GENERIC SEC. 7 CONSULTATION
HOPPER DREDGING

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 25 1991

John P. Elmore, P.E.
Chief, Operations, Construction
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Department of the Army
Washington, D.C. 20314-1000

Dear Mr. Elmore:

Thank you for your November 20, 1991, letter responding to the National Marine Fisheries Service (NMFS) draft biological opinion on hopper dredging in the southeastern United States. We appreciate the opportunity to review your draft comments on the opinion, and I can assure you that all issues of concern to the U.S. Army Corps of Engineers (Corps) have been considered in preparation of a final biological opinion. Unfortunately, as you correctly noted in your letter, it will not be possible to resolve all matters concerning statements in the biological opinion by December 1, 1991. Therefore, we are issuing the enclosed opinion to allow dredging to begin as scheduled. Questions concerning this biological opinion should be directed to Robert Ziobro, Office of Protected Resources, Protected Species Management Division (301-427-2323).

Also enclosed are responses to your draft comments on the draft biological opinion. Many of these comments were helpful to us in improving the document, and have been incorporated in the opinion. For your information a "redlined" version of the draft opinion is enclosed so that changes can be identified readily (additions are highlighted and deletions are surrounded by highlighted brackets). We appreciate your cooperation in working towards a resolution on the sea turtle/hopper dredging issue and look forward to continued cooperation in solving this problem.

Sincerely,

William W. Fox, Jr.

Enclosures

THE ASSISTANT ADMINISTRATOR
FOR FISHERIES

unlikely, but may be possible. Presently, NMFS has determined that pipeline dredges are unlikely to adversely affect sea turtles. This position, of course, could change if new information suggests that sea turtle/pipeline dredge interactions occur.

In addition to the three types of dredges identified, the special purpose split-hull hopper dredge CURRITUCK and sidecast dredges are used on a limited basis in the southeast. These dredges are not believed harmful to sea turtles because of the small size of dragheads (roughly 2' by 2'), slow speed of the vessels, and the low suction levels. For the present consultation, NMFS has determined that these dredges are unlikely to adversely affect sea turtles.

Of the three major dredge types, only the hopper dredge has been implicated in the mortality of endangered and threatened species. Thus, this biological opinion concentrates on the adverse impacts of hopper dredging in the southeastern United States.

The primary Endangered Species Act (ESA) concern with hopper dredging is the documented take of a significant number of sea turtles. A secondary concern is the potential for hopper dredge/right whale collisions. Past ESA section 7 consultations have addressed the adverse effects of hopper dredging to both endangered right whales and endangered/threatened sea turtles.

1. Sea turtles

The take of sea turtles by hopper dredges was first identified as a potential problem in the late 1970's. In early 1978, NMFS received reports of unprecedented numbers of sea turtles taken by shrimp trawlers in the Canaveral ship channel, Florida. Trawl surveys were conducted by NMFS during February and March of 1978, and the reports of high turtle abundance were corroborated. In August of 1978, NMFS requested that the Corps initiate ESA Section 7 consultation on the probable impacts of maintenance and construction dredging to sea turtles residing in the Canaveral channel.

On March 30, 1979, NMFS issued a biological opinion based on a threshold examination of the situation. This opinion concluded that insufficient information existed to determine whether or not dredging was likely to jeopardize the continued existence of sea turtles. Through agreement with the Corps and the U.S. Navy, trawl surveys were implemented to further assess turtle abundance and distribution in the channel.

On January 22, 1980, NMFS issued a biological opinion concluding that "dredging may result in the loss of large numbers of loggerhead sea turtles but is not likely to result in jeopardizing either the loggerhead or Atlantic ridley sea turtle

In 1986, the U.S. Navy reinitiated ESA Section 7 consultation on Kings Bay, Georgia, channel dredging. The scope of the project involved widening and deepening of existing channels and extension of the channel approximately 14 miles. The Navy proposed to implement sea turtle conservation measures including observer coverage, screening of dredge overflow, and a stand-by trawler to catch and remove turtles, if necessary. NMFS concurred with these measures and issued a "no affect" determination through an informal consultation. This determination was later changed through reinitiation of consultation to a "may affect" opinion when turtle takes occurred. From July 1987 through December 1989, a total of 21 turtles were taken during hopper dredging operations in the Kings Bay project.

Turtle take by hopper dredges in Kings Bay resulted in major changes in NMFS policy on channel dredging. This was the first documented take of turtles by hopper dredges anywhere other than in the Canaveral channel. Additionally, the take included 3 endangered Kemp's ridley turtles and 3 endangered/threatened green turtles; only loggerhead turtle takes had been previously documented in Canaveral. NMFS began to consider the additive consequences of hopper dredging in the southeast as a whole, assuming that Kings Bay and Canaveral were not exceptional and that take levels observed in these channels might reflect take levels in other channels.

