Endangered Species Act - Section 7 Consultation
Biological Opinion

Action Agency: The National Park Service (NPS)

Activity: Proposed 36 CFR Part 7 Special Regulations and General Management Plan Amendment for the Dry Tortugas National Park (DTNP) (Consultation Number F/SER/2005/04111)

Consulting Agency: National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS), Southeast Regional Office (SERO), Protected Resources Division (F/SER3), St. Petersburg, Florida

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Introduction

Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1531 *et seq.*), requires each federal agency to ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered or threatened species, or result in the destruction or adverse modification of any designated critical habitat of such species. When an action of a federal agency may affect a species protected under the ESA, that agency is required to consult with either NMFS or the U.S. Fish and Wildlife Service, depending on the protected species that may be affected. Consultations on most listed marine species are conducted between the action agency and NMFS. Consultations are concluded after NMFS determines the action is not likely to adversely affect listed species or critical habitat, or issues a biological opinion (opinion). If jeopardy or destruction of adverse modification is found to be likely, the opinion must identify any reasonable and prudent alternatives (RPAs) to the action that would avoid such impacts. The opinion also includes an incidental take statement (ITS) specifying the amount or extent of incidental take that may result from the proposed action. Non-discretionary reasonable and prudent measures (RPMs) to minimize the impact of the incidental take are included, and conservation recommendations are made. Notably, there are no RPMs associated with critical habitat, only RPAs that must avoid destruction or adverse modification.

This document constitutes our opinion on the effects of proposed rule changes to the DTNP General Management Plan on threatened and endangered species and designated critical habitat, in accordance with section 7 of the ESA. This consultation considers the management of the DTNP as established in the Final General Management Plan Amendment/Environmental Impact Statement of 2001 (NPS 2001).

This opinion is based on information provided in: the Final General Management Plan Amendment/Environmental Impact Statement of 2001 for the DTNP (NPS 2001); the Assessment of Effects on Federally Listed Species and Species of Concern for the Proposed Regulations Implementing the Final General Management Plan Amendment/Environmental Impact Statement (NPS 2005); annual reports of the DTNP Sea Turtle Monitoring Program (Grimshaw 2003, 2004); sea turtle recovery plans; past and current sea turtle research and population modeling efforts; logbook data and analyses presented in the opinion on the continued authorization of reef fish fishing under the Gulf of Mexico Reef Fish Fishery Management Plan (RFFMP) and Proposed Amendment 23 (NMFS 2005); other relevant scientific data and reports; and phone conversations with National Park Service staff.

1.0 Consultation History

This is the first section 7 consultation on the DTNP. NPS made a no effect determination on the original proposed General Management Plan /Development Concept Plan for Fort Jefferson National Monument (now the DTNP).

On July 27, 2005, SERO received a letter from NPS requesting section 7 consultation on proposed 36 CFR Part 7 Special Regulations for the DTNP. NPS had determined that their proposed action might adversely affect listed sea turtle species. They also sought concurrence with their determination of may affect, but not likely to adversely affect for other listed species under NMFS' purview. The letter had four enclosures, including the: (1) Assessment of Effects on Federally Listed Species for the Proposed Regulations Implementing the Final General Management Plan Amendment (NMFS 2005), (2) Draft

36 CFR Part 7 Regulations, (3) Record of Decision for the Dry Tortugas National Park FGMPA/Environmental Impact Statement, and (4) 2001 Final General Management Plan Amendment/Environmental Impact Statement for the DTNP (NPS 2001).

We reviewed the consultation package for completeness under section 7 regulations at 50 CFR 402.14(c). Although the initiation package provided a detailed description of the proposed changes to DTNP regulations, it contained insufficient information on the baseline conditions in the action area (e.g., current fishing effort, detailed information on sea turtles found stranded in the park) for assessing the impacts of the proposed action. On August 19, 2005, we notified NPS that this information was needed prior to initiating the consultation. This request was followed up on August 29, 2005, with written notice via e-mail.

