SEP 28 1995

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, Maryland 20910

SEP 22 1995

Herbie A. Maurer, P.E.
Chief, Construction-Operations Division
Galveston District Corps of Engineers
P.O. Box 1229
Galveston, Texas 77553-1229

Dear Mr. Maurer:

Enclosed is the Biological Opinion (BO) concluding formal Endangered Species Act Section 7 consultation specifically on the hopper dredging of channels in Texas and Louisiana. As summarized in your request for consultation dated March 23, 1995, seven projects occur in the Galveston District that may require annual or periodic maintenance dredging using a hopper dredge. These channels include: the Sabine-Neches Waterway, the Galveston Harbor and Channel, Freeport Harbor, Matagorda Ship Channel, Corpus Christi Ship Channel, Port Mansfield Entrance Channel, and the Brazos Island Entrance Channel. Although dredging in Brazos Channel was conducted during winter months when sea turtles are least abundant in Texas waters, four green turtles and one Kemp's ridley were observed after entrainment by a hopper dredge operating in February of 1995. An additional Kemp's ridley was observed taken in Galveston in August 1995. The enclosed BO reviews the best available information and concludes that continued use of hopper dredges in these channels may adversely affect, but is not likely to jeopardize, the continued existence of any sea listed turtle species.

An incidental take level is established for the total allowable take per fiscal year for all channel dredging in the Galveston District. This take level is attached to the BO and consists of the documented take, by injury or mortality, of seven (7) Kemp's ridleys, five (5) green turtles, one (1) hawksbill, and fifteen (15) loggerhead turtles. A separate incidental take level is established for the New Orleans District. Consultation must be reinitiated by the appropriate District if more than one turtle is taken in any day, or if five or more turtles are taken in any channel. Reasonable and Prudent Measures are listed to ensure the take levels are not exceeded. These measures include: the deployment of NMFS-approved observers, the installation of screening to allow sampling of dredge material, the use of the rigid draghead deflector developed by COE in channels in which takes have been documented, and reporting requirements. Additionally, we recommend that hopper dredging of areas in which sea turtle takes by hopper dredge have been documented, such as Galveston channel, be confined to winter months. Compliance with the measures listed is necessary to insure that sea turtle takes that occur are authorized.

This concludes consultation regarding the effects of hopper dredging on sea turtles in the Galveston District initiated by your letter dated July 20, 1995. 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 BO; or (4) a new species is listed or critical habitat designated that may be affected by the identified action. Additionally, consultation must be reinitiated if the take reaches 75% of the take level established for any one species, or if one hawksbill is taken. If none of the previous criteria are met, consultation must be reinitiated within five years of the date of the enclosed BO.

Please call Colleen Coogan (813 570-5312), in the Southeast Region's Protected Species Branch, or Karen Salvini (301 713-1401), from the Protected Resources Division, if you have any questions regarding the enclosed BO.

Sincerely,

for D A Montanio

William W. Fox, Jr., Ph.D.
Director
Office of Protected Resources

Enclosure

cc: COE GD - Dr. Rob Hauch
F/SEO13 - Oravetz

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, Maryland 20910

SEP 22 1995

Dr. R. H. Schroeder, Jr.
Chief, Planning Division
New Orleans District Corps of Engineers
P.O. Box 60267
New Orleans, LA 70160-0267

Dear Dr. Schroeder:

Enclosed is the Biological Opinion (BO) concluding formal Endangered Species Act Section 7 consultation specifically on the hopper dredging of channels in Texas and Louisiana. Three channels in which sea turtles may occur and hopper dredges may be deployed are within the New Orleans District: the lower Mississippi River's Southwest Pass, the bar channel of the Mississippi River Gulf Outlet (MRGO), and the bar channel of the lower Calcasieu River. During Fiscal Year 1996, hopper dredging in the Southwest and Calcasieu River channels may be completed early in the calendar year, before sea turtles return to Louisiana waters. A hopper dredge may be operating in the bar channel of the MRGO and in Southwest Pass, when turtles may occur in the project area. Hopper dredging in areas and periods in which sea turtles occur has been documented to lethally take listed sea turtles. While we agree that sea turtle takes in hopper dredging activities anticipated in your District are not likely to jeopardize the continued existence of any species, National Marine Fisheries Service (NMFS) cannot concur with your finding that hopper dredging of these channels will not adversely affect listed sea turtle species.

An incidental take level is established for the total allowable take per fiscal year for all channel dredging in the New Orleans District. This take level is attached to the BO and consists of the documented take, by injury or mortality, of seven (7) Kemp's ridleys, three (3) green turtles, one (1) hawksbill, and fifteen (15) loggerhead turtles. A separate incidental take level is established for the Galveston District. Consultation must be reinitiated by the appropriate District if more than one turtle is taken in any day, or if five or more turtles are taken in any channel. Reasonable and Prudent Measures are listed to ensure the take levels are not exceeded. These measures include: the seasonal deployment of NMFS-approved observers, the installation of screening to allow sampling of dredge material, the use of the rigid draghead deflector developed by COE in channels in which takes have been documented, and reporting requirements. Compliance with the measures listed is necessary to insure that sea turtle takes that occur are authorized.

This concludes formal consultation regarding the effects of hopper dredging on sea turtles in the New Orleans District, which was initiated by your letter dated July 20, 1995. 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 BO; or (4) a new species is listed or critical habitat designated that may be affected by the identified action. Additionally, consultation must be reinitiated if the take reaches 75% of the take level established for any one species, or if one hawksbill is taken. If none of the previous criteria are met, consultation must be reinitiated within five years of the date of the enclosed BO.

Please call Colleen Coogan (813 570-5312), in the Southeast Region's Protected Species Branch, or Karen Salvini (301 713-1401), from the Protected Resources Division, if you have any questions regarding the enclosed BO.