At NMFS' urging, the Corps' Jacksonville District and the Corps' Waterways Experiment Station (WES) jointly sponsored a May 11-12, 1988, "National Workshop on Methods to Minimize Dredging Impacts on Sea Turtles," held in Jacksonville, Florida. This workshop brought together representatives of the Corps, NMFS, the U.S. Navy, the dredging industry and the environmental community to discuss the dredging/sea turtle conflict. While the workshop was valuable in terms of heightening awareness of this problem and bringing together a diverse group of interested parties, limited action was taken to implement the recommendations of the participants. The Jacksonville District and WES did work together to design and test new draghead deflector designs on the Corp's dredge MCFARLAND as well as several contractor-owned hopper dredges, and developed and tested inflow screening on the MCFARLAND. Unfortunately, few of the other recommended actions were implemented.

In a July 8, 1988, letter from the Assistant Administrator for Fisheries to the Acting Commander of the Corps, NMFS applauded the Corps efforts in sponsoring the workshop. NMFS advised the Corps of agency plans to assess the cumulative impacts to sea turtles of dredging in channels other than Canaveral, and to "request formal consultation under Section 7 of the ESA wherever turtles are known to occur and hopper dredging is proposed." For the first time, NMFS clearly stated that "this conflict can no

NMFS considers this to be a minimal estimate of actual mortalities.

After completion of the Savannah work, the dredge moved to Charleston where trawl surveys for turtles were ongoing. The surveys suggested that turtles were present in the channel and that take was likely if dredging occurred during summer and fall months. To minimize take, the Corps began dredging in the outer reaches of the channel and slowly moved inshore as sections of the channel were completed. During the first few weeks of the project, no turtles were taken. Hopper dredging occurred in the outer channel from August to October 1, 1991. A total of three loggerheads were taken by the hopper dredge. Intensive trawling to relocate sea turtles from the ship channel encountered only 15 sea turtles which is relatively low compared to previous trawling efforts at Savannah and Brunswick ship channels.

The high levels of take in Brunswick and Savannah were not ignored by the Corps, and every effort to minimize take was employed. Trawlers were chartered to capture and relocate turtles in these channels, and it is believed that these actions helped to reduce the level of take. Unfortunately, it is not possible to quantify the effectiveness of turtle relocation techniques at this point because all such actions were taken after high levels of mortality were observed aboard dredges. The possibility remains that reductions in take aboard dredges following implementation of relocation procedures may simply reflect decreased population levels in the channels resulting from habitat disruption by dredges and/or prior high levels of take. Despite uncertainties about the effectiveness of relocation techniques, it appears that these techniques reduce turtle mortalities and warrant further investigation.

What has been learned from past dredging episodes is that turtle take cannot be avoided if hopper dredging occurs when turtles are present. To significantly reduce/eliminate turtle mortalities from hopper dredges given our present abilities to protect turtles, dredging should be scheduled in areas and at times when turtles are not present or occur at low abundance levels.

2. Right whales

In 1983 it was confirmed, through photo-identification, that right whales migrate from their summer feeding grounds to winter calving grounds off the coasts of Georgia and northern Florida. Portions of the North Atlantic right whale population are now known to migrate along the United States east coast each year from October through April.

On July 25, 1986, NMFS concurred with the Navy's determination of "no affect" for construction dredging in Kings Bay, Georgia.

This Biological Opinion is based on the best scientific and commercial data available. It incorporates information from: (1) previous Biological Opinions on dredging of channels in the southeastern United States, (2) Corps Biological Assessments, (3) discussions at Sea Turtle/Dredging Task Force meetings, (4) discussions at the May 11-12, 1988, dredging workshop, (5) the August 22, 1991, meeting in St. Petersburg, Florida, and (6) the scientific literature and other available information.

B. Proposed Activity

This consultation addresses Corps channel dredging activities along the southeastern Atlantic seaboard from North Carolina to Cape Canaveral, Florida. This includes both maintenance dredging and new construction dredging. Major channel dredging projects in which hopper dredges are normally used include:

(1) Oregon Inlet, North Carolina
(2) Morehead City, North Carolina
(3) Wilmington Harbor, North Carolina
(4) Georgetown, South Carolina
(5) Charleston, South Carolina
(6) Port Royal, South Carolina
(7) Savannah, Georgia
(8) Brunswick, Georgia
(9) Kings Bay/St. Marys, Georgia
(10) Jacksonville, Florida
(11) St. Augustine, Florida
(12) Ponce Inlet, Florida
(13) Canaveral, Florida

Information on the timing and amount of materials removed during past hopper dredging projects in these channels was provided by Corps district offices and is attached.

C. Listed Species and Critical Habitat

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

(1) the endangered right whale - *Eubalaena glacialis*
(2) the threatened loggerhead turtle - *Caretta caretta*
(3) the endangered/threatened green turtle - *Chelonia mydas*
(4) the endangered Kemp's ridley turtle - *Lepidochelys kempi*

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

fortunately, this occurred during daylight hours, and when no vessels were transiting the channel. The breeding/calving season off the southeastern United States coastline is primarily from January through March, but may extend from December through April.

NMFS does not anticipate any effects of the proposed dredging activity on populations of right whales, but believes that additional precautions to avoid vessel/right whale collisions may be necessary during winter dredging, particularly off Georgia and northern Florida.

2. Sea Turtles

NMFS believes that hopper dredging activities in the southeastern United States may adversely affect the endangered Kemp's ridley and Florida green turtles, and the threatened loggerhead turtle. Because of their low population numbers, the Kemp's ridley and green turtles are particularly vulnerable to the impacts of this activity.

Past maintenance dredging in the southeastern United States has been demonstrated to affect sea turtles adversely. The first documented instance of dredge related sea turtle mortality occurred in Cape Canaveral during the July-November 1980 dredging period. Subsequently, turtle/dredge encounters have been documented in most channels in the southeast. Ninety-five percent of these encounters resulted in mortality, although mortality rates varied by species and size of animals. Turtles are drawn into the dragheads, forced through the pumps and subsequently crushed. The remains, which usually consist of small sections of viscera, bones, shell, etc., are deposited in the hopper along with the dredged materials.

Sea turtle surveys of the Cape Canaveral ship channel have been conducted by NMFS since 1978. These surveys were initiated when unprecedented numbers of sea turtles in an apparent state of hibernation were discovered (Carr et al. 1980). Subsequent surveys have provided evidence that the Canaveral ship channel supports aggregations of sea turtles during all months of the year and particularly during cooler winter months (Henwood 1987; Butler et al. 1987; Henwood and Ogren 1987). More recent survey reports (Bolten and Bjorndal 1988; Christian and Harrington 1987; Henwood 1987) suggest that aggregations of sea turtles inhabiting the channel have not changed since the earlier studies.

There is a growing body of evidence that sea turtles are abundant in specific channels during certain months of the year. Trawl surveys and sea turtle removal activities using trawlers have been conducted in Kings Bay, Brunswick, Savannah, and Charleston. In each of these channels, significant catch rates of sea turtles have been documented at certain times of the year.

urchins among the foods of loggerhead turtles. The horseshoe crab (Limulus polyphemus) has been identified as a major food source of loggerheads in Mosquito Lagoon, Florida (Mortimer 1982).

Nesting aggregations of loggerhead sea turtles along the United States Atlantic coast have received considerable attention in recent years, but most studies have been limited to nesting migrations of adult females, development of eggs and behavior of hatchlings (Ernst and Barbour 1972). Little information on the life history of subadults and adult males is available. The work of Mendonca and Ehrhart (1982) suggests that subadult loggerhead turtles may use lagoonal systems as preferred habitats during stages of their life cycles.

Since 1978, loggerhead turtles occurring in the Cape Canaveral area have been studied extensively. Spatial and temporal changes in size and sex composition of loggerhead aggregations, monthly catch rates by trawlers, abundance estimates and movements into and out of the channel have been examined (Henwood 1987; Butler et al. 1987; Henwood and Stuntz 1987). Results of NMFS surveys are summarized in previous NMFS Biological Opinions.

The most recent information suggests that loggerheads occur in ship channels in the southeastern United States throughout much of the year, and that mortalities associated with hopper dredging are likely. Therefore, the direct effects of unrestricted hopper dredging will be mortalities of an unknown number of loggerhead turtles. Over eighty percent of these mortalities will be of subabult turtles.

Several sea turtle researchers (Ehrhart 1987; Frazer 1986; Murphy pers. comm.) have suggested that loggerhead turtle nesting populations in the United States are continuing to decline at rates of up to five percent annually. A theoretical explanation for these declines was provided by Crouse et al. (1987). Applying a Leftovitch stage-class matrix model of loggerhead populations on Little Cumberland Island, Georgia, these authors showed that loggerhead population stability is more sensitive to changes in the subadult stage of development than in other developmental stages. The significance of these findings with respect to dredging activities should be readily evident; by impacting the most sensitive developmental stages of loggerhead turtles, dredging may exert a major impact on the recovery of these populations.

To further examine the additive impacts of all channel dredging activities in areas where turtles are known to occur, we must first consider the magnitude of potential turtle mortalities from hopper dredging. In Canaveral channel alone, we have documented a minimum of 98 sea turtles taken by dredges that were monitored. Presently, we have no estimates of the actual percent of

been identified on the southeast Atlantic coast, evidence provided by Mendonca and Ehrhart (1982) indicates that immature green turtles may utilize lagoonal systems during periods of their lives. These authors identified a population of young green turtles (carapace length 29.5 - 75.4 cm) believed to be resident in the Mosquito Lagoon, Florida. The Indian River system, of which Mosquito Lagoon is a part, supported a green turtle fishery during the late 1800's (Ehrhart 1983), and these turtles may be remnants of this historical colony.

Information on green turtle distribution and abundance in southeastern Atlantic channels is sparse. However, juvenile green turtles are known to occur seasonally throughout the southeastern United States, and take by hopper dredges in any channel would not be unexpected. During NMFS surveys in the Cape Canaveral area between 1978 and 1984, a total of 21 green turtles were captured; ten of these turtles were dead and the remaining 11 survived. All of these turtles were subadults ranging in size from 23.6 to 68.1 cm total straight-line carapace length. With the exceptions of August and November, green turtles were captured during all months of the year (Henwood and Ogren 1987).

The most immediate and damaging "dredge effect" on green turtles is injury or death which results from being drawn into the suction of the draghead. Dredge observers at Canaveral have documented the take by hopper dredges of three green turtles during 1980, one during 1981, three during 1988, nine during 1989, and five during 1991. Three green turtles have also been taken by hopper dredges in Kings Bay. Some of these turtles survived, but were injured and required rehabilitation before release.

The presence of green turtles in association with channel jetties has been observed in both Canaveral and in Texas. The Corps is presently cooperating with NMFS in tracking studies to determine the behavior of green turtles in and around channels. Preliminary findings indicate that green turtles may occupy relatively small foraging ranges (300-400 yards) in which they reside for weeks at a time. Given this behavior, it may be possible to capture and remove resident green turtles prior to hopper dredging of channels where green turtles are known to be present. Another option would be to schedule dredging projects when green turtles have left the area.

c. Kemp's ridley turtle (Lepidochelys kempi) - Endangered status

Of the seven extant species of sea turtles of the world, the Kemp's ridley is probably in the greatest danger of extinction. The only major nesting area for this species is a single stretch of beach near Rancho Nuevo, Tamaulipas, Mexico (Carr 1963; Hildebrand 1963). Virtually the entire world population of adult females nest annually in this single locality (Pritchard 1969b).

Four Kemp's ridley mortalities have been documented aboard hopper dredges in the southeastern United States. Three of these mortalities occurred at Kings Bay during 1988 (October 31-December 9 dredging period), and one occurred at Brunswick during 1991 (March 23-June 19 dredging period). Surprisingly, no Kemp's ridley mortalities have been documented at Cape Canaveral despite their relatively high abundance during winter months.

E. Conclusions

1. Right whale:

NMFS concludes that continued unrestricted hopper dredging in the southeastern United States is not likely to jeopardize the continued existence of the right whale (*Eubalaena glacialis*). This decision is contingent upon implementation of appropriate precautionary measures in areas and at times when right whales may be present. A right whale "watch" should be instituted aboard hopper dredges during the months of December through March in Georgia and northern Florida channels to assure that dredge/whale collisions during transit to and from the offshore disposal site are avoided. Similar right whale watches should be implemented in other channels during periods of known right whale migratory activity. Aerial surveys in the vicinity of Kings Bay should be continued, and similar measures may be appropriate in channels north and south of Kings Bay.

2. Sea Turtles:

NMFS concludes that unrestricted hopper dredging in the southeastern United States is likely to jeopardize the continued existence of the Florida green turtle (*Chelonia mydas*), and the Kemp's ridley turtle (*Lepidochelys kempi*). This opinion is based on the critically small population sizes of these two species, the occurrence of greens and Kemp's ridleys in shipping channels, the known adverse impacts of hopper dredging, and the additive impacts of past and future dredging on these species. NMFS also concludes that the additive effects of hopper dredging in all channels will adversely affect the loggerhead turtle (*Caretta caretta*) but is probably not likely to jeopardize its continued existence. This determination is based on the annual magnitude of hopper dredging in the southeastern United States, and the fact that subadult loggerheads are the predominant turtles taken during these activities.

NMFS believes that dredging can be conducted in the southeastern United States if reasonable and prudent alternatives are implemented to avoid the likelihood of jeopardizing the Kemp's ridley, green and loggerhead turtles. These alternatives have been discussed with the Corps.

6. If other types of dredging equipment are, or become, available the Corps should notify NMFS and describe its method of operation before using the dredge.

G. Conservation Recommendations

Pursuant to Section 7(a)(1) of the ESA the following conservation recommendations are made to assist the Corps in reducing/eliminating adverse impacts to loggerhead, green, and Kemp's ridley turtles that result from hopper dredging in the southeastern United States. Many of these recommendations have been discussed at the recent Corps/NMFS meeting in St. Petersburg, Florida, and the Corps has already implemented many of these suggestions.

1. The Corps should establish a program to address turtle/dredging conflicts on a regional or national scale. Recently documented high levels of turtle mortality in Brunswick and Savannah channels indicate that turtle take by hopper dredges can no longer be considered a problem unique to Canaveral and Kings Bay. NMFS suggests that such a program address the following:

   a. Investigate possible modifications to existing dredges which might reduce or eliminate the take of sea turtles. Develop new dragheads or external screening techniques to exclude turtles from dangerous areas of high suction. Design an effective turtle deflector device to push turtles out of the dredge path. Basically, investigate any and all possible engineering solutions to the problem.

   b. Explore potential biological approaches to temporarily moving turtles out of areas to be dredged. Additional studies using sound or other possible deterrents should be considered.

   c. Determine through scientific studies where turtles may be found in the water column, whether they bury themselves in the soft sediments of channels, whether they are feeding in the channels, what factors attract turtles to channels, what is their behavior while in channels, where do they sleep, etc. An understanding of basic sea turtle biology might allow modification of dredging techniques to minimize impacts to turtles.

   d. Survey all channels in which hopper dredges are used. Given adequate information on turtle distribution and abundance on a channel specific basis, it may be possible to expand or contract hopper dredging windows. Surveys may indicate that some channels do not support

Incidental Take Statement

Section 7(b)(4) of the Endangered Species Act requires that when an agency action is found to be consistent with section 7(a)(2) of the Act and the proposed action may incidentally take individuals of listed species, NMFS will issue a statement that specifies the impact (amount or extent) of such incidental taking. It also states that reasonable and prudent measures be provided that are necessary to minimize such impacts. Incidental taking by the Federal agency or applicant that complies with the specified terms and conditions of this statement, is authorized and exempt from the taking prohibition of the ESA.

Based on results of previous dredging of southeastern United States channels, NMFS anticipates that future hopper dredging activities may result in the injury or mortality of loggerhead, Kemp's ridley and green turtles. Therefore, we have established a low level of incidental take and terms and conditions necessary to minimize and monitor this impact. A documented incidental take level of two (2) Kemp's ridley, or five (5) green, hawksbill or leatherback turtle mortalities, or fifty (50) loggerhead turtle mortalities is set pursuant to Section 7(b)(4) of the ESA. This take level represents a total allowable take through 1992 for <u>all</u> channel dredging in the southeastern United States combined. If the incidental take meets or exceeds this level, the Corps must reinitiate consultation.

To ensure that the specified levels of take are not misinterpreted as an allowable take that can be saved and used for particularly high risk dredging projects, the Corps should reinitiate consultation for any project in which five (5) turtles are taken. The Southeast Region, NMFS, will cooperate with the Corps in the review of such incidents to determine the need for developing further mitigation measures or to terminate the remaining dredging activity.

The above levels of take for dredging in the southeastern United States substantially exceed expected take upon implementation of the specified reasonable and prudent alternatives. However, uncertainty remains regarding when turtles may be present in specific channels, and whether seasonal restrictions on hopper dredging will be adequate in the southernmost channels. Annual differences in water temperatures during December and March will certainly influence whether turtles are present during a given year. For this reason, some level of turtle take in southerly channels is expected during the months of December and March. Seasonal restrictions on hopper dredging will be adjusted on a channel-by-channel basis as better information on turtle occurrence is collected.

permitted outside of the December-March dredging window under carefully monitored conditions. The Corps is responsible for ensuring that applicable permits for scientific research and/or incidental taking are obtained.

5. A report summarizing the results of the dredging and the sea turtle take must be submitted to the Corps and NMFS within 15 working days of completion of any given dredging project.

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