UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, FL 33702
(727) 570-5312, FAX 570-5517

AUG -4 2003 F/SER3:SKB

Dr. Susan Ivester Rees
Leader, Coastal Environment Team
U.S. Army Corps of Engineers, Mobile District
P.O. Box 2288
Mobile, AL 36628-0001

Dear Dr. Rees:

This constitutes the National Marine Fisheries Service's (NOAA Fisheries) biological opinion (Opinion) based on our review of the U.S. Army Corps of Engineers, Mobile District (MDCOE) request for formal consultation on the dredging and spoil deposition by hopper dredge in Pensacola Pass, Florida. The Opinion analyzes project impacts on green sea turtles *(Chelonia mydas)*, loggerhead sea turtles (*Caretta caretta*), Kemp's ridley sea turtles *(Lepidochelys kempii)*, Gulf sturgeon (*Acipenser oxyrinchus desotoi*), and Gulf sturgeon critical habitat, in accordance with section 7 of the of the Endangered Species Act (ESA) of 1973 as amended.

This Opinion is based on project information provided by the MDCOE. In addition, NOAA Fisheries utilized published literature and summary reports provided by COE (annual reports detailing take, dredge observer reports, dredging project completion reports, and annual dredging project summaries). A complete administrative record of this consultation is on file at NOAA Fisheries' Southeast Regional Office.

We look forward to further cooperation with you on other MDCOE projects to ensure the conservation of our threatened and endangered marine species and designated critical habitat. If you have any questions, please contact Dr. Stephania Bolden, fishery biologist, at (727) 570-5312, or by e-mail at stephania.bolden@noaa.gov.

Sincerely,

Roy E. Crabtree, Ph.D.
Regional Administrator

Enclosure

cc: F/PR3
O:\section7\formal\sturgeon\NAS Pensacola
File: 1514-22.f.1 (MDCOE)
Ref: F/SER/20032/00053

Endangered Species Act - Section 7 Consultation
Biological Opinion

Action Agency: U.S. Army Corps of Engineers (COE)

Activity: Naval Air Station (NAS), Pensacola Channel, Florida: impacts of dredging and spoil deposition via hopper dredges (Consultation Number F/SER/2003/00053)

Consulting Agency: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Regional Office, Protected Resources Division, St. Petersburg, Florida

Approved by:

Roy E. Crabtree, Ph.D., Regional Administrator
NOAA Fisheries, Southeast Regional Office
St. Petersburg, Florida

Date Issued: AUG -4 2003

Contents

Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1531 *et seq.*), requires that each Federal agency shall ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. When the action of a Federal agency may affect a protected species or its critical habitat, that agency is required to consult with either the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries), or the U.S. Fish and Wildlife Service (USFWS), depending upon the protected species that may be affected.

This document represents NOAA Fisheries' biological opinion (Opinion) based on our review of impacts associated with both the dredging of Pensacola Pass (channel between Santa Rosa Island and Perdido Key) in the U.S. Gulf of Mexico and the deposition of the dredging spoil in the littoral zone off Perdido Key to the west of Pensacola Pass by hopper dredge. The COE Jacksonville District is the permitting authority; the Mobile District COE is acting as an agent for the U.S. Navy (specifically, Naval Air Station Pensacola). This Opinion analyzes project impacts and its effects on green sea turtles *(Chelonia mydas)*, loggerhead sea turtles (*Caretta caretta*), Kemp's ridley sea turtles *(Lepidochelys kempii)*, Gulf sturgeon (*Acipenser oxyrinchus desotoi*), and Gulf sturgeon critical habitat, in accordance with section 7 of the ESA.

Formal consultations are required when action agencies determine that a proposed action "may affect" listed species or designated critical habitat. Formal consultations on most listed marine species and their designated critical habitat are conducted between the action agency and NOAA Fisheries. Consultations are concluded after NOAA Fisheries' issuance of an Opinion that identifies whether a proposed action is likely to jeopardize the continued existence of a listed species, or destroy or adversely modify critical habitat. The Opinion also states the amount or extent of incidental taking that may occur. Measures to reduce the effect of takes of listed species are developed (i.e., reasonable and prudent measures) and conservation recommendations are made. Notably, there are no reasonable and prudent measures associated with critical habitat, only reasonable and prudent alternatives. The issuance of an Opinion detailing NOAA Fisheries' findings concludes ESA section 7 consultation.

This Opinion is based on project information provided by the Mobile District COE. In addition, NOAA Fisheries utilized published literature, and summary reports provided by COE (annual reports detailing take, dredge observer reports, dredging project completion reports, and annual dredging project summaries).

Consultation history

NOAA Fisheries received a request from Mobile COE on January 27, 2003, for an informal consultation on the NAS Pensacola Channel project. Mobile COE determined that the proposed action is not likely to adversely affect species under NOAA Fisheries' purview and requested concurrence with their "not likely to adversely affect" determination. The consultation request included mention of Gulf sturgeon and designated Gulf sturgeon critical habitat, and "sea turtles." No determination on project impacts to critical habitat was made. The consultation request stated that the dredging event is scheduled for April/May 2003 and that the Navy has requested a permit by March 2003, as naval readiness exercises are scheduled to begin in the summer of 2003. The disposal site was described as the littoral zone south of Perdido Key between the 14- and 20-foot contours.

On February 19, 2003, NOAA Fisheries received an email from the Jacksonville COE office inquiring about the project; Jacksonville COE will be issuing the regulatory permit for this project.

On March 7, 2003, NOAA Fisheries sent and faxed a letter to Mobile COE regarding the project and requested additional project information including:

(1) A description of any listed species or critical habitat that occurs in the project area;
(2) A description of the manner in which each aspect of the proposed action (i.e., dredging by each dredge-type and placement of material at disposal site) may affect each listed species and designated critical habitat;

(3) A determination of how each aspect of the project will affect each listed species and designated critical habitat (i.e., no effect, not likely to adversely affect, likely to adversely affect, likely to jeopardize species/adversely modify critical habitat);
(4) Supporting information; and
(5) Any other relevant information (e.g., alternative sites for material placement, additional details on proposed sea turtle observer).

During March and April 2003, NOAA Fisheries and Mobile COE continued communications regarding potential project impacts to both listed species (i.e., sea turtles and Gulf sturgeon) and designated critical habitat. A paucity of scientific data on local benthic community structure, and recolonization and recovery rates, complicated determination of project impacts to designated critical habitat. Mobile COE and NOAA Fisheries discussed the opportunity for a monitoring project to be associated with the project that would provide information that could assist in future analyses. Mobile COE provided to NOAA Fisheries additional scientific information about the benthic macroinvertbrate fauna in the project area and Gulf sturgeon prey items.

NOAA Fisheries received on May 14, 2003, from Mobile COE information detailing measures that will be included in the project design if hopper dredging will be used in the awarded contract. Mobile COE was also investigating the necessity of sea turtle relocation trawling and requested the authorization to employ such trawling only in the event of a turtle take. Protective measures proposed to be used in relocation trawling included:

1. Intake and overflow screening,
2. Use of sea turtle deflector draghead,
3. Observer and reporting requirements, and
4. Potential to minimize area used within the disposal site.

Between June 9-July 23, 2003, NOAA Fisheries and Mobile COE continued communications to clarify details of the proposed action and discuss the status of the consultation.

A complete administrative record of this consultation is on file at the NOAA Fisheries' Southeast Regional Office, St. Petersburg, Florida.

BIOLOGICAL OPINION

I. Description of the proposed action and area

Action area

The project area is in the northern Gulf of Mexico. The dredging action area is Pensacola Pass, Florida, in western Escambia County, between the eastern end of Perdido Key and the western edge of Santa Rosa Island. The disposal area is the littoral zone west of Pensacola Pass and south of Perdido Key, Escambia County, Florida.

Proposed action

The proposed action and action area includes:

1) Hopper dredging of Pensacola Pass to remove approximately 200,000 cubic yards (cy) of sandy material from a shoaling area. Dredge area is within Reach 2 (0+00 to 112+00) of the channel. Pensacola Pass is considered a major shipping channel and dredge area is totally within the standard channel marked by navigation buoys. The actual dredge depth will be 48 feet; this includes permitted design depth of 44 feet plus 2 feet advance maintenance dredging and 2 feet allowable overdepth dredging.

2) Disposal of dredged material will be in the littoral zone between the 14- and 20- foot depth contours to the west of Pensacola Pass and south of Perdido Key. The coordinates that enclose the disposal area, provided by the COE (referenced to the Florida/North State Plane coordinate system 83 datum zone 903) are (see Appendix I for map):

A. 489242.10 N 1074580.83 E
B. 486583.49 N 1079790.24 E
C. 484652.18 N 1079735.37 E
D. 485629.11 N 1074495.95 E

3) The amount of sea bottom affected by the material disposal is projected to encompass between 69 and 342 total acres (i.e., 0.28 and 1.3 km^2). The Mobile COE is committed (Mobile COE email to NOAA Fisheries, June 24, 2003) to place material within the disposal area in a manner consistent with NOAA Fisheries' recommendations (e.g., a thin layer over a large area).

4) The proposed action will be completed by September 30, 2003.

II. STATUS OF LISTED SPECIES AND CRITICAL HABITAT

The following endangered (E) and threatened (T) marine mammal, sea turtle, and fish species, and designated critical habitat under the jurisdiction of NOAA Fisheries are known to occur in or near the action area:

Common Name	Scientific Name	Status
Marine Mammals		
Blue whale	*Balaenoptera musculus*	E
Humpback whale	*Megaptera novaeangliae*	E

Fin whale	*Balaenoptera physalus*	E
Sei whale	*Balaenoptera borealis*	E
Sperm whale	*Physeter macrocephalus*	E

Sea Turtles

Leatherback sea turtle	*Dermochelys coriacea*	E
Hawksbill sea turtle	*Eretmochelys imbricata*	E
Kemp's ridley sea turtle	*Lepidochelys kempii*	E
Green sea turtle	*Chelonia mydas*[1]	E/T
Olive ridley sea turtle	*Lepidochelys olivacea*[2]	E/T
Loggerhead sea turtle	*Caretta caretta*	T

Fish

Gulf sturgeon	*Acipenser oxyrinchus desotoi*	T
Smalltooth sawfish	*Pristis pectinata*	E

Critical Habitat

Within the Gulf of Mexico, designated critical habitat occurs only for the Gulf sturgeon.

A. Analysis of the species not likely to be affected

Marine mammals

NOAA Fisheries believes that sperm, blue, fin, humpback, or sei whales will not be adversely affected by hopper dredging or disposal operations; the possibility of dredge collisions is remote since these are deepwater species unlikely to be found near hopper dredging sites. There has never been a report of a whale taken by a hopper dredge. Based on the unlikelihood of their presence, feeding habits, and very low likelihood of hopper dredge interaction, the above-mentioned cetaceans are not considered further in this Opinion. However, it should be noted that incidental takes of any marine mammals (listed or non-listed) are not authorized through the ESA section 7 process. If such takes may occur, an incidental take authorization under the Marine Mammal Protection Act (MMPA) section 101 (a)(5) is necessary. For more information regarding MMPA permitting procedures, contact Ken Hollingshead of NOAA Fisheries Headquarters' Protected Resources staff at (301) 713-2323.

Sea turtles

There are six species of sea turtles (loggerhead, green, Kemp's ridley, hawksbill, leatherback, and olive ridley) that can possibly be found in or near the action area. Table 1 details the confirmed sea turtle strandings between 1998 and 2002 in the counties encompassing the action area. Olive ridley turtles in the northern hemisphere are mainly found in the Pacific Ocean and rarely found in the southeast United

[1]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 these populations away from the nesting beach, green turtles are considered endangered wherever they occur in U.S. waters.

[2]Olive ridley turtles are listed as threatened except for the Mexican breeding population which is listed as endangered. Due to the inability to distinguish between these populations away from the nesting beach, olive ridley turtles are considered endangered wherever they occur in U.S. waters.

States. In the past two years, three confirmed strandings of olive ridleys have been recorded in south Florida. Thus, although present within the Gulf of Mexico, NOAA Fisheries believes their occurrence is extremely rare based on the lack of strandings anywhere other than south Florida. Therefore, olive ridleys will not be considered further in this Opinion.

Leatherback sea turtles are generally found in deep, pelagic, offshore waters though they occasionally may come into shallow waters to forage on jellyfish. Leatherbacks are unlikely to be found associated with ship channels and thus are unlikely to be impacted by hopper dredging activities. While leatherbacks are reported locally in the strandings database (Table 1), there has only been one reported instance of leatherback take by a relocation trawler in a shipping channel (approximately 1.5 miles offshore of Aransas Pass, Texas; April 28, 2003, pers. comm. T. Bargo to E. Hawk, NOAA, SERO), and there has never been a reported take of a leatherback sea turtle by a hopper dredge. The typical leatherback turtle would be as large or larger than the typical hopper dredge draghead and therefore unlikely to be entrained. Leatherback sea turtles will not be considered further in this Opinion based on the unlikelihood of their presence nearshore, their non-benthic feeding habits, and their large size that, combined, equate to a discountable likelihood of entrainment by a hopper dredge.

Table 1. 1998-2002 Sea turtle strandings* in Santa Rosa and Escambia Counties, Florida by month.

Species	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
loggerhead	0	2	1	8	11	5	7	1	3	6	1	2	47
green	1	1	0	0	1	0	1	1	0	0	1	0	6
leatherback	0	0	1	0	2	0	3	1	0	0	0	0	7
hawksbill	0	0	0	0	0	0	0	0	0	0	0	0	0
Kemp's ridley	0	1	1	3	6	1	3	0	1	1	3	1	21
unknown	0	0	0	0	1	1	0	0	0	0	0	0	2
Totals	1	4	3	11	21	7	14	3	4	7	5	3	83

* strandings are true strandings only: no headstarts, TED-testers incidental captures or post-hatchlings included

The hawksbill turtle is listed as Endangered under the ESA, 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 3 generations (105 years) (Meylan and Donnelly, 1999). Only five regional nesting populations remain where more than 1,000 females nest annually (Seychelles, Mexico, Indonesia, and 2 in Australia) (Meylan and Donnelly, 1999). There are no recent (1998-2002) strandings of hawksbill in the project area (Table 1). Furthermore, there has never been a reported take of a hawksbill by a hopper dredge and NOAA Fisheries believes hawksbills are unlikely to frequent or forage in shipping channels. Based on this information, NOAA Fisheries believes that the chances of a hawksbill turtle being affected either by dredging or disposal of dredged material is unlikely. Therefore, hawksbill turtles will not be discussed further in this Opinion.

Based on this information, NOAA Fisheries believes that the chances of an olive ridley, leatherback, or hawksbill turtle being affected by the proposed action are discountable. Therefore, these three species will not be discussed further in this Opinion.