Sincerely,

for Montanio

William W. Fox, Jr., Ph.D.
Director
Office of Protected Resources

Enclosure

cc: COE NOD - Beth Nord, Bruce Baird
F/SEO13 - Oravetz

Endangered Species Act - Section 7 Consultation

Biological Opinion

Agencies: United States Army Corps of Engineers (COE), Galveston District and New Orleans District

Activity: Channel Maintenance Dredging Using a Hopper Dredge

Consultation Conducted By: National Marine Fisheries Service (NMFS) Southeast Region

Date Issued: SEP 22 1995

BACKGROUND INFORMATION

Consultations on hopper dredging in channels along the southeast U.S. Atlantic Coast have been conducted since 1978. Information regarding the abundance and distribution of sea turtles along the Atlantic coast was sparse; however, there is documentation of the relative abundance and apparent short-term residence of sea turtles in the Cape Canaveral ship channel, and lethal takes of sea turtles by hopper dredges operating in the channel. Early consultations therefore focused on the effects of hopper dredging only in the Cape Canaveral channel. Further scrutiny indicates that sea turtles aggregate in the vicinity of channels along the east coast when waters are warm, and when takes by hopper dredge have been documented, and are considered likely to occur during spring, fall, and summer months in most channels along the southeast Atlantic Coast. A Biological Opinion issued by NMFS to the COE South Atlantic Division (SAD) on November 25, 1991, found that unrestricted hopper dredging in these channels was likely to jeopardize the continued existence of sea turtles. Consultation concluded that: dredging in Canaveral must be conducted with dredges other than hopper dredges; and hopper dredging along the Atlantic coast from Oregon Inlet, North Carolina, to Ponce Inlet, Florida, must be restricted to the months of December through March. Recently, as a result of the seasonal distribution and abundance data collected by COE-funded research, modifications have been implemented that extend dredging windows in some channels.

Pipeline dredges are relatively stationary, and therefore act on only small areas at any given time. Observer coverage was required at pipeline outflows during several dredging projects deploying pipeline dredges along the Atlantic Coast. No turtles

or turtle parts were observed. Additionally, the COE's SAD provided documentation of hundreds of hours of informal observation by COE inspectors during which no takes of listed species were observed. Additional monitoring by other agency personnel, conservation organizations, and the general public has never resulted in reports of a turtle take by pipeline dredges.

Historically, Section 7 consultations conducted on dredging in the Gulf of Mexico were limited by the meager information available on the seasonal and spatial distribution of sea turtles in Gulf channels. Information was lacking on adverse effects of hopper dredging in the Gulf of Mexico channels on sea turtles or other species under NMFS jurisdiction. Prior to initiation of research into sea turtle abundance and distribution funded by the COE in 1990, there were no data to suggest that sea turtles aggregate in Gulf channels the way they do along the southeast U.S. Atlantic Coast.

Below is a brief review of consultations, dating back to 1990, that were conducted on specific channels being considered within this Biological Opinion. These consultations concluded that dredging was not likely to adversely affect listed species in the Gulf of Mexico.

COE New Orleans District (NOD)

Since 1991, the COE NOD has held annual dredging conferences and has submitted the resulting conference notebook with a request for a Section 7 consultation on the dredging projects anticipated for the upcoming fiscal year. Information on the proposed maintenance dredging dates, anticipated dredge types, and amount of material to be dredged is included within the dredge notebook.

These annual consultations were generally concluded informally, with a concurrence from NMFS that hopper dredging in these channels was not likely to adversely affect any listed species or critical habitat. Since 1990, reporting conditions have been implemented that required the following precautionary measures. The goal of the measures was to improve the information available on interactions between sea turtles and hopper dredge activities in the Gulf. The COE NOD was asked to:

1. Advise inspectors, operators, and vessel captains about the prohibitions on taking, harming, or harassing sea turtles, and the civil penalties that apply.

2. Instruct the captain of the hopper dredge to avoid any turtles encountered while traveling between the dredge site and offshore disposal area, and to immediately contact the COE if sea turtles are seen in the vicinity.

3. Notify NMFS if sea turtles are observed in the dredging area, to coordinate further precautions to avoid impacts to turtles.

No turtle takes have been reported in projects in Louisiana.

A COE-funded research program was conducted during 1993 and 1994 to assess the occurrence of sea turtles in the vicinity of the channel at Calcasieu. COE NOD suggested that ongoing research assessing sea turtle occurrence in the vicinity of the channel during the dredging period, and observations by dredge workers and COE observers, was sufficient to preclude the need for NMFS-approved observers.

Request for consultation was reinitiated for FY 1995 for the channels within the NOD where a hopper dredge was likely to be used. These included Calcasieu, Mississippi River Gulf Outlet (MRGO), and the Mississippi River Southwest Pass. Preliminary studies of sea turtle occurrence in Calcasieu and Sabine Passes, discussed below, suggest that sea turtles may congregate in the vicinity of some passes along the northern Gulf of Mexico during some seasons. Additionally, high levels of sea turtle strandings have been documented over the past few years on Louisiana beaches, despite the lack of dedicated stranding network observer effort. For these reasons, in response to COE NOD's request for consultation, NMFS issued a letter dated January 30, 1995 indicating that NMFS-approved observers were necessary to verify the lack of impact of dredging in these channels on listed sea turtles species. The letter further suggested that formal consultation be conducted in late 1995, incorporating the results of the Calcasieu study and observer reports. NMFS also suggested that the newly-developed rigid deflector draghead be deployed on the dredge if available.

The COE's NOD determined that observers would not be deployed during FY 1995 in the Southwest Pass since the channel consisted primarily of fresh, high flow waters. Additionally, the complexity of dredging operations in Southwest Pass results in up to seven hopper dredges operating at any time in any part of the Pass, often with less than ten days notice. Dredging effort and location are dependant on weather, resultant flow, and siltation from up-river (International Dredging Review, 1995). Variable dredging demands make it difficult to obtain 100% observer coverage at the appropriate extents of the Pass.

