–52 ft from –45 ft mean low tide (MLT), plus advanced maintenance and allowable overdepth; deepening the remainder of the channel into the Gulf of Mexico to 54 ft (depths will be increased roughly 10,000 ft into the Gulf of Mexico to the –56 ft isobath); widening of the Upper bay and Lower Bay reaches (from Port Aransas to Harbor Bridge) to 530 ft (existing widths are 500 ft between Port Aransas and La Quinta Junction and 400 ft between La Quinta Junction and the Harbor Bridge); construction of 200-ft wide barge shelves (-12 ft MLT) on both sides of the ship channel from La Quinta Junction to the Harbor Bridge, across the Upper bay portion of the CCSC; and extending La Quinta Channel 7,200 ft to a depth of –40 ft MLT and a width of 400 ft and including a turning basin.

It is estimated that approximately 40 million cubic yards of new work would require seven separate dredging contracts to complete. Dredged material management incorporates the use of existing placement areas, as well as newly designated placement areas including several beneficial use (BU) sites. BU sites will be constructed to create several hundred acres of shallow water habitat throughout the bay system; environmental enhancement features consist of construction of two breakwaters to protect and enhance existing habitat. The proposed work is to be conducted by pipeline dredges in the bay, and hopper dredges in the entrance channel. The dredged new material from the entrance channel described in the June 2002 Draft Feasibility Report and Draft EIS consists predominantly of medium to dense sand and soft clay.

The COE proposes to use hopper dredges to deepen the Corpus Christi Ship Channel Entrance Channel. The Entrance Channel includes the Inner Basin, the Jetty Channel Reach, and the Outer Bar Reach including the extended portion. The length of the Entrance Channel from the landward end of the Inner Basin and including the proposed extension of the Outer Bar Reach into the Gulf of Mexico is approximately 7 miles. The proposed work will also widen an approximately 1000-foot portion of the Jetty Channel Reach from 600 to 700 feet and deepen the area as described above. The Outer Bar Reach width will be extended at the same 700-foot width as existing and deepened as described above. The action area includes an offshore site for the placement of dredged materials. The Dredged Material Placement Area 1 (PA 1, also referred to as ODMPA 1) has been used continuously for such purpose since at least 1940. Use of PA 1 for maintenance material has been previously coordinated under the September 22, 1995, Regional Biological Opinion (RBO) on Channel Maintenance Dredging Using a Hopper Dredge (RBO). Two beneficial use sites are also proposed for one-time use: BU 1 (also referenced as Site MN) and BU 10 (also referenced as Navy Homeport Site); both are in near proximity to PA 1.

Maintenance dredging of the Corpus Christi Ship Channel is conducted every 1.5 years by contract or government-owned hopper dredge and requires approximately 2 months. One loggerhead was lethally taken during clean-up in the entrance channel in September 1995 and 3 additional turtles, all loggerheads, were lethally taken in June 1999.

The Corpus Christi Ship Channel Entrance Channel has been divided into two separate sections for planning purposes: the inshore section from the approximate beginning of the landward end of the Inner Basin east to approximately ½ mile seaward from the end of the submerged portion of the Aransas Pass south jetty, the Jetty Reach Channel (JRC); and the nearshore section from approximately ½ mile seaward from the submerged end of the Aransas Pass jetties east to the seaward end of the extension channel in the Gulf of Mexico, referred to the Outer Bar Reach (OBR). Maintenance dredging of the present Entrance Channel and use of PA 1 using hopper dredges is covered under the 1995 RBO, and therefore any takes are counted against the ITS for that RBO. The proposed extension of the OBR begins

approximately 2.6 miles offshore and ends about 4.6 miles offshore of the submerged end of the south jetty. NOAA Fisheries has determined that sea turtles may occur in the area of the OBR extension only as transients due to lack of structure to attract sea turtles or their prey species; however, hopper dredging in the JRC and OBR is likely to result in the taking of sea turtles, particularly loggerheads, and therefore, the OBR extension is included in this Opinion and incidental take statement. The COE will implement the following measures when hopper dredges are being used during new work dredging of the Corpus Christi Ship Channel Improvement Project JRC and OBR:

- One-hundred percent observer coverage by NOAA Fisheries-approved observers will be required. Additionally, while a hopper dredge is operating in the JRC and OBR, the COE and NOAA Fisheries will maintain close contact with the Sea Turtle Stranding and Salvage Network to determine whether beached sea turtles display evidence of impingement by the dredge.

- The COE expects to encounter soft clays and sands during new work dredging of the entrance channel and will use maintenance material dragheads. The maintenance draghead (sea turtle) deflector designed for use in soft sediments has been modified for use in hard virgin clay. It will be used for this project only if extensive areas of hard virgin clays are unexpectedly encountered unless the modified deflector results in substantially reduced production that will increase the amount of time the dredge will operate. The COE will inspect the appropriate draghead deflector prior to commencement of dredging to ensure that the selected deflector has been tailored appropriately for this project. Additionally, the COE will assess whether the dredge operator appears to be familiar with the operation of the applicable draghead deflector and will provide necessary training where appropriate. The COE will contact NOAA Fisheries to discuss any problems with the modified draghead deflector prior to authorizing removal during dredging of hard clay. If the modified draghead deflector proves unworkable in hard virgin clays encountered, the COE will discontinue dredging operations until an alternate solution has been agreed upon with NOAA Fisheries, such as having a contract trawler drag ahead of the hopper dredge to sweep the area clean of sea turtles.

- One-hundred percent overflow screening will be required and must be designed to maximize sampling of the dredged material. Additionally, modified inflow screening will be required. The draghead inflow screens should have 6- by 6-inch screening on the bottom and 4- by 4-inch screening on the top. If the dredge operator, in consultation with observers and any onboard COE or NOAA Fisheries personnel, determines that the draghead is clogging and reducing production substantially, the screens can be quickly modified to have 12- by 12-inch openings on the bottom and 8- by 8-inch openings on top. Clogging should be greatly reduced with these flexible options; however, further clogging may compel removal of the screening altogether. In past consultations NOAA Fisheries has agreed that these flexible options are necessary, since the need to constantly clear the screens will increase the time it takes to complete the project and therefore increase the exposure of sea turtles to the risk of impingement. Additionally, there are increased risks to sea turtles in the water column when the inflow is halted to clear screens, since this results in clogged intake pipes that may have to be removed from the bottom to discharge the clay.

- Sea turtle takes are most likely to occur during dredging of the JRC and OBR. These areas will be dredged during winter months (mid-November through mid-April), when sea turtle abundance is lowest.

The COE will continue to coordinate with the COE's Waterways Experiment Station, the COE's South Atlantic Division, and dredge operators regarding additional measures to further reduce the likelihood of sea turtle takes. The diamond-shaped *pre-deflector*, or another promising design such as tickler chains or water jets, should be used wherever possible, as a means of alerting sea turtles that something is coming towards them before they encounter the deflecting draghead. Due to their experimental nature, use of pre-deflectors is not a requirement at this time.

II. Status of Listed Species and Critical Habitat

The following listed species under the jurisdiction of NOAA Fisheries are known to occur in waters of the Gulf of Mexico nearshore areas and bays in or near the action area.

Common Name	Scientific Name	Status
Sea turtles:		
Kemp's ridley	*Lepidochelys kempii*	E
Leatherback	*Dermochelys coriacea*	E
Hawksbill	*Eretmochelys imbricata*	E
Green	*Chelonia mydas*	E/T*
Loggerhead	*Caretta caretta*	T
Whales:		
Northern right	*Eubalaena glacialis*	E
Humpback	*Megaptera novaeangliae*	E
Sperm	*Physeter macrocephalus*	E
Fin whale	*Balaenoptera physalus*	E
Blue whale	*Balaenoptera musculus*	E
Sei whale	*Balaenoptera borealis*	E

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

Of the listed species that may occur in the action area, only sea turtles are known to be taken by dredges. There are no documented takes of large whales by dredges. In addition, the proposed project will take place in Corpus Christi Bay and associated nearshore areas where large whales rarely occur. Based on this information, whales are not likely to be adversely affected by the proposed action and therefore, will not be considered further in this biological opinion. Summary information on the status and biology of the remaining species that may be affected by the proposed action is provided below.

There is no designated critical habitat for any listed species under the purview of NOAA Fisheries within the action area.

A. Species/critical habitat description

Loggerhead Sea Turtle

The loggerhead sea turtle was listed as a threatened species in 1978. This species inhabits the continental shelves and estuarine environments along the margins of the Atlantic, Pacific, and Indian Oceans, and within the continental U.S. it nests from Louisiana to Virginia. The major nesting areas include coastal islands of Georgia, South Carolina, and North Carolina, and the Atlantic and Gulf coasts of Florida, with the bulk of the nesting occurring on the Atlantic coast of Florida. Developmental habitat for small juveniles are the pelagic waters of the North Atlantic and the Mediterranean Sea.

There is no critical habitat designated for the loggerhead sea turtle.

Green Sea Turtle

Federal listing of the green sea turtle occurred on July 28, 1978, with all populations listed as threatened except for the Florida and Pacific coast of Mexico breeding populations which are endangered. The complete nesting range of the green turtle within the NOAA Fisheries Southeast Region includes sandy beaches of mainland shores, barrier islands, coral islands, and volcanic islands between Texas and North Carolina and at the U.S. Virgin Islands (U.S.V.I.) and Puerto Rico (NMFS and USFWS 1991a). Principal U.S. nesting areas for green turtles are in eastern Florida, predominantly Brevard through Broward counties (Ehrhart and Witherington 1992). Regular green turtle nesting also occurs on St Croix, U.S.V.I., and on Vieques, Culebra, Mona, and the main island of Puerto Rico (Mackay and Rebholz 1996, Díez pers. comm.).

Critical habitat for the green sea turtle has been designated for the waters surrounding Isla Culebra, Puerto Rico and its associated keys.

Kemp's Ridley Sea Turtle

The Kemp's ridley was listed as endangered on December 2, 1970. Internationally, the Kemp's ridley is considered the most endangered sea turtle (Zwinenberg 1977, Groombridge 1982). Kemp's ridleys nest in daytime aggregations known as arribadas, primarily at Rancho Nuevo, a stretch of beach in Mexico, Tamaulipas State. The species occurs mainly in coastal areas of the Gulf of Mexico and the northwestern Atlantic Ocean. Occasional individuals reach European waters (Brongersma 1972). Adults of this species are usually confined to the Gulf of Mexico, although adult-sized individuals sometimes are found on the Eastern Seaboard of the United States.

There is no designated critical habitat for the Kemp's ridley sea turtle.

Leatherback Sea Turtle

The leatherback was listed as endangered on June 2, 1970. Leatherbacks are widely distributed throughout the oceans of the world, and are found in waters of the Atlantic, Pacific, and Indian Oceans; the Caribbean Sea; and the Gulf of Mexico (Ernst and Barbour 1972). Adult leatherbacks forage in temperate and subpolar regions from 71°N to 47°S latitude in all oceans and undergo extensive migrations between 90°N and 20°S, to and from the tropical nesting beaches. In the Atlantic Ocean,

leatherbacks have been recorded as far north as Newfoundland, Canada, and Norway, and as far south as Uruguay, Argentina, and South Africa (see NMFS SEFSC 2001). Female leatherbacks nest from the southeastern United States to southern Brazil in the western Atlantic and from Mauritania to Angola in the eastern Atlantic. The most significant nesting beaches in the Atlantic, and perhaps in the world, are in French Guiana and Suriname (see NMFS SEFSC 2001).

Critical habitat for the leatherback includes the waters adjacent to Sandy Point, St. Croix, U.S.V.I.