On September 28, 2005, we received the requested data on past sea turtle strandings documented in the DTNP by e-mail. Fishing effort information was unavailable, so consultation was initiated upon receipt of the stranding information.

During the formal consultation period, staff biologists communicated with NPS staff several times to gather additional information, which we later found necessary to conduct the consultation.

2.0 Description of Proposed Action

NPS proposes to establish 36 CFR Part 7 Special Regulations for the DTNP to implement key regulatory elements of the 2001 Final General Management Plan Amendment/Environmental Impact Statement (FGMPA/EIS). The proposed rule is necessary to (1) address legislative changes that occurred in Public Law 102-525, which established the park and abolished the Fort Jefferson National Monument in 1992, (2) strengthen the management direction for visitor use and resource protection, and (3) facilitate compliance with legislative mandates regarding the protection of park resources (NPS 2005). The FGMPA/EIS provides overall guidance for the future use of resources and facilities; clarifies research and resource management needs, priorities and strategies; and addresses increasing levels of park visitation and use (NPS 2001). The proposed action seeks to simultaneously increase resource protection and improve the quality of visitors' experiences by instituting new management zones and a private boater permit requirement, as well as altering the current commercial use agreement (CUA) system.

An overview of current management and regulations and a more detailed description of the elements of the proposed action relevant to our analysis of the proposed action's effects on listed species are provided below. Additional information may be reviewed in the FGMS/EIS.

2.1 Overview of Current Management and Regulations

The DTNP has been operating under the General Management Plan/Development Concept Plan/Environmental Assessment for Fort Jefferson National Monument

(GMP/DCP/EA) since 1983. Parklands are managed under five area designations (Protected Natural Area; Natural Environment designations (one for submerged lands, one for dry land); Joint Natural/Historic (all submerged); Historic Preservation/Adaptive Use, and Special Use[1]), each providing a varying degree of resource protection and recreational activities. Protected Natural Areas encompass four keys (Bush, Long, East, and Hospital Keys) and are designed to protect bird and sea turtle nesting sites. The Natural Environment designations apply to all park waters, and Loggerhead and Middle Keys. All other underwater areas fall under Joint Natural/Historic zoning. The areas of consistent human use on Garden Key, the location of Fort Jefferson, and Loggerhead Key are designated as Historic Preservation/Adaptive use and Special Use Zones, respectively (NPS 2001). A sea turtle nesting survey is conducted in all of these zones. The program's primary function is to track sea turtle nesting within the park. A secondary objective of the program is to document any sea turtle strandings that occur within the park. For a more detailed overview of the program, see Grimshaw (2004).

The DTNP is closed to all commercial fishing. Private and charter/headboat vessels are allowed to fish within the park, subject to applicable fishing regulations. The DTNP adopted the state recreational guidelines under 36 CFR 2.3 (a), but has implemented stricter regulations on certain activities.[2] For example, spearfishing, lobster harvest, and the collection of conch and ornamental reef fish are permissible under state regulations but prohibited within the park (FWCC 2005).

The park's commercial services for transportation to and from the park, fishing charters, snorkeling, scuba diving, etc., are regulated by CUAs.[3] In 1999, 55 CUAs were issued to two ferry operators, four air taxi operators, and smaller boats for sailing, fishing, scuba/snorkeling, and bird watching. From 1983 to 2000, visitation at the park increased from 11,004 to 83,704 recreational visitors annually. This increase, due primarily to the initiation of high-speed ferry service, created serious concern about potential threats to park resources, facilities, and visitor experiences. In May 1999, the park superintendent placed a moratorium on new or expanded commercial services to stabilize visitation until a new GMP Amendment could be completed and implemented (NPS 2001). The number of CUA holders has declined from 55 in 1999 to 31 in 2005 through attrition and enforcement of the 1999 moratorium (see below) on new or expanded commercial services.