A pilot study has been proposed to further characterize the habitat of the Southwest Pass, and to identify the likelihood of turtle occurrence at the Pass. This study should be conducted in concert with the limited observer coverage that is possible in Southwest Pass. During 1995, NMFS-approved observers were deployed on a hopper dredge operating in the Calcasieu Pass

during maintenance dredging operations between April 27 and July 8, 1995. No sea turtle takes were observed.

Reports indicated that screening and observer effort were sufficient to have observed a take had one occurred. Although two sea turtles, a leatherback and a loggerhead, were observed from the dredge, no sea turtle takes were documented. NMFS-approved endangered species observers also attended maintenance dredging operations in the MRGO between March 18 and May 10, 1995. No sea turtles were taken nor observed in the vicinity. Very little biological material was observed in the dredged spoil.

COE NOD submitted a Biological Assessment with the FY 1996 dredging workshop notebook on July 20, 1995 and requested a biological opinion on the effects of the proposed dredging by September 29, 1995.

COE Galveston District (GD)

Consultations have been conducted on a channel-by-channel basis within the GD. During a consultation conducted on the Sabine-Neches Waterway in 1992, NMFS concurred with COE GD's finding that hopper dredging in the Waterway was not likely to adversely affect listed species, based on the lack of documented takes in the project area (May 14, 1992). However, NMFS cited the preliminary information collected in the Sabine area which suggested that sea turtles occurred in the vicinity of the channel. For precautionary purposes, NMFS suggested the COE GD require the following measures:

1. Advise inspectors, operators and vessel captains about the prohibitions on taking, harming, or harassing sea turtles, and the civil penalties that apply.

2. Instruct the captain of the hopper dredge to avoid any turtles encountered while traveling between the dredge site and offshore disposal area, and to immediately contact the COE if sea turtles are seen in the vicinity.

3. Notify NMFS if sea turtles are observed in the dredging area, to coordinate further precautions to avoid impacts to turtles.

These measures were followed on most hopper dredging projects conducted within the GD between 1992 and May of 1995.

Formal consultation was conducted on hopper dredging in the Port Mansfield Channel. The Biological Opinion issued on September 12, 1992 restricted the use of hopper dredges in the Port Mansfield Channel during the months of December through

March. During winter months, observations by dredge personnel and COE dredge inspectors were required. The Opinion recommended the use of pipeline or bucket dredges during all months of the year as an alternative to hopper dredging in this channel. The Opinion also recommended that the COE adhere to National Park Service recommendations regarding dredge operations and disposal activities, and conduct studies to determine the seasonal abundance of sea turtles in the channel.

Informal consultation conducted on winter dredging of the Galveston Harbor and Channel in early 1995 indicated that formal consultation should be conducted for northern Gulf hopper dredging projects between April and November due to new information collected by COE funded research suggesting sea turtles were abundant in waters adjacent to channels. The need for formal consultation and requirements beyond COE observers was further demonstrated in the Brazos Pass, south Texas. Dredging began in February 1995, a time of year when historical information suggests the relative abundance of sea turtles is low. On February 7 and 8, anterior portions of sea turtles were discovered on beaches adjacent to the Pass. Inquiries to the COE GD revealed two unreported observations of live green turtles onboard the dredge by COE inspectors the day after dredging began. Four additional strandings of green turtles with injuries indicative of dredging, and two lethal takes of green turtle were observed before dredging operations were halted on February 26. The final take observed was the lethal take of a Kemp's ridley.

These reports provided the first documentation of sea turtle takes by hopper dredges in channels in the Gulf of Mexico. The COE Galveston and New Orleans District were asked to initiate formal consultation as a result of these documented takes and the new information available regarding the abundance of sea turtles near Gulf channels. Formal consultation was requested by Galveston on March 23, 1995 and by New Orleans on March 31, 1995. Additionally, a Biological Assessment was submitted by the New Orleans District on July 20, 1995. This Biological Opinion responds to both requests and considers the specific effects of hopper dredging within the jurisdiction of the Galveston and New Orleans Districts on listed sea turtles.

PROPOSED ACTION (ONGOING ACTIVITY)

The COE NOD has identified the following channels in which annual maintenance dredging is required, and use of a hopper dredge is anticipated.

1. The lower Mississippi River (mile 4 above Head of Passes to mile 22 below Head of Passes, Southwest Pass): Maintenance dredging is required, conducted by contract and

government-owned hopper dredges for eight to twelve months each year. The FY 1996 Dredging Notebook submitted July 20, 1995, indicates maintenance dredging of the South Pass and the associated bar channel will be conducted by a Cutter head dredge, beginning January 1996 and continuing for approximately six months. Maintenance dredging in Southwest Pass will be done by hopper and Cutter head dredges. Dredging is anticipated to begin in December 1995 and continue for approximately eight months (through July 1996).

2. The bar channel of the MRGO (miles -3.0 to -9.0): Maintenance dredging is conducted annually by contract and government-owned hopper dredges for approximately three months. During FY 1996, maintenance dredging on the MRGO bar channel is anticipated to begin in September and continue for approximately 90 days.

3. The bar channel of the lower Calcasieu River (miles 0.0 to -32.0): Annual maintenance dredging is required for two to three months per year. During FY 1996, this project is scheduled to take approximately 60 days and begin in January.

NMFS-approved observers were deployed on hopper dredges in the MRGO and the Calcasieu River channels during 1995 operations. No takes were observed.

Hopper dredges are used for maintenance dredging in the channels listed below in the GD. Hopper dredges deployed since May 1995 have had 100% observer coverage, good screening, rigid deflector dragheads and have attempted to disengaged dredge pumps when dragheads were suspended in the waters column.