Hawksbill Sea Turtle

The hawksbill turtle was listed as endangered under the ESA (1973), and is considered Critically Endangered by the International Union for the Conservation of Nature (IUCN) based on global population declines of over 80% during the last three generations (105 years) (Meylan and Donnelly 1999). Only five regional nesting populations remain with more than 1,000 females nesting annually (Seychelles, Mexico, Indonesia, and two in Australia) (Meylan and Donnelly 1999). Most populations are declining, depleted, or remnants of larger aggregations. Although hawksbills are subject to the suite of threats that affect other marine turtles, the decline of the species is primarily attributed to centuries of exploitation for tortoiseshell, the beautifully patterned scales that cover the turtle's shell (Parsons 1972).

Critical habitat for the hawksbill includes the waters around Mona and Monito Islands, Puerto Rico.

B. Life history

Loggerhead Sea Turtle

Mating takes place in late March-early June, and eggs are laid throughout the summer, with a mean clutch size of 100-126 eggs in the southeastern U.S. Individual females nest multiple times during a nesting season, with a mean of 4.1 nests/nesting individual (Murphy and Hopkins 1984). Nesting migrations for an individual female loggerhead are usually on an interval of 2-3 years, but can vary from 1-7 years (Dodd 1988). Loggerhead sea turtles originating from the western Atlantic nesting aggregations are believed to lead a pelagic existence in the North Atlantic Gyre for as long as 7-12 years or more, but there is some variation in habitat use by individuals at all life stages. Turtles in this life history stage are called "pelagic immatures." Stranding records indicate that when pelagic immature loggerheads reach 40-60 cm straight-line carapace length they begin to recruit to coastal inshore and nearshore waters of the continental shelf throughout the U.S. Atlantic and Gulf of Mexico.

Benthic immature loggerheads, the life stage following the pelagic immature stage, have been found from Cape Cod, Massachusetts, to southern Texas, and occasionally strand on beaches in northeastern Mexico. Large benthic immature loggerheads (70-91 cm) represent a larger proportion of the strandings and in-water captures (Schroeder et al. 1998) along the south and western coasts of Florida as compared with the rest of the coast, which could indicate that the larger animals are either more abundant in these areas or just more abundant within the area relative to the smaller turtles. Benthic immature loggerheads foraging in northeastern United States waters are known to migrate southward in the fall as water temperatures cool (Epperly et al. 1995, Keinath 1993, Morreale and Standora 1999, Shoop and Kenney 1992), and migrate northward in spring. Past literature gave an estimated age at maturity of 21-35 years (Frazer and Ehrhart 1985; Frazer et al. 1994) and the benthic immature stage as lasting at least 10-25 years. However, NMFS SEFSC (2001) reviewed the literature and constructed growth curves from new

data, estimating ages of maturity ranging from 20-38 years and benthic immature stage lengths from 14-32 years.

Juveniles are omnivorous and forage on crabs, mollusks, jellyfish and vegetation at or near the surface (Dodd 1988). Sub-adult and adult loggerheads are primarily coastal and typically prey on benthic invertebrates such as mollusks and decapod crustaceans in hard bottom habitats.

Green Sea Turtle

Green sea turtle mating occurs in the waters off the nesting beaches. Each female deposits 1-7 clutches (usually 2-3) during the breeding season at 12-14 day intervals. Mean clutch size is highly variable among populations, but averages 110-115. Females usually have 2-4 or more years between breeding seasons, while males may mate every year (Balazs 1983). After hatching, green sea turtles go through a post-hatchling pelagic stage where they are associated with drift lines of algae and other debris.

Green turtle foraging areas in the southeast United States include any neritic waters having macroalgae or sea grasses near mainland coastlines, islands, reefs, or shelves, and any open-ocean surface waters, especially where advection from wind and currents concentrates pelagic organisms (Hirth 1997, NMFS and USFWS 1991a). Principal benthic foraging areas in the region include Aransas Bay, Matagorda Bay, Laguna Madre, and the Gulf inlets of Texas (Doughty 1984, Hildebrand 1982, Shaver 1994), the Gulf of Mexico off Florida from Yankeetown to Tarpon Springs (Caldwell and Carr 1957, Carr 1984), Florida Bay and the Florida Keys (Schroeder and Foley 1995), the Indian River Lagoon System, Florida (Ehrhart 1983), and the Atlantic Ocean off Florida from Brevard through Broward counties (Wershoven and Wershoven 1992, Guseman and Ehrhart 1992). Adults of both sexes are presumed to migrate between nesting and foraging habitats along corridors adjacent to coastlines and reefs. Age at sexual maturity is estimated to be between 20 to 50 years (Balazs 1982, Frazer and Ehrhart 1985).

Green sea turtles are primarily herbivorous, feeding on algae and sea grasses, but also occasionally consume jellyfish and sponges. The post-hatchling, pelagic-stage individuals are assumed to be omnivorous, but little data are available.

Kemp's Ridley Sea Turtle

Remigration of females to the nesting beach varies from annually to every 4 years, with a mean of 2 years (TEWG 1998). Nesting occurs from April into July and is essentially limited to the beaches of the western Gulf of Mexico, near Rancho Nuevo in southern Tamaulipas, Mexico. The mean clutch size for Kemp's ridleys is 100 eggs/nest, with an average of 2.5 nests/female/season.

Juvenile/subadult Kemp's ridleys have been found along the Eastern Seaboard of the United States and in the Gulf of Mexico. Atlantic juveniles/subadults travel northward with vernal warming to feed in the productive, coastal waters of Georgia through New England, returning southward with the onset of winter to escape the cold (Lutcavage and Musick 1985, Henwood and Ogren 1987, Ogren 1989). In the Gulf, juvenile/subadult ridleys occupy shallow, coastal regions. Ogren (1989) suggested that in the northern Gulf they move offshore to deeper, warmer water during winter. Studies suggest that subadult Kemp's ridleys stay in shallow, warm, nearshore waters in the northern Gulf of Mexico until cooling waters force them offshore or south along the Florida coast (Renaud 1995). Little is known of the movements of the post-hatching, planktonic stage within the Gulf. Studies have shown the post-hatchling

pelagic stage varies from 1-4 or more years, and the benthic immature stage lasts 7-9 years (Schmid and Witzell 1997). The TEWG (1998) estimates age at maturity to range from 7-15 years.

Stomach contents of Kemp's ridleys along the lower Texas coast consisted of a predominance of nearshore crabs and mollusks, as well as fish, shrimp and other foods considered to be shrimp fishery discards (Shaver 1991). Pelagic stage, neonatal Kemp's ridleys presumably feed on the available sargassum and associated infauna or other epipelagic species found in the Gulf of Mexico.

Leatherback Sea Turtle

Female leatherbacks nest from the southeastern United States to southern Brazil in the western Atlantic and from Mauritania to Angola in the eastern Atlantic, with nesting occurring as early as late February or March. When they leave the nesting beaches, leatherbacks move offshore but eventually utilize both coastal and pelagic waters. Very little is known about the pelagic habits of the hatchlings and juveniles, and they have not been documented to be associated with the sargassum areas as are other species. Leatherbacks are deep divers, with recorded dives to depths in excess of 1,000 m (Eckert and Eckert 1989), but they may come into shallow waters if there is an abundance of jellyfish nearshore.

Although leatherbacks are a long-lived species (> 30 years), they are somewhat faster to mature than loggerheads, with an estimated age at sexual maturity reported of about 13-14 years for females, and an estimated minimum age at sexual maturity of 3-6 years, with 9 years reported as a likely minimum (Zug and Parham 1996) and 19 years as a likely maximum (NMFS SEFSC 2001). They nest frequently (up to 7 nests per year) during a nesting season and nest about every 2-3 years. During each nesting, they produce 100 eggs or more in each clutch and, thus, can produce 700 eggs or more per nesting season (Schultz 1975).

Leatherback sea turtles feed primarily on jellyfish as well as cnidarians and tunicates. They are also the most pelagic of the turtles, but have been known to enter coastal waters on a seasonal basis to feed in areas where jellyfish are concentrated.

Hawksbill Sea Turtle

The life history of hawksbills consists of a pelagic stage that lasts from the time they leave the nesting beach as hatchlings until they are approximately 22-25 cm straight carapace length (Meylan 1988, Meylan in prep.), followed by residency in developmental habitats (foraging areas where immatures reside and grow) in coastal waters. Adult foraging habitat, which may or may not overlap with developmental habitat, is typically coral reefs, although other hard-bottom communities and occasionally mangrove-fringed bays may be occupied. Hawksbills show fidelity to their foraging areas over periods of time as great as several years (van Dam and Díez 1998).

Hawksbills may undertake developmental migrations (migrations as immatures) and reproductive migrations that involve travel over hundreds or thousands of kilometers (Meylan 1999b). Reproductive females undertake periodic (usually non-annual) migrations to their natal beach to nest. Movements of reproductive males are less well known, but are presumed to involve migrations to the nesting beach or to courtship stations along the migratory corridor. Females nest an average of 3-5 times per season with some geographic variation in this parameter (see references on pp. 204-205 of Meylan and Donnelly 1999, Richardson et al. 1999). Clutch size is higher on average (up to 250 eggs) than that of green turtles

(Hirth 1980). Reproductive females may exhibit a high degree of fidelity to their nest sites. This, plus the tendency of hawksbills to nest at regular intervals within a season, make them vulnerable to capture on the nesting beach.

C. Population dynamics, status, and distribution

Loggerhead Sea Turtle

Loggerhead sea turtles occur throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans and are the most abundant species of sea turtle occurring in U.S. waters. Loggerhead sea turtles concentrate their nesting in the north and south temperate zones and subtropics, but generally avoid nesting in tropical areas of Central America, northern South America, and the Old World (Magnuson et al. 1990).

In the western Atlantic, most loggerhead sea turtles nest from North Carolina to Florida and along the Gulf coast of Florida. There are 5 western Atlantic subpopulations, divided geographically as follows: (1) a northern nesting subpopulation, occurring from North Carolina to northeast Florida at about 29° N (approximately 7,500 nests in 1998); (2) a south Florida nesting subpopulation, occurring from 29° N on the east coast to Sarasota on the west coast (approximately 83,400 nests in 1998); (3) a Florida Panhandle nesting subpopulation, occurring at Eglin Air Force Base and the beaches near Panama City, Florida (approximately 1,200 nests in 1998); (4) a Yucatán nesting subpopulation, occurring on the eastern Yucatán Peninsula, Mexico (Márquez 1990) (approximately 1,000 nests in 1998) (TEWG 2000); and (5) a Dry Tortugas nesting subpopulation, occurring in the islands of the Dry Tortugas, near Key West, Florida (approximately 200 nests per year) (NMFS SEFSC 2001). Natal homing of females to the nesting beach provides the barrier between these subpopulations, preventing recolonization with turtles from other nesting beaches.

Based on the data available, it is difficult to estimate the size of the loggerhead sea turtle population in the United States or its territorial waters. There is, however, general agreement that the number of nesting females provides a useful index of the species' population size and stability at this life stage. Nesting data collected on index nesting beaches in the United States from 1989-1998 represent the best data set available to index the population size of loggerhead sea turtles. However, an important caveat for population trends analysis based on nesting beach data is that this may reflect trends in adult nesting females but not reflect overall population growth rates. Given this caveat, between 1989 and 1998, the total number of nests laid along the U.S. Atlantic and Gulf coasts ranged from 53,014 to 92,182 annually, with a mean of 73,751. On average, 90.7% of these nests were from the south Florida subpopulation, 8.5% were from the northern subpopulation, and 0.8% were from the Florida Panhandle nest sites. There is limited nesting throughout the Gulf of Mexico west of Florida, but it is not known to which subpopulation the turtles making these nests belong.

The number of nests in the northern subpopulation from 1989 to 1998 was 4,370 to 7,887, with a 10-year mean of 6,247 nests. With each female producing an average of 4.1 nests in a nesting season, the average number of nesting females per year in the northern subpopulation was 1,524. The total nesting and non-nesting adult female population is estimated as 3,810 adult females in the northern subpopulation (TEWG 1998, 2000). The northern population, based on number of nests, has been classified as stable or declining (TEWG 2000). Another consideration adding to the vulnerability of the northern subpopulation is that NOAA Fisheries scientists estimate that the northern subpopulation produces 65%

males, while the south Florida subpopulation is estimated to produce 80% females (NMFS SEFSC 2001).