2.2 Management and Regulations Under Proposed Action

The proposed rule would (1) institute four management zones with varying use parameters to areas within the park; (2) impose greater restrictions on private boaters; and (3) use commercial services to direct and structure visitor use (NPS 2001).

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[1] See Final General Management Plan Amendment/ Environmental Impact Statement (NPS 2001) for specifics of each management zone.
[2] See Appendix A for a list of current state recreational fishing guidelines.
[3] By law (36 CFR 5.3), a written instrument must authorize all commercial services in national parks. CUAs were formerly called Incidental Business Permits or IBPs (NPS 2005).

Proposed Management Zones

The proposed action will reduce the number of management zones within the park from five to four. Each of the four proposed management zones (Natural/Cultural, Research Natural Area (RNAs), Historic Preservation/Adaptive Use, and Special Protection Zones [SPZs]) varies in size, purpose, and visitor restrictions. The largest of these zones, the Natural/Cultural Zone, would encompass 50% of the park (50 square nautical miles). Visitors would be allowed access with few restrictions; snorkeling, scuba diving, swimming, and boating and recreational fishing would all be permissible within this zone. RNAs would encompass 46% of the park's waters (46 square nautical miles). Visitors would be granted access only with a special permit. Snorkeling, scuba diving, swimming, and boating would still be allowed within RNA areas, but recreational fishing would be prohibited and any vessel transiting a RNA would be required to stow all fishing gear. The Historic Preservation/Adaptive Use Zones would encompass 3% of the total park's waters (3 square nautical miles) and would extend out 1 nautical mile in all directions around Garden, Bush, and Long Keys. Recreational fishing, snorkeling, and scuba diving would be allowed in these waters without the need for a permit. The smallest of the proposed management zones, the Special Protection Zones, would encompass less than 1% (1 square nautical mile) of the total park area. These zones would be closed to all public activities to protect pristine habitats including *Acropora spp.* coral patches and sea turtle nesting beaches on three keys (NPS 2005).

Private Boater Permit Requirements

Private boaters entering the park would be required to obtain a permit.[4] Boaters would be prohibited from discharging any substance into park waters or from striking or injuring any coral, seagrass, or marine organism attached to the seafloor. Anchoring would be prohibited in RNAs (mooring buoys will be provided) and SPZs, but allowed elsewhere in the park. Additionally, boaters would be prohibited from entering SPZs, including transiting through them, without a special permit.

Commercial Services

Commercial transportation services to the park and other appropriate commercial services in the park, such as guided fishing, sailing, and diving trips, would continue to be regulated under CUAs. The total number of CUAs would be limited to 30 or the capacity of the resources to accommodate use (NPS 2005). Commercial transportation services operating under these CUAs would continue to transport visitors to the park and to provide guide, interpretive and educational services. A concession contract is proposed to authorize one seaplane operator to carry 60 visitors per day to the park. A second concession contract to authorize one ferry operator to carry 150 visitors per day to the park is also proposed. The number of vessels used and the arrival and departure patterns would be determined in the concession contracting process. The current role of the ferry operator would be expanded to allow excursions to other park locations, as well as sanctioning guide/interpretive/educational services, which supplement those provided by NPS.

[4] At the time of this consultation the details of this permitting system had not been finalized. Any changes required in the permitting system can be made through modification of the superintendent's compendium.

2.2 Action Area

The action area is defined as all of the areas affected directly or indirectly by the federal action and not merely the immediate area involved in the action. The DTNP is located in the western most part of the Florida Keys, 70 miles west of Key West, Florida. It encompasses approximately 100 square miles of NPS administered land and water and includes seven keys, two of which are inhabited. The maximum depth of the park's waters is 100 ft, with the majority being shallower than 60 ft (NPS 2001). The park's submerged lands consists of hardbottom, sand, seagrass, patch reef, reef flat, fore reef, and deep reef habitats and is home to some 200 species of reef fish (NPS 2001). The proposed action and its effects would be limited to within the park boundaries. NMFS believes any vessel traffic in or around the action area would be reasonably certain to occur even if the DTNP did not exist. The terms action area and "park" are used as synonyms throughout this document to refer to the area circumscribed by the DTNP and should be considered interchangeable. Throughout this analysis those terms are meant to refer to the entire 100-square-mile area of the park.