1. The Sabine-Neches Waterway: Annual maintenance dredging is required in this channel, conducted by contract and government-owned hopper dredges in four months. During FY 1995, hopper dredging of Sabine is anticipated for 30 days in late summer.

2. Galveston Harbor Channel: Maintenance dredging is conducted for approximately 3.5 months every 1.5 years using contract and government-owned hopper dredges. Twenty days of hopper dredging in Galveston was forecasted.

3. Freeport Harbor: Annual maintenance dredging is conducted by contract hopper dredging and normally requires two months. During FY 1995, the Outer Bar Channel is scheduled to be hopper dredged, beginning October 1 and lasting for approximately 84 days.

4. Matagorda Ship Channel: Maintenance dredging is conducted for 1.5 months every four years using contract hopper dredge.

5. Corpus Christi Ship Channel: Maintenance dredging is conducted every 1.5 years by contract or government-owned hopper dredge and requires approximately two months. During FY 1995, a hopper dredge has been deployed since August 1, for an anticipated 35 days of dredging.

6. Port Mansfield: Maintenance dredging is required every three years by hopper or pipeline dredge, except for the channel seaward of the jetties which requires approximately one month of hopper dredging during maintenance years.

7. Brazos Island Harbor: Maintenance dredging is conducted every two years by contract hopper dredge and requires approximately 1.5 months. Brazos was dredged during February 1995.

LISTED SPECIES

Listed species under the jurisdiction of NMFS that occur in the Gulf of Mexico include:

Sea Turtles

(1) the endangered Kemp's ridley turtle - *Lepidochelys kempii*
(2) the endangered leatherback turtle - *Dermochelys coriacea*
(3) the endangered hawksbill turtle - *Eretmochelys imbricata*
(4) the endangered/threatened green turtle - *Chelonia mydas*
(5) the threatened loggerhead turtle - *Caretta caretta*

Green turtles in U.S. waters are listed as threatened except for the Florida breeding population, which is listed as endangered. NMFS has determined that leatherbacks are not likely to be affected by hopper dredging in the Gulf of Mexico.

Whales

(1) the endangered blue whale - *Balaenoptera musculus*
(2) the endangered fin whale - *Balaenoptera physalus*
(3) the endangered sei whale - *Balaenoptera borealis*
(4) the endangered sperm whale - *Physeter catodon*

NMFS has determined that listed whales are unlikely to be adversely affected by hopper dredging in the Gulf of Mexico.

Information regarding species in the Gulf of Mexico can be found in the September 12, 1992 consultation on the Mansfield Channel

dredging, which is incorporated by reference. New information is given below.

Value of nearshore northern Gulf waters to Kemp's ridley, loggerhead and green sea turtles

Over 150 Kemp's ridleys have been intentionally live-captured by research gillnets in 1993 and 1994 at Sabine Pass by Texas A&M University (TAMU) scientists conducting research for the COE. This illustrates the availability of ridleys to human interactions in north Texas waters. NMFS' research, also recently funded in part by COE, supports the likelihood that the nearshore waters of Texas and Louisiana provide important developmental habitat for young loggerheads and Kemp's ridley sea turtles. Ogren (1988) suggests that the Gulf Coast, from Port Aransas Texas through Cedar Key, Florida represents the primary habitat for subadult ridleys in the northern Gulf of Mexico. Since 1989, 50 Kemp's ridley (*Lepidochelys kempii*) sea turtles have been tracked using satellite and radio telemetry by the NMFS Galveston Laboratory. The goals of the tracking study were to determine the presence of sea turtles within navigation channels that are Federally maintained with hopper dredges. The study included attempts to characterize sea turtle habitat and migration patterns.

The enclosed figures (Renaud, unpublished data, Dec. 8, 1994) illustrate the movements of radio and satellite tracked ridleys in the western Gulf of Mexico from April through September (Figure 1) and from October through March (Figure 2). Sea turtles occurred within the waters of Galveston Bay and the Intracoastal during both seasons, although data suggest that ridleys move southward along the Texas coast as nearshore northern Gulf waters cool (Renaud, Draft in-house report, Dec. 8, 1994). Ridleys and other turtle species are least abundant in Texas waters from December through February, after a sharp drop in water temperatures.

Although the figures illustrate a greater density of turtles in the waters of Sabine Pass and northern Louisiana during summer months, this may be a factor of sampling success at Sabine and observed short-term site fidelity among juvenile ridleys. TAMU staff have initiated a netting program in the Bolivar Roads Pass (the channel and pass entering Galveston Bay from the Gulf); however, few turtles have been collected. During 1994, NMFS tracked one loggerhead and three Kemp's ridleys collected from the Bolivar Roads Pass. An additional 10 turtles that were treated after capture by hook and line also were tagged and released in the Galveston area. Because of discontinuous monitoring, no ridleys were actually observed going through the Pass into Galveston Bay (Renaud *et al.*, 1995). However, turtles captured offshore were later found in inshore Galveston Bay.

The large number of sea turtles taken by hook and line from the Galveston area suggest that, despite low capture rates in research gillnets, ridleys and loggerheads are abundant near the project area (Cannon, pers comm). Stranding data, discussed below, also suggest that loggerheads and ridleys are common in east Texas (i.e., east of Freeport) waters. Workers suggest that different sampling conditions and unfavorable weather have contributed to the low number of captures during sampling efforts.

During 1994, 27 adult-sized Kemp's ridleys stranded in Texas, primarily west of Freeport. Sex could only be identified in 11 carcasses. Seven of these were females, including three with tags from Rancho Nuevo indicating they had nested at the main nesting beach. A fourth tagless female was gravid. Additionally, a pair of mating Kemp's ridley turtles were observed and photographed on June 3, 1991 in the channel west of the Mansfield Channel jetties (Shaver, pers comm).

