impairments and ecosystem impacts of the New York Bight", by the State University of New York (unpublished), concluded that preservation of "prime" feeding grounds of sea turtles inhabiting the Bight was one of the "most important ecological aspects to consider when evaluating a program to clean up the Bight." Therefore, impacts to the benthic environment are of primary importance in management of dredging (i.e. preconstruction surveys, observer reports) projects in these areas.

The biological assessment states that within the typical borrow area, and most federally maintained inlets, the physical and oceanographic regime and its related lack of abundant food resources make it highly unlikely that turtles would remain any longer that it takes for them to travel through the area. However, data from the observer reports included in the Final Environmental Assessment, Emergency Beach Closure, Westhampton Beach, NY, February 1994 (ACOE 1994) show that offshore borrow areas are not always devoid of organic materials. Fauna samples taken at the site include searobins, flounder, blue crabs, spider crabs, clams, whelks, puffers, eels, tounguefish, horseshoe crabs. In fact, almost every load had crabs, a preferred forage for loggerhead and Kemp's ridley sea turtles. Observer reports from a beach nourishment project Cape May, New Jersey in 1992, and from the ACOE's maintenance dredging of the Delaware River

Main Channel show that dredge loads from some portions of the Main Channel and at the Cape May borrow site contained horseshoe crabs, spider crabs, blue crabs, skates, whelks, flounder and clams. In addition, stranding data attests to the presence of turtles in New Jersey and Delaware waters at least as late as November. These reports indicate that benthic resources do exist in some of the borrow areas and navigation channels, that turtles may make use of deeper water (>15 m) for resting or foraging, and that some turtles take up residence in shallow bays, but others have been shown to frequently transit the New Jersey and Delaware area during the spring, summer and fall. Finally, as mentioned, sea turtles have been taken in dredge operations in the navigation channels in Delaware Bay, primarily in early summer.

Morreale and Standora (1994) have also provided evidence that sea turtles occupy narrow corridors in their north-south migratory movements that have important management implications. Unfortunately, these routes take them close to shore which is where the impacts from growing human populations and associated activities are most severe.

Because of their deep water, offshore existence and the fact theat they are feeding in the water column makes it unlikely that leatherbacks will interact with the draghead. Leatherback sea turtles are susceptible to vessel strikes. However, since leatherbacks are primarily transitory in the projects action areas, and the fact that the vessels are usually traveling at reduced speeds, it is unlikely that leatherbacks will interact with these dredging/disposal/beach nourishment activities.

3. **Marine mammals**: Vessel strikes are a major factor contributing to injury and mortality of the endangered whales. The majority of these interactions are with vessels traveling at rapid speeds or with reduced maneuverability due to their size (for example, commercial shipping). Impacts to whales could occur while barges and related vessels are in transit to or from the offshore borrow areas particularly at night. However, no injuries or mortalities from dredging operations including vessel traffic associated with dredging operations for beach nourishment projects have been reported for the New Jersey/Delaware. As mentioned, the use of the waters off of New Jersey and Delaware by whales are limited to occasional transients on their migratory routes, that do not remain for extended periods of time. Although vessel strikes with whales as a result of the proposed action are highly unlikely, dredges and vessels could affect whales by changing their behavior or movements. Therefore, operators should follow the procedures set forth in the Conservation Recommendations section (Part I, No. 9) in areas and during the time of year when whales may be present.

F. CUMULATIVE EFFECTS

"Cumulative effects" are defined in 50 CFR §402.02 as 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.

In addition to dredging activities, Delaware River shortnose sturgeon are also threatened by other activities including habitat alteration especially in the spawning grounds. Sport fishing activities in the Delaware River and poor water quality in the industrialized portions of the river may also impact shortnose sturgeon.

State-regulated fishing activities, ship strikes, and ingestion of plastic debris and other pollutants, are known to cause injury and mortality to sea turtles. Various disease vectors such as fibropappiloma disease and impacts on nesting beaches including development and public use also limit sea turtle populations throughout their range.

While the combination of these activities may affect populations of endangered shortnose sturgeon and endangered and threatened sea turtles, preventing or slowing a species' recovery, the magnitude of these effects is currently unknown.