3.0 Status of Listed Species and Critical Habitat

The following endangered and threatened species are known to occur in or near the DTNP.

Marine Mammals	**Status**
Sei whale (*Balaenoptera borealis*)	Endangered
Sperm whale (*Physeter macrocephalus*)	Endangered
Northern right whale (*Eubalaena glacialis*)	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered
Sea turtles	
Green turtle (*Chelonia mydas*)	Endangered/Threatened*
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered
Loggerhead sea turtle (*Caretta caretta*)	Threatened
Fish	
Smalltooth sawfish (*Pristis pectinata*)	Endangered**

Critical Habitat

No critical habitat has been designated within the action area.

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

***The U.S. distinct population segment (DPS).*

3.1 Analysis of Species Not Likely to be Adversely Affected

Sei and Sperm Whales

We believe sei and sperm whales are not likely to be adversely affected by the proposed action. Both species are predominantly found seaward of the continental shelf. Sightings of sperm whales are almost exclusively over the continental shelf edge and continental slope areas (Scott and Sadove 1997). Sei whales also typically occur in deeper waters and neither species are commonly observed in the east coast waters of the U.S. (Cetacean and Turtle Assessment Program 1982; Waring et al. 1998; Waring et al. 2006). Nor has either species ever been sighted near DTNP. These factors lead us to conclude that any impacts of the proposed action on sei and sperm whales will be discountable.

Northern Right Whale

We believe northern right whales are not likely to be adversely affected by the proposed action. Northern right whales are not typically found in the Gulf of Mexico. Although recent confirmed sightings have occurred near Panama City, Florida and off the coast of Texas (this mother/calf pair was later spotted off Longboat Key, Florida [NMFS unpublished data 2006]) for the first time in 20 years. Prior to these events, the last northern right whale sighting in the Gulf of Mexico was during the 1970s. Individual occurrences within the Gulf of Mexico are considered rare because traveling there requires extended transit through waters with sea surface temperatures (~20°C) much warmer than their preferred temperature range (14.3°C ± 2.1°) (Keller et al. 2006). There has never been a northern right whale sighting inside DTNP. These factors lead us to conclude that any impacts of the proposed action on right whales will be discountable.

Humpback Whale

Humpbacks are not likely to be adversely affected by the proposed action. They are geographically wide ranging, spending summers in higher latitudes (35°-65°N) and winters in lower, more temperate latitudes (10°-23°N) in or around the Lesser Antilles archipelago (Waring et al. 2006). They are often associated with the waters over continental shelves, along their edges, and near oceanic islands (Balcomb and Nichols 1978; Whitehead 1987). Humpbacks have very infrequently been seen within the park, and sightings are considered extremely rare (Bass 2005). Sightings within the surrounding waters and Gulf of Mexico are also considered very uncommon. Since 1960, only two whales have been documented within its waters (NMFS 1991). We believe the occurrence of a humpback within the action area is extremely unlikely and any adverse effects from the proposed action will be discountable.

Fin Whale

Fin whales are not likely to be adversely affected by the proposed action. Although this species occurs from the Gulf of Mexico (Jefferson and Schiro 1997) to the Mediterranean Sea (Jonsgård 1966a, 1966b; Sergeant 1977; IWC 1992), it is found most commonly found north of 30° N latitude (Mead 1977). This species is most commonly associated with the 100-m isobath (Kenney and Winn 1987; Hain et al. 1992). Sightings of humpbacks within the park have been extremely rare (Bass 2005), and the depth of water within the park (<33m) is far shallower than their preferred depth range. Given these factors, we believe the occurrence of a fin whale within the action area is extremely unlikely and any adverse effects from the proposed action will be discountable.