The southeastern U.S. nesting aggregation is of great importance on a global scale and is second in size only to the nesting aggregation on islands in the Arabian Sea off Oman (Ross 1979, Ehrhart 1989, NMFS and USFWS 1991b). The global importance of the southeast U.S. nesting aggregation is especially important because the status of the Oman colony has not been evaluated recently. It is located in an area of the world where it is highly vulnerable to disruptive events such as political upheavals, wars, catastrophic oil spills, and lack of strong protections (Meylan et al. 1995).

Ongoing threats to the western Atlantic populations include incidental takes from dredging, commercial trawling, longline fisheries, and gill net fisheries; loss or degradation of nesting habitat from coastal development and beach armoring; disorientation of hatchlings by beachfront lighting; nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; watercraft strikes; and disease.

Green Sea Turtle

The vast majority of green turtle nesting within the southeast United States occurs in Florida. In Florida from 1989-1999, green turtle abundance from nest counts ranges from 109-1,389 nesting females per year (Meylan et al. 1995 and Florida Marine Research Institute Statewide Nesting 2001 Database, unpublished data; estimates assume 4 nests per female per year, Johnson and Ehrhart 1994). High biennial variation and a predominant 2-year re-migration interval (Witherington and Ehrhart 1989, Johnson and Ehrhart 1994) warrant combining even and odd years into 2-year cohorts. This gives an estimate of total nesting females that ranges from 705-1,509 during the period 1990-1999. It is important to note that because methodological limitations make the clutch frequency number (4 nests/female/year) an underestimate (by as great as 50%), a more conservative estimate is 470-1,509 nesting females in Florida between 1990 and 1999. In Florida during the period 1989-1999, numbers of green turtle nests by year show no trend. However, odd-even year cohorts of nests do show a significant increase during the period 1990-1999 (Florida Marine Research Institute Statewide Nesting 2001 Database, unpublished data).

It is unclear how greatly green turtle nesting in the whole of Florida has been reduced from historical levels (Dodd 1981), although one account indicates that nesting in Florida's Dry Tortugas may now be only a small fraction of what it once was (Audubon 1926). Total nest counts and trends at index beach sites during the past decade suggest that green turtles that nest within the southeast United States are recovering and have only recently reached a level of approximately 1,000 nesting females. There are no reliable estimates of the number of green turtles inhabiting foraging areas within the southeast United States, and it is likely that green turtles foraging in the region come from multiple genetic stocks. These trends are also uncertain because of a lack of data. However, there is one sampling area in the region with a large time series of constant turtle-capture effort that may represent trends for a limited area within the region. This sampling area is at an intake canal for a power plant on the Atlantic coast of Florida where 2,578 green turtles have been captured during the period 1977-1999 (FPL 2000). At the power plant, the annual number of immature green turtle captures (minimum straight-line carapace length < 85 cm) has increased significantly during the 23-year period.

Status of immature green turtles foraging in the southeast United States might also be assessed from trends at nesting beaches where many of the turtles originated, principally, Florida, Yucatán, and

Tortuguero. Trends at Florida beaches are presented above. Trends in nesting at Yucatán beaches cannot be assessed because of irregularity in beach survey methods over time. Trends at Tortuguero (ca. 20,000-50,000 nests/year) show a significant increase in nesting during the period 1971-1996 (Bjorndal et al. 1999).

The principal cause of past declines and extirpations of green turtle assemblages has been the over-exploitation of green turtles for food and other products. Although intentional take of green turtles and their eggs is not extensive within the southeast United States, green turtles that nest and forage in the region may spend large portions of their life history outside the region and outside United States jurisdiction, where exploitation is still a threat. Adult green turtles and immatures are exploited heavily on foraging grounds off Nicaragua and to a lesser extent off Colombia, Mexico, Panama, Venezuela, and the Tortuguero nesting beach (Carr et al. 1978, Nietschmann 1982, Bass et al. 1998, Lagueux 1998).

There are significant and ongoing threats to green turtles from human-related causes. Threats to nesting beaches in the region include beach armoring, erosion control, artificial lighting, and disturbance, which can be expected to increase with time. Pollution is known to have both direct (ingestion of foreign materials such as tar balls and plastics) and indirect (degradation of foraging grounds) impacts on green sea turtles. Foraging habitat loss also occurs as a result of direct destruction by dredging, siltation, boat damage, and other human activities. Green turtles are often captured and occasionally killed by interactions with fishing gear. Collisions with power boats and encounters with suction dredges have killed green turtles along the U.S. coast and may be common elsewhere where boating and dredging activities are frequent (Florida Marine Research Institute, Sea Turtle Stranding and Salvage Network Database). Threats from increasing incidences of disease, which may or may not have some relation to human influences, are also a concern. The occurrence of green turtle fibropapillomatosis disease was originally reported in the 1930s, when it was thought to be rare (Smith and Coates 1938). Presently, this disease is cosmopolitan and has been found to affect large numbers of animals in some areas, including Hawaii and Florida (Herbst 1994, Jacobson 1990; Jacobson et al. 1991).

Kemp's Ridley Sea Turtle

L. kempii has a very restricted distribution relative to the other sea turtle species. Data suggests that adult Kemp's ridley turtles are restricted somewhat to the Gulf of Mexico in shallow near shore waters, and benthic immature turtles of 20-60 cm straight line carapace length are found in nearshore coastal waters including estuaries of the Gulf of Mexico and the Atlantic, although adult-sized individuals sometimes are found on the Eastern Seaboard of the United States. The post-pelagic stages are commonly found dwelling over crab-rich sandy or muddy bottoms. Juveniles frequent bays, coastal lagoons, and river mouths.

Of the seven extant species of sea turtles in the world, the Kemp's ridley has declined to the lowest population level. Most of the population of adult females nest on the Rancho Nuevo beaches (Pritchard 1969). When nesting aggregations at Rancho Nuevo were discovered in 1947, adult female populations were estimated to be in excess of 40,000 individuals (Hildebrand 1963). By the early 1970s, the world population estimate of mature female Kemp's ridleys had been reduced to 2,500-5,000 individuals. The population declined further through the mid-1980s. Recent observations of increased nesting suggest that the decline in the ridley population has stopped and the population is now increasing.

The TEWG (1998) identified three population trends in benthic immature ridleys. Benthic immatures are not yet reproductively mature but have recruited to feed in the nearshore benthic environment, where they are exposed to nearshore mortality sources that often result in strandings. Increased production of hatchlings from the nesting beach beginning in 1966 resulted in an increase in benthic ridleys that leveled off in the late 1970s. A second period of increase followed by leveling occurred between 1978 and 1989 as hatchling production was further enhanced by the cooperative program between the U.S. Fish and Wildlife Service and Mexico's Instituto Nacional de Pesca to increase the nest protection and relocation program in 1978. A third period of steady increase, which has not leveled off to date, has occurred since 1990 and appears to be due to the greatly increased hatchling production and an apparent increase in survival rates of immature turtles beginning in 1990, due in part to the introduction of turtle excluder devices (TEDs) in the U.S. and Mexican shrimping fleets. Adult ridley numbers have now grown, as shown in nesting increases at the main nesting sites in Mexico. Nesting at Tamaulipas and Veracruz increased from a low of 702 nests in 1985, to 1,930 nests in 1995, to 6,277 nests in 2000 (USFWS 2000). The population model used by the TEWG (1998) projected that Kemp's ridleys could reach the intermediate recovery goal identified in the Recovery Plan, of 10,000 nesters by the year 2020 if the assumptions of age to sexual maturity and age specific survivorship rates used in their model are correct.

The largest contributor to the decline of the ridley in the past was commercial and local exploitation, especially poaching of nests at the Rancho Nuevo site, as well as the Gulf of Mexico trawl fisheries. The advent of TED regulations for trawlers and protections for the nesting beaches have allowed the species to begin to rebound. Many threats to the future of the species remain, including interactions with fishery gear, marine pollution, foraging habitat destruction, illegal poaching of nests and potential threats to the nesting beaches from such sources as global climate change, development, and tourism pressures.

Leatherback Sea Turtle

Leatherbacks are widely distributed throughout the oceans of the world, and are found in waters of the Atlantic, Pacific, Caribbean, and the Gulf of Mexico (Ernst and Barbour 1972). The leatherback is the largest living turtle and it ranges farther than any other sea turtle species, exhibiting broad thermal tolerances (NMFS and USFWS 1995). Genetic analyses of leatherbacks to date indicate that within the Atlantic basin significant genetic differences occur among St. Croix (U.S. Virgin Islands), and mainland Caribbean populations (Florida, Costa Rica, Suriname/French Guiana) and between Trinidad and the mainland Caribbean populations (Dutton et al. 1999) leading to the conclusion that there are at least three separate subpopulations of leatherbacks in the Atlantic.

Nest counts are the only reliable population information available for leatherback turtles. Recent declines have been seen in the number of leatherbacks nesting worldwide (NMFS and USFWS 1995). A population estimate of 34,500 females (26,200-42,900) was made by Spotila et al. (1996), who stated that the species as a whole was declining and local populations were in danger of extinction. Historically, it was due primarily to intense exploitation of the eggs (Ross 1979) but adult mortality has increased significantly from interactions with fishery gear (Spotila et al. 1996). The Pacific population is in a critical state of decline, now estimated to number less than 3,000 total adult and subadult animals (Spotila et al. 2000). The status of the Atlantic population is less clear. In 1996, it was reported to be stable, at best (Spotila et al. 1996), but numbers in the western Atlantic at that time were reported to be on the order of 18,800 nesting females. According to Spotila (pers. comm.), the western Atlantic population currently numbers about 15,000 nesting females, whereas current estimates for the Caribbean (4,000) and the eastern Atlantic, off Africa, (numbering ca. 4,700) have remained consistent with

numbers reported by Spotila et al. in 1996.

The nesting aggregation in French Guiana has been declining at about 15% per year since 1987. From 1979-1986, the number of nests was increasing at about 15% annually. The number of nests in Florida and the U.S. Caribbean has been increasing at about 10.3% and 7.5%, respectively, per year since the early 1980s but the magnitude of nesting is much smaller than that along the French Guiana coast (see NMFS SEFSC 2001). In summary, the conflicting information regarding the status of Atlantic leatherbacks makes it difficult to conclude whether or not the population is currently in decline. Numbers at some nesting sites are up, while at others they are down.

Zug and Parham (1996) pointed out that the combination of the loss of long-lived adults in fishery-related mortality (especially entanglement in gear and drowning in trawls), and the lack of recruitment stemming from elimination of annual influxes of hatchlings because of intense egg harvesting, has caused the sharp decline in leatherback populations. Other important ongoing threats to the population include pollution, loss of nesting habitat, and boat strikes.

Hawksbill Sea Turtle

The hawksbill is a medium-sized sea turtle with adults in the Caribbean ranging in size from approximately 62.5 to 94.0 cm straight carapace length. The species occurs in all ocean basins although it is relatively rare in the Eastern Atlantic and Eastern Pacific, and absent from the Mediterranean Sea. Hawksbills are the most tropical of the marine turtles, ranging from approximately 30°N to 30°S. They are closely associated with coral reefs and other hard-bottom habitats, but they are also found in other habitats including inlets, bays and coastal lagoons. The diet is highly specialized and consists primarily of sponges (Meylan 1988) although other food items, notably corallimorphs and zooanthids, have been documented to be important in some areas of the Caribbean (van Dam and Díez 1997, Mayor et al. 1998, León and Díez 2000).