Vessel strikes are cited as a major component of injury and mortality for endangered marine mammals in the Recovery Plans for northern right whales and humpback whales. Efforts to prevent these occurrences are vital to recovery of these species.

G. CONCLUSIONS

1. Shortnose Sturgeon: Since shortnose sturgeon are known to overwinter between river km 190 and 210, especially in the Duck Island to Newbold Island region of the Delaware River, and because it is probable that the three shortnose sturgeon found in a dredge material disposal site in mid-March of this year, were taken by a dredge, dredging in the Delaware River may adversely affect shortnose sturgeon. However, due to the limited scope and frequency of the dredging in most years during the time periods of concern, and to the ACOE's use of the Coop.'s seasonal restrictions to reduce impacts to shortnose sturgeon spawning and migration, dredging in the Delaware River may affect but are not likely to jeopardize the continued existence of the species.

2. Sea Turtles: For the beach nourishment and some federal navigation channel maintenance projects, winter weather constraints and the logistics and economics of mobilizing large scale projects make seasonal restrictions impossible. Therefore, dredging may occur during the time when sea turtles are present

in substantial numbers in New Jersey and Delaware waters. The type of dredges to be used varies and includes hopper dredges.

The use of hopper dredges during the season when turtles are present in New Jersey/Delaware waters (June through November) may adversely affect sea turtles, but will not jeopardize the continued existence of any of the endangered or threatened sea turtle species. Unlike the information available for southeastern Atlantic dredging operations (Georgia--Florida), dredging in Philadelphia District waters has not been implicated as a major cause of death or injury to sea turtles. However, several sea turtles were taken by a hopper dredge during the maintenance dredging on the Delaware River federal navigation channels in the summers of 1993 and 1994. Therefore, special management considerations (i.e. observer coverage, deflector draghead) are necessary to monitor, reduce, and identify potential takes that may occur during those months.

3. Marine mammals: The borrow areas and navigation channels in the project area are located in areas where whales are primarily transitory. Dredge operations do not represent one of the major threats to these species in the Northeast. Injury or mortality associated with dredging associated vessel traffic has not been reported for the Philadelphia District, although it is possible that operations could cause changes in behavior and movements. In addition, project borrow areas are located near the beach nourishment sites and the associated vessels travel at low speeds. Therefore, although these projects may adversely affect listed whales, interactions are expected to be minimal in the project area.

In summary:

(1) dredging with hopper dredges may adversely affect, but is not likely to jeopardize, sea turtles in New Jersey/Delaware waters during the season of their abundance (June through November). Dredges other than hopper dredges are not likely to adversely affect sea turtles as long as preconstruction borrow area sampling is conducted to determine if benthic resources will be seriously impacted.

(2) hydraulic dredging may adversely affect shortnose sturgeon, but is not likely to jeopardize shortnose sturgeon in the Delaware River provided the seasonal restrictions developed by the Coop. And the conditions of the ITS are met.

(3) dredging activities may adversely affect endangered whales, but interactions in the project area are expected to be rare.

H. REINITIATION OF CONSULTATION

Reinitiation of consultation is required if (1) the amount or

extent of taking specified in the incidental take statement is exceeded; (2) new information reveals effects of this action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the identified action is subsequently modified in a manner that causes an effect to the listed species that was not considered in the biological opinion, or (4) a new species is listed or critical habitat designated that may be affected by the identified action.

I. 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 an additional 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 . . . ."

In addition to protecting nesting beaches, which has been the area where most conservation funds and efforts have gone, protecting these important developmental and foraging habitats for sea turtles, such as the northeast, should be equally reflected in management activities of federal agencies. This is part of the ESA mandate to federal agencies and is reflected in recovery plans for these species. As suggested earlier, Crouse et al. (1987) developed a population model of the loggerhead which suggests that the key to recovery of this species is in reducing mortality in later stages of life, particularly large juveniles; juveniles represent a significant component of the life stages of sea turtles inhabiting the waters of New Jersey and Delaware.

NMFS recommends that the following conservation measures be implemented to further reduce adverse effects of dredging projects on endangered shortnose sturgeon and endangered and threatened sea turtles and marine mammals.

1. If it is determined that a hopper dredge must be used for a particular dredging project in the Atlantic coastal waters of New Jersey and Delaware, and in Delaware Bay, dredging between June 1 and November 30 should be avoided to reduce the potential for impacts to sea turtles.