Kemp's Ridley Sea Turtle
Kemp's ridley sea turtles are not likely to be adversely affected by the proposed action. These sea turtles only rarely occur in the waters of the DTNP and nesting has never been documented there (Bass 2005). Nesting occurs primarily on the northeastern Mexican coast in the Gulf of Mexico (USFWS and NMFS 1992), with some incidental nesting occurring in Florida (Meylan 1992). We believe the low levels of occurrence within the action area; in conjunction with no known nesting occurring there, suggests their occurrence within the action area is very rare. The rarity of occurrence leads us to believe any adverse affects on Kemp's ridleys will be discountable.

Smalltooth Sawfish
Smalltooth sawfish are not likely to be adversely affected by the proposed action. The morphology of this species makes it vulnerable to potential entanglement with recreational fishing gear. However, entanglement seems very unlikely since the species range data and anecdotal evidence suggests that smalltooth sawfish occurrences within the action area are extremely rare. Smalltooth sawfish occur in the waters off the west coast of peninsular Florida, and the Florida Keys. The proposed action area lies 70 miles west of Key West, Florida, where current data suggests that smalltooth sawfish occurrences are quite low (0.06-0.08 sightings per mile [Simpfendorfer and Wiley 2005]). In fact, the last recorded sighting of a smalltooth sawfish within the park's boundaries was in 1975 (NPS 2005). The extremely low likelihood of occurrence within the action area leads us to conclude any adverse affects from the proposed actions will be discountable.

3.2 Analysis of the Species Likely to be Adversely Affected

Green, hawksbill, leatherback, and loggerhead sea turtles are likely to be adversely affected by the proposed action because of their regular presence in the action area and documented vulnerability to one or more of the gear types used in Southeast fisheries that employ similar gears and techniques as those that will be used in the park. The remaining sections of this opinion, therefore, will focus on these species.

The following subsections are synopses of the best available information on the life history, distribution, population trends, and current status of the four species of sea turtles likely to be adversely affected by the proposed action. Additional background information on the status of sea turtle species can be found in a number of published documents, including: recovery plans for the Atlantic green sea turtle (NMFS and USFWS 1991a), hawksbill sea turtle (NMFS and USFWS 1993), loggerhead sea turtle (NMFS and USFWS 1991b) and leatherback sea turtle (NMFS and USFWS 1992); Pacific Sea Turtle Recovery Plans (NMFS and USFWS, 1998a-e); sea turtle status reviews and biological reports (NMFS and USFWS 1995; Turtle Expert Working Group (TEWG) 1998, 2000; NMFS SEFSC 2001).

The sea turtle subsections focus primarily on the Atlantic Ocean populations of these species because these are the populations that may be directly or indirectly affected by the proposed action in the DTNP. However, these species are listed as global populations (with the exception of Florida greens, whose distribution is entirely in the Atlantic, including the Gulf of Mexico). The global status and trends of these species, therefore, are included as well, to provide a basis and frame of reference for our final determination of the effects of the proposed action on the species as listed under the ESA.

3.2.1 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 nesting range of the green sea turtles in the southeastern United States includes sandy beaches of mainland shores, barrier islands, coral islands, and volcanic islands between Texas and North Carolina and the U.S. Virgin Islands (U.S.V.I.) and Puerto Rico (NMFS and USFWS 1991a). Principal U.S. nesting areas for green sea turtles are in eastern Florida, predominantly Brevard through Broward counties (Ehrhart and Witherington 1992). Green sea 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).