In the Western Atlantic, the largest hawksbill nesting population occurs in the Yucatán Península of Mexico, where several thousand nests are recorded annually in the states of Campeche, Yucatán, and Quintana Roo (Garduño-Andrade et al. 1999). Important but significantly smaller nesting aggregations are documented elsewhere in the region in Puerto Rico, the U.S. Virgin Islands, Antigua, Barbados, Costa Rica, Cuba, and Jamaica (Meylan 1999a). Estimates of the annual number of nests for each of these areas are of the order of hundreds to a few thousand. Nesting within the southeastern U.S. and U.S. Caribbean is restricted to Puerto Rico (>650 nests/yr), the U.S. Virgin Islands (~400 nests/yr), and, rarely, Florida (0-4 nests/yr)(Eckert 1995, Meylan 1999a, Florida Statewide Nesting Beach Survey database). At the two principal nesting beaches in the U.S. Caribbean where long-term monitoring has been carried out, populations appear to be increasing (Mona Island, Puerto Rico) or stable (Buck Island Reef National Monument, St. Croix, USVI) (Meylan 1999a).

E. Analysis of the Species Likely to be Affected

NOAA Fisheries believes that all five species of sea turtles may be potentially affected by the proposed action since all are susceptible to hopper dredge entrainment, and therefore, will further consider them in the remaining sections of this Opinion.

III. Environmental Baseline

This section contains an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, their habitat (including designated critical habitat), and ecosystem, within the action area. The environmental baseline is a snapshot of a species' health at a specified point in time and includes state, tribal, local and private actions already affecting the species, or that will occur contemporaneously with the consultation in progress. Unrelated Federal actions affecting the same species or critical habitat that have completed formal or informal consultation are also part of the environmental baseline, as are Federal and other actions within the action area that may benefit listed species or critical habitat.

The environmental baseline for this Opinion includes the effects of several activities that affect the survival and recovery of threatened and endangered species in the action area. The activities that shape the environmental baseline in the action area of this consultation generally fall into the following three categories: vessel operations, fisheries, and recovery activities associated with reducing those impacts. Other environmental impacts include effects of discharges, dredging, military activities, oil and gas development activities, industrial cooling water intake, aquaculture, recreational fishing, and marine debris.

A. Status of the species within the action area

The five species of sea turtles that occur in the action area are all highly migratory. NOAA Fisheries believes that no individual members of any of the species are likely to be year-round residents of the action area. Individual animals will make migrations into nearshore waters as well as other areas of the North Atlantic Ocean, Gulf of Mexico, and the Caribbean Sea. Therefore, the range-wide status of the five species of sea turtles, given in Section II above, most accurately reflects the species' status within the action area.

B. Factors affecting species environment within the action area.

As explained above, sea turtles found in the action area are not year-round residents of the area, and may travel widely throughout the Atlantic, Gulf of Mexico, and Caribbean Sea. Therefore, individuals found in the action area (Corpus Christi Bay and associated nearshore waters) can potentially be affected by activities anywhere else within this wide range.

Federal Actions

In recent years, NOAA Fisheries has undertaken several ESA section 7 consultations to address the effects of federally-permitted fisheries and other Federal actions on threatened and endangered species. Each of those consultations sought to develop ways of reducing the probability of adverse effects of the action on sea turtles. Similarly, recovery actions NOAA Fisheries has undertaken under the ESA are addressing the problem of take of sea turtles in the fishing and shipping industries. The following summary of anticipated sources of incidental take of turtles includes only those Federal actions which have undergone formal section 7 consultation.

Potential adverse effects from Federal vessel operations in the action area and throughout the range of sea turtles include operations of the Navy (USN) and Coast Guard (USCG), the Environmental

Protection Agency, the National Oceanic and Atmospheric Administration (NOAA), and the COE. NOAA Fisheries has conducted formal consultations with the USCG, the USN, and NOAA on their vessel operations. Through the section 7 process, where applicable, NOAA Fisheries has and will continue to establish conservation measures for all these agency vessel operations to avoid or minimize adverse effects to listed species. At the present time, however, they represent potential for some level of interaction.

In addition to vessel operations, other military activities including training exercises and ordnance detonation also affect sea turtles. Consultations on individual activities have been completed, but no formal consultation on overall USCG or USN activities in any region has been completed at this time.

The construction and maintenance of Federal navigation channels has also been identified as a source of turtle mortality. Hopper dredges move relatively rapidly (compared to sea turtle swimming speeds) and can entrain and kill sea turtles, presumably as the drag arm of the moving dredge overtakes the slower moving turtle. A RBO with the COE's South Atlantic Division has been completed for the southeast Atlantic waters. Consultation on a new RBO for the COE's Gulf of Mexico hopper dredging operations is currently underway.

The COE and Minerals Management Service (MMS) (the latter is non-military) oil and gas exploration, well development, production, and abandonment/rig removal activities also adversely affect sea turtles. Both of these agencies have consulted with NOAA Fisheries on these types of activities. A biological opinion on the impacts of seismic arrays for oil and gas exploration in the Gulf of Mexico is currently being developed.

Adverse effects on threatened and endangered species from several types of fishing gear occur in the action area. Efforts to reduce the adverse effects of commercial fisheries are addressed through the ESA section 7 process. Gillnet, longline, trawl gear, and pot fisheries have all been documented as interacting with sea turtles. For all fisheries for which there is a Federal fishery management plan (FMP) or for which any Federal action is taken to manage that fishery, impacts have been evaluated under section 7. Several formal consultations have been conducted on the following fisheries that NOAA Fisheries has determined are likely to adversely affect threatened and endangered species: American lobster, monkfish, dogfish, southeastern shrimp trawl fishery, northeast multispecies, Atlantic pelagic swordfish/tuna/shark, and summer flounder/scup/black sea bass fisheries. Formal consultation is currently underway for the calico scallop trawl fishery.

On June 14, 2001, NOAA Fisheries issued a jeopardy opinion for the Highly Migratory Species (HMS) fisheries off the eastern United States. The HMS Opinion found that the continued prosecution of the pelagic longline fishery in the manner described in the HMS FMP was likely to jeopardize the continued existence of loggerhead and leatherback sea turtles. This determination was made by analyzing the effects of the fishery on sea turtles in conjunction with the environmental baseline and cumulative effects. The environmental baseline section of the HMS opinion is incorporated herein by reference and can be found at the following NOAA Fisheries website:

http://www.nmfs.noaa.gov/prot_res/readingrm/ESAsec7/HMS060801final.pdf

The environmental baseline for the June 14, 2001, HMS Opinion also considered the impacts from the North Carolina offshore spring monkfish gillnet fishery and the inshore fall southern flounder gillnet

fishery, both of which were responsible for large numbers of sea turtle mortalities in 1999 and 2000, especially loggerhead sea turtles. However, during the 2001 season NOAA Fisheries implemented an observer program that observed 100% of the effort in the monkfish fishery, and then in 2002 a rule was enacted creating a seasonal monkfish gillnet closure along the Atlantic coast based upon sea surface temperature data and turtle migration patterns. In 2001, NOAA Fisheries also issued an ESA section 10 permit with mitigative measures for the southern flounder fishery. Subsequently the sea turtle mortalities in these fisheries were drastically reduced. The reduction of turtle mortalities in these fisheries reduces the negative effects these fisheries have on the environmental baseline.

NOAA Fisheries has implemented a reasonable and prudent alternative (RPA) in the HMS fishery which would allow the continuation of the pelagic longline fishery without jeopardizing the continued existence of loggerhead and leatherback sea turtles. The provisions of this RPA include the closure of the Grand Banks region off the northeast United States and gear restrictions that are expected to reduce the by-catch of loggerheads by as much as 76% and leatherbacks by as much as 65%. Further, NOAA Fisheries is implementing a major research project to develop measures aimed at further reducing longline by-catch. The implementation of this RPA reduces the negative effects that the HMS fishery has on the environmental baseline. The conclusions of the June 14, 2001, HMS Opinion and the subsequent implementation of the RPA are hereby incorporated into the environmental baseline section of this Opinion.

Another action with Federal oversight which has impacts on sea turtles is the operation of electrical generating plants. Sea turtles entering coastal or inshore areas have been affected by entrainment in the cooling-water systems of electrical generating plants. Biological opinions have already been written for a number of electrical generating plants, and others are currently undergoing section 7 consultation.

State or Private Actions

Commercial traffic and recreational pursuits can have an adverse effect on sea turtles through propeller and boat strike damage. Private vessels participate in high speed marine events concentrated in the southeastern United States and are a particular threat to sea turtles, and occasionally to marine mammals as well. The magnitude of these marine events is not currently known. NOAA Fisheries and the USCG are in early consultation on these events, but a thorough analysis has not been completed.

Various fishing methods used in state fisheries, including trawling, pot fisheries, fly nets, and gillnets are known to cause interactions with sea turtles. Georgia and South Carolina prohibit gillnets for all but the shad fishery. Florida has banned all but very small nets in state waters, as has Texas. Louisiana, Mississippi, and Alabama have also placed restrictions on gillnet fisheries within state waters such that very little commercial gillnetting takes place in southeast waters, with the exception of North Carolina. Most pot fisheries in the Southeast are prosecuted in areas frequented by sea turtles.

Other Potential Sources of Impacts in the Environmental Baseline

A number of activities that may indirectly affect listed species include discharges from wastewater systems, dredging, ocean dumping and disposal, and aquaculture. The impacts from these activities are difficult to measure. Where possible, however, conservation actions are being implemented to monitor or study impacts from these elusive sources.

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

Conservation and Recovery Actions Shaping the Environmental Baseline

NOAA Fisheries implemented a series of regulations aimed at reducing potential for incidental mortality of sea turtles in commercial fisheries. In particular, NOAA Fisheries has required the use of TEDs in southeast U.S. shrimp trawls since 1989 and in summer flounder trawls in the mid-Atlantic area (south of Cape Charles, Virginia) since 1992. It has been estimated that TEDs exclude 97% of the turtles caught in such trawls. These regulations have been refined over the years to ensure that TED effectiveness is maximized through proper placement and installation, configuration (e.g., width of bar spacing), floatation, and more widespread use. Recent analyses by Epperly and Teas (1999) indicate that the minimum requirements for the escape opening dimensions are too small, and that as many as 47% of the loggerheads stranding annually along the Atlantic seaboard and Gulf of Mexico were too large to fit through existing openings. On October 2, 2001, NOAA Fisheries published a proposed rule to require larger escape openings in TEDs and is planning to publish a final rule in 2002.

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

NOAA Fisheries is also working to develop a TED which can be effectively used in a type of trawl known as a fly net, which is sometimes used in the mid-Atlantic and northeast fisheries to target sciaenids and bluefish. Limited observer data indicate that takes can be quite high in this fishery. A prototype design has been developed, but testing under commercial conditions is still necessary.

In addition, NOAA Fisheries has been active in public outreach efforts to educate fishermen regarding sea turtle handling and resuscitation techniques. As well as making this information widely available to all fishermen, NOAA Fisheries recently conducted a number of workshops with longline fishermen to discuss bycatch issues including protected species, and to educate them regarding handling and release guidelines. NOAA Fisheries intends to continue these outreach efforts and hopes to reach all fishermen participating in the pelagic longline fishery over the next one to two years. There is also an extensive network of Sea Turtle Stranding and Salvage Network participants along the Atlantic and Gulf of Mexico which not only collects data on dead sea turtles, but also rescues and rehabilitates any live stranded turtles.

IV. Effects of the Action

A. Factors considered and analyses for effects of the action

- **Water quality** impacts as a direct and indirect result of this project were considered. Impacts from sediment disturbance as a result of the proposed action are expected to be temporary, with suspended particles settling out within a short time frame. These sediment disturbance impacts will be minimal in

nature and will not have a significant effect on sea turtles. Additionally, past sampling of water column and elutriate chemistry in various locations within the project area demonstrated that dredging is not likely to significantly impact water quality. Potential changes in salinity and tidal amplitude are expected to be minimal. NOAA Fisheries does not expect significant impacts to sea turtles as a result of water quality impacts related to this project.

- **Habitat loss** can potentially occur as a direct result of dredging and through disposal of dredged materials. There is no designated critical habitat under NOAA Fisheries jurisdiction in the Gulf of Mexico; therefore, critical habitat is not likely to be destroyed or adversely modified by the proposed action. Channel widening and deepening will modify existing sea bottom and modify available foraging habitat for sea turtles. Mitigation plans call for the creation of seagrass habitat and shallow water habitat to offset the loss of shallow water bay bottom. Although potential long term positive impact may occur due to creation of shallow water habitat from dredged material and development of marsh submerged aquatic vegetation, negative impacts will occur as a result of physical changes in the bay due to deposition of dredged material and change in hydrodynamics from creation of channels. Through recruitment and local migrations, finfish, crustaceans, and benthic invertebrates that sea turtles feed on are expected to eventually repopulate the affected area. Habitat loss impacts as a result of this project are expected to be minimal to sea turtles and will not have a significant effect on them.

- **Dredge entrainment** is a documented source of sea turtle mortality. NOAA Fisheries believes that hopper dredging conducted within state waters of the Gulf of Mexico–especially between April and November, or when water temperatures are above 12°C–is a high risk for taking sea turtles, especially Kemp's ridleys. Injuries sustained by sea turtles entrained in the hopper dredge dragheads are usually fatal. Consequently, NOAA Fisheries believes that seasonal dredging windows and observer monitoring requirements for hopper dredges are necessary to minimize lethal takes of listed sea turtle species that occur in inshore and nearshore Gulf waters. These dredging windows have been in effect since 1995 for the COE's Galveston and New Orleans districts, as well as in the COE's South Atlantic Division districts, and have proven effective in keeping sea turtle take levels below the limits established in their respective biological opinion's incidental take statements. Based upon information from past dredging work, other biological opinions, the specifics of this project, and the assumption that all terms and conditions specified in the ITS will be adhered to, NOAA Fisheries expects injury or mortality of **three (3)** Kemp's ridleys, **three (3)** green turtles, **one (1)** hawksbill, and **five (5)** loggerhead turtles annually as a result of hopper dredging associated with the proposed project.

B. Species' response to the proposed action

Based on the year-round presence of sea turtles in the action area, it can be expected that the proposed action involving hopper dredging may result in the entrainment of sea turtles. Such entrainment can be expected to result in mortality of the individuals captured by the draghead.

Recent satellite telemetry work funded by COE and conducted by NOAA Fisheries' Galveston Laboratory, demonstrates the nearshore occurrence of Kemp's ridleys near northern Gulf channels. Ridleys remained within 10 nautical miles of shore for greater than 95% of the observed time, with 90% of the observed locations within 5 nautical miles (Renaud, NOAA Fisheries Galveston Laboratory, pers. comm.). Movements out of northern Gulf waters in response to cooling temperatures occurred during December, and ridleys returned with warming waters in March.

Seasonal abundance of sea turtles utilizing nearshore waters of the northwest Gulf of Mexico varies with species and location. Green turtles within subtropical habitats of the Laguna Madre are the region's only year-round, nearshore occupant. Other species, especially the Kemp's ridley, are transient users of the coastal zone who venture toward tidal passes and into bays during May-August when food sources and other environmental factors are favorable. The May-August period has yielded over 80% of the sea turtle captures (N=516) recorded by Texas A&M researchers (Landry et al., 1997).

NOAA Fisheries believes that hopper dredging conducted in state waters, especially between April and November, or when water temperatures are above 12 degrees Celsius, is a high risk for taking sea turtles, especially Kemp's ridleys. Injuries sustained by sea turtles entrained in the hopper dredge dragheads are usually fatal. Seasonal and observer monitoring requirements for hopper dredges are necessary to minimize effects of these removals on Kemp's ridleys and other listed sea turtle species that occur in inshore and nearshore northern Gulf waters.

NOAA Fisheries has requested the COE, in previous and present hopper dredging consultations by Galveston and New Orleans Districts, to conduct studies on seasonal abundance of sea turtles in Gulf channels, and to continue research to develop improved ('turtle-friendly') dredge draghead designs. NOAA Fisheries has previously indicated to the COE, and again in this consultation (Conservation Recommendation No. 1), that such seasonal abundance studies or new designs of a more effective draghead (to exclude turtles), if substantiated by adequate scientific data, could form the basis for relaxing the seasonal restrictions and observer requirements listed in the Incidental Take Statement of this biological opinion. Any future requests by the COE to lessen the dredging restriction on this project, based on submissions of new sea turtle distribution, temperature and draghead design data, will be carefully considered by NOAA Fisheries at that time to ensure that, if restrictions are relaxed, listed sea turtles will not be jeopardized.

V. Cumulative Effects

Cumulative effects are the effects of future state, local, or private activities that are reasonably certain to occur within the action area or within the range of sea turtles. Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Within the action area, major future changes are not anticipated in the ongoing human activities described in the environmental baseline. The present, major human uses of the action area are expected to continue at the present levels of intensity in the near future. Listed species of turtles, however, migrate throughout the Atlantic Ocean and Gulf of Mexico and may be affected during their life cycles by non-Federal activities outside the action area.

Throughout the coastal Gulf of Mexico the loss of thousand of acres of wetlands is occurring due to natural subsidence and erosion, as well as reduced sediment input from the Mississippi River. Impacts caused by residential, commercial, and agricultural developments appear to be the primary causes of wetland loss in Texas.

Oil spills from tankers transporting foreign oil, as well as the illegal discharge of oil and tar from vessels discharging bilge water will continue to affect water quality in the Gulf of Mexico, including Texas inshore and nearshore waters. Cumulatively, these sources and natural oil seepage contribute most of the oil discharged into the Gulf of Mexico. Floating tar sampled during the 1970s, when bilge discharge was still

legal, concluded that up to 60% of the pelagic tars sampled did not originate from northern Gulf of Mexico coast.

Marine debris will likely persist in the action area in spite of MARPOL prohibitions. In Texas and Florida, approximately half of the stranded turtles examined have ingested marine debris (Plotkin and Amos 1990; Bolten and Bjorndal 1991). Although fewer individual are affected, entanglement in marine debris may contribute more frequently to the death of sea turtles.

Coastal runoff and river discharges carry large volumes of petrochemical and other contaminants from agricultural activities, cities, and industries into the Gulf of Mexico. The coastal waters of the Gulf of Mexico have more sites with high contaminant concentrations than other areas of the coastal United States, due to the large number of waste discharge point sources. The species of turtles analyzed in this biological opinion may be exposed to and accumulate these contaminants during their life cycles.

Beachfront development, lighting, and beach erosion control all are ongoing activities along the Atlantic and Gulf coasts. These activities potentially reduce or degrade sea turtle nesting habitats or interfere with hatchling movement to sea. Nocturnal human activities along nesting beaches may also discourage sea turtles from nesting sites. The extent to which these activities reduce sea turtle nesting and hatchling production is unknown. However, as conservation awareness spreads, more and more coastal cities and counties are adopting more stringent measures to protect hatchling sea turtles from the disorienting effects of beach lighting.

State-regulated commercial and recreational fishing activities in Atlantic Ocean and Gulf of Mexico waters currently result in the incidental take of threatened and endangered species. 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 issue regulations that will affect fishery activities. Any increase in recreational vessel activity in inshore and offshore waters of the Gulf of Mexico and Atlantic Ocean 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. Future cooperation between NOAA Fisheries and the states on these issues should help decrease take of sea turtles caused by recreational activities. NOAA Fisheries will continue to work with coastal states to develop and refine ESA section 6 agreements and section 10 permits to enhance programs to quantify and mitigate these takes.

VI. Conclusion

After reviewing the current status of endangered green, leatherback, hawksbill, and Kemp's ridley sea turtles and threatened loggerhead sea turtles in the proposed action area, the environmental baseline, the effects of the proposed action, and the cumulative effects, it is NOAA Fisheries' biological opinion that the implementation of the proposed action, as described in the Proposed Action section of this Opinion, is not likely to jeopardize the continued existence of endangered green, leatherback, hawksbill, or Kemp's ridley sea turtles, or threatened loggerhead sea turtles. No critical habitat has been designated for these species within the action area; therefore, none will be affected.

Incidental Take Statement

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or to attempt to engage in any such conduct. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary and must be undertaken by the COE so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The COE has a continuing duty to regulate the activity covered by this incidental take statement. If the COE fails to assume and implement the terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the COE must report the progress of the action and its impact on the species to NOAA Fisheries as specified in the incidental take statement. [50 CFR 402.14 (i) (3)]

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.

Amount or Extent of Anticipated Take

NOAA Fisheries foresees that hopper dredging activities in Corpus Christi Ship Channel Improvement Project navigation channels may result in the injury or mortality of loggerhead, Kemp's ridley, green and hawksbill turtles. While it is difficult to ascertain future take of sea turtles because of the inherent variability caused by seasonal, annual, and localized variations in sea turtle densities, and other factors, NOAA Fisheries bases the estimated anticipated take levels during new dredging (i.e. channel widening, deepening, and lengthening) on the following:

1. Previous sea turtle takes during Atlantic and Gulf of Mexico maintenance dredging, new work hopper dredging, and sand mining operations by the COE's New Orleans, Galveston, Jacksonville, Charleston, and Wilmington Districts, including dredging of southeastern U.S. channels, and Brazos Santiago Pass, Mansfield Channel, Aransas Pass, Freeport Channel, and Bolivar Roads Pass, Texas (see Appendix for tables summarizing previous hopper dredging takes in the Galveston District since the 1995 RBO);
2. The level of take anticipated in previous hopper dredging Opinions; and
3. COE adherence to recommended dredging windows and other terms and condition.

Therefore, pursuant to section 7(b)(4) of the ESA, NOAA Fisheries anticipates an annual incidental take as described below:

> For the Corpus Christi Ship Channel Improvement Project navigation channel reaches referred to in this Opinion and statement as the entrance channel nearshore Outer Bar Reach (OBR) including the extension of the Outer Bar reach, and the inshore Jetty Reach channel (JRC), the anticipated annual incidental take, by injury or mortality, of **three (3)** Kemp's ridleys, **three (3)** green turtles,

one (1) hawksbill, and **five (5)** loggerhead turtles, is set pursuant to section 7 (b) (4) and the ESA. This take level represents a total anticipated take per fiscal or calendar year for all channel deepening, lengthening, and widening by hopper dredge of the Corpus Christi Ship Channel Improvement Project. If the actual incidental take exceeds this level, reinitiation of formal consultation must immediately be requested. The above annual totals are for new work only. Any takes during maintenance dredging will be counted against the allowable take for the 1995 Gulf of Mexico maintenance dredging RBO (or the new RBO when finished).

Effect of the Take

NOAA Fisheries believes that the aforementioned level of anticipated take is not likely to appreciably reduce either the survival or recovery of hawksbill, Kemp's ridley, green, or loggerhead sea turtles in the wild by reducing their reproduction, numbers, or distribution, even if all incidental takes are from the same species. In particular, NOAA Fisheries does not expect activities associated with the proposed action, when added to ongoing activities affecting these species in the action area and cumulative effects, to affect sea turtles in a way that measurably or significantly reduces the number of animals born in a particular year (i.e., a specific age-class), the reproductive success of adult sea turtles, or the number of young sea turtles that annually recruit into the adult breeding population.

Reasonable and Prudent Measures

Regulations (50 CFR 402.02) implementing section 7 of the ESA define reasonable and prudent measures as actions the Director believes necessary or appropriate to minimize the impacts, i.e., amount or extent, of incidental take. The reasonable and prudent measures that NOAA Fisheries believes are necessary to minimize the impacts of hopper dredging in the Gulf of Mexico have been discussed with the COE, and have largely been incorporated in COE regulatory projects and COE civil works projects throughout the Gulf of Mexico (Mobile District projects excepted) and South Atlantic for almost a decade. These measures include use of temporal dredging windows, intake and overflow screening, use of sea turtle deflector dragheads, observer and reporting requirements, and sea turtle relocation/abundance trawling. The following terms and conditions are established to implement these measures, and to document incidental takes. Only incidental takes that occur while these measures are in full implementation are authorized. These restrictions remain valid until re-initiation and conclusion of any subsequent section 7 consultation.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the COE must comply, and require any of their contractors to comply, with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting and monitoring requirements. These terms and conditions are nondiscretionary.