In addition to the NMFS studies, satellite transmitters have been applied to approximately 50 adult female Kemp's ridleys over the last decade to identify the movements of the females after leaving the nesting beach in Rancho Nuevo, Mexico (Byles, unpublished data). While most female ridleys head south towards the Bay of Campeche after leaving the beach, two out of eight turtles headed into nearshore Texas waters during one year's study. Clearly, reproductively active Kemp's ridleys, which are directly required for the recovery of the population, are found within the U.S. Gulf of Mexico, and are as vulnerable to human impacts as sub-adults.

Stomach content analyses on sea turtles stranded in Texas suggest that, in all years, mortalities involved sea turtles that had been foraging in nearshore waters shortly before death. Studies conducted on loggerheads stranded on the lower Texas coast (south of Matagorda Island) have indicated that stranded individuals were feeding in nearshore waters shortly before their death (Plotkin *et al.*, 1993). Stomach contents of Kemp's ridleys along the lower Texas coast also showed a predominance of nearshore crabs and mollusks, as well as fish, shrimp, and other foods considered to be shrimp fishery discards (Shaver, 1991). Analyses of stomach contents from sea turtles stranded on north Texas beaches suggest similar nearshore foraging behavior (Plotkin, pers comm).

Historical information

The value of the coastal waters of the Gulf of Mexico to sea turtles is supported by historical accounts of the occurrence of sea turtles in Louisiana and Texas waters. Interviews with shrimp fishermen conducted in the late 1970s indicated that sea

turtle capture rates in Louisiana were second only to those reported in Florida (Fuller, 1978). An annual average of about four turtles were reportedly taken by each vessel during the 1970s. Shrimp fishermen recalled catching up to 45 to 55 sea turtles per year in the 1940s and 1950s (Cox and Mauermann, 1978). Cox and Mauermann indicated that more sea turtles were taken nearshore (< 10 fathoms) than offshore.

Fuller and Tappan (1986) conducted 131 interviews with Louisiana fishermen, pilots, offshore workers, and divers in 1986. Shrimpers at that time reported takes of one or two turtles per year. More than 50% of the people interviewed thought there were fewer turtles in 1986 than there were 10 years earlier, while 17% of those interviewed thought sea turtle numbers in the Gulf of Mexico had increased.

Most of the sea turtles identified in the fishery interviews conducted in 1986 were reported to be Kemp's ridleys (*Lepidochelys kempii*), although 45% of the reporters could not identify the species of turtles observed. Ogren (1988) indicated that Caillou Bay and Terrebonne Parish were areas of periodically high rates of incidental capture of Kemp's ridleys in shrimp trawls from the mid-1970s. Prior to that, E. A. Liner, in a paper in the proceedings of the 1954 Louisiana Academy of Sciences, discussed 11 ridleys taken in shrimp trawls off Terrebonne Parish.

Henry Hildebrand summarized historical records of sea turtles in Texas waters and their interactions with fisheries in a contract report to NMFS in 1980 (Hildebrand, 1980). His primary source was from south Texas, and he begins his paper with a qualification of that bias. Since green turtles are the preferred food turtle, they made up the majority of very early sea turtle accounts in Texas waters. Hildebrand cites an 1893 report of 585,000 pounds of green turtle caught, primarily between Rockport and Fulton, Texas. One 900 green turtle sample included turtles averaging 270 pounds, much larger than the size class seen most commonly today. The coastal fishery for green turtles, as well as a freeze in 1899, are blamed for the decline in abundance of greens still obvious today. Hawksbills had been documented but were never abundant in nearshore Texas waters. Records of ridleys were scarce; a condition Hildebrand attributes in part to misidentification. All size classes of ridleys were reported, and some nesting had been documented. Loggerheads were the most abundant species in historical reports reviewed by Hildebrand, at least after the 1899 freeze. There was sparse documentation of the occurrence of loggerheads and ridleys in embayments, and Hildebrand considered loggerhead habitat to be primarily the shallow continental shelf out to ten fathoms.

Distribution of sea turtles based on strandings

Stranding data, which are a useful tool for determining the general distribution of sea turtles in nearshore waters, indicate that Kemp's ridleys and loggerheads are abundant in nearshore northern Gulf waters. Netting studies suggest that green turtles occur in greater relative abundance in the embayments in southwest Texas. Hawksbills also occur in the northern Gulf, although in lesser numbers than all other species.

In recent years, unprecedented numbers of Kemp's ridley carcasses have been reported from Texas and Louisiana beaches during periods of high levels of shrimping effort. During May and June 1993, 104 endangered Kemp's ridley turtles stranded on beaches in the vicinity of Grand Isle, Louisiana. During 1994, an unprecedented 174 sea turtle strandings were reported on offshore Louisiana beaches, including 134 Kemp's ridleys. Also during 1994, 488 strandings occurred on offshore Texas beaches, including 243 ridleys and 190 loggerheads. While most of these turtles are believed to have been incidentally taken in the shrimp fishery, these events illustrate the vulnerability of Kemp's ridleys and loggerheads to impacts by human activities nearshore in the northern Gulf of Mexico.

In summary, review of the best available information suggests that Kemp's ridleys and loggerheads remain in shallow, warm, nearshore waters in the northern Gulf of Mexico until cooling waters force them offshore or south along the Texas and Florida Coast (Renaud, pers comm). Green turtles occur throughout the Gulf of Mexico, but have been documented primarily in embayments of southwest Texas.

New information regarding the relative abundance of Kemp's ridleys in the Gulf of Mexico

Precise data regarding the total number of Kemp's ridleys occurring in the Gulf of Mexico are not available. Trends in turtle populations are identified through monitoring of their most accessible life stages on the nesting beaches, where hatchling production and the status of adult females can be directly measured. Most Kemp's ridley nesting occurs in aggregations, called arribadas, on a single beach at Rancho Nuevo, Mexico. Film taken in 1947 documented over 40,000 nesting females in a single day during an arribada at Rancho Nuevo (Carr 1963). Bi-national protection and monitoring by Mexico and the United States has occurred on the nesting beach since 1978. Since monitoring began, arribadas usually include less than 200 females (FWS and NMFS, 1992). Nest production plummeted to only 702 nests in 1985, but has been steadily increasing since that time. Over 1500 nests were observed during the 1994 nesting season, and greater than 1800 nests were documented through July

of 1995. These two years represent the highest nesting years since monitoring was initiated. While these data need to be interpreted cautiously due to expanded monitoring efforts since 1990, greater than 110,000 hatchlings were released from Rancho Nuevo during 1994, compared to 50,000 to 80,000 over the preceding six years (Byles, USFWS, pers comm).

Documented evidence and anecdotal accounts suggest an upward trend in the Kemp's ridley population. A recovery criteria for downlisting the Kemp's ridley from endangered to threatened status is 10,000 nesting females per season (Recovery Plan for the Kemp's ridley sea turtle, FWS and NMFS, 1992). Considering that 58% of all adult females appear to nest in any one year, and each female lays an estimated 2.7 nests, USFWS estimates suggest that the number of nesting females in the ridley population remains below 1000. This is less than 2.5% of the nesting females observed in one day in 1947, and only 5% of the downlisting criterion identified in the Recovery Plan. Continued protection of all life stages of Kemp's ridleys is necessary to increase the reproductive population and ensure recovery of the species.

It is not certain whether the abundance of sea turtles in Texas and Louisiana during 1994 was a seasonal anomaly, or reflects the current status of sea turtles in nearshore waters. Although strandings have been elevated during 1995, they have not reached the unprecedented levels documented during 1994, due to implementation of an Emergency Response Plan restricting gear types used by the shrimp fishery in high stranding areas.

ASSESSMENT OF IMPACTS

New information suggests that aggregations of sea turtles can be found in the vicinity of Gulf of Mexico channels. Hopper dredges are known to take sea turtles. Cumulatively, large numbers of three species of sea turtles (loggerheads, greens, and ridleys) have been observed taken by hopper dredges in Canaveral, Kings Bay, Savannah, and Brunswick channels. Until 1995, sea turtle takes were not observed during dredging operations in the Gulf of Mexico.

Dredging of Brazos Pass, Texas began in February 1995 - a period in which historical information suggests the relative abundance of sea turtles is low. On February 7 and 8, anterior portions of sea turtles were discovered on beaches adjacent to the Pass. Inquiries to the COE GD revealed two takes of live green turtles were observed onboard the dredge by COE inspectors the day after dredging began. Four additional strandings of green turtles with injuries indicative of dredging, and two lethal takes of green turtles, were observed before dredging operations were halted on

February 26 due to the documentation of the lethal take of a Kemp's ridley.

Impacts on Kemp's ridleys

Kemp's ridleys make up the vast majority of strandings throughout Louisiana waters, and west through Freeport, Texas. Large numbers of juvenile Kemp's ridleys have been captured by TAMU workers near Sabine and Calcasieu passes. Telemetry studies show short-term site fidelity among the ridleys, not dissimilar to that seen among loggerheads near the Cape Canaveral ship channel. Four of 28 radio tracked turtles collected from Sabine and Calcasieu Pass channels were observed in the channels between the jetties or just seaward of the jetties. Although sea turtles were observed relatively rarely within channel waters, they were documented in inshore waters, which required transit through the passes into the bays (Renaud *et al.*, 1994). Observers on the dredge in Calcasieu Pass during 1995 documented biological debris that included numerous benthic invertebrates which are prey species for ridleys and loggerheads (Final observer report to COE, submitted to NMFS 10 August 1995). Three Kemp's ridleys have been taken lethally in the channels associated with nearby Galveston Harbor so far this year. Since the dredged material is primarily heavy clay, takes are difficult to observe and additional takes may have occurred unobserved. In addition to one Kemp's ridley taken at Brazos Pass in February, 1995, a total of four Kemp's ridleys were taken in the Galveston District in FY 1995.

Preliminary results from COE-funded research projects indicate shallow, warm, nearshore waters in the northern Gulf of Mexico provide prime Kemp's ridley habitat until cooling waters force turtles offshore or south along the Florida and Southwest Texas Coast (Renaud, pers comm). Generally, ridleys were observed in water depths of less than 18 m (Renaud, Draft in-house report transmitted Dec. 8, 1994), and waters greater than 12° C. Ridleys, as well as other sea turtle species, are least abundant in nearshore waters of the northern Gulf of Mexico waters from December through February, after a sharp drop in water temperatures. The entrainment of green turtles and a ridley during February of 1994 illustrate the fact that sea turtles may return to nearshore southwest Texas waters quickly if reversed currents introduce warmer waters from the south.

Stranding data suggest that ridleys, primarily juveniles, are most common in coastal Gulf waters east of Freeport. However, adult ridley strandings occur primarily west of Freeport. Therefore, NMFS believes that Kemp's ridleys are significantly vulnerable to hopper dredging and other human activities throughout the Gulf of Mexico.

Impacts on loggerheads

The distribution of loggerheads in coastal waters is similar to that of Kemp's ridleys. Both species are benthic foragers with similar prey preferences, although some spatial segregation may occur in Texas waters (Plotkin, 1993). While strandings indicated loggerheads occur throughout the Gulf, their abundance relative to Kemp's ridleys is only higher from Freeport, Texas west. Like ridleys, they would be vulnerable to hopper dredging in areas in which they congregate. One lethal take of a loggerhead was observed in the Port Aransas area of the Cape Canaveral ship channel on September 16, 1995.

Impacts on greens

Green turtles are also observed throughout the Gulf of Mexico, but are rarely reported stranded north of Aransas Pass. Sampling efforts in the Mansfield Pass suggest that green turtles aggregate between the jetties of the south Texas passes (Shaver, pers comm). Between June, 1989 and April, 1992, 58 sea turtle captures (57 green and one hawksbill, representing a total of 38 individuals) were recorded during monthly sampling in the entrance channel near the north Jetty. Repeated captures, suggesting short-term residency, were not uncommon. Most turtles were captured during warm months of the year. Although strandings occur year-round in south Texas, no captures occurred in the Mansfield Pass area when water temperatures dropped below 15.5° C.

Work conducted in 1991 and 1992 by TAMU and the NMFS Galveston Lab, funded by COE, confirm that the Brazos Santiago Pass and the Laguna Madre waters provide important developmental habitat for juvenile green turtles. Green turtles and one loggerhead were collected in the area, and habitat characterization studies identified numerous forage species for both turtles (Landry *et al.*, 1992). Although telemetry studies suggest green turtles rarely use the Brazos Santiago Channel (Renaud *et al.*, 1993), use of the Pass is necessary for transit between habitats. The Renaud *et al.* study concluded that biannual dredging was not a major threat to green turtles in the vicinity of the Brazos Santiago Channel. However, four green turtle takes have been observed during dredging operations in that area. In addition, strandings on adjacent beaches suggest that additional green turtles were killed by the hopper dredge.

Impacts on hawksbills

The reporting of hawksbill strandings throughout the Gulf of Mexico is rare. NMFS believes that there is a small possibility of incidental take of hawksbills by channel dredging.

In summary, NMFS believes that sea turtles, primarily Kemp's ridleys, loggerheads, and hawksbills, may be taken by hopper dredges in all ship channels in the northern Gulf when water temperatures exceed 12° C. Lacking seasonal water temperature data, NMFS believes takes may occur from April through November northeast of Corpus Christi, Texas. NMFS concurs with COE's NOD's assessment that takes are least likely in the Southwest Pass of the Mississippi River. However, some observed data are necessary to identify the presence or absence of sea turtles or their prey species in the seaward extents of the Pass. Brazos Pass and the channels of southwestern Texas may be exceptions, as takes may occur between December and March if current reversals bring warm water north alongshore of southwest Texas. NMFS believes that dredging with pipeline or clamshell dredges, or with a hopper dredge operating from December through March in the channels northeast of Corpus Christi, is not likely to adversely affect listed species under NMFS purview.

CUMULATIVE EFFECTS

Cumulative impacts from unrelated, non-Federal actions occurring in the Gulf of Mexico may affect listed sea turtles and their habitats. Sea Turtle Stranding Network data indicate sea turtles in the Gulf of Mexico die of various natural causes, including cold stunning, and as a result of human activities not authorized under any Federal programs, such as incidental capture in recreational fisheries, ingestion of, or entanglement in debris, boat strikes, degradation and development of nesting habitat, and degradation of foraging habitat by pollution from unpermitted discharges. In the northern Gulf, the state-permitted gillnet fishery in Louisiana waters, recreational fishing, and habitat loss are particularly likely to have severe impacts on sea turtles.

CONCLUSION

New information suggests that aggregations of sea turtles can be found in the vicinity of Gulf of Mexico channels. The extent of takings that may occur cannot be precisely quantified at this time. However, based on the limited observer information collected to date, NMFS believes that the proposed activity may adversely affect, but is not likely to jeopardize the continued existence of any sea turtle species. Close monitoring of hopper dredging activities is needed in channels in the northern Gulf of Mexico when water temperatures exceed 12° C. Measures to prevent sea turtle captures are necessary to minimize the impacts of maintenance dredging activities, including effective use of the rigid deflector draghead developed by COE's Waterways Experiment Station, or seasonal hopper dredging restrictions.

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.

CONSERVATION RECOMMENDATIONS

Pursuant to Section 7(a)(1) of the Endangered Species Act of 1973, the following conservation recommendations are made to assist the COE in reducing/eliminating adverse impacts to sea turtles that result from hopper dredging.

1. Channel-specific studies should be continued to identify seasonal relative abundance of sea turtles within northern Gulf channels. Given adequate information on turtle distribution and abundance on a channel-specific basis, or on the habitat characteristics of specific channels, it may be possible to expand or contract hopper dredging observer requirement/ restriction windows. Surveys may indicate that some channels do not support significant turtle populations, and hopper dredging in these channels may be unrestricted on a year-round basis.

2. Relocation trawling has shown limited success in east coast channels at temporarily reducing the abundance of sea turtles during periods in which dredging is required. Relocation trawling in advance of an operating dredge in Texas and Louisiana channels should be considered if takes are documented early in a project that requires use of a hopper dredge during a period in which large numbers of sea turtles may occur.

3. Implementation of the pilot study to identify the habitat characteristics at Southwest Pass of the Mississippi River, including the collection of data on salinity, water temperatures, water clarity, current and climactic factors from Venice to Southwest Pass, including monthly data compilation and opportunistic observations of biological and physical occurrences, proposed by COE NOD, is recommended. Results from the COE NOD study may indicate that seasonal restrictions and observers in the Southwest Pass area are unnecessary.

4. The Gulf COE Districts should supplement the efforts of the South Atlantic Division and Waterways Experiment Station to develop possible modifications to existing dredges which might reduce or eliminate the take of sea turtles. Valid, replicable studies to estimate the effectiveness of the rigid draghead deflector should be conducted in concert with dredging activities using the deflector. NMFS should be consulted regarding the development of a protocol for draghead evaluation tests. This requirement was listed in the consultation conducted on channel dredging along the Atlantic coast (1991), which anticipated the necessity of testing the effectiveness of new draghead designs under carefully monitored conditions in channels where sea turtles are present.

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 action 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 results of previous hopper dredging activities, including dredging of southeastern U.S. channels, and Brazos Pass, Texas, NMFS anticipates that future hopper dredging activities may result in the injury or mortality of loggerhead, Kemp's ridley, and green turtles. Therefore, a low level of incidental take, and terms and conditions necessary to minimize and monitor takes, is established. An incidental take level for each COE District is established.

For the New Orleans District, the incidental take, by injury or mortality, of seven (7) documented Kemp's ridleys, three (3) green turtles, one (1) hawksbill, and fifteen (15) loggerhead turtles, is set pursuant to Section 7(b)(4) of the ESA. This take level represents a total allowable take per fiscal year for all channel dredging in the New Orleans District.

For the Galveston District, the incidental take, by injury or mortality, of seven (7) documented Kemp's ridleys, five (5) green turtles, one (1) hawksbill, and fifteen (15) loggerhead turtles, is set pursuant to Section 7(b)(4) of the ESA. This take level represents a total allowable take per fiscal year for all channel dredging in the Galveston District. A greater number of green turtles is included in the incidental take level established for the Galveston District due to the greater abundance of green turtles in south Texas waters.

If the incidental take meets or exceeds the level set for either District, the pertinent COE District must reinitiate consultation. In addition, consultation must be reinitiated if the take reaches 75% of the take level established for any one species, or if one hawksbill is taken. To ensure that the specified levels of take are not exceeded early in a project, the 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 NMFS Southeast Region will cooperate with the COE in the review of such incidents to determine the need to implement further mitigating measures or to terminate the remaining dredging activity.

Seasonal restrictions on hopper dredging listed in the terms and conditions of this incidental take statement may be adjusted on a channel-by-channel basis as improved information on turtle distribution is collected.

The reasonable and prudent measures that NMFS believes are necessary to minimize the impact of hopper dredging in the Gulf of Mexico have been discussed with the COE. The following terms and conditions are established to implement these measures, and to document the incidental take should such take occur. Only incidental takes that occur while these measures are in full implementation are authorized. These restrictions remain valid until reinitiation and conclusion of a subsequent Section 7 consultation.

1. Pipeline or hydraulic dredges must be used whenever possible between April 1 and November 30 in Gulf of Mexico waters up to one mile into rivers. This recommendation should be considered particularly in channels such as those associated with Galveston Bay, where lethal takes of Kemp's ridleys have been documented during summer months. The annual summary report, discussed below, must give a complete explanation of why alternative dredges were not used for maintenance dredging of channels between April and November.

2. Hopper dredging activities occurring in Gulf of Mexico waters and up to one mile into rivers shall be completed between December 1 and March 31, when sea turtle abundance is lowest throughout Gulf coastal waters, whenever possible. This dredging window and associated observer requirements listed below may be adjusted on a channel specific basis, if (1) the COE can provide sufficient scientific evidence that turtles are not present or that levels of abundance are extremely low during other months of the year, or (2) the COE can identify seawater temperature regimes that insure low abundance of sea turtles in coastal waters, and can monitor water temperatures in a real-time manner.

   In addition, if the COE can provide evidence that an engineering solution, such as the rigid draghead deflector, is significantly effective at excluding sea turtles from hopper dredge entrainment, such information may also be considered in extending the dredging window.

3. The COE shall arrange for NMFS-approved observers aboard hopper dredges to monitor the hopper spoil, screening, and dragheads, for sea turtles and their remains, as appropriate. That is, observers shall be aboard the hopper dredges year-round from Corpus Christi, southwest (from Aransas Pass to Brazos Pass at the Mexican Border. If no turtle take is observed during December, observer coverage can be terminated during January and February or until water temperatures again reach 12°. In channels northeast of Corpus Christi, Texas (except for Southwest Pass as discussed below), observers shall be aboard whenever surface water temperatures are 12° or greater, and/or between April 1 and November 30. Due to the complexity of dredging operations in Southwest Pass, one observer must be deployed on a hopper dredge operating between April 1 and November 30, 1996. Whenever possible, the observer must be on a hopper dredge deployed in the seaward extent of the pass. While this does not represent 100% observer coverage for Southwest Pass, it ensures sufficient coverage to detect interactions with sea turtles, which are less likely in this Pass than in all others in the northern Gulf. The observer may assist with data collection associated with the pilot study noted in the Conservation Recommendations. Observer reports must be faxed to NMFS Southeast Regional Office (813 570-5517) within 24 hours of any sea turtle take observed.

4. During periods in which hopper dredges are operating and NMFS approved observers are not required, (as delineated in 3. above), the appropriate COE District must:

   a. Advise inspectors, operators and vessel captains about the prohibitions on taking, harming, or harassing sea turtles, and the civil penalties that apply.

   b. Instruct the captain of the hopper dredge to avoid any turtles encountered while traveling between the dredge site and offshore disposal area, and to immediately contact the COE if sea turtles are seen in the vicinity.

   c. Notify NMFS if sea turtles are observed in the dredging area, to coordinate further precautions to avoid impacts to turtles.

   d. Notify NMFS immediately if a sea turtle is taken by the dredge.

5. When sea turtle observers are required on hopper dredges, in the areas and seasons that turtles may be present (see 3. above), 100% inflow screening is required whenever possible, and 100% overflow screening is recommended. If conditions prevent 100% inflow screening, inflow screening may be reduced, but 100% overflow screening is then required, and an explanation must be included in the preliminary dredging report.

6. Every effort must be made to disengage dredging pumps while the dragheads are firmly on the bottom to prevent impingement of sea turtles within the water column.

7. The rigid deflector draghead must be used on all hopper dredges in all Gulf of Mexico channels in areas of documented take or in areas and seasons of known concentrations of sea turtles.

8. Reporting: A preliminary report summarizing the results of the dredging and any documented sea turtle takes must be submitted to NMFS within 30 working days of completion of any given dredging project. An annual report (based on either calendar or fiscal year) must be submitted to NMFS summarizing hopper dredging projects and documented incidental takes.

9. Consultation must be reinitiated within five years from the date of signature of this biological opinion.

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