3.2.1.1 Pacific Ocean

Green turtles are thought to be declining throughout the Pacific Ocean, with the exception of Hawaii, from a combination of overexploitation and habitat loss (Eckert 1993, Seminoff 2002). In the western Pacific, the only major (>2,000 nesting females) populations of green turtles occur in Australia and Malaysia, with smaller colonies throughout the area. Indonesia has a widespread distribution of green turtles, but has experienced large declines over the past 50 years. Hawaii green turtles are genetically distinct and geographically isolated, and the population appears to be increasing in size despite the prevalence of fibropapilloma and spirochidiasis (Aguirre et al. 1998 in Balazs and Chaloupka 2003). In the Eastern Pacific, mitochondrial DNA analysis has indicated that there are three key nesting populations: Michoacan, Mexico; Galapagos Islands, Ecuador; and Islas Revillagigedos, Mexico (Dutton 2003). There is also sporadic green turtle nesting along the Pacific coast of Costa Rica.

3.2.1.2 Atlantic Ocean

Life History and Distribution
The estimated age at sexual maturity for green sea turtles is between 20-50 years (Balazs 1982, Frazer and Ehrhart 1985). 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, whereas 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. At approximately 20 to 25 cm carapace length, juveniles leave pelagic habitats and enter benthic foraging areas (Bjorndal 1997).

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

Green sea turtle foraging areas in the southeastern United States include any coastal shallow waters having macroalgae or sea grasses. This includes areas 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.

Population Dynamics and Status

The vast majority of green sea turtle nesting within the southeastern United States occurs in Florida (Meylan et al. 1995, Johnson and Ehrhart 1994). It is known that current nesting levels in Florida are reduced compared to historical levels, but the extent of the reduction is not known (Dodd 1981). However, green sea turtle nesting in Florida has been increasing since 1989 (Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute Index Nesting Beach Survey Database). Total nest counts and trends at index beach sites during the past decade suggest the numbers of green sea turtles that nest within the southeastern United States are increasing.

Although nesting activity is obviously important in determining population distributions, the remaining portion of the green turtle's life is spent on the foraging and breeding grounds. Some of the principal feeding pastures in the western Atlantic Ocean include the upper west coast of Florida and the northwestern coast of the Yucatán Peninsula. Additional important foraging areas in the western Atlantic include the Mosquito and Indian River Lagoon systems and nearshore wormrock reefs between Sebastian and Ft. Pierce Inlets in Florida, Florida Bay, the Culebra archipelago and other Puerto Rico coastal waters, the south coast of Cuba, the Mosquito Coast of Nicaragua, the Caribbean coast of Panama, and scattered areas along Colombia and Brazil (Hirth 1971). The summer developmental habitat for green turtles also encompasses estuarine and coastal waters from North Carolina to as far north as Long Island Sound (Musick and Limpus 1997).

There are no reliable estimates of the number of immature green sea turtles that inhabit coastal areas (where they come to forage) of the southeastern United States. However, information on incidental captures of immature green sea turtles at the St. Lucie Power Plant (they have averaged 215 green sea turtle captures per year since 1977) in St. Lucie County, Florida (on the Atlantic coast of Florida), show that the annual number of immature green sea turtles captured has increased significantly in the past 26 years (FPL 2002).

It is likely that immature green sea turtles foraging in the southeastern United States come from multiple genetic stocks; therefore, the status of immature green sea 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 were previously discussed. Trends in nesting at Yucatán beaches cannot be assessed because of a lack of consistent beach surveys over time. Trends at Tortuguero (ca. 20,000-50,000 nests/year) showed a significant increase in nesting during the period 1971-1996 (Bjorndal et al. 1999), and more recent information continues to show increasing nest counts (Troëng and Rankin 2004). Therefore, it seems reasonable that there is an increase in immature green sea turtles inhabiting coastal areas of the southeastern United States; however, the magnitude of this increase is unknown.

Threats
The principal cause of past declines and extirpations of green sea turtle assemblages has been the over-exploitation of green sea turtles for food and other products. Although intentional take of green sea turtles and their eggs is not extensive within the southeastern United States, green sea 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 sea 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 interactions with fishing gear. Sea sampling coverage in the pelagic driftnet, pelagic longline, Southeast shrimp trawl, and summer flounder bottom trawl fisheries has recorded takes of green turtles. There is also the increasing threat from green sea 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).

3.2.1.3 Summary of Status for Atlantic Green Sea Turtles

Green turtles range in the western Atlantic from Massachusetts to Argentina, including the Gulf of Mexico and Caribbean, but are considered rare in benthic areas north of Cape Hatteras, North Carolina (Wynne and Schwartz 1999). In the continental United States, green turtle nesting occurs on the Atlantic coast of Florida (Ehrhart 1979). Recent population estimates for the western Atlantic area are not available. The pattern of green turtle nesting shows biennial peaks in abundance, with a generally positive trend during the ten years of regular monitoring since establishment of index beaches in 1989. However, given the species' late sexual maturity, caution is warranted about over-interpreting nesting trend data collected for less than 15 years.

3.2.2 Hawksbill Sea Turtle

The hawksbill turtle was listed as endangered under the precursor of the ESA on June 2, 1970, and is considered Critically Endangered by the International Union for the Conservation of Nature (IUCN). The hawksbill is a medium-sized sea turtle, with adults in the Caribbean ranging in size from approximately 62.5 to 94.0 cm straight carapace length. The species occurs in all ocean basins, although it is relatively rare in the Eastern Atlantic and Eastern Pacific, and absent from the Mediterranean Sea. Hawksbills are the most tropical of the marine turtles, ranging from approximately 30ºN latitude to 30ºS latitude. They are closely associated with coral reefs and other hard-bottom habitats, but they are also found in other habitats including inlets, bays and coastal lagoons (NMFS and USFWS 1993). There are only five regional nesting populations with more than 1,000 females nesting annually. These populations are in the Seychelles, Mexico, Indonesia, and two in Australia (Meylan and Donnelly 1999). There has been a global population decline of over 80% during the last three generations (105 years) (Meylan and Donnelly 1999).

3.2.2.1 Pacific Ocean

Anecdotal reports throughout the Pacific indicate that the current Pacific hawksbill population is well below historical levels (NMFS 2004). It is believed that this species is rapidly approaching extinction in the Pacific because of harvesting for its meat, shell, and eggs as well as destruction of nesting habitat (NMFS 2001). Hawksbill sea turtles nest in the Hawaiian Islands as well as the islands and mainland of southeast Asia, from China to Japan, and throughout the Philippines, Malaysia, Indonesia, Papua New Guinea, the Solomon Islands, and Australia (NMFS 2004). However, along the eastern Pacific Rim where nesting was common in the 1930s, hawksbills are now rare or absent (Cliffton et al. 1982, NMFS 2004).

3.2.2.2 Atlantic Ocean

Life History and Distribution
The best estimate of age at sexual maturity for hawksbill sea turtles is about 20-40 years (Chaloupka and Limpus 1997, Crouse 1999a, NMFS 2004). Reproductive females undertake periodic (usually non-annual) migrations to their natal beach to nest. Movements of reproductive males are less well known, but are presumed to involve migrations to their nesting beach or to courtship stations along the migratory corridor (Meylan 1999b). Females nest an average of 3-5 times per season (Meylan and Donnelly 1999, Richardson et al. 1999). Clutch size is larger on average (up to 250 eggs) than that of other turtles (Hirth 1980). Reproductive females may exhibit a high degree of fidelity to their nest sites.

The life history of hawksbills consists of a pelagic stage that lasts from the time they leave the nesting beach as hatchlings until they are approximately 22-25 cm in straight carapace length (Meylan 1988, Meylan and Donnelly 1999), followed by residency in developmental habitats (foraging areas where juveniles reside and grow) in coastal waters. Adult foraging habitat, which may or may not overlap with developmental habitat, is typically coral reefs, although other hard-bottom communities and occasionally mangrove-fringed bays may be occupied. