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April 9, 1997

Endangered Species Act - Section 7 Consultation

(6)

Interim Biological Opinion

Agency: U.S. Army Corps of Engineers, South Atlantic Division

Activity: The continued hopper dredging of two channels and two borrow areas in the southeastern United States during 1997

Consultation Conducted By: National Marine Fisheries Service, Southeast Regional Office

Date Issued: _____

Background

Hopper dredging in channels and borrow areas along the southeastern coast of the United States during the spring of 1997 has resulted in an unanticipated high rate of sea turtle takes, rapidly approaching the incidental take level established in the Regional Biological Opinion (BO) issued to the Army Corps of Engineers (COE) on August 25, 1995. The 1995 BO contains a complete discussion of the history of Endangered Species Act (ESA) Section 7 consultations on the use of hopper dredges to maintain the depths of southeastern channels and is incorporated by reference. That BO established an annual documented incidental take level of seven (7) Kemp's ridleys, seven (7) green turtles, two (2) hawksbills, twenty (20) loggerhead turtles, and five (5) shortnose sturgeon taken by injury or mortality. Reinitiation of consultation was prescribed if more than one turtle was taken in any day, or five were taken in any one channel. Additionally, reinitiation of formal consultation was required if 75 percent of the incidental take limit was reached to ensure that the agencies were consulting when take levels were high and to reduce the likelihood of exceeding the incidental take level. The National Marine Fisheries Service (NMFS) identified its intention to cooperate with COE to review incidences of rapid takes to determine whether further mitigation measures or dredging activity needed to be terminated for some channels.

Although no endangered sea turtles have been taken in any channel dredging projects to date during 1997, 19 loggerheads have been

killed. Nine of these takes occurred in Kings Bay in just 10 days, including three takes on one day, after COE specialists reconfigured the draghead deflector. Relocation trawling was attempted, but two additional takes occurred on the day following the initiation of trawling. COE had been in constant contact with NMFS in reaching the decision to continue dredging in Kings Bay while attempting to identify and resolve any problems contributing to the high take level. In addition to these takes, one loggerhead was taken in Brunswick Channel, three in Savannah Harbor and five in Charleston Harbor. The primary causes of the rapid take rate during 1997 appear to be the abundance of sea turtles in nearshore and inshore waters earlier than usual due to the mild winter and the reduced efficacy of the draghead deflector under some dredging conditions.

1991 Biological Opinion

Two hundred twenty-five sea turtle takes, including 22 live turtles, were documented between 1980 and 1990 in the Southeast channels despite limited observer coverage in most channels throughout most of that decade. Seventy-one of these turtles were taken in four months of dredging in the Canaveral ship channel in 1980, the first year in which observers were required. Twenty-one were observed in over two years of dredging in the Kings Bay Channel in 1987-1989, after observers were first deployed on dredges in that channel. Further observations of dredging in Brunswick and other Southeast U.S. channels indicated that sea turtles were vulnerable to hopper dredges in all southeastern channels during warmer months. These observations resulted in the Section 7 consultation that concluded with a BO issued on November 25, 1991.

The November 1991 BO was the first Division-wide consultation between NMFS and COE's South Atlantic Division (SAD). The 1991 Opinion found that continued unrestricted hopper dredging in Southeast U.S. channels could jeopardize the continued existence of listed sea turtles. The Opinion established a reasonable and prudent alternative to unrestricted hopper dredging which prohibited the use of a hopper dredge in the Canaveral ship channel, and from April 1 through November 30 in other southeastern channels north of Canaveral. An incidental take level was established based on assumptions that takes would be significantly reduced due to the limited dredging windows, but water temperatures in some years would result in turtle presence in channels during December and March. Observers were required to accompany dredges equipped with outflow and/or inflow screening in March and December. The presence or absence of turtles in December would determine the further need for observer

coverage into January. The documented incidental take of a total of five (5) Kemp's ridley, green, hawksbill or leatherback turtle mortalities in any combination of which no more than two (2) are Kemp's ridley, or fifty (50) loggerhead turtle mortalities was set. The Opinion anticipated that seasonal restrictions on hopper dredging would be adjusted on a channel-by-channel basis as better information on turtle occurrence was collected. Additionally, the development and testing of a draghead deflector was promoted.

Between 1992 and 1995, only 14 sea turtle takes were documented, including three that were alive when collected during dredging operations in the SAD under the dredging windows established in the November 1991 BO. Additionally, during that period COE developed a rigid draghead deflector that appeared to be effective during videotaped dredging trials using mock turtles, as well as during experimental dredging associated with trawling in the Canaveral Channel. COE also completed a study of six Southeast channels to determine seasonal abundance and spatial distribution of these turtles. A discussion of the findings can be found in the COE report entitled "Assessment of Sea Turtle Abundance in Six South Atlantic U.S. Channels" (Dickerson et al. 1994), summarized in the 1995 BO. Based on the new information, COE requested new, expanded dredging windows and observer requirements. NMFS considered their request and modified it, but established new dredging windows, observer requirements and new requirements for the use of hopper dredges in borrow areas along the east coast. Table A lists the specific requirements established in the August 1995 BO.

COE districts within the SAD generally required observers in some channels, such as Kings Bay, throughout the winter despite the new monitoring windows. Nine sea turtle takes, including one green turtle and eight loggerheads, were observed during the period between the issuance of the 1995 BO and January 1997 (see Table 1, attached). No more than three takes occurred in any project. The dredging windows and draghead deflector appeared to provide good protection to sea turtles during this period. However, beginning on March 2, 1997, sea turtle takes occurred at rates higher than ever observed within Kings Bay. Six turtles were taken in four days of dredging. While consulting with NMFS regarding these unprecedented take levels, a COE specialist from the Waterways Experiment Station proposed some modifications to the draghead that could reduce sea turtle takes. Relocation trawling was also initiated, beginning March 9, 1997; however, as can be seen on Table 2, these efforts did not preclude further sea turtle takes in Kings Bay. Dredging was terminated on March 12, 1997, with only 53 percent of the project completed.

TH ATLANTIC COAST HOPPER
DREDGING (Calendar Year 97)

Project	Dredge Period	Approximate Amount of Work Completed	Turtle Takes	Mitigative Measures Taken	Remarks
Kings Bay	3/1/97 to 3/12/97	Removed 437,000 out of 821,000 CY Approximately 53% completed.	L 3/2/97 L 3/4/97 L 3/5/97 L 3/6/97 L 3/6/97 L 3/6/97 L 3/8/97 L 3/8/97 L 3/12/97	Sea turtle deflecting draghead used. Jacksonville Dist. specialist inspected deflector on 3/6/97. Relocation trawling started 3/9/97. Extensive, ongoing consultation with NMFS as takes occurred. All work terminated 3/12/97 due to high take levels even though relocation trawling had become operational.	Water temp. 67 to 68 F. Dredge Eagle 1. Two takes in batch on 3/6/97 and 3/8/97. Contract required removal of relatively small veneer of material. Most takes occurred through starboard dragarm. Rapidity of takes was a surprise to all concerned.
Brunswick Harbor	2/6/97 to 3/19/97	Removed 975,400 CY. Work stopped at 50% completion.	L 3/9/97	Sea turtle deflecting draghead used. Sea turtle abundance, based on visual observations, prompted termination of work because of potential for unacceptable levels of entrainment.	Water temp 63 F. Dredge RN Weeks. Historic abundance of sea turtles and high levels of entrainment in 1991 was the reason for termination of work.
Savannah Harbor	3/4/97 to 3/22/97	Removed about 545,500 CY, or about 52% of what could have been dredged.	L 3/14/97 L 3/22/97 L 3/22/97	Sea turtle deflecting draghead used. Dredging terminated so as not to take any more sea turtles.	Water temp. 63 F. Numerous sea turtles sighted. Dredge Quachita was 'skimming' high areas to bring depth to acceptable levels quickly before leaving for urgent work on the Mississippi River.
Charleston Harbor	3/14/97 to 3/26/97	Bid qty 900,000 CY Req. qty 408,000 CY Removed qty 350,000 CY. About 39% completed.	L 3/19/97 L 3/20/97 L 3/21/97 L 3/25/97 L 3/26/97	WES expert / developer of sea turtle deflecting draghead system, conducted onboard inspection and made recommendations. Some changes to draghead and dredging operation made. Relocation trawling performed.	Water temp. 61 F. Dredge Eagle 1.
Myrtle Beach borrow area (Phase 1)	9/15/96 to 5/13/97	Bid qty 2.5 million CY. Work completed.	L 4/15/97 L 5/04/97 L 5/09/97	Sea turtle deflecting draghead used. Relative abundance trawling on 3/28-29/97, with 12 hours of "nets in water", yielded one loggerhead. Trawling on 5/8 thru 5/13/97 yielded no sea turtles.	This is one of 3 phases / reaches of total project. Phase 1 work in all phases is by pipeline dredge. Total quantity of material to be dredged is about 6 million CY.
Morehead City Harbor	4/25/97 to 5/16/97	About 120,000 CY removed out of about 1,720,000 CY. About 7% of work completed.	L 4/27/97 L 4/30/97 L 5/01/97 L 5/02/97 L 5/15/97 L 5/15/97	Sea turtle deflecting draghead. Relocation trawling began 5/8/97 and continued until termination of dredging. One loggerhead captured on 5/9/97. Nighttime trawling performed 5/10 & 5/11 with no turtles captured. Because of concern over extensive takes, dredging terminated with only 7% of work done.	Dredge Manhattan Island
Wilmington Harbor (Interior Channels)	2/14/97 to 3/13/97	About 217,300 CY removed. Work completed.	No takes		Dredge McFarland
MOTSU	3/14/97 to 4/3/97	About 60,000 CY. removed. Work completed.	No takes		Dredge McFarland
Wilmington Harbor (Ocean Bar)	4/3/97 to 4/30/97	About 300,000 CY Work completed.	L 4/07/97	Sea turtle deflecting draghead.	Dredge RN Weeks
Dade County Beach (Miami Reach)	3/30/97 7/20/97 (estimate)	About 380,000 of 475,000 CY completed as of 6/6/97.	No takes	Based on past dredging and anecdotal information about sea turtles in area, takes are not anticipated.	

L = Loggerhead

CY = Cubic Yards

AREA	WHALE MONITORING	SEA TURTLE MONITORING: NAVIGATION CHANNELS		SEA TURTLE MONITORING: BORROW AREAS	
		WINDOWS	MONITORING	WINDOWS	MONITORING
North Carolina to Pawleys Island, SC (includes channels at Oregon Inlet, Morehead City and Wilmington)	One observer (daytime coverage) between 1 Dec and 31 Mar. Monitoring by dredge operator and sea turtle observer between 1 Apr and 30 Nov.	Year Round	Two observers (100% monitoring) 1 Apr - 30 Nov	Year Round	One observer (50% monitoring) 1 Apr - 30 Nov
Pawleys Island, SC to Tybee Island, GA (includes channels at Charleston, Port Royal and Savannah)	One observer (daytime coverage) between 1 Dec and 31 Mar. Monitoring by dredge operator and sea turtle observer between 1 Apr and 30 Nov.	1 Nov - 31 May	Two observers (100% monitoring) 1 Nov - 30 Nov and 1 Apr - 31 May	Year Round	One observer (50% monitoring) 1 Apr - 30 Nov
Tybee Island, GA to Titusville, FL (includes channels at Brunswick, Kings Bay, Jacksonville, St. Augustine, and Ponce de Leon Inlet)	Aerial surveys in right whale critical habitat, 1 Dec thru 31 Mar. One observer (daytime coverage) between 1 Dec and 31 Mar.	1 Dec - 15 Apr	Two observers (100% monitoring) 1 Apr - 15 Apr	Year Round	One observer (50% monitoring) 1 Apr - 15 Dec
Titusville, FL to Key West, FL (includes channels at West Palm Beach, Miami and Key West)	Whale observations are not necessary beyond those conducted between monitoring of dredge spoil.	Year Round	Two observers (100% monitoring) year round	Year Round	One observer (50% monitoring) year round

TABLE A: Specific requirements for dredging windows, observer requirements and use of hopper dredges in borrow areas along the east coast established in the August 1995 BO.

Table 2 lists the additional takes observed during March 1997, as well as the steps taken by COE to reduce the likelihood of takes. Deflector dragheads were re-engineered wherever possible and relocation trawling was initiated. Dredging was terminated prior to completion in Kings Bay, Brunswick Harbor, Savannah Harbor and Charleston Harbor. However, COE has asked NMFS to increase the hopper dredging take level to allow them to dredge Wilmington Harbor Ocean Bar Channel, the Morehead City Channel, and the Myrtle Beach and Miami borrow areas. Dredging began in Wilmington Harbor in early April, however, operations were suspended on April 7 after the entrainment and mortality of a loggerhead sea turtle.

Formal consultation was requested by COE by telephone on March 21, 1997 and by letter on March 27, 1997. COE is analyzing the takes that occurred this year and considering modifications to the draghead deflector design, the efficacy of the draghead deflector under differing bottom conditions and alternative contracting schemes that may reduce the likelihood of dredging with hopper dredges during March and provide flexibility if high rates of takes occur in a particular channel. However, prior to their completion of these deliberations, the letter dated March 27, 1997 requested an expedited addition of ten loggerhead sea turtles to the incidental take statement for SAD hopper dredging activities to allow COE to complete the projects remaining for this year. Further consideration of the borrow area projects resulted in a telephone request on April 7th for the addition of 15 loggerheads, rather than 10, to allow projects to finish uninterrupted by reconsultation should takes remain elevated. Delays in project completion could result in increased likelihood of sea turtle takes later in the spring and summer.

Proposed Activity

This interim consultation addresses the use of hopper dredges during 1997 in the Atlantic portion of COE's South Atlantic District, including Morehead City Harbor, Wilmington Harbor and the Myrtle Beach and Miami borrow areas. As identified in Table 2 (attached), the Wilmington Harbor Project was initiated but was suspended on April 7 after the lethal take of a loggerhead. Approximately 300,000 cubic yards remains to be dredged over a period of approximately one month. A rigid draghead deflector will be used, and 100 percent observer coverage is required. Approximately 1,150,000 cubic yards of material is expected to be dredged from the Morehead City Harbor beginning in late April. A sea turtle deflecting draghead and two observers will be used throughout the project period, which is anticipated to be approximately two months. Approximately 600,000 cubic yards of

sand remain to be removed from the Myrtle Beach borrow area. The project will likely take approximately one more month. A deflecting draghead will be deployed, and 100 percent observer effort will be required. Lastly, approximately 400,000 cubic yards of sand remain to be removed from the borrow area off Miami. If sufficient sand remains at the borrow site, an additional 120,000 cubic yards of sand will be dredged for placement at Sunny Isles, adjacent to Miami Beach. The project is expected to last for 68 more days, with an additional 30 days if the Sunny Isles renourishment can also be conducted. The sandy bottom is ideal for the draghead deflector, and the desire to maximize sand collection should ensure the effective deployment of the draghead hard on the bottom.

Listed Species and Critical Habitat

Listed species under the jurisdiction of the NMFS that may occur in channels along the southeastern United States and which may be affected by dredging include:

THREATENED:

- (1) the threatened loggerhead turtle - Caretta caretta

ENDANGERED:

- (1) the endangered right whale - Eubalaena glacialis
- (2) the humpback whale - Megaptera novaeangliae
- (3) the endangered/threatened green turtle - Chelonia mydas
- (4) the endangered Kemp's ridley turtle - Lepidochelys kempii
- (5) the endangered hawksbill turtle - Eretmochelys imbricata
- (6) the endangered shortnose sturgeon - Acipenser brevirostrum

Green turtles in U.S. waters are listed as threatened, except for the Florida breeding population which is listed as endangered.

Additional endangered species which are known to occur along the Atlantic coast include the finback (Balaenoptera physalus), the sei (Balaenoptera borealis), and sperm (Physeter macrocephalus) whales and the leatherback sea turtle (Dermochelys coriacea). NMFS has determined that these species are unlikely to be adversely affected by hopper dredging activities.

Information on the biology and distribution of sea turtles can be found in the 1991 and 1995 BOs, which are incorporated by reference. Channel specific information has been collected by COE for channels at Morehead City, Charleston, Savannah, Brunswick, Fernandina and Canaveral, and is presented in detail in COE summary report entitled "Assessment of Sea Turtle

Abundance in Six South Atlantic US Channels" (Dickerson et al., 1994) and in the COE Biological Assessment.

There is no significant new information regarding the status of ridley and green turtle populations that would change the findings of the 1995 BO. New information regarding the status and genetic structure of the loggerhead population has been developed and reviewed by the Sea Turtle Expert Working Group (STEWG) and is included below.

Caretta caretta:

Because of the broad range over which loggerheads nest, the high internesting variability, and the variety in the quality and quantity of nesting survey effort throughout the range, the status of the loggerhead population is difficult to ascertain. Studies of maternally inherited DNA suggest that there are four distinct loggerhead nesting assemblages in the western North Atlantic (Bowen et al. 1993, Bowen unpubl. data 1996). The largest is the South Florida assemblage, which occur from Cape Canaveral south. The northern assemblage occurs from Canaveral north to North Carolina, with occasional nests as far north as New Jersey. The smaller Yucatan and northern Gulf of Mexico assemblages comprise the Gulf of Mexico nesting beaches. While there is little information regarding the Gulf of Mexico assemblages, nest surveys conducted on East Coast U.S. beaches indicate that since the late 1980s (Meylan et al. 1995) and the early 1990s (Hopkins-Murphy 1996) the loggerhead population as reflected by nests appears to be stable.

The STEWG, established by NMFS to estimate population sizes and trends, reviewed the best available information and concluded that loggerheads spend approximately ten years in the pelagia after leaving the nest as hatchlings. Loggerheads from the South Florida nesting assemblage may reach sexual maturity around 25 years; however, a preliminary review of size distribution data from the STSSN database and unpublished data from nesting beach studies suggests that neophytes are larger on the northern nesting beaches, and the average size of nesting females may be larger. Preliminary mark-recapture information at the Virginia Institute of Marine Science suggests that the growth rate of sea turtles from the Chesapeake Bay (where greater than half of the loggerheads are from the northern nesting assemblage) is similar to loggerheads further south.

Ongoing studies of loggerheads occurring on foraging grounds along the Atlantic coast suggest that up 50 to 60 percent of these immature loggerheads originate from the northern nesting assemblage. Preliminary studies suggest that turtles from this

small nesting group represent more than half the loggerheads found in Georgia and South Carolina waters, despite the fact that the adjacent Florida population is an order of magnitude larger (Sears, 1995). Similar studies discussed by the STEWG indicate that this is true in the North Carolina and Virginia foraging grounds as well.

Because of the loggerheads long pelagic phase, changes in the mortality rate of benthic immature loggerheads would not necessarily be apparent on nesting beaches for a number of years. The current loggerhead population model run suggests that a decrease of only 13 percent in the survival rates of small immature loggerheads would result in a stable population growth rate (Crowder; Duke U., pers comm. 1996), but would halt any increase in the population caused by the observed TED effect (Crowder et al. 1994). Recovery of the loggerhead population, particularly those from the northern nesting assemblage, requires continued conservative management practices.

PROPOSED, THREATENED:

- (1) Johnson's seagrass - Halophila johnsonii

According to federal regulations (50 CFR Section 402.10), a conference is required if a planned Federal action is likely to jeopardize the continued existence of a proposed species. At this time, NMFS is unable to make a determination on the collective effects of hopper dredging in and adjacent to channels in which Johnson's seagrass occurs. COE should develop estimates of annual take of seagrass anticipated by projects within Florida's intracoastal waterways within Johnson's seagrass habitat. Consideration of impacts to H. johnsonii should continue to take place on a project-by-project basis until collective impacts have been estimated and/or listing has been finalized.

Assessment of Impacts

Sturgeon:

No impacts to sturgeon beyond those considered in the 1995 BO are anticipated. No sturgeon takes have been observed during COE dredging projects conducted since the BO was issued.

Sea Turtles:

The high rate of sea turtle takes observed thus far this year suggests that loggerheads were more abundant in nearshore waters during March 1997 than in previous years. The incidental take of

nine sea turtles in Kings Bay over only 11 days of dredging is significantly higher than the rate of capture observed from July 1987 through December 1989, when 21 turtles were taken there. This winter was considerably milder than usual, and nearshore water temperatures reached 60°F in early March in Kings Bay. Charleston Harbor waters were also unseasonably warm.

Additionally, the high rate of take suggests that the rigid draghead deflector, even after fine tuning for specific channel depths and contours, does not perform as well as was originally anticipated. The draghead may not remain hard on the bottom throughout the dredging of channels with greatly irregular or rocky sediments, or in channels with high relief. Takes during 1995 and 1996 occurred primarily during clean-up, when ridges and valleys remain due to the earlier dredging. Deflector design modifications appear to be necessary, and some channels may not be suited to the deflector. Additionally, contracted dredge operators may not be keeping the draghead firmly on the channel bottom in an attempt to avoid expending greater effort by collecting additional sediment and digging beyond contract depths.

COE is required to pay contractors, such as dredge operators, full contract amounts when projects are canceled for reasons other than operator errors. The cessation of dredging in Kings Bay, Brunswick, Savannah and Charleston harbors has been costly. COE has asked us to reconsult on additional 1997 dredging activities because of existing contracts for dredging at the Wilmington Harbor Ocean Bar Channel, the Morehead City Harbor Channel and the borrow areas off Myrtle Beach and Miami.

The Wilmington Harbor Ocean Bar Channel is not historically an area of high sea turtle abundance. Four loggerheads have been observed taken in Wilmington, one in January of 1995, one in April of 1996, one in August of 1996, and one in April 1997. These past takes suggest that usually, no more than one turtle would be taken in any month. However, the high rate of sea turtle takes this year suggests that sea turtles may be present in higher numbers throughout the nearshore southeastern waters during 1997. Additionally, Wilmington's rocky and irregular bottom topography does not enable the rigid draghead deflector to remain evenly on the channel bottom. During dredging operations in 1995 and 1996, the deflector was removed, with the consent of NMFS, due to constant clogging that was reducing the efficiency of the draghead. Similar problems that increase the time it takes to complete the dredging operation, particularly in a channel in which the deflector is not likely to efficiently exclude sea turtles, may result in an increased period of

vulnerability for sea turtles. Unless the draghead deflector is greatly modified, COE should consider prohibiting the use of hopper dredges in the Wilmington Harbor projects.

The channel bottom in Morehead City is ideal for the draghead deflector -- sandy and silty bottom without any great changes in elevation. In the past, only one sea turtle take has been documented in Morehead City -- a loggerhead taken during April of 1996. Morehead City Harbor had the lowest sea turtle CPUE in COE studies, with only .025 per hour. Therefore, while turtles may be more abundant in Morehead City Harbor than in past years, the likely efficacy of the draghead deflector in this channel, and the historical low abundance of sea turtles in the harbor, suggest that this dredging project is not likely to result in many sea turtle takes.

The use of a hopper dredge at the Myrtle Beach borrow area may result in the take of sea turtles. Two loggerheads were observed taken in the borrow area during October 1996 and one loggerhead was collected during 12 hours of trawling on March 28-29, 1997. COE has indicated that the draghead deflector used at the borrow area will be designed specifically for the appropriate bottom depths and angles. The substrate, fine sand, is excellent for the efficient operation of the deflector; therefore, take levels are likely to be low.

The Miami borrow area also has suitable substrate for the effective use of the draghead deflector. Nearby hard-bottom reefs provide excellent habitat for sea turtles, which are commonly observed on the reefs. These ideal habitats may reduce the likelihood that turtles will occur at the sandy borrow area except when in transit. No sea turtle takes have ever been observed during dredging operations in Dade County.

CUMULATIVE EFFECTS

"Cumulative effects" are those effects of future state or private activities, not involving Federal actions, that are reasonably certain to occur within the action area of the Federal action subject to consultation. State regulated fishing activities, including trawl and gillnet fisheries, in inshore and nearshore Atlantic waters likely take endangered species. These takes are not regulated or reported. It is expected that states will continue to license/permit large vessel and thrill-craft operations which do not fall under the purview of a Federal agency and will issue regulations that will affect fishery activities. NMFS will continue to work with states to develop ESA Section 6 agreements and Section 10 permits to enhance

programs to quantify and mitigate these takes. Increased recreational vessel activity in nearshore and inshore waters of the Atlantic will likely increase the number of turtles taken by injury or mortality in vessel collisions. Recreational hook-and-line fisheries have been known to lethally take sea turtles, including Kemp's ridleys. Although pathological effects of oil spills have been documented in laboratory studies of marine mammals and sea turtles (Vargo et al., 1986), the impacts of other anthropogenic toxins have not been investigated.

Conclusion:

NMFS believes that the elevated rate of observed sea turtle takes by dredges in the southeastern United States during March of 1997 was likely due to increased abundance of loggerheads in nearshore waters due to an unseasonably warm winter. Additionally, the draghead deflector did not exclude sea turtles as well as anticipated. The continued dredging operations planned by COE during the spring of 1997 are likely to take additional sea turtles. Take rates in prior years suggest that no more than five or six turtles (approximately two in Wilmington, one in Morehead City, two in Myrtle Beach, none in Miami) would be taken. However, the apparent high density of sea turtles in nearshore waters of the southeastern United States is likely to continue. Therefore, NMFS believes that it is likely that up to 16 loggerheads may be taken in these remaining dredging projects. Sixteen additional takes would not elevate the take level to levels observed historically. The cumulative take level would also remain below the annual level authorized in the 1991 BO. Up to half of the turtles collected from the North Carolina dredging sites may be from the northern nesting assemblage. While COE should continue to develop methods to mitigate and minimize these takes, NMFS believes that these projects are not likely to jeopardize the continued existence of any listed species.

Conservation Recommendations

Pursuant to section 7(a)(1) of the ESA, conservation recommendations are made to assist COE in reducing or eliminating adverse impacts to loggerhead, green, and Kemp's ridley turtles that result from hopper dredging in the southeastern United States. The recommendations made in the 1995 BO are pertinent to this consultation as well, and therefore remain valid.

Incidental Take Statement

Section 7(b)(4) of the Endangered Species Act (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 will issue a statement that specifies the impact of any incidental taking of endangered or threatened species. It also states that reasonable and prudent measures, and terms and conditions to implement the measures, be provided that are necessary to minimize such impacts. 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 of the ESA.

Based on the high rate of sea turtle takes observed during March of 1997, the NMFS anticipates that the additional hopper dredging planned and contracted by COE in the Atlantic portion of their South Atlantic Division for the spring of 1997, including dredging at the Wilmington Ocean Bar Channel, Morehead City Harbor and the Myrtle Beach and Miami borrow areas may result in the injury or mortality of loggerhead turtles beyond those anticipated in the 1995 BO. Therefore, a low level of incidental take, and terms and conditions necessary to minimize and monitor takes, are established. The incidental take, by injury or mortality, of seven (7) documented Kemp's ridleys, seven (7) green turtles, two (2) hawksbills, sixteen (16) loggerhead turtles, and five (5) shortnose sturgeon is set pursuant to section 7(b)(4) of the ESA. This take level represents the take level remaining from the annual level established in the 1995 BO, and an additional fifteen loggerheads.

To ensure that the specified levels of take are not exceeded early in any project, COE should reinitiate informal consultation for any project in which more than one turtle is taken in any day, or once five or more turtles are taken. The Southeast Region, NMFS, will cooperate with COE in the review of such incidents to determine the need for developing further mitigation measures or to terminate the remaining dredging activity.

Section 7(b)(4)(c) of the ESA specifies that in order to provide an incidental take statement for an endangered or threatened species of marine mammal, the taking must be authorized under section 101(a)(5) of the Marine Mammal Protection Act of 1972 (MMPA). Since no incidental take in the Atlantic Region has been

authorized under section 101(a)(5) of the MMPA, no statement on incidental take of endangered right whales is provided.

The reasonable and prudent measures that the NMFS believes are necessary to minimize the impact of the continued use of hopper dredges during the spring of 1997 in three projects in the southeastern United States have been discussed with COE. The following terms and conditions are established, in addition to those identified in the 1995 BO, to implement these measures and to document the incidental take should such take occur.

1. COE and NMFS should continue to identify mechanisms to reduce the likelihood of sea turtle takes in dredging operations in the Southeast U.S. channels and borrow areas. Formal consultation on the cumulative impact of all dredging along the Southeast Atlantic coast should continue. A new cumulative consultation should be completed prior to FY 1988. Re-engineering of the draghead deflector, new dredging windows and an evaluation of the efficacy of the deflector over certain substrates should be considered.

2. Relocation trawling shall be initiated as soon as possible after any sea turtle takes occur in the remaining 1997 projects. COE shall consult with NMFS regarding any modifications to this requirement should such takes occur when the projects are nearing completion.

3. If the rigid draghead deflector appears to be ineffective in Wilmington Harbor and slows the dredging project, increasing the amount of time the hopper dredge will be deployed, the deflector should be removed from the draghead for that channel.

Table 1

Sea turtle takes in hopper dredging projects in the Corps of Engineers South Atlantic Division (SAD), August 1995 through February 1996

Project	Dredging Period	Portion Completed	Turtle Takes	Mitigation Actions	Remarks
Morehead City Hbr.	March 1996	NA	L 4/27/96	NA	Dredge Padre Island. Temp. 70 F.
Wilmington Hbr.	November 1995 March 1996 September 1996	NA	L 1/14/95 L 4/27/96 L 9/29/96	NA NA NA	Dredge Padre Island Temp. 65 F. Dredge RN Weeks. Temp. 66 F. Dredge McFarland Temp. 82 F
Myrtle Beach	October 1996	NA	L 10/17 L 10/21	NA	
Palm Beach	January 1995 May 1996	NA	G 1/3/95 L 5/12/96	NA	
Kings Bay	March 1995	NA	L		
Savannah	Dec 94 / Jan 95	NA	0		Dredges Padre Island, Dodge Island, Sugar Island and Dodge Island
Brunswick	Jan / Feb 95 Jan/ Feb 95 Dec 95 / Jan 96 Dec 95 /Jan 96	NA NA NA NA	0 0 0 0		Dredge Sugar Island Dredge Padre Island Dredge Dodge Island Dredge Padre Island

L = Loggerhead

G = Green

Table 2

SOUTH ATLANTIC COAST HOPPER DREDGING
(Calendar Year 97)

Project	Dredging Period	Approximate Portion Completed	Turtle Takes	Mitigation Actions taken	Remarks
Kings Bay	3/1/97 to 3/12/97	Removed 437,000 CY out of 821,000 CY. Approximately 53% completed.	L 3/2/97 L 3/4/97 L 3/5/97 L 3/6/97 L 3/6/97 L 3/6/97 L 3/8/97 L 3/8/97 L 3/12/97	Sea turtle deflecting draghead used. Jacksonville Dist. Specialist inspects dredge / deflector on 3/6/97 recommends changes. Relocation trawler contracted on 3/7/97. If takes occur on weekend (3/7-3/8) dredging to stop until relocation trawler in place. Relocation trawling started 3/9/97. All work terminated after sea turtle take occurred with relocation trawling in place. As a lessons learned, SAD will try in the future not to have hopper dredges to do this type of work (thin layer removal/ clean up/ skimming) when sea turtles are present.	Water temp. 57 to 58 F. Dredge Eagle 1. Two takes in one batch on 3/6/97 and 3/8/97. Ongoing consult. between Corps and NMFS staff as takes occurred. Since these were the first takes of dredging season, Corps was trying to determine why they were occurring and make changes. Rapidity of takes were a surprise to all concerned.
Brunswick Harbor	2/6/97 to 3/19/97	Removed 975,400 CY. Work stopped at 50% completion.	L 3/9/97	Sea turtle deflecting draghead used. Turtle abundance prompted termination of work.	Water temp 63 F. Dredge RN Weeks. Historic abundance of turtles here was reason for termin.
Savannah Harbor	3/4/97 to 3/22/97	Removed about 545,500 CY, or about 52% of what could have been dredged.	L 3/14/97 L 3/22/97 L 3/22/97	Sea turtle deflecting draghead used. Terminated dredging so as not to take any more sea turtles at SAD's recommendation.	Water temp. 63 F. Dredge Ouachita. Numerous sea turtles sighted. Dredge was 'skimming' high areas to bring depth to acceptable levels quickly before leaving for urgent work in Mississippi River.
Charleston Harbor	3/14/97 to 3/26/97	Bid qty 900,000 CY Req. qty 408,000 CY Removed qty 350,000 CY. About 39% completed.	L 3/19/97 L 3/20/97 L 3/21/97 L 3/25/97 L 3/26/97	WES sea turtle deflecting draghead expert observed dredging process and inspected draghead. Dist. made physical changes to draghead and dredging operation. Relocation trawling initiated on 3/23/97	Water temp. 61 F. Dredge Eagle 1.
Myrtle Beach borrow area (Phase 1)	9/15/96 to present	bid qty 2.5 million CY removed qty 1.9 million CY	No takes this calendar year	Abundance trawling 3/28-29/97 one loggerhead in 12 hours of nets in water.	This is one of 3 phases / reaches of total project. Part of work in all phases is by pipeline dredge. Total quantity of material to be dredged is about 6 million CY
Morehead City Harbor	4/20/97 to 6/17/97	0% (About 1,155,000 CY to be dredged).	0	Sea turtle deflecting draghead.	Dredge Padre Island
Wilmington Harbor (Interior Channels)	2/14/97 to 3/13/97	217,300 CY Work completed.	No takes this calendar year		Dredge McFarland
MOTSU	3/14/97 to present (Comp. about 4/4/97)	removed about 50,000 CY. 90% comp. (Total abt. 60,000)	No takes this calendar year.		Dredge McFarland
Wilmington Harbor (Ocean Bar)	4/3/97 to 4/30/97	About 300,000 CY to be dredged	0	Sea turtle deflecting draghead.	Dredge RN Weeks
Dade County Miami	4/1/97 to 7/10/97	410,000 to 530,000 CY to be dredged	No takes ever observed	Sea turtle deflecting draghead	

L = Loggerhead CY = Cubic Yards