2. Continue to follow the seasonal dredging restrictions developed by the Delaware River Fish and Wildlife Management Cooperative for protection of shortnose sturgeon and other anadromous fish.

3. In addition to the Coop's seasonal restrictions, hydraulic dredging, including hopper dredging in the Delaware River from the Kinkora range to Trenton should be avoided during the months of November to February.

4. For projects using dredges other than hopper dredges in sea turtle habitat, pre-construction sampling of the borrow area should identify any important forage resources that may be available to sea turtles. Observer coverage on hopper dredges will document these resources, but without observers onboard these other dredge types, the only information that will be

available on habitat impacts will be from pre-sampling.

5. Support future research to determine age structure and sex ratio of the shortnose sturgeon population in the Delaware River. Age classes represented in the concentration areas in the upper tidal river need to be determined.

6. Support future research to define significant habitat for shortnose sturgeon in the Delaware River and more accurately determine the timing of sturgeon movement within the River.

7. Re-evaluate the need to conduct maintenance dredging in the Newbold Island to Trenton region of the river under the current schedule. Insure that the forage base has adequate time to recolonize. Studies should determine what interval will best protect these resources and you may want to cooperate with the Coop. in this effort.

8. Use the WES rigid deflector draghead during the time when sea turtles may be present. Research to eliminate the technical deficiencies on effective use of the WES rigid deflector draghead design must precede operational use in areas where they are prohibitive . This has also been recommended in a Biological Opinion for ACOE dredging projects in the Southeast region. Increasing the flexibility of the draghead and training dredge operators to ensure its effectiveness are important steps to decreasing dredge-turtle interactions.

9. Dredges and vessels should not intentionally approach whales or leatherback sea turtles closer than 100 feet when in transit. If listed species are present within a distance equal to 500 yards, then speed should be reduced to 5 knots or less unless precluded by safety considerations. Currently, the NMFS is proposing a rule which would require all vessels to not intentionally approach right whales within 500 yards. The NMFS is working with the US Coast Guard to establish a detailed protocol regarding approaches to whales by January 1, 1997. Unless positively identified as another whale species, any large whale should be considered a suspected right whale especially if one has been recently sighted by the vessel, or if the vessel is in an area where right whales could be present. The advice of the onboard NMFS-approved observer, if present, should be followed at all times when operating around listed species

10. Maintain a database mapping system to create a history of use of the geographic areas affected and endangered/threatened species presence/interactions on which to base future management decisions.

11. Should any interactions resulting in death or injury of a non-listed marine mammal occur, all dredge operators should be instructed to immediately contact **for New Jersey** the Marine

Mammal Stranding Center, P.O. Box 773, Brigantine, NJ (Bob Schoelkopf (609)266-0538), **for Delaware** the Delaware Department of Natural Resources and Environmental Control, (Leon Spence (302)739-4782) and the NMFS stranding coordinator (Pat Gerrior (508)495-2264).

J. INCIDENTAL TAKE STATEMENT

Section 7(b)(4) of the ESA requires that, when a proposed agency action is found to be consistent with section 7(a)(2) of the ESA and the proposed action may incidentally take individuals of listed species, NMFS must issue a statement that specifies the impact of any incidental taking of endangered or threatened species. The ESA also states that reasonable and prudent measures, and terms and conditions to implement the measures, necessary to minimize such impacts, be provided. Only incidental taking resulting from the agency action, including incidental takings caused by activities approved by the agency, that are identified in this statement and that comply with the specified reasonable and prudent alternatives, and terms and conditions, are exempt from the takings prohibition of section 9(a), pursuant to section 7(o) of the ESA.

For projects in the Philadelphia District, the anticipated incidental take by injury or mortality is as follows:

three (3) shortnose sturgeon; and

four (4) loggerhead, or one (1) Kemp's ridley or green sea turtle.

No takes resulting in injury or mortality of endangered marine mammals are expected. Therefore, no incidental take for marine mammals is authorized.

Consultation must be reinitiated if the take level for any one species is exceeded. However, to ensure continued compliance under section 7(a)(2) of the ESA, it would be prudent for the ACOE to reinitiate consultation before the anticipated incidental take level is exceeded to avoid operating in violation of section 9 of the ESA. Therefore, NMFS recommends that when actual take reaches two (2) shortnose sturgeon, three (3) loggerhead, or one (1) Kemp's ridley or green sea turtle, ACOE should contact NMFS, Northeast Region to determine if further management measures are necessary to reduce the probability of take, or if consultation should be reinitiated. NMFS has identified the following reasonable and prudent measures and terms and conditions as necessary to minimize the impacts of dredging projects on shortnose sturgeon and sea turtles:

1. Dredging in the Delaware River must be done in accordance

with the seasonal restrictions developed by the Coop. Extensions of the Coop's seasonal dredging restrictions for the Kinkora to Trenton range of the Delaware River will not be granted.

2. In addition to the Coop's seasonal restrictions, hydraulic dredging, including hopper dredging, in the Delaware River from the Kinkora to Trenton range should be avoided from November to February. If a hopper dredge is used in this range during November through February, qualified endangered species observers must be onboard. If a cutterhead pipeline dredge is used in this range during November through February, weekly inspections of the disposal site must be made.

3. If hopper dredges are used in the Kinkora to Trenton range of the Delaware River from November through February:

(a) onboard endangered species observers must be employed to document any incidental take of shortnose sturgeon.

(b) the dredge must be equipped with screening and baskets to monitor the intake and overflow of dredged materials for shortnose sturgeon and their remains. Every effort must be made to collect sturgeon parts which travel through the hopper and exit in the overflow material. Inflow screening is recommend.

(c) weekly reports must be submitted to NMFS detailing any incidences with shortnose sturgeon. An annual report must be submitted within 30 working days of project completion summarizing impacts on shortnose sturgeon.

4. If a pipeline dredge is used in the Kinkora to Trenton Range of the Delaware River from November through February, weekly inspections must be made of the spoil pile to look for evidence of entrained shortnose sturgeon. Weekly reports should be submitted as stated above.

5. If a hopper dredge is used to accomplish the dredging during the months of June through November, the ACOE, in its permit issuance, must adhere to the attached "Monitoring Specifications for Hopper Dredges" with trained sea turtle/marine mammal NMFS-approved observers, approved by NMFS in accordance with the attached "Observer Protocol" and "Observer Requirements (Appendix A)." Data must be submitted to NMFS upon completing construction.

6. The following sea turtle handling techniques must be employed by all permit holders:

Any endangered or threatened sea turtle incidentally taken must be handled with due care to prevent injury to live specimens, observed for activity, and returned to the water as provided in the sea turtle regulations (50 CFR Part 227.72(e)(1)(I)).

Specifically these measures include the following:

(a) Live animals must be handled with care and released as soon as possible without further injury.

(b) Animals are to be released when the vessel is in neutral and only in areas where they are unlikely to be recaptured or injured by vessels.

(c) Comatose sea turtles should be resuscitated according to the procedures set forth in 50 CFR 227.72 (e)(1)(I)(B) and provided in Appendix B.

(d) Dead sea turtles may not be consumed, sold, landed, offloaded, transshipped or kept below deck.

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APPENDIX A

Monitoring Specifications for Hopper Dredges

I. EQUIPMENT SPECIFICATIONS

A. Baskets or screening must be installed over either the hopper inflows or overflows with openings of approximately 4 inches by 4 inches to provide 100% coverage of all dredged material and shall remain in place during all dredging operations between June 1 and November 30 of any calendar year.

B. Suction pumps on the dredge should not be activated until the dragheads are in the sediment, and will be turned off before the dragheads are raised.

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

D. Sufficient time must be allotted between each dredging cycle for the NMFS-approved observer to inspect the baskets and screens for sea turtles and/or turtle parts and document the findings.

II. OBSERVER PROTOCOL

A. A NMFS-approved observer with demonstrated ability to identify sea turtle species and marine mammals must be placed aboard the dredge(s) being used; starting immediately upon project commencement to monitor for the presence of sea turtles and/or sea turtle parts being pulled into the hopper during dredging operations and marine mammals in the vicinity of dredge and disposal operations.

B. One NMFS-approved observer is to be onboard for the first week of dredging and subsequent shifts would proceed one week on and one week off duty until project completion or mid-November, 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 one dredging cycle with 25% of total dredging time having been monitored by observers. Observer data will be evaluated after the first cycle of dredging to determine if monitoring is necessary for the next cycle of dredging (not to be confused with loading cycle).

C. During the required inspection coverage, the trained sea turtle/marine mammal NMFS-approved observer shall inspect the galvanized screens at the

completion of each loading cycle for sea turtles or sea turtle parts. Observation sheets and major incident reports shall be prepared by the observer using a format approved by NMFS (copy attached). The observation sheet shall be completed for each loading cycle, whether sea turtles/marine mammals are present or not. Weekly reports including all completed load sheets and relevant incident reports, as well as a final report, are to be submitted to the attention of Laurie Silva, NMFS, Habitat and Protected Resources Division, One Blackburn Drive, Gloucester, Massachusetts 01930 and the Regulatory Branch of the Philadelphia Corps of Engineers within seven days of completion of each observation period.

D. For each sighting of an endangered or threatened marine species, record the following information (the attached "Daily Whale Reporting Form" can be used for marine mammals):

(1) Date, time, coordinates of vessel
(2) Visibility, weather, seastate
(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. If any parts or whole turtles are taken incidental to the project(s), Laurie Silva [(508)281-9291] or Kim Thounhurst [(508)281-9138] must be contacted within 24 hours of the take. Any dead sea turtles or turtle parts taken shall be placed in plastic bags and labeled to note location, load number, 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 or sea turtle parts will be determined by NMFS. Live, uninjured or live, injured turtles will be held onboard the dredge until such time as the trained NMFS-approved observer decides that the turtle is ready for release away from the dredge site, or should be transported to the appropriate stranding network members **(for New Jersey)** the Marine Mammal Stranding Center, P.O. Box 773, Brigantine, NJ (Bob Schoelkopf (609)266-0538) for rehabilitation, and **(for Delaware)** the Delaware Division of Natural Resources and Environmental Control (Leon Spence (302)739-4782).

Any marine mammal injuries or mortality should be reported immediately to the appropriate stranding network member listed in the preceding paragraph **and** NMFS stranding network coordinator, Kim Thounhurst at (508)281-9138.

APPENDIX A (I)

INCIDENT REPORT OF SEA TURTLE MORTALITY AND DREDGING ACTIVITY

Species _____ Date _____ Time _____
Geographic site _____
Location: Lat/lon _____ (decimal format)
Vessel name _____
Type of dredging activity _____
Load # _____
Sampling method _____
_____
Location specimen recovered _____
_____

Draghead deflector used? ___ YES ___ NO

Condition of Deflector _____
_____

Rigid Deflector Draghead? ____ YES ____ NO

Weather conditions _____
_____

Water temp: Surface _____

Head width _____ Plastron length _____
Carapace S.L. length _____
Carapace S.L. width _____
Carapace O.C. length _____
Carapace O.C. width _____
Condition of specimen _____
_____

Turtle tagged __ YES __ NO
Tag # _____ Tag Date _____

Comments/other _____
_____
_____
Observer's signature _____

APPENDIX A (II) ENDANGERED SPECIES OBSERVER FORM

Daily Report

Date: _____ / _____ / _____

Weather conditions: _____

_____

_____

Water temperature: surface _____ Below mid depth_____

____

Condition of screening apparatus:_____

_____

_____

_____

Incidents involving endangered or threatened species ? (Circle) Yes No
(If yes, turtle, fill out incident report; if whale, describe below))

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

_____

_____

_____

_____

_____

_____

_____

Bridge Watch Summary

Species	# of Sightings	# of Animals	Comments

APPENDIX A (III). Guidelines for NMFS, Northeast Region, Approval of Endangered Species Observers for ACOE Dredge Projects

Skill Sets

I. If sea turtles are likely to be present, observers must be able to:

A) identify sea turtle species and recognize the morphological differences between sea turtle species.

B) handle live sea turtles and be knowledgeable of holding and release procedures.

C) take standard field measurements of samples.

D) observe and advise dredge operators on the appropriate screening of the dredge's overflow, skimmer funnels and dragheads for turtles (if hopper dredges might be employed).

II. If shortnose sturgeon are likely to be present, observers must be able to:

A) identify shortnose sturgeon and understand the morphological difference between shortnose and Atlantic sturgeon.

B) handle live shortnose sturgeon and be knowledgeable of holding and release procedures.

C) take standard field measurements of samples (total length and fork length).

D) observe and advise dredge operators on the appropriate screening of the dredge's overflow, skimmer funnels and dragheads for sturgeon (if hopper dredges might be employed).

III. If whales are likely to be present, observers must be able to:

A) identify endangered whale species that may be encountered during project operations.

B) discern whale behaviors, such as milling, traveling, and feeding.

C) demonstrate knowledge of individually distinctive markings on humpback and right whales for identification purposes.

Observer Credentials

Certain credentials and experience might indicate an observer has the skills listed above. Ideally, the applicant will have educational background in marine biology, general experience aboard dredges, and hands on field experience with the species of concern.

A person who does not have a college degree in marine biology or a related field may be qualified as an observer if she/he has successfully completed an approved endangered species dredge observer training program (item 3a), *and* has twice the experience identified as necessary in items (3b), (3c), and (3d).

1. EDUCATION: *College degree (BS or higher) in marine biology or a related field, **and**

2. DREDGE/AFLOAT EXPERIENCE:

   a) For shortnose sturgeon or sea turtle observers: Work for a minimum of one week in any capacity aboard dredges of the same type as those to be used in the proposed project, **or**

   b) For large whale observers: Work for a minimum of two months as a *naturalist* or *wildlife guide* aboard an active whale watch vessel or other vessel primarily engaged in the observation of large whales in the wild, **and**

3. FIELD EXPERIENCE AND EQUIVALENTS

   a) Successful completion of an approved endangered species dredge observer training course, **or**

   b) Documented field research focused on the species or its habitat, **or**

   c) Work for a minimum of four months as an endangered species observer-in-training aboard dredges that have interacted with the species in question, **or**

   d) Active involvement for a minimum of one year in organized responses to protected species stranding events where sea turtles and marine mammals are identified and handled.

Note: If dredge operations are likely to interact with more than one group of protected species, the observer must demonstrate that he/she has all of the respective skill sets. For example, if channel maintenance dredging is conducted in turtle habitat and the dredged material is dumped in the offshore habitat of whales, the observer should meet the criteria listed in section I AND III above.

APPENDIX B

Sea Turtle Resuscitation Techniques

50 CFR ∝227.72 (e)(1)(I)(B)

(B) Resuscitation must be attempted on sea turtles that are comatose or inactive but not dead by:

(1) Placing the turtles on its back (carapace) and pumping its breastplate (plastron) with hand or foot; or

(2) Placing the turtle on its breastplate (plastron) and elevating its hindquarters several inches for a period of 1 up to 24 hours. The amount of the elevation depends on the size of the turtle; greater elevations are needed for larger turtles. Sea turtles being resuscitated must be shaded and kept wet or moist. Those that revive and become active must be released over the stern of the boat only when trawls are not in use, when the engine gears are in neutral position, and in areas where they are unlikely to be recaptured or injured by vessels.

DELAWARE RIVER RANGES
DELAWARE BAY TO DELAWARE MUM ALL AREAS
DELAWARE MEMORIAL BR. TO BETSY FEDERAL CHANNEL AND ANCHOR NON-FEDERAL AREAS
BETSY ROSS BR. TO KINKORA RANGE FEDERAL CHANNEL AND ANCHOR NON-FEDERAL AREAS
KINKORA RANGE TO TRENTON FEDERAL CHANNEL AND ANCHOR NON-FEDERAL AREAS
TRENTON TO DELAWARE WATER GA ALL AREAS
DELAWARE WATER GAP TO FORT JER ALL AREAS
FORT JERVIS TO B & W BRANCHES ALL AREAS

DELAWARE RIVER RANGES
DELAWARE BAY TO DELAWARE MUI ALL AREAS
DELAWARE MEMORIAL BR. TO BETS ALL AREAS
BETSY ROSS BR. TO KINKORA RANG ALL AREAS
KINKORA RANGE TO TRENTON ALL AREAS
TRENTON TO DELAWARE WATER G ALL AREAS
DELAWARE WATER GAP TO FORT J ALL AREAS
FORT JERVIS TO B & W BRANCHES ALL AREAS

* Dredging Permit Applicati
restrictions may be imple