Fish

Smalltooth sawfish

The U.S. population of smalltooth sawfish was listed as endangered under the ESA on April 1, 2003 (68 FR 15674); critical habitat has not yet been designated. Historically, smalltooth sawfish commonly

occurred in the shallow waters of the Gulf of Mexico and eastern seaboard up to North Carolina; current distribution is believed to be centered around the extreme southern portion of peninsular Florida (i.e., Everglades National Park including Florida Bay). Therefore, NOAA Fisheries believes that smalltooth sawfish are rare in the action area and that the chances of the proposed action affecting them are discountable. This species will not be discussed further in this Opinion.

In sum, NOAA Fisheries concludes that the leatherback, olive ridley and hawksbill sea turtles; the blue, humpback, fin, sei, sperm, and northern right whales; and the smalltooth sawfish are not likely to be adversely affected by the proposed action and will not be discussed further in this Opinion.

B. Species/critical habitat likely to be affected

Of the above-listed threatened and endangered species of sea turtles, whales, and fish potentially present in the action area, NOAA Fisheries believes that only loggerhead, green, and Kemp's ridley sea turtles, and Gulf sturgeon are vulnerable to take as a result of the use of hopper dredges to deepen Pensacola Pass and dispose of the dredged material. Furthermore, while Pensacola Pass (as marked by buoys) is excluded from critical habitat (68 FR 13342), the project disposal site is within designated critical habitat (68 FR 13446) and placement of the dredged material may affect designated Gulf sturgeon critical habitat.

1. Species/critical habitat description

Loggerhead sea turtle

The loggerhead sea turtle was listed as a threatened species on July 28, 1978. This species inhabits the continental shelves and estuarine environments along the margins of the Atlantic, Pacific, and Indian Oceans, and within the continental United States it nests from Louisiana through 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 includes the pelagic waters of the North Atlantic and the Mediterranean Sea (NMFS and USFWS, 1993).

Life history

In the western Atlantic, most loggerhead sea turtles nest from North Carolina to Florida and along the Gulf coast of Florida. There are five western Atlantic subpopulations, divided geographically as follows:

(1) a northern nesting subpopulation, occurring from North Carolina to northeast Florida at about 29° N;
(2) a south Florida nesting subpopulation, occurring from 29° N on the east coast to Sarasota on the west coast;
(3) a Florida Panhandle nesting subpopulation, occurring at Eglin Air Force Base and the beaches near Panama City, Florida;
(4) a Yucatán nesting subpopulation, occurring on the eastern Yucatán Peninsula, Mexico (Márquez, 1990; TEWG, 2000); and
(5) a Dry Tortugas nesting subpopulation, occurring in the islands of the Dry Tortugas, near Key West, Florida (NMFS SEFSC, 2001).

The fidelity of nesting females to their nesting beach is the reason these subpopulations can be differentiated from one another. This nesting beach fidelity will prevent recolonization of nesting beaches with turtles from other subpopulations.

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 United States. Individual females nest multiple times during a nesting season, with a mean of 4.1 nests/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). Generally, 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. Stranding records indicate that when pelagic immature loggerheads reach 40-60 cm straight-line carapace length they begin to live in coastal inshore and nearshore waters of the continental shelf throughout the U.S. Atlantic and Gulf of Mexico. Benthic immature loggerheads (turtles that have come back to inshore and nearshore waters), 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.

Past literature gave an estimated age at maturity of 21-35 years (Frazer and Ehrhart, 1985; Frazer et al., 1994) with the benthic immature stage lasting at least 10-25 years. However, based on new data from tag returns, strandings, and nesting surveys, NMFS SEFSC (2001) estimates ages of maturity ranging from 20-38 years and benthic immature stage lasting from 14-32 years.

Pelagic and benthic 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.

Population dynamics and status

A number of stock assessments (TEWG, 1998; TEWG, 2000; NMFS SEFSC, 2001) have examined the stock status of loggerheads in the waters of the United States, but have been unable to develop any reliable estimates of absolute population size. Based on nesting data, of the five western Atlantic subpopulations, the south Florida-nesting and the northern-nesting subpopulations are the most abundant (TEWG, 2000; NMFS SEFSC, 2001). The Turtle Expert Working Group (TEWG) (2000) was able to assess the status of these two better-studied populations and concluded that the south Florida subpopulation is increasing, while no trend is evident (at that time considered stable but possibly declining) for the northern subpopulation. Another consideration adding to the vulnerability of the northern subpopulation is that NOAA Fisheries' scientists estimate that the northern subpopulation produces 65% males (NMFS SEFSC, 2001).

The latest and most extensive stock assessment (NMFS SEFSC, 2001) was successful in assembling the best available information on loggerhead turtle life history and developing population models that can be used to predict the response of the loggerhead populations to changes in their mortality and survival. The new turtle excluder device (TED) rule (68 FR 8456, February 21, 2003) requiring larger turtle escape openings is expected to reduce trawl related loggerhead mortality by 94% (NMFS SEFSC, 2002) from the mortality expected using current TEDs. Based on the loggerhead population models in NMFS SEFSC (2001), this change in the mortality rate is expected to move the northern nesting population from stable to increasing.

The southeastern U.S. nesting aggregation is second in size only to the nesting aggregation on islands in the Arabian Sea off Oman (Ross, 1979; Ehrhart, 1989; NMFS and USFWS, 1993). 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 gillnet 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

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 the United States 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). Green turtle nesting also occurs regularly on St. Croix, U.S.V.I., and on Vieques, Culebra, Mona, and the main island of Puerto Rico (MacKay and Rebholz, 1996).

Life history

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 eggs/nest. 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 southeastern United States include any shallow coastal waters having macroalgae or seagrasses 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 southeastern United States 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 20-50 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 few data are available.

Population dynamics and status

The vast majority of green turtle nesting within the southeastern United States occurs in Florida (Meylan et al., 1995; Johnson and Ehrhart, 1994). It is unclear how greatly green turtle nesting in the whole of Florida has been reduced from historical levels (Dodd, 1981). However, based on 1989-2002 nesting information, green turtle nesting in Florida has been increasing (Florida Marine Research Institute

Statewide Nesting 2002, Database). Total nest counts and trends at index beach[3] sites during the past decade suggest that the number of green turtles that nest within the southeastern United States is increasing.

There are no reliable estimates of the number of immature green turtles that inhabit coastal (foraging) areas within the southeastern United States. However, information on incidental captures of immature green turtles at the St. Lucie Power Plant (average 215 green turtle captures per year since 1977) in St. Lucie County, Florida, (on the Atlantic coast) indicates that the annual number of immature green turtles captured has increase significantly in the past 26 years (FPL, 2002). It is not known whether or not this increase is indicative of local or Florida east coast populations.

It is likely that immature green turtles foraging in the southeastern United States come from multiple genetic stocks; therefore, the status of immature green turtles in the southeastern United States might also be assessed from trends at all of the main regional nesting beaches, principally Florida, Yucatán, and Tortuguero. Trends at Florida beaches are presented above. Trends in nesting at Yucatán beaches cannot be assessed because of a lack of consistent beach surveys over time. Trends at Tortuguero (around 20,000-50,000 nests/year) show a significant increase in nesting during the period 1971-1996 (Bjorndal et al., 1999). Therefore, it seems reasonable that there is an increase in immature green turtles inhabiting coastal areas of the southeastern United States; however, the magnitude of this increase is unknown.

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 southeastern United States, green turtles that nest and forage in the region may spend large portions of their life history outside the region and outside U.S. jurisdiction where exploitation is still a threat. However, there are still significant and ongoing threats to green turtles from human-related causes in the United States. These threats include beach armoring, erosion control, artificial lighting, beach disturbance (e.g., driving on the beach), pollution, foraging habitat loss as a result of direct destruction by dredging, siltation, boat damage, other human activities, and fishing gear. There is also the increasing threat from occurrences of green turtle fibropapillomatosis disease. 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

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; TEWG, 2000). Kemp's ridleys nest 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 east coast of the United States.

[3]Index beaches are those where survey effort to monitor annual nesting has been standardized and is constant year-to-year and therefore nesting trends may be determined with statistical confidence; at non-indexed beaches, survey effort may, and often does, vary from year to year.

Life history

Females return to their nesting beach about every 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.

Benthic immature Kemp's ridleys have been found along the east coast of the United States and in the Gulf of Mexico. In the Atlantic, benthic immature turtles travel northward as the water warms to feed in the productive, coastal waters offshore waters (Georgia through New England), migrating southward with the onset of winter (Lutcavage and Musick, 1985; Henwood and Ogren, 1987; Ogren, 1989). In the Gulf, studies suggest that benthic immature 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 stage (pelagic 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 from 7-15 years.

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

Population dynamics and status

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 mid-1980s, nesting numbers were below 1,000 (with a low of 702 nests in 1985). However, recent observations of increased nesting (6,277 nests recorded in 2000) suggest that the decline in the Kemp's ridley population has stopped and the population is now increasing (USFWS, 2000).

A period of steady increase in benthic immature Kemp's ridleys has been occurring since 1990 and appears to be due to increased hatchling production and an apparent increase in survival rates of immature turtles. The increased survivorship of immature turtles is due in part to the introduction of TEDs in the U.S. and Mexican shrimping fleets. As demonstrated by nesting increases at the main nesting sites in Mexico, adult Kemp's ridley numbers has increased. The population model used by TEWG (2000) projected that Kemp's ridleys could reach the intermediate recovery goal identified in the Recovery Plan of 10,000 nesters by the year 2015.

The largest contributor to the decline of the Kemp's 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 shrimp 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.

Gulf sturgeon

NOAA Fisheries and the USFWS listed the Gulf sturgeon, also known as the Gulf of Mexico sturgeon, as a threatened species on September 30, 1991 (56 CFR 49653). The present range of the Gulf sturgeon extends from Lake Pontchartrain and the Pearl River system in Louisiana and Mississippi east to the Suwannee River in Florida. Sporadic occurrences have been recorded as far west as the Rio Grande River between Texas and Mexico, and as far east and south as Florida Bay (Wooley and Crateau, 1985; Reynolds, 1993).

Life history

The Gulf sturgeon is an anadromous fish; adults spawn in freshwater then migrate to feed and grow in estuarine/marine habitats. After spawning in the upper river reaches, both adult and subadult Gulf sturgeon migrate from the estuaries, bays, and the Gulf of Mexico to the coastal rivers in early spring (i.e., March through May) when river water temperatures range from 16 to 23°C (Huff, 1975; Carr, 1983; Woolcy and Crateau, 1985; Odenkirk, 1989; Clugston et al., 1995; Foster and Clugston, 1997; Fox and Hightower, 1998; Sulak and Clugston, 1999; Fox et al., 2000). Fall downstream migration from the river into the estuary/Gulf of Mexico begins in September (at water temperatures around 23°C) and continues through November (Huff, 1975; Wooley and Crateau, 1985; Foster and Clugston, 1997).

Most subadult and adult Gulf sturgeon spend cool months (October or November through March or April) in estuarine areas, bays, or in the Gulf of Mexico (Odenkirk, 1989; Foster, 1993; Clugston et al., 1995; and Fox et al., 2002). Research indicates that in the estuary/marine environment both subadult and adult Gulf sturgeon show a preference for sandy shoreline habitats with water depths less than 3.5 m and salinity less than 6.3 parts per thousand (Fox and Hightower, 1998; Parauka et al., in press). The majority of tagged fish have been located in areas lacking seagrass (Fox et al., 2002; Parauka et al., in press), in shallow shoals 1.5 to 2.1 m and deep holes near passes (Craft et al., 2001), and in unvegetated, fine to medium-grain sand habitats, such as sandbars, and intertidal and subtidal energy zones (Menzel, 1971; Abele and Kim, 1986). These shifting, predominantly sandy, areas support a variety of potential prey items including estuarine crustaceans, small bivalve mollusks, ghost shrimp, small crabs, various polychaete worms, and lancelets (Menzel, 1971; Abele and Kim, 1986; AFS, 1989; and M. Brim, USFWS, pers. comm. 2002).

Once subadult and adult Gulf sturgeon migrate from the river to the estuarine/marine environment, having spent at least 6 months in the river fasting, it is presumed that they immediately begin foraging. Upon exiting the rivers, Gulf sturgeon are found in high concentrations near their natal river mouths; these lakes and bays at the mouth of the river are important because they offer the first opportunity for Gulf sturgeon to forage. Specifics regarding Gulf sturgeon diet items and foraging are discussed within Section IV (Effects of the Action) of this Opinion.

Gulf sturgeon are long-lived, with some individuals reaching at least 42 years in age (Huff, 1975). Age at sexual maturity for females ranges from 8 to 17 years, and for males from 7 to 21 years (Huff, 1975). Chapman et al. (1993) estimated that mature female Gulf sturgeon weighing between 29 and 51 kg produce an average of 400,000 eggs.

Based on the fact that male Gulf sturgeon are capable of annual spawning, and females require more than one year between spawning events (Huff, 1975; Fox et al., 2000), we assume that the Gulf sturgeon are similar to Atlantic sturgeon (*A. o. oxyrhinchus*); that is, they exhibit a long inter-spawning period, with females spawning at intervals ranging from every 3 to 5 years, and males every 1 to 5 years (Smith, 1985).

Spawning occurs in the upper river reaches in the spring when water temperature is around 15° to 20°C. While Sulak and Clugston (1999) suggested that sturgeon spawning activity is related to moon phase, other researchers have found little evidence of spawning associated with lunar cycles (Slack et al., 1999; Fox et al., 2000). Fertilization is external; females deposit their eggs on the river bottom and males fertilize them. Gulf sturgeon eggs are demersal, adhesive, and vary in color from gray to brown to black (Vladykov and Greeley, 1963; Huff, 1975; Parauka et al., 1991).

Genetic studies conclude that Gulf sturgeon exhibit river-specific fidelity. Stabile et al. (1996) analyzed tissue taken from Gulf sturgeon in eight drainages along the Gulf of Mexico for genetic diversity; they noted significant differences among Gulf sturgeon stocks, and suggested region-specific affinities and likely river-specific fidelity. Five regional or river-specific stocks (from west to east) have been identified: (1) Lake Pontchartrain and Pearl River, (2) Pascagoula River, (3) Escambia and Yellow Rivers, (4) Choctawhatchee River, and (5) Apalachicola, Ochlockonee, and Suwannee Rivers (Stabile et al., 1996).

Tagging studies also indicate that Gulf sturgeon exhibit a high degree of river fidelity (Carr, 1983). Of 4,100 fish tagged, 21% (860/4100 fish) were later recaptured in the river of their initial collection, eight fish (0.009%) moved between river systems, and the remaining fish (78%) have not yet been recaptured (USFWS et al., 1995). There is no information documenting the presence of spawning adults in non-natal rivers. However, there is some evidence of inter-riverine (from natal rivers into non-natal) movements by both male and female Gulf sturgeon (n=22) (Wooley and Crateau, 1985; Carr et al., 1996; Craft et al., 2001; Ross et al., 2001b; Fox et al., 2002). It is important to note that gene flow is low in Gulf sturgeon stocks, with each stock exchanging less than one mature female per generation (Waldman and Wirgin, 1998).

A full discussion of the life history of this subspecies may be found in the September 30, 1991, final rule listing the Gulf sturgeon as a threatened species (56 FR 49653), the Recovery/Management Plan approved by NOAA Fisheries and the U.S. Fish and Wildlife Service in September 1995, and the final rule designating Gulf sturgeon critical habitat (68 FR 13370).

Population dynamics and status

Gulf sturgeon occur in most major tributaries of the northeastern Gulf of Mexico, from the Mississippi River east to Florida's Suwannee River, and in the central and eastern nearshore Gulf waters as far south as Charlotte Harbor (Wooley and Crateau, 1985). In Florida, Gulf sturgeon are present in the Escambia, Yellow, Blackwater, Choctawhatchee, Apalachicola, Ochlockonee, and Suwannee Rivers (Reynolds, 1993). While little is known about the abundance of Gulf sturgeon throughout most of its range, population estimates have been calculated for the Apalachicola, Choctawhatchee, and Suwannee Rivers. The USFWS calculated an average (from 1984-1993) of 115 individuals (> 45 cm TL) over-summering in the Apalachicola River below Jim Woodruff Lock and Dam (USFWS, 1995). Preliminary estimates of the Gulf sturgeon subpopulation in the Choctawhatchee River system are 2,000 to 3,000 fish over 61 cm TL. The Suwannee River Gulf sturgeon population (i.e., fish > 60 cm TL and older than age 2) has recently been calculated at approximately 7,650 individuals (Sulak and Clugston, 1999). Although the size of the Suwannee River population is considered stable, the population structure is highly dynamic as indicated by length frequency histograms (Sulak and Clugston, 1999). Strong and weak year classes coupled with the regular removal of larger fish (by natural mortality) limits the growth of the Suwannee River population but stabilizes the average population size (Sulak and Clugston, 1999).

Gulf sturgeon critical habitat

Gulf sturgeon critical habitat was jointly designated by the NOAA Fisheries and USFWS in 2003 (68 FR 13370). Critical habitat is defined in section 3(5)(A) of the ESA as (i) the specific areas within the geographic area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management considerations or protection; and (ii) specific areas outside the geographic area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. "Conservation" is defined in section 3(3) of the ESA as the use of all methods and procedures that are necessary to bring any endangered or threatened species to the point at which listing under the ESA is no longer necessary.

Gulf sturgeon critical habitat includes areas within the major river systems that support the seven currently reproducing subpopulations (USFWS et al., 1995) and associated estuarine and marine habitats. Gulf sturgeon use the rivers for spawning, larval and juvenile feeding, adult resting, and staging, and to move between the areas that support these components. Gulf sturgeon use the lower riverine, estuarine, and marine environment during winter months primarily for feeding and, more rarely, for inter-river migrations. Estuaries and bays adjacent to the riverine units protect unobstructed passage of sturgeon from feeding areas to spawning grounds.

Fourteen areas (units) are designated as Gulf sturgeon critical habitat. Critical habitat units encompass approximately 2,783 river kilometers (km) and 6,042 km^2 of estuarine and marine habitats and include portions of the following Gulf of Mexico rivers, tributaries, estuarine and marine areas:

Unit 1 = Pearl and Bogue Chitto Rivers in Louisiana and Mississippi
Unit 2 = Pascagoula, Leaf, Bowie, Big Black Creek and Chickasawhay Rivers in Mississippi
Unit 3 = Escambia, Conecuh, and Sepulga Rivers in Alabama and Florida
Unit 4 = Yellow, Blackwater, and Shoal Rivers in Alabama and Florida
Unit 5 = Choctawhatchee and Pea Rivers in Florida and Alabama
Unit 6 = Apalachicola and Brothers Rivers in Florida
Unit 7 = Suwannee and Withlacoochee River in Florida
Unit 8 = Lake Pontchartrain (east of causeway), Lake Catherine, Little Lake, the Rigolets, Lake Borgne, Pascagoula Bay and Mississippi Sound systems in Louisiana and Mississippi, and sections of the state waters within the Gulf of Mexico
Unit 9 = the Pensacola Bay system in Florida
Unit 10 = Santa Rosa Sound in Florida
Unit 11 = Nearshore Gulf of Mexico in Florida
Unit 12 = Choctawhatchee Bay system in Florida
Unit 13 = Apalachicola Bay system in Florida, and
Unit 14 = Suwannee Sound in Florida

Critical habitat determinations focus on those physical and biological features (primary constituent elements = PCEs) that are essential to the conservation of the species (50 CFR 424.12). Federal agencies must insure that their activities are not likely to result in the destruction or adverse modification of the PCEs within defined critical habitats. Therefore, proposed actions that may impact designated critical habitat require an analysis of potential impacts to each PCE.

PCEs identified as essential for the conservation of the Gulf sturgeon consist of :

(1) Abundant food items, such as detritus, aquatic insects, worms, and/or molluscs, within riverine habitats for larval and juvenile life stages; and abundant prey

items, such as amphipods, lancelets, polychaetes, gastropods, ghost shrimp, isopods, molluscs and/or crustaceans, within estuarine and marine habitats and substrates for subadult and adult life stages.

(2) Riverine spawning sites with substrates suitable for egg deposition and development, such as limestone outcrops and cut limestone banks, bedrock, large gravel or cobble beds, marl, soapstone, or hard clay;

(3) Riverine aggregation areas, also referred to as resting, holding, and staging areas, used by adult, subadult, and/or juveniles, generally, but not always, located in holes below normal riverbed depths, believed necessary for minimizing energy expenditures during fresh water residency and possibly for osmoregulatory functions;

(4) A flow regime (i.e., the magnitude, frequency, duration, seasonality, and rate-of-change of fresh water discharge over time) necessary for normal behavior, growth, and survival of all life stages in the riverine environment, including migration, breeding site selection, courtship, egg fertilization, resting, and staging, and for maintaining spawning sites in suitable condition for egg attachment, egg sheltering, resting, and larval staging;

(5) Water quality, including temperature, salinity, pH, hardness, turbidity, oxygen content, and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages;

(6) Sediment quality, including texture and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages; and

(7) Safe and unobstructed migratory pathways necessary for passage within and between riverine, estuarine, and marine habitats (e.g., an unobstructed river or a dammed river that still allows for passage).

As stated in the final rule designating Gulf sturgeon critical habitat, the following activities, among others, when authorized, funded or carried out by a Federal agency, may destroy or adversely modify critical habitat:

(1) Actions that would appreciably reduce the abundance of riverine prey for larval and juvenile sturgeon, or of estuarine and marine prey for juvenile and adult Gulf sturgeon, within a designated critical habitat unit, such as dredging; dredged material disposal; channelization; in-stream mining; and land uses that cause excessive turbidity or sedimentation.

(2) Actions that would appreciably reduce the suitability of Gulf sturgeon spawning sites for egg deposition and development within a designated critical habitat unit, such as impoundment; hard-bottom removal for navigation channel deepening; dredged material disposal; in-stream mining; and land uses that cause excessive sedimentation.

(3) Actions that would appreciably reduce the suitability of Gulf sturgeon riverine aggregation areas, also referred to as resting, holding, and staging areas, used by adult, subadult, and/or juveniles, believed necessary for minimizing energy expenditures and possibly for osmoregulatory functions, such as dredged material disposal upstream or directly within such areas; and other land uses that cause excessive sedimentation.

(4) Actions that would alter the flow regime (the magnitude, frequency, duration, seasonality, and rate-of-change of fresh water discharge over time) of a riverine critical habitat unit such that it is appreciably impaired for the purposes of Gulf sturgeon migration, resting, staging, breeding site selection, courtship, egg fertilization, egg

deposition, and egg development, such as impoundment; water diversion; and dam operations.

(5) Actions that would alter water quality within a designated critical habitat unit, including temperature, salinity, pH, hardness, turbidity, oxygen content, and other chemical characteristics, such that it is appreciably impaired for normal Gulf sturgeon behavior, reproduction, growth, or viability, such as dredging; dredged material disposal; channelization; impoundment; in-stream mining; water diversion; dam operations; land uses that cause excessive turbidity; and release of chemicals, biological pollutants, or heated effluents into surface water or connected groundwater via point sources or dispersed non-point sources.

(6) Actions that would alter sediment quality within a designated critical habitat unit such that it is appreciably impaired for normal Gulf sturgeon behavior, reproduction, growth, or viability, such as dredged material disposal; channelization; impoundment; in-stream mining; land uses that cause excessive sedimentation; and release of chemical or biological pollutants that accumulate in sediments.

(7) Actions that would obstruct migratory pathways within and between adjacent riverine, estuarine, and marine critical habitat units, such as dams, dredging, point-source-pollutant discharges, and other physical or chemical alterations of channels and passes that restrict Gulf sturgeon movement (68 FR 13399).

III. ENVIRONMENTAL BASELINE

This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat (including designated critical habitat), and ecosystem, within the action area. The environmental baseline is a "snapshot" of a species' (or designated critical habitat) health at a specified point in time and includes state, tribal, local, and private actions already affecting the species or critical habitat 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.

A. Status of the species and critical habitat within the action area

The species of sea turtles that may be affected by the proposed action 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 affected species of sea turtles, provided in Section II above, most accurately reflects the species' status within the action area.

The Gulf sturgeon is found in the Gulf of Mexico primarily from Tampa Bay, Florida west to the mouth of the Mississippi River. Gulf sturgeon are not likely to be present in the project area in the summer (approximately May to September) when they are upstream at spawning areas. Upstream migration from the estuarine/marine area to riverine spawning areas occurs in early spring (i.e., March through May) when river water temperatures range from 16° to 23°C (Huff, 1975; Carr, 1983; Wooley and Crateau, 1985; Odenkirk, 1989; Clugston et al., 1995; Foster and Clugston, 1997; Fox and Hightower, 1998; Sulak and Clugston, 1999; Fox et al., 2000). Fall downstream migration from the river into the estuary/marine environment is cued by water temperature (around 23°C), generally beginning in September and

continuing through November (Huff, 1975; Wooley and Crateau, 1985; Foster and Clugston, 1997). A study investigating Gulf sturgeon summer movement upriver from the project area (Yellow and Escambia Rivers and Pensacola Pass) concluded that as water temperature drops, fish moved into the Pass and remained there for 1-2 months (Craft et. al., 2001). Therefore, while Gulf sturgeon usually begin their downstream migration in September (being cued by decreasing water temperature), they are unlikely to be in the project area given the length of the river (closest riverine spawning site is upriver at rkm 43) and Pensacola Bay they must traverse prior to entering the project area. Furthermore, local Gulf sturgeon have been found to occupy a common area (thought to be a deep hole) north of the project area (within the Bay) until the coldest part of the winter (Craft et. al., 2001).

Of the fourteen units designated as Gulf sturgeon critical habitat, only unit #11 (Nearshore Gulf of Mexico in Florida) will be impacted by the NAS Pensacola Channel project. Unit #11 includes a portion of the Gulf of Mexico as defined by the following boundaries:

> The western boundary is the line of longitude 87°20.0'W (approximately 1 nmi (1.9 km) west of Pensacola Pass) from its intersection with the shore to its intersection with the southern boundary. The northern boundary is the mean high water (MHW) line of the mainland shoreline and the 72 COLREGS lines at passes as defined at 30 CFR 80.810 (a-g). The southern boundary of the unit is 1 nmi (1.9 km) offshore of the northern boundary; the eastern boundary is the line of longitude 85°17.0'W from its intersection with the shore (near Money Bayou between Cape San Blas and Indian Peninsula) to its intersection with the southern boundary.

Unit #11 includes winter feeding and migration habitat for Gulf sturgeon from the Yellow, Choctawhatchee, and Apalachicola River subpopulations; the unit includes nearshore (1.6 km) waters from just west of Pensacola Pass to Money Bayou, Florida. Four PCEs are present in critical habitat unit #11: abundant prey items for subadults and adults, water quality, sediment quality, and safe and unobstructed migratory pathways.

There are no data available to determine if Gulf sturgeon prey are distributed randomly, in patches, or ubiquitously throughout the disposal area; for the purpose of this Opinion, NOAA Fisheries will assume even distribution of prey throughout the project area.

Unit #11 of Gulf sturgeon critical habitat encompasses a total of 442 km^2 (109,220 acres); the project area is projected to encompass between 69 and 342 total acres (i.e., 0.28 and 1.3 km^2) which constitutes less than 0.3% of the total area within the unit.

B. Factors affecting the species' environments within the action area.

As previously explained, 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 can potentially be affected by activities anywhere else within their wide range of distribution.

Designated critical habitat encompasses areas known to contain PCEs essential to the conservation of the species. Gulf sturgeon critical habitat unit #11 is a spatially-defined area that includes winter feeding and migratory habitat for three subpopulations. Upland activities could impact water quality in the unit; activities to the east (action areas is at extreme western edge of unit) could impact ability of the unit to serve its migratory function.

1. Federal Actions

Sea turtles

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 sea turtles. 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 takes of sea turtles in both the fishing and oil and gas industries, and vessel operations. The following summary of anticipated sources of incidental takes of turtles includes only those Federal actions which have undergone formal section 7 consultation. The incidental takes authorized in the biological opinions completed on the following actions are described in Table 2.

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 of these 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, calico scallop trawl fishery, monkfish, dogfish, southeastern shrimp trawl fishery, northeast multispecies, Atlantic pelagic swordfish/tuna/shark, and summer flounder/scup/black sea bass fisheries.

The southeastern shrimp trawl fishery affects more turtles than all other activities combined (NRC, 1990). On December 2, 2002, NOAA Fisheries completed the Opinion for shrimp trawling in the southeastern United States under proposed revisions to the TED regulations (68 FR 8456, February 21, 2003). This Opinion determined that the shrimp trawl fishery under the revised TED regulations would not jeopardize the continued existence of any sea turtle species. This determination is based, in part, on the Opinion's analysis that shows the revised TED regulations are expected to reduce shrimp trawl-related mortality by 94% for loggerheads and 97% for leatherbacks compared to trawl-related mortality under previous TED regulations, and on the fact that nesting in the southeastern United States for all species of sea turtles (and Rancho Nuevo, Mexico in the case of Kemp's ridleys), with the exception of the northern nesting population of loggerhead turtles, has been increasing. However, NMFS (SEFSC, 2001) population projection models indicate that a 30% decrease in benthic loggerhead mortality from an expanded TED rule will cause an increase in the northern nesting population. The shrimp trawling Opinion can be found at the following Web site:

http://www.nmfs.noaa.gov/prot_res/readingrm/ESAsec7/Biop_shrimp_trawling.PDF

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 (for loggerheads this determination was based on the effects on the northern nesting population). The environmental baseline section of the HMS Opinion is incorporated herein by reference and can be found at the following NOAA Fisheries Web site:

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

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 northeastern United States and gear restrictions that are expected to reduce the bycatch of loggerheads by as much as 76% and of leatherbacks by as much as 65% compared to previously existing conditions. Further, NOAA Fisheries has implemented a major research project to develop measures aimed at further reducing longline bycatch. 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.

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 to North Carolina with mitigative measures for the southern flounder fishery. Subsequently, the sea turtle mortalities in these fisheries were drastically reduced. Reinitiation of consultation for the summer flounder fishery has also begun. The reduction of turtle mortalities in these fisheries reduces the negative effects these fisheries have on the environmental baseline.

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 present the 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.

Federally-funded and permitted projects to construct and maintain navigation channels have 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 regional biological opinion (RBO) with the COE's South Atlantic Division has been completed for the southeastern Atlantic waters (North Carolina through Florida) and Gulf of Mexico northern and western waters. Consultation on a new RBO for the COE's entire Gulf of Mexico hopper dredging operations is currently underway.

The COE and the Minerals Management Service of the Department of Interior (MMS) issue permits for oil and gas exploration, well development, production, and abandonment/rig removal activities that also

may adversely affect turtles. Both these agencies have consulted with NOAA Fisheries on these activities which include the use of seismic arrays for oil and gas exploration in the Gulf of Mexico, the impacts of which have been addressed in Opinions for individual and multi-lease sales. Impacts are expected to result from vessel strikes, noise, marine debris, and the use of explosives to remove oil and gas structures.

Another action with Federal oversight (by the Federal Energy Regulatory Commission (FERC) or the Nuclear Regulatory Agency) 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.

Below is a table summarizing formal ESA section 7 consultations completed for Federal actions taking place in the southeastern United States that affect sea turtles:

Table 2. Summary of annual incidental take levels anticipated under the incidental take statements associated with NMFS' existing biological opinions in the U.S. Atlantic and Gulf of Mexico.

Federal Action	Annual Anticipated Incidental Take Level (lethal)[1]				
	Loggerhead	Leatherback	Green	Kemp's	Hawksbill
Coast Guard Vessel Operation	1(1)[2]	1(1)[2]	1(1)[2]	1(1)[2]	1(1)[2]
Navy-SE Ops Area[3]	91(91)	17(17)[2]	16(16)[2]	16(16)[2]	4(4)[2]
Navy-NE Ops Area	10(10)	0	1(1)[2]	1(1)[2]	0
Shipshock-Seawolf/Winston Churchill[4]	276(58)[2]	276(58)[2]	276(58)[2]	276(58)[2]	276(58)[2]
COE Dredging-NE Atlantic	27(27)	1(1)	6(6)[2]	5(5)[2]	0
COE Dredging-S. Atlantic	35(35)	0	7(7)	7(7)	2(2)
COE Dredging-N&W Gulf of Mexico	30(30)	0	8(8)	14(14)	2(2)
COE Dredging-E Gulf of Mexico	8 (8)[5]	5(5)[5]	5(5)[5]	5(5)[5]	5(5)[5]
COE Rig Removal, Gulf of Mexico	1(1)[2]	1(1)[2]	1(1)[2]	1(1)[2]	1(1)[2]
MMS Destin Dome Lease Sales	1(1)[2,6]	1(1)[2,6]	1(1)[2,6]	1(1)[2,6]	1(1)[2,6]
MMS 181 Lease Sales	1(1)[2,6]	1(1)[2,6]	1(1)[2,6]	1(1)[2,6]	1(1)[2,6]
MMS Rig Removal, Gulf of Mexico	10(10)[7]	5(5)[2,7]	5(5)[2,7]	5(5)[2,7]	5(5)[2,7]
NE Multispecies Sink Gillnet Fishery	10(10)	4(4)	4(4)	2(2)	0
ASMFC Lobster Plan	10 (10)	4(4)	0	0	0
Bluefish	6(3)	0	0	6(6)	
Herring	6(3)	1(1)	1(1)	1(1)	0
Mackerel, Squid, Butterfish	6(3)	1(1)	2(2)	2(2)	0
Monkfish Fishery[7]	6(3)	1(1)	1(1)	1(1)	0

Dogfish Fishery	6(3)	1(1)	1(1)	1(1)	0
Sargassum	30(30)[8]	1(1)[2]	1(1)[2]	1(1)[2]	1(1)[2]
Summer Flounder, Scup & Black Sea Bass	15(5)	3(3)[2]	3(3)[2]	3(3)[2]	3(3)[2]
Shrimp Fishery[9]	163,160 (3,948)	3,090 (80)	18,757 (514)	155,503 (4,208)	NA(640)[13]
Weakfish	20(20)	0	0	2(2)	0
HMS - Pelagic Longline Fishery[10]	468(7)	358(6)	46(2)	23(1)	46(2)
HMS - Shark gillnet Fishery[11]	20(20)	2(2)	2(2)	2(2)	2(2)
HMS - Bottom Longline Fishery[11]	12(12)	2(2)	2(2)	2(2)	2(2)
NRC – St. Lucie, FL[12]	1000[2] (10)[2]	1000[2] (1)	1000[2] (10)[2]	1000[2] (1)	1000[2] (1)
NRC – Brunswick, NC	50[2] (6)[2]	50[2]	50[2] (3)[2]	50[2] (2)[2]	50[2]
NRC – Crystal River, FL	55[2] (1)[2]	55[2] (1)[2]	55[2] (1)[2]	55[2] (1)[2]	55[2] (1)[2]
Total	**165,370 (4,346)**	**4,880 (197)**	**20,252 (656)**	**156,986 (4,348)**	**1,456 (835)**

[1]Anticipated Take level represents 'observed' unless otherwise noted. Number in parenthesis represents lethal take and is a subset of the total anticipated take; numbers less than whole are rounded up.
[2] The anticipated take level may represent any combination of species and thus is tallied under each column.
[3]Includes Navy Operations along the Atlantic Coasts and Gulf of Mexico, Mine warfare center, Eglin AFB, Moody AFB
[4] Total estimated take includes acoustic harassment
[5]Up to 8 turtles total, of which, no more than 5 may be leatherbacks, greens, Kemp's or hawksbill, in combination.
[6]Total anticipated take is 3 turtles of any combination over a 30-year period
[7] Not to exceed 25 turtles, in total.
[8] Anticipated take for post-hatchlings for total period June 21, 1999 through January 2001
[9]Represents estimated take (interactions between turtles and trawls). Lethal take in parentheses.
[10] Represents estimated total take and observed lethal take in parentheses
[11] Represents estimated total and lethal take
[12] Annual incidental capture of up to 1,000 turtles, in any combination of the five species found in the action area. NMFS anticipates 1% of the total number of green and loggerhead turtles (combined) captured (i.e., if there are 900 total green and loggerhead turtles captured in one year, then 9 turtles in any combination of greens and loggerheads are expected to be injured or killed as a result. In cases where 1% of the total is not a whole number, then the total allowable incidental take due to injury or death will be rounded to the next higher whole number) will be injured or killed each year over the next 10 years as a result of this incidental capture. NMFS also anticipates two Kemp's ridley turtles will be killed each year and one hawksbill or leatherback turtle will be injured or killed every 2 years for the next 10 years.
[13] Actual mortalities of hawksbills, as a result of turtle/trawl interactions, is expected to be much lower than this number. This number represents the estimated total number of mortalities of hawksbill turtles from all sources in areas where shrimp fishing takes place.

Gulf sturgeon and Gulf sturgeon critical habitat

The recent joint designation of Gulf sturgeon critical habitat by NOAA Fisheries and USFWS will benefit the species, primarily through the ESA section 7 consultation process. When critical habitat is designated, other Federal agencies are required to consult with NOAA Fisheries on actions they carry out, fund, or authorize, to ensure that their actions will not destroy or adversely modify critical habitat. In this way, a critical habitat designation will protect areas that are necessary for the conservation of the species. Designation of critical habitat may also enhance awareness within Federal agencies and the general public of the importance of Gulf sturgeon habitat and the need for special management considerations.

A designation of critical habitat also clarifies the section 7 consultation responsibilities for the Federal action agencies, particularly for projects where the action would not result in direct mortality, injury, or harm to individuals of the species. When critical habitat is designated, the action agency must consult - regardless of the seasonal presence or absence of the species - on actions that may affect critical habitat. Furthermore, the critical habitat designation describes the essential features of the habitat. Identifying the physical and biological features of each particular critical habitat area that are essential for species conservation assists agencies in identifying particular activities conducted outside the designated area that require section 7 consultation. For example, disposal of waste material in water adjacent to a critical habitat area may affect an essential feature (water quality) of the designated habitat and is therefore subject to the provisions of section 7.

Critical habitat designation also assists Federal agencies in planning future actions because it identifies, in advance, those habitats that will be given an additional review in section 7 consultations. This is particularly true in cases where two project areas exist and only one provides for the conservation of the species. With a designation of critical habitat, potential conflicts between Federal actions and listed species can be identified and possibly avoided early in the agency's process.

Federal agencies that consult on potential impacts to both Gulf sturgeon and its critical habitat include the Department of Defense (DOD), the COE, and the EPA. Dredging and dredged material disposal, and military activities including training exercises and ordnance detonation, have the potential to impact both the species and designated critical habitat. This Opinion is the first formal consultation on potential impacts to designated critical habitat since the effective date (April 18, 2003), although numerous formal consultations have been conducted on potential impacts to the species. Numerous informal consultations with the DOD, COE and EPA analyzing potential impacts to both Gulf sturgeon and its designated critical habitat have been conducted.

The operation of hydropower plants is a Federal action (FERC) that has impacts on Gulf sturgeon. Sturgeon migrating up or down rivers and entering coastal and inshore areas can be affected by entrainment in the cooling-water systems; larvae may be adversely affected by heated water discharges. Dredging impacts associated with maintenance of hydropower and nuclear plants may effect both the Gulf sturgeon and its critical habitat.

Federally-regulated stormwater and industrial discharges, and chemically treated discharges from sewage treatment systems, may impact Gulf sturgeon critical habitat. NOAA Fisheries continues to consult with EPA to minimize the effects of these activities on both listed species and designated critical habitat. In addition, other federally-permitted construction activities, such as beach restoration, have the potential to impact Gulf sturgeon critical habitat.

Incidental catch of Gulf sturgeon in both federally- and state-regulated fisheries has been documented. There have been incidental captures of Gulf sturgeon in the shrimp and gillnet fisheries in Apalachicola Bay (Swift et al., 1977; Wooley and Crateau, 1985). Similar incidental catches have been reported in Mobile Bay, Tampa Bay, and Charlotte Harbor. Louisiana Department of Wildlife and Fisheries (LDWF) reported 177 Gulf sturgeon were incidentally captured by commercial fishermen in southeast Louisiana during 1992. Rogillio (September 20, 2002, pers. comm. to Eric Hawk at the Gulf Sturgeon Workshop held at the University of Southern Mississippi in Hattiesburg on September 19-20, 2002) noted several recent instances of Gulf sturgeon takes by shrimpers operating off barrier island passes in Mississippi.

2. State or private actions

Sea turtles

Commercial vessel traffic and recreational vessel 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 threat to sea turtles and marine mammals. The magnitude of these marine events is not currently known. NOAA Fisheries and the USCG (which permits these events) are in early consultation on these events, but a thorough analysis of impacts 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 and Texas have banned all but very small nets in state waters. Louisiana, Mississippi, and Alabama have also placed restrictions on gillnet fisheries within state waters. Very little commercial gillnetting takes place in southeastern U.S. waters, with the exception of North Carolina. Most pot fisheries (turtles can get entangled in the lines in these fisheries) in the Southeast are prosecuted in areas frequented by sea turtles. Recreational angling, including bottom fishing for snapper, grouper, and other species in the Gulf of Mexico and southeastern waters, and fishing from private and public docks and piers, are known to occasionally take sea turtles by hooking and entanglement. NOAA Fisheries has consulted on potential sea turtle takes by fishermen on several federally-permitted public piers in Florida.

Gulf sturgeon and Gulf sturgeon critical habitat

A number of activities that may indirectly affect Gulf sturgeon and its critical habitat 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 through the ESA section 7 process, ESA section 10 permitting, and state permitting programs, are being implemented to monitor or study impacts from these sources.

Increasing coastal development and ongoing beach erosion will result in increased demands by coastal communities, especially beach resort towns, for periodic privately-funded or federally-sponsored beach renourishment projects. These activities may affect Gulf sturgeon and its critical habitat by burying nearshore habitats that serve as foraging areas, in addition to the potential direct effect to the species by entrainment in dredge suction dragheads at the sand mining sites.

Increased groundwater withdrawal for irrigation in southwest Georgia may result in a 30% reduction of discharge to streams and thereby affect water quality and quantity. Reducing discharge decreases cool water habitats which are thought to offer sturgeon refugia from warm riverine water (S. Carr, pers. comm.); recent droughts in the Apalachicola River basin have aggravated the loss of cool-water refugia; and spring-water intrusion into the Suwannee River during drought conditions changes ionic conductivity and water temperature unfavorably for embryonic development and larval success (Sulak and Clugston, 1999).

3. Conservation and recovery actions shaping the environmental baseline

NOAA Fisheries has 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 southeastern 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 are 97% efficient at

excluding (releasing alive) 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 (2002) indicate that the minimum requirements for the escape opening dimensions were 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 February 21, 2003, NOAA Fisheries published a final rule to require larger escape openings in TEDs used in the southeastern shrimp trawl fishery (68 FR 8456, February 21, 2003). Based upon the analyses in Epperly et al. (2002), leatherback and loggerhead sea turtles will greatly benefit from the new regulations, with expected reductions of 97% and 94% (over the reduction expected with the old TEDs), respectively, in mortality from shrimp trawling.

In 1993 (with a final rule implemented in 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 provided for short-term closures when high concentrations of normally pelagic leatherbacks are recorded in near coastal waters where the shrimp fleet operates. This measure was necessary because, due to their size, adult leatherbacks were larger than the escape openings of most NOAA Fisheries-approved TEDs. With the implementation of the new TED rule requiring larger opening sizes on all TEDs, the reactive emergency closures within the Leatherback Conservation Zone are no longer necessary.

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 northeastern 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, and testing has been underway since December 2002.

In addition, NOAA Fisheries has been active in public outreach efforts to educate fishermen regarding sea turtle handling and resuscitation techniques. 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. An extensive network of Sea Turtle Stranding and Salvage Network participants along the Atlantic and Gulf of Mexico not only collect data on dead sea turtles, but also rescue and rehabilitate any live stranded turtles.

Commercial harvesting of Gulf sturgeon has been banned by all coastal states where the species may be present (i.e., Florida, Mississippi, and Alabama). State actions eliminating or limiting gillnetting also benefit the Gulf sturgeon.

Federal Essential Fish Habitat consultation requirements pursuant to the Magnuson-Stevens Fishery Management and Conservation Act also minimize and mitigate for losses of wetlands, and preserve valuable foraging and developmental habitat for Gulf sturgeon.

IV. EFFECTS OF THE ACTION

A. Sea turtles

Disposal of dredged materials is unlikely to affect sea turtles in the area. Sea turtles are known to be highly mobile and are expected to exit the project area. Disposal of dredged material is a slow process

(material is let from the bottom of a barge) that has not been shown to adversely affect sea turtles, which are highly mobile and may be frightened away from the project area by dredging activity and noise.

Dredge entrainment of sea turtles 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 11°C–presents 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.

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 Kemp's ridleys returned with warming waters in March.

Seasonal abundance of sea turtles utilizing nearshore waters of the northeast Gulf of Mexico varies with species and location. Strandings data for the project area (Table 1) indicate that the three turtle species (Kemp's ridley, green and loggerhead) of concern have been recently (last five years) stranded during the project period (August and September). Therefore, based on sea turtle life history and strandings data, 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.

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 Incidental Take Statement (ITS) including relocation trawling will be adhered to, NOAA Fisheries anticipates injury or mortality to **two (2) individuals of any of the three sea turtle species** that may be affected (Kemp's ridley, green, or loggerhead), as a result of being entrained in or impinged by the hopper dredges, and non-lethal, non-injurious take of **ten (10) individuals of these same species** as a result of being captured during relocation trawling.

B. Gulf sturgeon

Dredge entrainment of Gulf sturgeon by hopper dredging has previously been assessed by NOAA Fisheries in section 7 consultations for channel maintenance. NOAA Fisheries had determined that the hopper dredge projects were not likely to adversely affect the species given either the project's limited scope and/or the unlikely seasonal presence of Gulf sturgeon. While no Gulf sturgeon take by hopper dredges have been reported to date, allopatric sturgeon species on the Atlantic Seaboard have been taken occasionally by hopper dredge. Similarly, the existing RBO to the COE's South Atlantic Division for hopper dredging between North Carolina through Florida limits the incidental take to 5 shortnose sturgeon (*A. brevirostrum*), despite the lack of documentation for shortnose take by hopper dredge. While NOAA Fisheries is unaware of any instances to date of Gulf sturgeon take by a hopper dredge, Atlantic sturgeon are occasionally taken by hopper dredges operating on the Atlantic seaboard (C. Slay, Coastwise Consulting, pers. comm.). Therefore NOAA Fisheries considers it prudent to address potential Gulf sturgeon takes by hopper dredges operating in the Gulf of Mexico as we presume the species can be taken given the evidence from two morphologically and ecologically similar Atlantic sturgeon species.

However, based on the project period (to be completed by September 30) and location, it is highly unlikely that Gulf sturgeon will be present in the project area (see details in Section III, Part A (status of species within the action area) of this Opinion. Therefore, NOAA Fisheries concludes that Gulf sturgeon are unlikely to be in the project area during the project period and therefore the project is not likely to adversely affect the Gulf sturgeon.

C. Gulf sturgeon critical habitat

As discussed above, critical habitat unit #11 contains 4 PCEs that may be adversely affected by the proposed project, and the potential impacts on these PCEs are analyzed below.

Water quality impacts as a result from 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 measurable effect on water quality (or on sea turtles or Gulf sturgeon directly). 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 measurable impacts to Gulf sturgeon critical habitat as a result of water quality impacts related to this project (or to sea turtles or Gulf sturgeon directly).

Sediment quality impacts as a direct result of dredged material disposal were considered in this Opinion. The composition of dredged material, predominantly sand most likely deposited in Pensacola Pass via littoral transport from either Perdido Key or nearby Santa Rosa Island, will be deposited directly into designated Gulf sturgeon critical habitat unit #11; a single disposal site encompassing between 68 and 324 acres (total acres within unit #11 = 109,220) has been identified. While alternative disposal sites were evaluated, none were deemed appropriate by the COE (Appendix II). Potential changes in sediment quality are expected to be minimal given that dredged material compatibility has been determined (via grab samples) and material has been found to be similar in grain size, color and composition to existing sediments. NOAA Fisheries does not expect measurable impacts to Gulf sturgeon critical habitat as a result of sediment quality impacts related to this project.

Effects on migratory pathways as a PCE for unit #11 were considered in this Opinion. Unit #11 is known to support migratory pathways for Gulf sturgeon from three subpopulations (Choctawhatchee, Yellow, and Apalachicola Rivers) as groups of individuals from these subpopulations have been located by telemetry on numerous occasions within unit #11 (F. Parauka, USFWS, pers. comm. 2002). Because the proposed project will be occurring in the western-most portion of the designated critical habitat unit (west of Pensacola Pass), NOAA Fisheries concludes that the project will not affect the ability of unit #11 to provide a migratory pathway for Gulf sturgeon.

Disposal of dredged materials into designated Gulf sturgeon critical habitat will directly impact abundance of Gulf sturgeon prey. NOAA Fisheries considered and analyzed the following factors to determine direct and indirect effects of the proposed action on the abundance of prey in unit #11 essential for the conservation of Gulf sturgeon:

(1) Gulf sturgeon sub-populations using affected Critical Habitat,
(2) Mean generation time,
(3) Foraging method,

(4) General prey items,
(5) Benthic community structure,
(6) Potential Gulf sturgeon prey in the action area, and
(7) Benthos recovery after burial.

Gulf sturgeon sub-populations using affected Critical Habitat
Overall, Gulf sturgeon critical habitat unit #11 provides important foraging area for fish from the Escambia, Blackwater, Yellow, Choctawhatchee and Apalachicola Rivers. Specifically, the project will be impacting area only in and around Pensacola Pass, located at the extreme western end of unit #11. Pensacola Pass provides direct passage for fish from the Escambia, Blackwater and Yellow Rivers to the Gulf of Mexico. Given the natal homing and river-specific fidelity exhibited by Gulf sturgeon, NOAA Fisheries believes that it is probable that only fish from the Escambia, Blackwater and Yellow Rivers are utilizing the project area for foraging and they alone will be impacted by the project.

The actual number of Gulf sturgeon utilizing the project area for foraging is, at this time, likely few. Few data describing the population size and structure of Gulf sturgeon are available. Of the nine major rivers that are known to support Gulf sturgeon (Pearl, Pascagoula, Escambia, Yellow, Conecuh, Choctawhatchee, Apalachicola, Suwannee, and Withlacoochee), population estimates have been calculated only for three (Apalachicola, Choctawhatchee, and Suwannee Rivers) as outlined in Section II, Part 3 (Population dynamics, status and distribution) of this Opinion. NOAA Fisheries believes that Gulf sturgeon population size within the other six major rivers is small. Therefore, the number of Gulf sturgeon from the three rivers (i.e., Escambia, Blackwater, and Yellow Rivers) that likely utilize the project area and that would be affected by an impacted prey base is presumably few, but likely to increase as species recovery occurs .

Mean generation time
Mean generation time (mean period elapsing between the birth of the parents and the birth of the offspring) is a useful tool to estimate the period of time for a population to increase in size. While mean generation time is unknown for the Gulf sturgeon, it has been calculated for the shortnose sturgeon (*A. brevirostrum*), a congener, as between 10 and 30 years (NMFS, 1998).

Foraging method
Findeis (1997) described sturgeon (Acipenseridae) as exhibiting evolutionary traits adapted for benthic cruising. As benthic cruisers, acipenserines forage by feeding focally from the substrate; they have modified jaws and skull to exploit benthic prey (Findeis, 1997). Benthic cruisers are thought to forage extensively in an area, presumably until preferred prey is depleted/reduced, relocate and resume foraging. Tracking observations by Sulak and Clugston (1999), Fox et al. (2002), and Edwards et al. (in prep.) support that individual Gulf sturgeon move over an area until they encounter suitable prey type and density, at which time they forage for extended periods of time. Individual Gulf sturgeon often remained in localized areas (less than 1 km^2) for extended periods of time (greater than two weeks) and then moved rapidly to another area where localized movements occurred again (Fox et al., 2002). While the exact amount of benthic area required to sustain Gulf sturgeon health and growth is unknown (and likely dependent on fish size and reproductive status), Gulf sturgeon have been known to travel long distances (greater than 161 km) during their winter feeding period. Notably, caudal fin morphology of the acipenserines has presumably been adapted for benthic cruising; the hypochordal lobe is often reduced to allow sweeping of the tail while close to the substrate (Findeis, 1997).

General prey items

Ontogenetic changes in Gulf sturgeon diet and foraging area have been documented. Young-of-year forage in freshwater on aquatic invertebrates and detritus (Mason and Clugston, 1993; Sulak and Clugston, 1999); juveniles forage throughout the river on aquatic insects (e.g., mayflies and caddisflies), worms (oligochaete), and bivalves (Huff, 1975; Mason and Clugston, 1993); adults forage sparingly in freshwater and depend almost entirely on estuarine and marine prey for their growth (Gu et al., 2001). Both adult and subadult Gulf sturgeon are known to lose up to 30% of their total body weight while in fresh water, and subsequently compensate the loss during winter feeding in marine areas (Carr, 1983; Wooley and Crateau, 1985; Clugston et al., 1995; Morrow et al., 1998; Heise et al., 1999; Sulak and Clugston, 1999; Ross et al., 2000). Therefore, once Gulf sturgeon leave the river having spent at least six months in the river fasting, it is presumed that they immediately begin feeding. Upon exiting the rivers, Gulf sturgeon concentrate around the mouths of their natal rivers in lakes and bays. These areas are very important for the Gulf sturgeon as they offer the first foraging opportunity for the Gulf sturgeon exiting the rivers.

Few data have been conducted on the food habits of Gulf sturgeon; their threatened status limits sampling efforts and gastric lavaging has only recently become successful (anal lavaging is being investigated). Gulf sturgeon have been described as opportunistic and indiscriminate benthivores; their guts generally contain benthic marine invertebrates including amphiopods, lancelets, polychaetes, gastropods, shrimp, isopods, molluscs, and crustaceans (Huff, 1975; Mason and Clugston, 1993; Carr et al., 1996; Fox et al., 2000; Fox et al., 2002). During the early fall and winter, immediately following downstream migration, Gulf sturgeon are most often located in nearshore (depth less than 20 feet) sandy areas that support burrowing macroinvertebrates, presumably foraging (Craft et al., 2001; Ross et al., 2001a; Fox et al., 2002; Parauka et al., in press).

Benthic community structure

In most areas, community structure of the benthos is unknown; without survey, availability of Gulf sturgeon prey is undeterminable. Most of what is known about the benthic communities of the western Florida Panhandle marine sands is the result of work by Saloman (1976), Saloman et al. (1982), Culter and Mahadevan (1982), and Rakocinski et al. (1991,1993,1996).

Potential Gulf sturgeon prey in the action area

Coincidentally, the research by Rakocinski et al. (1991, 1993, 1996) occurred in the project area. Rakocinski et al. (1991, 1993) described a total of four infaunal zones between the swash zone (the area between low and high tide) and 800 m seaward at Perdido Key, Florida and identified predominate species by zone (Appendix III). The mole crab *(Emerita talpoida)* and the spinoid polychaete (*Scolelelpis squamata*) dominated the swash zone; the dominant swash zone clam was the wedge clam (*Donax variabilis*). Other dominant benthic invertebrates included polychaetes *(Dispio uncinata, Leitoscoloplos fragilis*, and *Paraonis gracilis)*, the haustoriid amphipod (*Haustorius jaynae)*, isopods (*Ancinus depressus* and *Exosphaeroma diminutum*), and the mysid shrimp *(Metamysidospis swiftii)*. The transitional zone (100-300 m offshore) was typified by the cumacean (*Cyclaspsis* cf. *varians)* and polychaetes *(Streptosyllis pettiboneae* and *Nepthys bucera)*. A deep-water zone (4-6 m deep; 300-800 m offshore) was characterized by the sand lancet (*Branchiostoma* cf. *floridae)*, the syllid polychaetes *(Brania wellfleetensis* and *Parapionosyllis longicirrata*), and an amphipod (*Eudevenopus honduranus*). In some areas the gastropod *Nassarius acutus* and an archiannelid (*Polygordius* sp.) were abundant. Following beach nourishment with material containing high silt/clay content, Rakocinski et al. (1996) reported that population abundances of the lancet (*B. floridae)* recovered within a year, but species such

as *B. wellfleetensis*, *P. longicirrata*, and *H. jaynae* had not recovered by the end of the study nearly two years after nourishment.

Species-specific life history information for many marine benthic invertebrates, even those common to easily sampled nearshore waters, is often non-existent and where available, usually anecdotal. The following species description of species known to be Gulf sturgeon prey and located in the project area (Rakocinski et al., 1991, 1993, 1996) is provided courtesy of Drs. G. Ray and D. Clark (U.S. Army Corps of Engineers Research and Development Center, Vicksburg, Miss.). Notably the authors incorporated information from studies of congener and confamilial species, resulting in an admitted amount of speculation. Regardless, these descriptions summarize life history information for species present in the project area and likely being consumed by Gulf sturgeon as they forage via benthic cruising.

Leitoscoloplos fragilis - This orbiniid polychaete (formerly known as both *Scoloplos* and *Haploscoloplos*) is a head-down deposit feeding polychaete (Fauchald and Jumars, 1979), which feeds primarily upon diatoms (Bianchi, 1988; Bianchi and Rice, 1988; Bianchi et al., 1988). It occurs throughout North America from Canada to Florida and the Gulf of Mexico (Uebelacker and Johnson, 1984). Preferring sandy sediments, it is found in the greatest abundance on the side slopes of sand bars, burrowing no deeper than 10 cm (Brown, 1982). Boesch et al. (1976) described its salinity distribution as euryhaline with the center of its distribution in the mesohaline (i.e., *L. fragilis* is primarily an estuarine species). *L. fragilis* reproduces sexually, laying its eggs in gelatinous cocoons attached to the sediment by a mucus string (Anderson, 1961). Larvae take six days to hatch and are planktonic for less than a week. Brown (1982) has reported that it takes two years for worms in Delaware Bay to reach maturity. The breeding season has been reported to be July and August in New England (Pettibone, 1963). Dauer et al. (1982) found that Chesapeake Bay populations of *L. fragilis* reach peak abundances in April, while Tenore (1972) found greatest abundances during fall in the Pamlico River (North Carolina). It appears to be an early colonizer of recently disturbed sites (Dean and Haskin, 1964; Zajac and Whitlach, 1982). Subrahmanyam (1984) found that *L. fragilis* (listed as *Scoloplos*) colonized intertidally deposited dredged material relatively late (approximately 3-4 months after deposition), but quickly became one of the dominant species, particularly at mid- and subtidal elevations.

Armandia maculata - This opheliid polychaete is a shallow burrower in muddy and sandy sediments; it has been reported from Bermuda, North Carolina, and the Gulf of Mexico (Uebelacker and Johnson, 1984). Shaw et al. (1982) reported that *A. maculata* is one of the dominant species of clean sand habitats typical of tidal passes and offshore sands in Mississippi Sound. It is most likely a head-down deposit feeder (Fauchald and Jumars, 1979). Describing the development of *A. brevis*, a west coast species, Hermans (1977) reported that epitokous (sexually mature being that is highly specialized for swimming and reproduction) females shed planktotrophic larvae, which remain in the plankton until the 20-29 setiger (body segment with setae) stage. In studies of Japanese species, Tamaki (1985a,b) reported that *Armandia* migrate offshore as they grow older; the largest animals move first followed by smaller individuals. Some of the movement may be attributable to passive transport by wave action (Tamaki, 1987). *Armandia* avoid settling near *Callianassa* mounds, although the shrimp themselves cause no mortality (Tamaki, 1988). Saloman et al. (1982) recorded that *A. maculata* was one of the early colonizers of recently dredged sand borrow areas.

Acanthohaustorius shoemakeri* and *Protohaustorius bousfieldi - These haustoriid amphipods are commonly found as the dominant amphipod species of sandy marine sediments. Most are shallow-burrowing forms, feeding both on detritus and suspended particles. Bousfield (1973) indicated that *A. shoemakeri* has been found as far north as Cape Cod, is common in medium sands at depths of 15-20 m, and ovigerous females are present in August. *Acanthohaustorius* sp.A and *Lepidactylus* sp.C have been reported by Shaw et al. (1982) as dominant taxa of shallow marine sands in Mississippi Sound. Saloman (1976) reported that species of both *Acanthohaustorius* and *Protohaustorius* were commonly found at all stations along his swash zone to nearshore transects off Panama City Beach, Florida. Knott et al. (1983) has also found that haustoriids (including an *Acanthohaustorius* species) are important components of beach and nearshore sandy sediments at Murrells Inlet, South Carolina. Saloman et al. (1982) found that both *Acanthohaustorius* sp. and *Protohaustorius* sp. were among the early colonizers of recently dredged sand borrow areas.

Cyclaspis pustalata - This cumacean is commonly collected throughout shallow intertidal to offshore sands (Rakocinski et al., 1993). It is a shallow burrower that feeds on detritus and suspended matter and broods its young. Other cumaceans including *C. varians, Oxyurostylis smithi,* and *Manocuma* sp. have been reported from the northern Gulf of Mexico by Saloman (1976), Shaw et al. (1982), and Saloman et al. (1982). Cumaceans are well known as early colonizers of disturbed sediments (e.g., VanBlaricom, 1982).

***Callianassa* sp. and *Upogebia* sp.** - These thalassinid shrimps, commonly known as mud shrimps, are found throughout muddy intertidal, estuarine, and shallow bay bottoms (Felder, 1973). They are represented by several genera (including *Callianassa* and *Upogebia*) and a variety of species (Rabalais et al., 1981; Abele and Kim, 1986). Most are found in muddy sediments at shallow depths, but a few may be found as deep as 50 m and in relatively sandy habitats (Rabalais et al., 1981). Species in soft sediments produce complicated tunnel and chamber burrows which can reach up to 85 cm into the sediment (Nickell and Atkinson, 1995).

Branchiostoma floridae (=B. caribaeum) - The lancelet is a shallow burrowing suspension feeder and one of the dominant species of subtidal sand communities (Shaw et al., 1982; Saloman et al.,1982; Rakocinski et al., 1991, 1993, 1996). In some areas it constitutes 70% of community biomass (Bloom et al., 1972; Simon and Dauer, 1972). Along the coast of Florida it is most abundant between Cedar Key and Cape Sable, its favored habitat being sand with shell fragments, noticeable tidal currents, salinity between 22 and 35 ppt, and abundant phytoplankton (Pierce, 1965). It breeds from early May to mid-October producing distinct broods of larvae every 1-3 weeks (Stokes, 1996). They appear to live approximately two years. Saloman et al. (1982) found that *Branchiostoma floridae* was one of the more abundant species among the early colonizers of recently dredged sand borrow areas. Rakocinski et al. (1996) reported that population abundances of *B. floridae* recovered within a year despite high silt/clay contents in the placed materials.

Benthos recovery after burial

Rate and success of benthic recovery resulting from placement of material is a function of sediment texture, depth of overburden, time of year, and habitat type. Placement of materials similar to ambient sediments (e.g., sand on sand or mud on mud) has been shown to produce less severe impacts in contrast to placement of dissimilar sediments, which generally results in more severe, long-term impact (Maurer et al., 1978, 1986). Deposition of relatively thin layers of dredged material (<10 cm; 4 in) can minimize impacts by allowing many populations of small, shallow-burrowing infauna with characteristically high reproductive rates and wide dispersal capabilities to recover quickly. Deposits greater than 20 30 cm (8-12 in) generally eliminate all but the largest and most vigorous burrowers (Maurer et al., 1978).

Observed rates of benthic community recovery after dredged material placement range from a few months to several years. The relatively species-poor benthic assemblages associated with low salinity estuarine sediments can recover in periods of time ranging from a few months to approximately one year (Leathem et al., 1973; McCauley et al., 1976, 1977; Van Dolah et al., 1979, 1984; Clarke and Miller-Way, 1992), while the more diverse communities of high salinity estuarine sediments may require a year or longer (e.g., Jones, 1986; Ray and Clarke, 1999). Recovery rates for sandy inshore marine sites, such as the proposed placement area, should be similar to those reported for high salinity estuarine sites (Oliver et al., 1977; Richardson et al., 1977; Haskin et al., 1978; Van Dolah et al., 1984).

Summary of effects on Gulf sturgeon critical habitat

Gulf sturgeon prey abundance, the only PCE likely to be impacted by the project, has the ability to recover and recolonize and therefore its resilience to the action should be considered. General life history information on a few benthic species indicates that the majority of them recover relatively quickly from physical disturbance. Lancelets, in particular a known Gulf sturgeon prey item, are an early colonizer of dredged sand borrow areas. Because the deposited dredged material will consist of sands similar in properties to the disposal site substrate, and because the COE will attempt to distribute the dredged overburden as thinly as possible, some enhancement of recovery rates can be expected.

Further, Gulf sturgeon in the project area will likely find appropriate and abundant prey in the areas adjacent to the project location. Given that the sturgeon forage opportunistically while benthic cruising, they can easily locate prey and fulfill nutritional requirements in areas adjacent to those impacted. When available prey is reduced locally as a result of disposal, it is likely that the sturgeon will quickly relocate to other areas for foraging. Furthermore, there is no evidence suggesting that specific areas of unit #11 nearby the mouth of Pensacola Pass are utilized or preferred more than others by foraging Gulf sturgeon (Craft et al., 2001). Although the Gulf sturgeon entering the project area will have likely fasted for months (and thereby have lost a substantial percentage of their body weight), they will likely find appropriate prey in areas in close proximity to the project location.

Furthermore, prey is not likely a limiting factor nor impacting the recovery of the Gulf sturgeon in unit #11 given the small number of sturgeon foraging in the area (from the Escambia, Blackwater and Yellow Rivers) and the abundance and diversity of benthic macroinvertebrates. The decline of Gulf sturgeon is attributed more to over-harvest exacerbated by loss of spawning areas associated with construction of water control structures than to loss of foraging/growth areas. Thus, the temporary reduction of benthic prey availability (<1 - 2 years) in an area less than 0.3% of critical habitat unit #11 is not expected to reduce the critical habitat's ability to support the Gulf sturgeon's conservation in the short or long term.

D. Summary of effects

Based upon the information presented above, NOAA Fisheries concludes that:
1. Water quality, sediment quality and migratory pathways critical habitat PCEs will not be impacted by the project,
2. Disposal of dredged material will not impact sea turtles,
3. Dredge entrainment of sea turtles is a documented source of sea turtle mortality and likely to occur,
4. Dredge entrainment of Gulf sturgeon is unlikely,
5. Numerous parameters are important in assessing effects of the proposed action on the prey abundance PCE in designated Gulf sturgeon critical habitat, including:
   (a) The Gulf sturgeon is an opportunistic benthivore that is known to consume a wide range of benthic macroinvertebrates while foraging via benthic cruising,
   (b) Sub-population size of the Gulf sturgeon utilizing the area for foraging (i.e., from the Escambia, Blackwater, and Yellow Rivers) is currently likely small,
   (c) Disposal of dredged material that is predominantly sand content occurring in the thinnest layer possible (smallest depth of overburden possible) and over the largest area available within the project location (324 acres), will allow the typical shallow-water macrobenthic assemblages characteristic of the project location to recover and return to pre-project conditions (i.e., in terms of diversity, density, and evenness with some natural variation), and
   (d) Recovery rate of benthos ($\leq$ 2 years) will be shorter than Gulf sturgeon mean generation time (10 to 30 years); therefore, prey abundance will likely recover and return to similar pre-project density thereby not limiting species recovery (i.e., an increase in Gulf sturgeon population size).

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. 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 national and international treaty 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 few individuals 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 Opinion may be exposed to and accumulate these contaminants during their life cycles. A few (n=12) Gulf sturgeon have been analyzed for pesticides and heavy metals (Batemena and Brim. 1994). Each individual fish had concentrations of arsenic, mercury, DDT metabolites, toxaphene, polycyclic aromatic hydrocarbons and aliphatic hydrocarbons high enough to warrant concern (USFWS et al., 1995). Specific sources were not identified.

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.

Because many activities that affect marine habitat involve some degree of Federal authorization (e.g., through MMS or COE), NOAA Fisheries expects that ESA section 7 will apply to most major, future actions that could affect designated Gulf sturgeon critical habitat unit #11.

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

Based on the current status of green, loggerhead, and Kemp's ridley 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 effects of the proposed action and the combined take of 12 sea turtles as described in this Opinion is not likely to appreciably reduce either the survival or recovery of Kemp's ridley, green, or loggerhead sea turtles in the wild by reducing their reproduction, numbers, or distribution. In particular, NOAA Fisheries determined that it does not expect activities associated with the proposed action, when added to ongoing activities affecting these species in the action area (see Table 2) and the cumulative effects (Section V), to affect sea turtles in a way that 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. Based on these facts, NOAA Fisheries believes that the proposed action is not likely to jeopardize the continued existence of the endangered Kemp's ridley, green, or loggerhead sea turtles.

It is also NOAA Fisheries' biological opinion that following the deposition of material in designated Gulf sturgeon critical habitat, prey items will recover and recolonize and those prey will then be available for the conservation of the species. Therefore, NOAA Fisheries concludes that, when sandy material alone is deposited as thinly as possible over the available 324 acres, the project will not destroy or adversely modify designated Gulf sturgeon critical habitat.

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 ITS.

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 ITS. 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 listed 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 measures, and their implementing 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 anticipates that hopper dredging activities in Pensacola Pass may result in the injury or mortality of loggerhead, Kemp's ridley, and green sea turtles. While it is difficult to ascertain future take levels 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 during dredging on the following:

(1) Previous sea turtle take levels encountered during Atlantic and Gulf of Mexico maintenance dredging projects by the COE's South Atlantic and Gulf of Mexico Districts;
(2) The level of take anticipated in previous hopper dredging Opinions; and
(3) COE adherence to the terms and conditions of this Opinion.

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

> For the NAS Pensacola Channel project referred to in this Opinion, the removal via hopper dredge of approximately 200,000 cubic yards (cy) of sandy material from a shoaling area within Reach 2 (0+00 to 112+00) of the channel, and the disposal of that dredged material in the littoral zone between the 14- and 20-foot contours to the west of Pensacola Pass and south of Perdido Key, the anticipated incidental take, by injury or mortality resulting from entrainment in or impingement by hopper dredges, of **two (2) individuals of any of the three sea turtle species of concern** (Kemp's ridleys, green or loggerhead), and of the non-lethal, non-injurious take as a result of capture by relocation trawling of **ten (10) individuals of any of these same species,** is set pursuant to section 7 (b)(4) of the ESA. This take level represents a total anticipated take for the dredge and disposal required for the NAS Pensacola Channel project, and all relocation trawling associated with the project. If the actual incidental take exceeds this level, reinitiation of formal consultation must immediately be requested.
>
> No incidental take of Gulf sturgeon is authorized.

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 Kemp's ridley, green, or loggerhead sea turtles in the wild by reducing their reproduction, numbers, or distribution, even if all incidental takes (12) 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 (for NOAA, the Assistant Administrator for Fisheries or his authorized representative) 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 previously incorporated in many 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 intake and overflow screening, use of sea turtle deflector dragheads, endangered species observer monitoring of dredge spoils, reporting requirements, and sea turtle relocation 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 reinitiation 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 non-discretionary.

(1) 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 to be aboard the hopper dredge(s) to monitor the hopper spoil, screening, and dragheads for sea turtles and Gulf sturgeon and their remains. Observers shall be aboard the hopper dredge(s) at all times during the project. Observer reports must be faxed to NOAA Fisheries' Southeast Regional Office (727-570-5517) within 24 hours of any sea turtle or Gulf sturgeon take observed.

(2) The COE shall maintain close communication with the state and national Sea Turtle Stranding and Salvage Network (STSSN) representatives (contact information available at: http://www.sefsc.noaa.gov/seaturtleSTSSN.jsp) 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 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 (SERO) with a report summarizing STSSN beach observer reports of stranded sea turtles that may indicate draghead impingement, if there are any such reports.

(3) One-hundred percent inflow screening of dredged material is required and 100% overflow screening is recommended. 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 sequentially: 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 believes that this sequential, graduated-screen approach is 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 lifted from the bottom to discharge the clay by applying suction.

(4) Standard operating procedure shall be that dredging pumps shall be disengaged by the operator 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.

(5) Rigid sea turtle deflector dragheads must be used by all hopper dredges operating in the NAS Pensacola Pass project.

(6) Reporting: Observer reports of incidental take must be faxed to NOAA Fisheries' Southeast Regional Office (727-570-5517) by onboard endangered species observers or the COE within 24 hours of any observed sea turtle take. A final 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 Pensacola Pass. The report shall contain information on project location, 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. Beach observer data provided by the STSSN on stranded sea turtles showing evidence of draghead impingement should be reported to NOAA Fisheries immediately included separately in the preliminary and annual reports.

(7) Relocation Trawling: A minimum of 12-hours/day of relocation trawling in association with hopper dredging in the Pensacola Pass project, supervised by NOAA Fisheries-approved endangered species observers, shall be conducted since hopper dredging is occurring outside the December 1-March 31 window during which sea turtles are generally located offshore. Relocation trawling shall be conducted to temporarily reduce the abundance of the three sea turtle species during the hopper dredging project in order to reduce the probability of lethal hopper dredge interactions. Relocation trawling shall consist of either: (1) trawling directly in front of the dredge where dredge activity is focused, or (2) continuous trawling in the area of the channel being dredged, staying in the vicinity of the dredge but not directly in front of it. Both methods require a safe distance between the relocation trawler and the dredge, at a speed no greater than 3.5 knots.

This Opinion authorizes the **non-lethal, non-injurious take of 10 sea turtles** (in any combination of the three species of concern in this Opinion) in association with relocation trawling. Relocation trawling will be conducted to temporarily reduce sea turtle abundance in the project area thereby reducing the probability of lethal hopper dredge interactions. Relocation trawling is subject to the following conditions:

(a) Trawl tow-time durations shall be limited to not longer than 42 minutes (doors in - doors out) and trawl speeds shall not exceed 3.5 knots.

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

(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 not less than 3 nautical miles from the dredge site. If a released turtle is subsequently recaptured, all subsequent turtle captures shall be released not less than 5 nautical miles from the dredge site. If it can be done safely, turtles may be transferred onto another vessel for transport to the release area to enable the relocation trawler to keep sweeping the dredge site without interruption.

(e) All turtles shall be measured (standard carapace measurements including body depth) and tagged, and weighed when safely possible, prior to release. Any external tags shall be noted and data recorded into the observers log. Only NOAA Fisheries-approved observers or observer candidates in training under the direct supervision of a NOAA Fisheries-approved observer shall conduct the tagging/measuring/weighing/tissue sampling operations.

(f) All sea turtles captured by relocation trawling shall be externally flipper-tagged prior to release with external tags which shall be obtained prior to the project from the University of Florida's Archie Carr Center for Sea Turtle Research. **This Opinion serves as the permitting authority for any NOAA Fisheries-approved endangered species observer aboard these relocation trawlers to flipper-tag with external tags (e.g., Inconel tags) captured sea turtles.** Columbus crabs or other organisms living on external sea turtle surfaces may also be sampled and removed under this authority.

(g) All sea turtles captured by relocation trawling shall be tissue-sampled prior to release, according to the protocol described in Appendix V of this Opinion. **This Opinion serves as the permitting authority for any NOAA Fisheries-approved endangered species observer aboard these relocation trawlers to tissue-sample captured sea turtles, without the need for a section 10 permit.** Tissue samples shall be sent to the STSSN state coordinator, as described in Appendix V of this Opinion

(h) Observers handling sea turtles infected with fibropapilloma tumors shall either: (1) clean all equipment that comes in contact with the turtle (tagging equipment, tape measures, etc.) with mild bleach solution, between the processing of each turtle or (2) maintain a separate set of sampling equipment for handling animals displaying fibropapilloma tumors or lesions.

(i) All other tagging, external or internal sampling procedures (e.g., PIT tagging, blood letting, skin 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.

(j) This Opinion allows any NOAA Fisheries-approved endangered species observer aboard a hopper dredge or relocation trawler to conduct genetic sampling on **dead** turtles without the need for a Section 10 permit, if the genetics sampling protocol (Appendix VI) is followed.

(k) Any endangered species injured or killed during or as a consequence of relocation trawling shall count toward the project's incidental take quota of two (2) turtles injured or killed. Minor skin abrasions resulting from trawl capture are considered "non-injurious."

(l) While no take of Gulf sturgeon is authorized, if a sturgeon is captured during relocation trawling, NOAA Fisheries' Southeast Regional Office shall be **immediately** notified (727-570-5517). Following immediate notification, the Gulf sturgeon should be released immediately after capture, away from the dredge site or into already dredged areas, unless the trawl vessel is equipped with a suitable (not less than 2 ft. high by 2 ft. wide by 8 ft. long), well-aerated seawater holding tank where a maximum of one sturgeon may be held for not longer than ½ hour until it may be released, or relocated away from the dredge site.

NOAA Fisheries anticipates that no more than **twelve (12) individuals of any of the three sea turtle species** (Kemp's ridleys, green turtles, and loggerhead) will be taken as a result of this action; two injurious or fatal takes by hopper dredges and ten non-lethal, non-injurious takes by relocation trawls . 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 to help implement recovery plans or to develop information.

(1) Monitoring of benthic macroinvertebrates in the disposal area pre- and post-disposal with correlation to depth of overburden will provide important information describing recovery and recolonization of Gulf sturgeon prey. Mobile COE and NAS Pensacola have agreed to conduct a monitoring study to assess recovery rates of the benthic communities in and around the nearshore disposal area associated with the project. Objectives of the biological survey are to:

(a) Collect surface sediment samples to acquire an adequate representation of benthic communities within the NAS Pensacola project nearshore disposal area as well as a nearshore reference area outside of the disposal site but within Gulf sturgeon critical habitat. Four (4) biological surveys shall be performed: predisposal or baseline survey, three months post-disposal, six months post-disposal, and 12 months post-disposal. Samples shall be collected at three (3) stations within the nearshore disposal area and at one (1) suitable reference station for a total of four (4) sampling stations. At least three (3) replicate samples shall be collected at each station. Two (2) of the samples at each station shall be sub-sampled and analyzed for sediment texture and total organic carbon. All three samples at each station shall be analyzed for macroinfaunal taxonomy and abundance.

(b) Determine benthic macroinfaunal taxonomy and abundance from sediment samples.

(c) Assess recovery rates of the benthic communities impacted by the nearshore sand disposal

(2) Data indicating channel-specific environmental parameters will assist in better determining seasonal abundance of sea turtles within the Gulf channels and assist in better definition of seasonal dredging windows.

Reinitiation of consultation

This concludes formal consultation on the NAS Pensacola Pass dredging and disposal 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 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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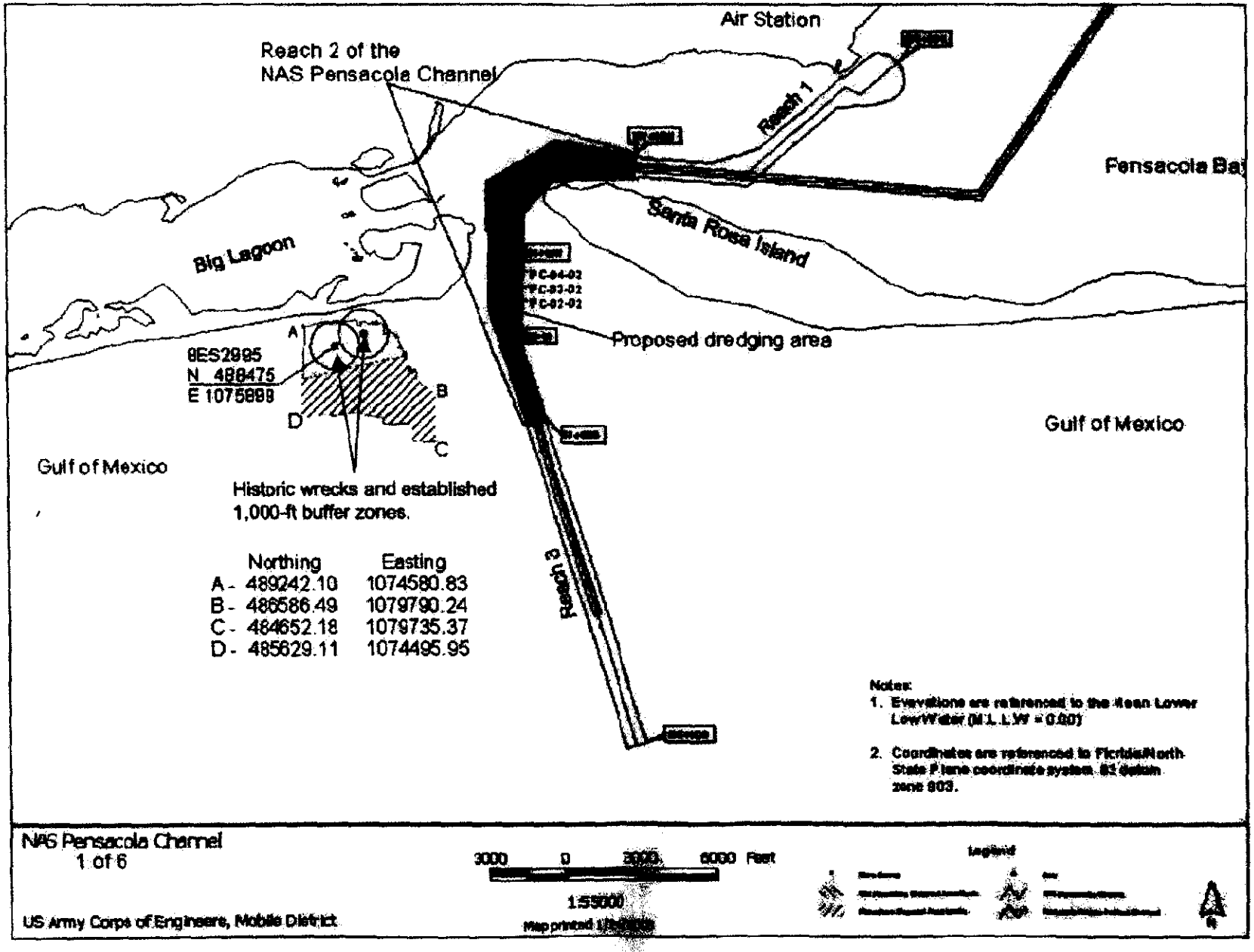
VII. Appendices

Appendix I. Map of the project area
Appendix II. Alternative disposal sites
Appendix III. Summary of life-history characteristics of common macroinvertebrates
Appendix IV. Safe handling
Appendix V. Protocol for collecting tissue from live sea turtles..
Appendix VI. Protocol for collecting tissue from dead sea turtles.


Air Station
Reach 2 of the
NAS Pensacola Channel
Reach 1
Pensacola Ba
Big Lagoon
Santa Rosa Island
Proposed dredging area
Gulf of Mexico
8ES2985
N 488475
E 1075888
A
B
C
D
Gulf of Mexico
Historic wrecks and established
1,000-ft buffer zones.
Reach 3
Northing Easting
A - 489242.10 1074580.83
B - 486586.49 1079790.24
C - 484652.18 1079735.37
D - 485629.11 1074495.95
Notes:
1. Elevations are referenced to the Mean Lower Low Water (M.L.L.W. = 0.00)
2. Coordinates are referenced to Florida North State Plane coordinate system, 83 datum zone 903.
NAS Pensacola Channel
1 of 6
3000 0 3000 6000 Feet
1:55000
US Army Corps of Engineers, Mobile District
Legend

Appendix II. Information received via email from the Mobile COE regarding alternative disposal sites considered and rejected for materials dredged from Pensacola Pass as a part of the NAS Pensacola Pass Project.

Placement site alternatives

Various placement alternatives were considered for the NAS Pensacola channel maintenance project. In order to satisfy both Florida Statute and concerns of the NPS, it was concluded that the only workable alternative at this time is littoral/nearshore placement at the current location, which is a historical disposal site. It should also be noted that after receiving contractor bids, the use of a hopper dredge is less than half the cost of a pipeline dredge for conducting work of this nature and magnitude, resulting in a savings in excess of $500,000. Below is a brief discussion of the other alternatives considered.

1. Florida Statute Section 161.161 requires that beach quality sand dredged from coastal inlets be bypassed downdrift and not removed from the littoral system. This statute disqualifies disposal alternatives such as offshore, upland, and any other disposal actions that would remove sand from the beach and littoral system.

2. Although, the statute calls for direct downdrift beach placement, the adjacent downdrift beaches are the property of the National Park Service (NPS). The NPS opposes the direct placement of dredged material on their beaches due to beach mouse concerns and would not grant permission to do so at the time the WQC application was prepared. Direct placement of this relatively small amount of material would require the use of pipeline to pump the sand, thus substantially increasing project costs. Placement between the -14 and -20-foot contours where it will remain in the littoral system satisfies the bypassing requirements and will provide numerous downdrift benefits. Such benefits are natural maintenance of wider downdrift beaches, increased storm protection, increased nesting habitat for endangered sea turtles and various shore birds, and many other beach dwelling organisms. Wider beaches augment natural dune creation and maintenance, which will be beneficial for dune dwelling organisms and endangered species such as beach mice. Established dune systems are also beneficial in providing greater storm protection to adjacent coastal habitats.

3. Moving the nearshore placement area further west and thus out of the sturgeon critical habitat was considered after the formal ruling became effective. This alternative would involve modifying and/or obtaining a new water quality certification which given the limited timeframe would result in missing the Navy's readiness objectives which is critical to national security. Additionally, we do not have cultural resource clearances for areas outside of the existing nearshore disposal site. Obtaining such clearances would require conducting underwater archaeological surveys, which are time consuming resulting in missing the Navy's time constraints. Also, these surveys are costly and would be cost prohibitive given the relatively small magnitude of this action.

4. Beach disposal outside of the NPS property was also considered. As discussed above, changing the disposal location will require modifications to the water quality permit. The farther sand is transported the greater the cost especially with a pipeline configuration. This option would involve transporting the sand a substantial distance, increasing the cost such that the action would be cost prohibitive. This would also apply to transporting the sand to Santa Rosa beach nourishment site. This option would also require additional handling to transfer the sand onto the beach.

Placement Scenarios Within the Proposed Nearshore Site

Thickness of sand cover versus area:

The total area of the disposal site is 396 acres. There is an archaeological restriction in the shallower portion of the site that we will be avoiding, totaling 72 acres. Leaving a maximum use area of 324 acres. Utilizing the entire 324 acres would result in an average cover thickness of 5 inches (0.4 feet). Keep in mind that this is an average thickness. In reality, there would be various mounds throughout the area. Some of this area would be substantially thicker with some areas not covered at all. Also keep in mind that this scenario involves the avoidance of 72 acres or approximately 18% of the overall disposal site.

We have conducted further evaluations showing that we can take measures to condense the placement area within the existing area to about 68 acres or 17% of the overall area. With this scenario the average cover thickness would be approximately 2.0 feet. Again, this is an average thickness. Utilizing the smaller 68-acre area out of the overall 396 acres, we would be making efforts to avoid 328 acres or 83% of the overall disposal area. This is a very small area in relation to the adjacent critical habitat area.

We also considered a thin layer placement option throughout the disposal area. This option is not possible using a hopper dredge and would require the use of a pipeline dredge. A pipeline bid was received for this work and is in excess of $900,000. Although this bid far exceeded the government cost estimate, if a thin layer requirement was added, the cost would be even greater. Just for your comparative information, the hopper bid came in at $373,000.

In considering the above placement scenarios, we will be looking for you to provide recommendations as to what sections of the areas would work best (i.e., deeper vs. shallower) and if it would be best to break up the 68 acres into multiple smaller areas.

Monitoring

Please keep in mind that we will be conducting a monitoring program to evaluate the benthic recovery. If there is anything you feel we can do during the monitoring to

maximize information gained towards supporting critical habitat research and knowledge, let us know upfront. Your input and participation in the monitoring effort will be valuable towards obtaining critical information required in making informed management decisions concerning critical habitat issues.

Appendix III. Summary of life-history characteristics for the 45 common taxa likely to be in the project area, including zone, taxonomic group, trophic position, life mode, type of motility, reproductive mode, and relative body size. From Rakocinski et al., 1993.
Codes: trophic position- SF (suspension feeder), DF (deposit feeder), O (omnivore), C (carnivore), GH (grazing herbivore); life mode = B (burrowing), TI (infaunal tube dweller), FE (free surface dweller), CM (commensal); type motility D (discretely motile), M (motile); reproductive mode = PD (planktonic development), BR (brooding), SD (substrate development), AS (asexual); adult size SM (small, ~< 5 mm), MD (medium, 5-20 mm), LG (large, ~ 20 mm). (Assignments follow Pettibone, 1963; Fauchald and Jumars, 1979; Shaw et al., 1982; Uebelacher and Johnson, 1984).

Zone/species	Taxonomic group	Trophic position	Life mode	Type motility	Reproductive mode	Body size
Swash						
Donax variabilis	Mollusca, Bivalvia	SF	B	D	PD	MD
Emerita talpoida	Crustacea, Decapoda	SF	B	M	PD	LG
Scolelepis squamata	Polychaeta, Spionidae	SF	TI	D	PD	MD
Inner subtidal						
Armandia agilis (Inner)	Polychaeta, Opheliidae	DF	B	M	PD	MD
Ancinus depressus	Crustacea, Isopoda	O	FE	M	BR	MD
Acanthohaustorius sp. A	Crustacea, Amphipoda	DF;SF	B	M	BR	SM
Bowmaniellafloridana	Crustacea, Mysidacea	SF	FE	M	BR	MD
Cyclaspis pustulata	Crustacea, Cumacea	DF;SF	B	M	BR	SM
Dispio uncinata	Polychaeta, Spionidae	DF	B	D	PD	LG
Donax texasianus	Mollusca, Bivalvia	SF	B	D	PD	MD
Exosphaeroma diminutum	Crustacea, Isopoda	O	FE	M	BR	SM
Haustorius jayneae	Crustacea, Amphipoda	SF	B	M	BR	MD
Leitoscoloplos fragilis (Inner)	Polychaeta, Orbiniidae	DF	B	M	SD	LG
Metamysidopsis swifti	Crustacea, Mysidacea	SF	FE	M	BR	SM
Ogyrides hayi	Crustacea, Decapoda	SF	B;FE	M	PD	LG
Paraonis fulgens	Polychaeta, Paraonidae	DF	B;TI	D	PD	MD
Tiron triocellatus	Crustacea, Amphipoda	DF	FE	M	BR	SM
Subtidal transition						
Cyclaspis cf. *varians*	Crustacea, Cumacea	DF;SF	B	M	BR	SM
Nephtys bucera	Polychaeta, Nephtyidae	C	B	M	PD	LG
Prionospio pygmaea	Polychaeta, Spionidae	DF;SF	TI	D	PD	MD
Protohaustorius cf. *bousfieldi*	Crustacea, Amphipoda	DF;SF	B	M	BR	SM
Streptosyllis pettiboneae	Polychaeta, Syllidae	C	FE	M	PD;AS	SM
Tellina sp. A	Mollusca, Bivalvia	DF	B	D	PD	MD

Appendix III cont'd.

Zone/species	Taxonomic group	Trophic position	Life mode	Type motility	Reproductive mode	Body size
Outer subtidal						
Armandia agilis (Outer)	Polychaeta, Opheliidae	DF	B	M	PD	MD
Branchiostoma cf. *floridae*	Chordata, Branchiostomidae	SF	B	M	PD	LG
Strigilla sp.	Mollusca, Bivalvia	DF	B	D	PD	MD
Brania wellfleetensis	Polychaeta, Syllidae	DF	FE	M	BR	SM
Caecum cf. *glabrum*	Mollusca, Gastropoda	GH	FE	M	SD	SM
Eudevenopus honduranus	Crustacea, Amphipoda	DF	B	M	BR	SM
Goniadides carolinae	Polychaeta, Goniadidae	C	B	M	PD	MD
Glycera sp. A	Polychaeta, Glyceridae	C	TI	D	PD	LG
Gibberosus sp. A	Crustacea, Amphipoda	SF	FE	M	BR	SM
Leitoscoloplos fragilis (Outer)	Polychaeta, Orbiniidae	DF	B	M	SD	MD
Mellita quinquiesperforata	Echinodermata, Echinoidea	DF	B;FE	D	PD	LG
Nassarius acutus	Mollusca, Gastropoda	O	FE	M	SD	MD
Ophelia denticulata	Polychaeta, Opheliidae	DF	B	M	PD	MD
Polygordius sp. A	Polychaeta, Polygordiidae	DF	B	D	PD	MD
Prionospio cf. *cirrobranchiata*	Polychaeta, Spionidae	DF;SF	TI	D	PD	MD
Prionospio cristata	Polychaeta, Spionidae	DF;SF	TI	D	PD	MD
Protodorvillea kefersteini	Polychaeta, Dorvilleidae	C;O	FE	M	PD	SM
Parapionosyllis longicirrata	Polychaeta, Syllidae	C	FE	M	PD;AS	SM
Pinnixa cf. *floridana*	Crustacea, Decapoda	SF	CM	M	PD	MD
Sigambra tentaculata	Polychaeta, Pilargidae	C	B	M	PD	SM
Synelmis sp. B	Polychaeta, Pilargidae	C;O	B	D	PD	MD
Sphaerosyllis aciculata	Polychaeta, Syllidae	DF	FE	M	BR	SM

Appendix IV: SEA TURTLE HANDLING AND RESUSCITATION GUIDELINES

Any sea turtles taken incidentally during the course of fishing or scientific research activities must be handled with due care to prevent injury to live specimens, observed for activity, and returned to the water according to the following procedures:

A) Sea turtles that are actively moving or determined to be dead (as described in paragraph (B)(4) below) must be released over the stern of the boat. In addition, they must be released only when fishing or scientific collection gear is not in use, when the engine gears are in neutral position, and in areas where they are unlikely to be recaptured or injured by vessels.

B) Resuscitation must be attempted on sea turtles that are comatose or inactive by:

1. Placing the turtle on its bottom shell (plastron) so that the turtle is right side up and elevating its hindquarters at least 6 inches (15.2 cm) for a period of 4 to 24 hours. The amount of elevation depends on the size of the turtle; greater elevations are needed for larger turtles. Periodically, rock the turtle gently left to right and right to left by holding the outer edge of the shell (carapace) and lifting one side about 3 inches (7.6 cm) then alternate to the other side. Gently touch the eye and pinch the tail (reflex test) periodically to see if there is a response.

2. Sea turtles being resuscitated must be shaded and kept damp or moist but under no circumstance be placed into a container holding water. A water-soaked towel placed over the head, carapace, and flippers is the most effective method in keeping a turtle moist.

3. Sea turtles that revive and become active must be released over the stern of the boat only when fishing or scientific collection gear is not in use, when the engine gears are in neutral position, and in areas where they are unlikely to be recaptured or injured by vessels. Sea turtles that fail to respond to the reflex test or fail to move within 4 hours (up to 24, if possible) must be returned to the water in the same manner as that for actively moving turtles.

4. A turtle is determined to be dead if the muscles are stiff (rigor mortis) and/or the flesh has begun to rot; otherwise, the turtle is determined to be comatose or inactive and resuscitation attempts are necessary.

Any sea turtle so taken must not be consumed, sold, landed, offloaded, transshipped, or kept below deck.

These guidelines are adapted from 50 CFR § 223.206(d)(1). Failure to follow these procedures is therefore a punishable offense under the Endangered Species Act.

Appendix V:
PROTOCOL FOR COLLECTING TISSUE FROM LIVE TURTLES FOR GENETIC ANALYSIS

Method for Live Turtles
IT IS CRITICAL TO USE A NEW BIOPSY PUNCH AND GLOVES FOR EACH TURTLE TO AVOID CROSS-CONTAMINATION OF SAMPLES

1. Turn the turtle over onto its back.
2. Put on a new pair of latex gloves.
3. Swab the entire cap of the sample vial with alcohol.
4. Wipe the ventral and dorsal surfaces of the rear flipper 5-10 cm from the posterior edge with the Betadine/iodine swab.
5. Place the vial under the flipper edge to use the cleaned cap as a hard surface for the punch.
6. Press a new biopsy punch firmly into the flesh as close to the posterior edge as possible and rotate one complete turn. Cut all the way through the flipper to the cap of the vial.
7. Wipe the punched area with Betadine/iodine swab; rarely you may need to apply pressure to stop bleeding.
8. Use a wooden skewer to transfer the sample from the biopsy punch into the plastic vial containing saturated NaCl with 20% DMSO *(SEE BELOW)
9. Use the pencil to write the stranding ID number (observer initials, year, month, day, turtle number by day), species, state and carapace length on the waterproof paper label and place it in the vial with the sample. EXAMPLE: For a 35.8 cm curved carapace length green turtle documented by Jane M. Doe on July 15, 2001 in Georgia, the label should read "JMD20010715-01, C. mydas, Georgia, CCL–35.8 cm". If this had been the third turtle Jane Doe responded to on July 15, 2001, it would be JMD20010715-03.
10. Label the outside of the vial with the same information (stranding ID number, species, state and carapace length) using the permanent marker.
11. Place clear scotch tape over the writing on the vial to protect it from being smeared or erased.
12. Wrap parafilm around the cap of the vial by stretching it as you wrap.
13. Place vial within whirlpak and close.
14. Dispose of the biopsy punch.
15. Note on the stranding form that a part was salvaged, indicating that a genetic sample was taken and specify the location on the turtle where the sample was obtained.
16. Submit the vial with the stranding report to your state coordinator. State coordinators will forward the reports and vials to NMFS for processing and archiving.

*The 20% DMSO buffer in the plastic vials is nontoxic and nonflammable. Handling the buffer without gloves may result in exposure to DMSO. This substance soaks into skin very rapidly and is commonly used to alleviate muscle aches. DMSO will produce a garlic/oyster taste in the mouth along with breath odor. The protocol requires that you WEAR gloves each time you collect a sample and handle the buffer vials.

The vials (both before and after samples are taken) should be stored at room temperature or cooler. If you don't mind the vials in the refrigerator, this will prolong the life of the sample. DO NOT store the vials where they will experience extreme heat (like in your car!) as this could cause the buffer to break down and not preserve the sample properly.

Genetic Sample Kit Materials – LIVE turtles

- latex gloves
- alcohol swabs
- Betadine/iodine swabs
- 4-6 mm biopsy punch – sterile, disposable (Moore Medical Supply 1-800-678-8678, part #0052442)
- plastic screw-cap vial containing saturated NaCl with 20% DMSO, wrapped in parafilm
- wooden skewer
- waterproof paper label, ¼" x 4"
- pencil to write on waterproof paper label
- permanent marker to label the plastic vials
- scotch tape to protect writing on the vials
- piece if parafilm to wrap the cap of the vial
- whirl-pak to return/store sample vial

Please direct questions to:
Sea Turtle Program
NOAA/NMFS/SEFSC
75 Virginia Beach Drive
Miami, FL 33149
305-361-4207

THANK YOU FOR COLLECTING SAMPLES FOR SEA TURTLE GENETIC RESEARCH!!

Appendix VI:

PROTOCOL FOR COLLECTING TISSUE FROM DEAD TURTLES FOR GENETIC ANALYSIS

Method for Dead Turtles

IT IS CRITICAL TO USE A NEW SCALPEL BLADE AND GLOVES FOR EACH TURTLE TO AVOID CROSS-CONTAMINATION OF SAMPLES

1. Put on a new pair of latex gloves.
2. Use a new disposable scalpel to cut out an approx. 1 cm (½ in) cube (bigger is NOT better) piece of muscle. Easy access to muscle tissue is in the neck region or on the ventral side where the front flippers "insert" near the plastron. It does not matter what stage of decomposition the carcass is in.
3. Place the muscle sample on a hard uncontaminated surface (plastron will do) and make slices through the sample so the buffer solution will penetrate the tissue.
4. Put the sample into the plastic vial containing saturated NaCl with 20% DMSO *(SEE BELOW)
5. Use the pencil to write the stranding ID number (observer initials, year, month, day, turtle number by day), species, state and carapace length on the waterproof paper label and place it in the vial with the sample. EXAMPLE: For a 35.8 cm curved carapace length green turtle documented by Jane M. Doe on July 15, 2001 in Georgia, the label should read "JMD20010715-01, C. mydas, Georgia, CCL=35.8 cm". If this had been the third turtle Jane Doe responded to on July 15, 2001, it would be JMD20010715-03.
6. Label the outside of the vial with the same information (stranding ID number, species, state and carapace length) using the permanent marker.
7. Place clear scotch tape over the writing on the vial to protect it from being smeared or erased.
8. Wrap parafilm around the cap of the vial by stretching it as you wrap.
9. Place vial within whirlpak and close.
10. Dispose of the scalpel.
11. Note on the stranding form that a part was salvaged, indicating that a genetic sample was taken and specify the location on the turtle where the sample was obtained.
12. Submit the vial with the stranding report to your state coordinator. State coordinators will forward the reports and vials to NMFS for processing and archiving.

*The 20% DMSO buffer in the plastic vials is nontoxic and nonflammable. Handling the buffer without gloves may result in exposure to DMSO. This substance soaks into skin very rapidly and is commonly used to alleviate muscle aches. DMSO will produce a garlic/oyster taste in the mouth along with breath odor. The protocol requires that you WEAR gloves each time you collect a sample and handle the buffer vials.

The vials (both before and after samples are taken) should be stored at room temperature or cooler. If you don't mind the vials in the refrigerator, this will prolong the life of the sample. DO NOT store the vials where they will experience extreme heat (like in your car!) as this could cause the buffer to break down and not preserve the sample properly.

Genetic Sample Kit Materials – DEAD turtles

- latex gloves
- single-use scalpel blades (Fisher Scientific 1-800-766-7000, cat. # 08-927-5A)

- plastic screw-cap vial containing saturated NaCl with 20% DMSO, wrapped in parafilm
- waterproof paper label, ¼" x 4"
- pencil to write on waterproof paper label
- permanent marker to label the plastic vials
- scotch tape to protect writing on the vials
- piece of parafilm to wrap the cap of the vial
- whirl pak to return/store sample vial

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THANK YOU FOR COLLECTING SAMPLES FOR SEA TURTLE GENETIC RESEARCH!!