1. Pipeline or hydraulic dredges must be used whenever possible between April 1 and November 30 in all Corpus Christi Ship Channel Improvement Project channels, since lethal takes of loggerheads have been documented using hopper dredges during summer months. The annual summary report, discussed below, must give a complete explanation of why alternative dredges were not used for dredging of channels during the April through November period.

2. Hopper dredging in the entrance channel JRC (the inshore section from the landward end of the Inner Basin to ½ mile seaward of the submerged end of the Aransas Pass jetties) and the OBR (the

nearshore section from ½ mile from the submerged end of the Aransas Pass jetties to the seaward end of the extension channel) shall be completed, whenever possible, between December 1 and March 31, when sea turtle abundance is lowest throughout Gulf coastal and inshore waters.

3. One-hundred percent observer coverage of hopper dredging operations by NOAA Fisheries-approved observers is required. The COE shall arrange for NOAA Fisheries-approved observers aboard hopper dredges to monitor the hopper spoil, screening, and dragheads for sea turtles and their remains, as appropriate. Observers shall be aboard hopper dredges whenever surface water temperatures are 12 degrees Celsius or greater, and between April 1 and November 30. Observer reports must be faxed to NOAA Fisheries' Southeast Regional Office (727-570-5517) within 24 hours of any sea turtle take observed. If no take is observed during December, observer coverage can be terminated until water temperature reaches 12 degrees Celsius or until April 1.

4. The COE shall maintain close communication with the Sea Turtle Stranding and Salvage Network (STSSN) state representative (contact information available at: http://www.sefsc.noaa.gov/seaturtleSTSSN.jsp) and NOAA Fisheries Galveston Laboratory in order to be advised of any sea turtle strandings in the project area that show possible signs of draghead impingement. This monitoring will give the COE and dredge operators an additional tool to know if they are taking sea turtles, enable them to better evaluate the effectiveness of the onboard observers and operations of the draghead deflector and pre-deflector, and provide additional information on sea turtle presence. This stranding data will be used to augment monitoring and for information purposes only. It will not count against the incidental take. The COE will provide NOAA Fisheries' Southeast Regional Office with quarterly reports summarizing beach observer reports of stranded sea turtles that may indicate draghead impingement.

5. During periods in which hopper dredges are operating and NOAA Fisheries-approved observers are not required (i.e., when surface water temperatures are less than 12 degrees Celsius, or between December 1 and March 31), the COE 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 NOAA Fisheries if sea turtles are observed in the dredging area, to coordinate further precautions to avoid impacts to turtles.

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

6. When sea turtle observers are required on hopper dredges, in the areas and seasons that turtles may be present, 100% inflow screening of dredged material is required whenever possible, and 100% overflow screening is recommended. If conditions prevent 100% inflow screening, inflow screening may be reduced gradually, as further detailed in the following paragraph, but 100% overflow screening is then required. NOAA Fisheries must be consulted prior to the action and an explanation must be included in the dredging report.

The hopper's inflow screens should have 4-inch by 4-inch screening. If the COE, in consultation with observers and the draghead operator, determines that the draghead is clogging and reducing production substantially, the screens may be modified subsequently: mesh size may be increased to 6-inch by 6-inch, then 9-inch by 9-inch, then 12-inch by 12-inch openings. Clogging should be greatly reduced with these flexible options; however, further clogging may compel removal of the screening altogether, in which case effective 100% overflow screening is mandatory. The COE shall notify NOAA Fisheries beforehand if inflow screening is going to be reduced or eliminated, and provide details of how effective overflow screening will be achieved.

NOAA Fisheries agrees that these flexible graduated screening options are necessary, since the need to constantly clear the inflow screens will increase the time it takes to complete the project and therefore increase the exposure of sea turtles to the risk of impingement or entrainment. Additionally, there are increased risks to sea turtles in the water column when the inflow is halted to clear screens, since this results in clogged intake pipes that may have to be removed from the bottom to discharge the clay.

7. Every effort must be made to disengage dredging pumps when the dragheads are not firmly on the bottom to prevent impingement of sea turtles resting or feeding on the bottom, or in the water column. This precaution is especially important during the cleanup phase of dredging operations when the draghead frequently comes off the bottom and can suck in turtles resting in the shallow depressions between the high spots the draghead is trimming off.

8. The rigid sea turtle deflector draghead or the modified deflector draghead must be used on all hopper dredges operating in the Corpus Christi Ship Channel Improvement Project navigation channels. Other state-of-the-art designs will be considered for approval, prior to implementation, by NOAA Fisheries if shown to be of equal or greater effectiveness at excluding sea turtles.

9. Reporting: Observer reports of incidental take must be faxed to NOAA Fisheries Southeast Regional Office (727-570-5517) by onboard endangered species observers within 24 hours of any observed sea turtle take. A preliminary report summarizing the results of the dredging and any documented sea turtle takes must be submitted to NOAA Fisheries within 30 working days of completion of hopper dredging the entrance channel JRC or OBR. The report shall contain information on project location (specific channel/area dredged), start-up and completion dates, cubic yards of material dredged, problems encountered, incidental takes and sightings of protected species, mitigative actions taken, screening type (inflow, overflow) utilized, daily water temperatures, name of dredge, names of endangered species observers, percent observer coverage, and any other information the COE deems relevant.

   An annual report (based on either calendar or fiscal year) must be submitted to NOAA Fisheries summarizing hopper dredging results and documented incidental takes. Beach observer data provided by the STSSN or the Galveston Laboratory on stranded sea turtles showing evidence of draghead impingement should be included separately in the reach reports and yearly reports.

10. Relocation Trawling and Relative Abundance Trawling: Relocation trawling and relative abundance trawling in association with hopper dredging in the Corpus Christi Ship Channel Improvement Project navigation channels, conducted with NOAA Fisheries-approved endangered species observers, should be considered if: (a) takes are documented early in the project during a period in which large numbers of sea turtles may occur; (b) two or more turtles are taken in a 24-hour period;

(c) four or more turtles are taken per fiscal year of the project; (d) seawater temperatures are unseasonably warm; (e) large amounts of sea turtle prey species are being collected in the inflow screens; or (f) the authorized take limit for a particular species is close to being reached; (g) dredging is necessary outside the December 1 - March 31 window or when unseasonably warm temperatures exist during the window; (h) evidence exists indicating protected sea turtle species presence may be high; or (i) a combination of factors exists.

This Opinion authorizes the unlimited non-lethal, non-injurious take of sea turtles in association with assessment or relocation trawling deemed necessary by the COE to assess or temporarily reduce the abundance of these species prior to or during hopper dredging to reduce the possibility of lethal hopper dredge interactions, subject to the following conditions:

a. Trawl tow-time durations shall be limited to not longer than 30 minutes (doors in - doors out).

b. Turtles captured pursuant to assessment and relocation trawling shall be handled in a manner designed to ensure their safety and comfort.

c. Captured turtles shall be kept moist, and, whenever possible, shaded, until they are released.

d. Turtles shall not be kept longer than 12 hours prior to release and shall be released as far away as practicable from the dredge site.

e. All turtles shall be measured prior to release (standard carapace measurements including body depth and total length), and weighed when it is possible to do so safely.

f. All other tagging, external or internal sampling procedures (e.g., PIT tagging, blood letting, skin tag sampling, laparoscopies, gastric lavages, mounting satellite or radio transmitters, genetic sampling, etc.) for sea turtles are not permitted under this Opinion unless the observer holds a valid sea turtle research permit (pursuant to section 10 of the ESA, from the NOAA Fisheries Office of Protected Resources, Permits Division) authorizing the activity, either as the permit holder, or as a designated agent of the permit holder.

g. Any endangered species injured or killed during or as a consequence of relocation trawling shall count toward the project's incidental take quota. Minor skin abrasions resulting from trawl capture are considered "non-injurious."

NOAA Fisheries anticipates that no more than **three (3)** Kemp's ridleys, **three (3)** green turtles, **one (1)** hawksbill, and **five (5)** loggerhead turtles will be taken annually (lethal or non-lethal) as a result of this action (with the exception of relocation trawling, for which only lethal takes and serious injuries will be counted). The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If during the course of the action this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The COE must cease the permitted activity, immediately request initiation of formal consultation, provide an explanation of the causes of the taking, and

review with NOAA Fisheries the need for possible modification of the reasonable and prudent measures.

Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authority to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat to help implement recovery plans or to develop information.

(1) Channel-specific studies should be continued to identify the seasonal relative abundance of sea turtles within the Gulf channels. The dredging window and the associated observer requirements listed above may be adjusted (after consultation and authorization by NOAA Fisheries) 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 ensure low abundance of sea turtles in coastal water, and can monitor water temperatures in a real-time manner.

(2) The Galveston District should continue to 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, as well as develop methods to minimize sea turtle take during "cleanup" operations when the draghead maintains only intermittent contact with the bottom. Some method that level the "peaks and valleys" created by dredging would reduce the amount of time dragheads are off the bottom. Valid, replicable studies to estimate the effectiveness of the rigid draghead deflector and modified draghead deflector should be conducted in concert with dredging activities using the deflector. NOAA Fisheries should be consulted regarding the development of a protocol for draghead evaluation test. This conservation recommendation, anticipating the necessity of testing the effectiveness of new draghead designs under carefully monitored conditions in channels where sea turtles are present, was listed in prior consultations conducted on channel dredging along the Atlantic coast and channel maintenance dredging in the New Orleans and Galveston Districts. If the COE can provide evidence that an engineering solution, such as the modified sea turtle deflecting draghead, is significantly effective at excluding sea turtles from hopper dredge entrainment, such information may also be considered in extending the dredging window

(3) NOAA Fisheries recommends that the Galveston District require that by the end of **2003** all dragheads on hopper dredges contracted by the COE for dredging projects in the Galveston District be outfitted with water ports located in the top of the dragheads or some other effective method to help prevent the dragheads from becoming plugged with sediments. When the dragheads become plugged with sediments, the dragheads are often raised off the bottom (by the dredge operator) with the suction pumps on, in order to take in enough water to help clear clogs in the dragarm pipeline. This increases the likelihood that sea turtles in the vicinity of the draghead will be taken by the dredge. Water ports located in the top of the dragheads may relieve the necessity of raising the draghead off the bottom to perform such an action, and reduce the likelihood of incidental take of sea turtles.

Reinitiation of Consultation

This concludes formal consultation on the Corpus Christi Ship Channel Improvement Project. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if (1) the amount or extent of taking specified in the incidental take statement is exceeded, (2) new information reveals effects of the action that may affect listed species or critical habitat (when designated) 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 listed species or critical habitat 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. In instances where the amount or extent of incidental take is exceeded, the COE must immediately request reinitiation of formal consultation.

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Appendix. Summary of Takes by Hopper Dredges in the COE Galveston District since the 1995 RBO.

TABLE 1

MAINTENANCE DREDGING TURTLE TAKES BY FISCAL YEAR

Date Taken	Kemp's ridley	Loggerhead	Green	Hawksbill
Fiscal Year 1995				
Feb 19, 1995			1	
Feb 22, 1995			1	
Feb 26, 1995	1			
Aug 5, 1995	1			
Aug 31, 1995	1			
Sep 4, 1995	1			
Sep 16, 1995		1		
TOTAL FY 95	4	1	2	0
Fiscal Year 1996				
Oct 9, 1995		1		
Jun 28, 1996		1		
Jul 11, 1996		1		
Jul 13, 1996		1		
Jul 22, 1996		1		
TOTAL FY 96	0	5	0	0
Fiscal Year 1997				
Oct 13, 1996		1		
Mar 26, 1997	1			
Apr 29, 1997	1			
Jun 13, 1997		1		
TOTAL FY 97	2	2	0	0
Fiscal Year 1998				
TOTAL FY 98	0	0	0	0

Fiscal Year 1999				
Oct 29, 1998		1		
Feb 18, 1999			1	
Mar 2, 1999			1	
Jun 18, 1999		1		
Jun 19, 1999		1		
Jun 30, 1999		1		
TOTAL FY 99	0	4	2	0

Fiscal Year 2000				
Aug 10, 2000		1		
Aug 15, 2000		1		
TOTAL FY 00	0	2	0	0

Fiscal Year 2001				
TOTAL FY 01	0	0	0	0

Fiscal Year 2002				
Mar 18, 2002			1	
Mar 19, 2002			2	
Mar 20, 2002			1	
Aug 11, 2002		1		
TOTAL FY 02	0	1	4	0

TOTAL	6	15	8	0

TABLE 2

NEW-WORK DREDGING TURTLE TAKES BY FISCAL YEAR

Date Taken	Kemp's ridley	Loggerhead	Green	Hawksbill
Fiscal Year 1999				
Jan 4, 1999	1			
Sep 29, 1999			1	
TOTAL FY 99	1	0	1	0
Fiscal Year 2000				
TOTAL FY 00	0	0	0	0
TOTAL	1	0	1	0

TABLE 3

TURTLE TAKES BY PROJECT

Date Taken	Kemp's ridley	Loggerhead	Green	Hawksbill
Brazos Island Harbor				
Feb 19, 1995			1	
Feb 22, 1995			1	
Feb 26, 1995	1			
Apr 29, 1997	1			
Jun 13, 1997		1		
Feb 18, 1999			1	
Mar 2, 1999			1	
Mar 18, 2002			1	
Mar 19, 2002			1	
TOTAL	2	1	6	0

Corpus Christi Ship Channel				
Sep 16, 1995		1		
Jun 18, 1999		1		
Jun 19, 1999		1		
Jun 30, 1999		1		
TOTAL	0	4	0	0

TABLE 3

TURTLE TAKES BY PROJECT

Date Taken	Kemp's ridley	Loggerhead	Green	Hawksbill
Freeport Harbor				
Oct 9, 1995		1		
Jun 28, 1996		1		
Jul 11, 1996		1		
Jul 13, 1996		1		
Jul 22, 1996		1		
Oct 29, 1998		1		
Aug 10, 2000		1		
Aug 15, 2000		1		
TOTAL	0	8	0	0
Galveston Harbor and Channel /Houston-Galveston Navigation Channels				
Aug 15, 1995	1			
Aug 31, 1995	1			
Sep 4, 1995	1			
Jan 4, 1999	1			
Sep 29, 1999			1	
TOTAL	4	0	1	0
Matagorda Ship Channel				
Oct 13, 1996		1		
TOTAL	0	1	0	0
Sabine – Neches Waterway				
Mar 26, 1997	1			
Aug 11, 2002		1		
TOTAL	1	1	0	0
Port Mansfield Channel				
Mar 19, 2002			1	
Mar 20, 2002			1	
TOTAL	0	0	2	0

SECTION 3:

CULTURAL RESOURCES COORDINATION

March 31, 2000

Environmental Branch

James E. Bruseth, Ph.D.
Deputy State Historic
Preservation Officer
Texas Historical Commission
P.O. Box 12276
Austin, Texas 78711

Dear Dr. Bruseth:

The Galveston District, Corps of Engineers, and the Port of Corpus Christi Authority are currently conducting a feasibility study for proposed improvements to the Corpus Christi Ship Channel (CCSC) and the La Quinta Ship Channel (LQSC) and Turning Basin in Nueces and San Patricio Counties, Texas. With this letter, we would like to coordinate a draft scope of work for marine remote-sensing survey of submerged lands in Corpus Christi Bay and the Gulf of Mexico which may be affected by the project (Enclosure 1). Upland areas and open-bay placement areas which may be affected by the improvements are not fully identified at this time. They will be coordinated with your office at a later date.

This marine historic properties investigation is designed to cover impacts from the largest alternatives under study. For the CCSC, the largest alternative involves deepening the existing 40 mile-long channel from an authorized depth of 45 ft to 52 ft from the Corpus Christi Outer Bar channel to the Viola Turning Basin, and widening and deepening a 10-mile segment between the La Quinta Junction and Beacon 82 from the existing 400 ft to 550 feet. Placement areas for this construction have not yet been determined. For the LQSC, the largest alternative involves deepening the existing channel and turning basin from the currently authorized 45 ft to 50 ft and construction of a 1.4 mile 50-foot channel extension and new turning basin. The existing La Quinta placement area would be enlarged to contain material from channel and turning basin construction. The proposed alignments and survey areas are identified on the enclosed map (Enclosure 2).

A significant amount of archival research and marine remote-sensing survey have been conducted in the general project area in conjunction with our maintenance dredging program. All of this work was coordinated with your office and copies of the reports were furnished at that time. A list of the reports is provided in the reference section of the Scope of Work.

Four remote-sensing investigations (Hoyt, 1990; Hoyt and Schmidt, 1995; James and Pearson, 1991; Pearson and Simmons, 1995) have thoroughly investigated the jetty channel and, therefore, no additional survey from station -30+00 to +60+00 is recommended in conjunction with the proposed improvements. These surveys have documented the location of two shipwrecks adjacent to the south jetty. The remains of the *Utina* (41NU264), a wooden-hulled freighter constructed in 1920 by the Emergency Fleet Corporation, lie perpendicular to the channel at the eastern tip of the south jetty near Corps station 65+50. The results of archival research and mapping of the vessel's remains reported in Hoyt and Schmidt (1995) indicate that the wreck is not eligible for the National Register because of its extremely poor preservation. We concur with the report's recommendation and propose no further work in conjunction with the proposed project.

The remains of the *SS Mary* (41NU252, a shallow-draft sidewheel steamer built by the Morgan Steamship Line in 1866) lie on the plateau between the south jetty and the channel, extending down the channel's south slope near station +34+00. Based on extensive previous research and mapping (Hoyt, 1990; Pearson and Simmons 1995), the wreck has been determined eligible for National Register and listed as a State Archeological Landmark. In a letter dated June 7, 1994, your office accepted work done to date as data recovery for the on-going maintenance dredging of the jetty channel, but recommended avoidance of further impacts. In addition, your office asked that consultation be reopened should the *Mary* be threatened by channel widening or deepening. The currently proposed project to deepen the channel through this reach has the potential to adversely affect the *Mary*'s remains when deeper channel slopes slump to achieve equilibrium. However, inasmuch as the actual extent of impacts cannot be determined at this time, we recommend that consultation on the *Mary* be delayed until project dimensions are finalized in a recommended plan.

Historical/archival research has also documented the potential for additional significant historic shipwrecks in the Corpus Christi Bay area. The most significant of these are the Mexican war-era *Dayton* (a riverboat steamer built in 1835) and three Civil War-era shipwrecks (the sloop *Hanna*, the schooner *Elma*, and the steamer *A.Bee*). Because potentially significant shipwrecks could be impacted by the proposed improvements, the remote-sensing surveys have been designed to cover all new impact areas that have not been covered by prior investigations. The previous surveys covered the outer bar channel, the jetty channel, portions of the LQSC from station +55+00 to +130+00 and the CCSC from station 270+00 through 755+00. With the exception of the jetty channel, these surveys covered the authorized bottom width and the adjacent lower slopes of the channels, only. The upper channel slopes and top-of-cut were not surveyed. Therefore, we propose to survey a narrow impact zone on the upper slope and top-of-cut in CCSC and LQSC project areas where only deepening is proposed. For the channel segment across Corpus Christi Bay where both deepening and widening are proposed, we designed the survey area to account for all areas impacted by the

TEXAS HISTORICAL COMMISSION

The State Agency for Historic Preservation

GEORGE W. BUSH, GOVERNOR

JOHN L. NAU, III, CHAIRMAN

F. LAWERENCE OAKS, EXECUTIVE DIRECTOR

April 5, 2000

Ms Carolyn Murphy
Chief, Environmental Branch
US Army Corps of Engineers
P.O. Box 1229
Galveston, TX 77553-1229

Re: Project review under Section 106 of the National Historic Preservation Act of 1966 and the Antiquities Code of Texas
Proposed Scope of Work, Marine Remote-Sensing Survey for Historic Properties, Corpus Christi Ship Channel Improvements and La Quinta Channel Improvements and Extension, Corpus Christi Bay, TX, Nueces and Aransas Counties.
COE-VD

Dear Ms Murphy:

Thank you for your correspondence describing the above referenced project. This letter serves as comment on the proposed federal undertaking from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission. As the state agency responsible for administering the Antiquities Code of Texas, these comments also provide recommendations on compliance with state antiquities laws and regulations.

The review staff, led by State Marine Archeologist Steve Hoyt, has completed its review. The proposed Scope of Work for the project is adequate to address concerns about submerged archaeological resources within the project area. The only suggestion we might provide is to add a digital recording fathometer to the minimum remote-sensing equipment suite. Bathymetric data correlated to magnetic data helps to evaluate the latter through assessment of sensor-to-source distance.

We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your cooperation in this federal and state review process, and for your efforts to preserve the irreplaceable heritage of Texas. **If you have any questions concerning our review or if we can be of further assistance, please contact Steve Hoyt at (512) 463-7188.**

Sincerely,

Steven D. Hoyt

for
F. Lawerence Oaks, State Historic Preservation Officer

May 9, 2001

Environmental Section

James E. Bruseth, Ph.D.
Deputy State Historic
Preservation Officer
Texas Historical Commission
P.O. Box 12276
Austin, Texas 78711

Dear Dr. Bruseth:

The Galveston District, Corps of Engineers, and the Port of Corpus Christi Authority are currently conducting a feasibility study for proposed improvements to the Corpus Christi Ship Channel (CCSC) and the La Quinta Ship Channel (LQSC) and Turning Basin in Nueces and San Patricio Counties, Texas. A marine remote-sensing survey of submerged lands and close-order survey of potentially significant anomalies which may be affected by the project have been completed. Draft letter reports describing the results of these surveys are provided as Enclosures 1 and 2. We would like to coordinate a scope of work for additional survey and diver assessments at this time. The results of the proposed investigations will be incorporated into one comprehensive report which includes all the marine survey and assessment investigations conducted in conjunction with this feasibility study.

Eight open-water areas in Corpus Christi Bay and the Gulf of Mexico have been proposed for the beneficial use of dredged material in conjunction with this project (Enclosure 3). The scope of work provides for remote-sensing survey of six beneficial use (BU) areas (sites CQ, I, P, PI, R and S) in proximity to McGloin's Bluff and Ingleside, an area which historical research has identified as having high potential for the occurrence of significant historic shipwrecks. The most significant of these are the Mexican War-era *Dayton* (a riverboat steamer built in 1835) and three Civil War-era shipwrecks (the sloop *Hanna*, the schooner *Elma*, and the steamer *A. Bee*). No survey is proposed for two BU sites – site GH and site MN. Eighty percent of site GH was surveyed during the initial marine survey of areas proposed for navigation improvements (see Enclosure 1). Because no potentially significant anomalies were recorded by this survey and the Texas Historical Commission's (THC) shipwreck database contained no indication of a wreck in the area, no survey is proposed in the remaining 20%. Site MN is located 6,500 ft offshore south of the south jetty. It

consists of a 2,050 ft x 15,850 ft area running parallel to the shoreline in 30+ feet of water. A hopper dredge will deposit dredged material in various locations within this larger area in an effort to restore sediment to the littoral drift and encourage sand replenishment of nearby beaches. In verbal coordination of this site and disposal methods, the State Marine Archeologist determined that no survey would be necessary because of the low potential for wrecks in the area.

The scope of work proposes diver assessments of nine anomalies determined to possess signatures similar to those of historic shipwrecks by the close-order survey reported in Enclosure 2. The letter report identifies 12 such anomalies in the affected area of proposed channel improvements. Two of these (M 12 and M13) are associated with M38. Investigation of M38, the most promising of the three anomalies, will constitute investigation of all three. No further field investigation of M2, the anomaly formerly identified as the *Utina*, is proposed. Two previous diver assessments have retrieved sufficient information to determine that the remains of this wreck are extremely fragmentary and unlikely to yield significant historical data. Discovery of another wreck on the south side of the jetty outside the area of potential effects, reported in Enclosure 2, has cast doubt on the previous identification of this wreck as the *Utina*. For this reason, limited local historical research and informant interviews are proposed in an effort to better identify the M2 remains.

We request your review and comment on the draft Scope of Work. Further consultation will be initiated as the results of these investigations are received and project planning proceeds. If you have any questions, please contact Ms. Janelle Stokes at 409/766-3039.

Sincerely,

Carolyn Murphy
Chief, Environmental Section

Enclosures

CF w/o encls:
CESWG-PE-P, Mr. Heinly
CESWG-PE-E, Ms. Stokes
CESWG-PE-E, Mr. Roberts

CF with encls:

Mr. Bob Gearhart
PBS&J
206 Wild Basin Road, Suite 300
Austin, TX 78746-3343

SECTION 4:

PUBLIC INVOLVEMENT

Port of Corpus Christi
Channel Improvement Project
Public Involvement

The Port of Corpus Christi (Port) initiated a pro-active public outreach program to ensure that the public, resource agencies, industry, local government, and other interested parties were informed about the project and that any concerns were identified and addressed.

The Port and the Coastal Bend Bays & Estuaries Program (CBBEP) worked together on the issue of beneficial uses of dredged materials. The CBBEP's work plan had identified the need for public involvement and comment on potential beneficial uses of dredged materials. The Port contracted with CBBEP during 2000 to conduct public outreach on this issue, combining it with the Port's public outreach program for the Channel Improvement Project. As a result, there was extensive public outreach on this particular topic throughout the CBBEP program area. In these resulting meetings, the public in areas not directly affected by the Channel Improvement Project, such as Rockport and Kingsville, were briefed on project plans.

The public outreach program included newsletters, public meetings, special interest group meetings, and other outreach. Summaries of each of these are outlined below.

Newsletters

A series of newsletters was sent to individuals and organizations throughout the Corpus Christi Bay area, including local residents and businesses, port industries, community groups, city and county officials, and people who previously attended meetings on this project. The mailing list was expanded in 2000 to include individuals throughout the CBBEP area. Copies of all the newsletters are contained in Appendix A-1.

The first newsletter was mailed in July 1998. This newsletter discussed the elements and benefits of the proposed project and outlined issues already identified for the feasibility study investigation. It also gave a background and timeline for the project and announced the first public meeting.

The second newsletter was mailed in August 1999. It identified initial alternatives to be evaluated, outlined the project elements, and gave a brief history of the project.

In May 2000, a third newsletter was mailed to approximately 1,100 people. It gave a brief project background and discussed the proposed improvement alternatives, selected project studies, and the potential for beneficial uses of dredged materials. It also announced two public meetings scheduled in May 2000.

The fourth newsletter, mailed in November 2000 to approximately 1,300 people, announced the public meeting in December 2000 and gave a detailed update of the project's progress. It discussed the more refined project improvement alternatives and the results of several project studies. It also listed the beneficial use ideas that had been submitted by the public to date.

The April 2001 newsletter was mailed to approximately 1,300 people and announced the Corp's recommended plan and the proposed Dredged Material Management/Beneficial

Uses (DMM/BU) plan. It gave an update on several project studies and announced a public meeting scheduled for April 2001.

The Port also publishes a quarterly newsletter, *Channels International*, which serves as a means to update the public, port-related industries, and other businesses on various activities at the Port. Several articles have been written in *Channels International* regarding this project. The most recent, published in the fall of 2001, is included in Appendix A-1.

Additional newsletters will be produced as needed throughout the life of this project to ensure continuing, pro-active public outreach.

Public Meetings

Numerous public meetings have been held to update the public on the project as it has progressed and to solicit their input. To announce each meeting, newspaper advertisements were placed in local newspapers and press releases were sent to various media. Attendees were encouraged to comment at the meetings and to submit written comments.

March 30, 1994

During the reconnaissance phase of this study, the U.S. Army Corpus of Engineers (Corps) held a public workshop in Corpus Christi to describe the reconnaissance study and to solicit public input on the proposed project. A letter from the U.S. Fish and Wildlife Service regarding this meeting is included in Appendix A-2.

July 15, 1998

The first meeting was held in Corpus Christi. Approximately 130 people attended. The presentation included information on the history of the channel, trends in the shipping industry, specifics of the widening, deepening, and extension elements of the project, an outline of the federal project authorization process, and an overview of issues which had already been identified for inclusion in the feasibility study. The meeting also gave the public the opportunity to give input on what issues should be addressed in the feasibility study.

This meeting was announced in a newsletter that was mailed in July 1998 and in notices published in several local newspapers. Coastal Bend Bays Foundation members were also notified by letter by their organization. Newspaper articles appeared in the Corpus Christi Caller Times on July 26, the Port Aransas South Jetty on July 9, the Aransas Pass Progress on July 15, and the Coastal Bend Sun on July 11. A summary of this meeting and the newspaper articles are included in Appendix A-2.

August 19, 1999

This meeting was held at the Omni Bayfront Hotel in Corpus Christi. The meeting was sponsored by the Port and the U.S. Army Corps of Engineers (Corps) and served as the

required Public Scoping Meeting as part of the Feasibility Study. The presentation included information on the history of the channel, specifics of the widening, deepening, and extension elements of the project, the outline of the federal authorization process, the 17 alternatives proposed to be studied, the elements and final determination of the reconnaissance study, and the various studies included in the feasibility study. The meeting also gave the public the opportunity to present views, opinions, and recommendations to the Port and Corps concerning the project. This meeting was announced to over 750 individuals, agencies, organizations, and news media. A summary of this meeting is included in Appendix A-2.

May 15, 2000

This meeting was held at the Conrad Blucher Institute at Texas A&M University - Corpus Christi. Approximately 30 people attended. The presentation included information on the existing system, the proposed improvements, an outline of the federal project authorization process, and examples of beneficial uses of dredged material. The public was encouraged to comment on possible beneficial uses of dredged material that would result from the project.

This meeting was announced in a newsletter that was mailed in May 2000 and in several local newspapers, including the Corpus Christi Caller Times on May 11 and 15, the Portland News on May 4 and 11, the Ingleside Index on May 11, the Aransas Pass Progress on May 10, and the Coastal Bend Sun on May 11. A summary of this meeting is included in Appendix A-2.

May 17, 2000

This meeting was held in Ingleside On The Bay. Thirty-six people attended this meeting. The presentation included information on the existing system, the proposed improvements, an outline of the federal project authorization process, and examples of beneficial uses of dredged material. The public was encouraged to comment on possible beneficial uses of dredged material that would result from the project.

This meeting was announced in a newsletter that was mailed in May 2000 and in several local newspapers, including the Corpus Christi Caller Times on May 11 and 15, the Portland News on May 4 and 11, the Ingleside Index on May 11, the Aransas Pass Progress on May 10, and the Coastal Bend Sun on May 11. A summary of this meeting is included in Appendix A-2.

September 15, 2000

This meeting was held at the University of Texas Marine Sciences Institute (UT-MSI) in Port Aransas. Twenty-one people attended this meeting. The presentation included information on the existing system, the proposed improvements, an outline of the federal project authorization process, and examples of beneficial uses of dredged material. This meeting was directed toward the scientific community, and they were encouraged to

comment on possible beneficial uses of dredged material that would result from the project.

This meeting was announced in the Port Aransas South Jetty on September 14, and flyers were sent to UT-MSI for posting around campus. A summary of this meeting is included in Appendix A-2.

October 10, 2000

This meeting was held at the Kingsville Chamber of Commerce in Kingsville. Two people attended this meeting. The presentation included information on the existing system, the proposed improvements, an outline of the federal project authorization process, and examples of beneficial uses of dredged material. Attendees were encouraged to comment on possible beneficial uses of dredged material within the Coastal Bend Bays & Estuaries Program area.

This meeting was announced in the Kingsville Record on October 4 and 8, and flyers were posted in various placed around Kingsville, including the campus of Texas A&M University - Kingsville, the Kleberg County Courthouse, and the Kingsville Chamber of Commerce. A summary of this meeting is included in Appendix A-2.

October 11, 2000

This meeting was held in the Rockport Community Building in Rockport. Three people attended this meeting. The presentation included information on the existing system, the proposed improvements, an outline of the federal project authorization process, and examples of beneficial uses of dredged material. Attendees were encouraged to comment on possible beneficial uses of dredged material within the Coastal Bend Bays & Estuaries Program area.

This meeting was announced in the Rockport Pilot on October 4 and 7, the Aransas Pass Progress on October 4 and 5, and the Ingleside Index on October 4 and 5. Flyers were mailed to several local businesses and individuals for posting. A summary of this meeting is included in Appendix A-2.

December 6, 2000

This meeting was held in Corpus Christi at the Solomon P. Ortiz International Center. Thirty-six people attended this meeting. The presentation included a comprehensive project overview, a report on hydrodynamic and salinity modeling, and options for the Dredged Material Management/Beneficial Uses (DMM/BU) plan. The public was encouraged to comment on the DMM/BU plan.

This meeting was announced in a newsletter that was mailed in November 2000 and in several local newspapers, including the Rockport Herald on November 30, the Flour Bluff Sun on December 2, the Coastal Bend Sun on November 25 and December 2, and the Corpus Christi Caller Times on November 22, December 3, 4, and 5. At least two

local television stations reported on the meeting during their regular 10:00 PM news. A summary of this meeting is included in Appendix A-2.

April 25, 2001

This meeting was held in Corpus Christi at the Solomon P. Ortiz International Center. Forty-five people attended this meeting. The presentation included the plan recommended by the U.S. Army Corps of Engineers and the Dredged Material Management/Beneficial Uses (DMM/BU) plan. The public was encouraged to comment on these plans.

This meeting was announced in a newsletter that was mailed in April, in the Corpus Christi Caller Times on April 22, the Flour Bluff Sun on April 14, and the Coastal Bend Sun on April 14. Newspaper articles appeared in the Corpus Christi Caller Times on April 24 and April 27 and in the Coastal Bend Sun on April 28. At least one television station reported on the meeting during their regular 10:00 PM news. A summary of this meeting and the newspaper articles are included in Appendix A-2.

Future Meetings

As required in the NEPA process, a public meeting will be held following the completion of the draft Environmental Impact Statement. Additional public meetings or small group meetings will be held if the level of interest so dictates or if interested parties so request.

Examples of the notices advertising the meetings, some of the newspaper stories, and comment forms are included in Appendix A-2.

Special Interest Group Meetings

In addition to the general public meetings, many meetings have been held with special interest groups. Examples of these meetings are described below, and selected summaries are included in Appendix A-3.

La Quinta Trade Gateway Project

Several meetings have been held on the La Quinta Trade Gateway project. These meetings addressed that project, as well as the Channel Improvement Project, and resulted in the beneficial use idea of an upland dredged material placement area site that would be used as a berm separating the La Quinta Trade Gateway property from the North Shore Country Club.

A meeting, held on January 7, 1999, briefed San Patricio County Judge Josephine Miller and Texas State Representative Judy Hawley on the project.

Another meeting, held on May 26, 1999, was a special meeting of the Commissioners of the Port of Corpus Christi. The public was invited to attend and speak about the project. The announcement of this meeting is included in Appendix A-3.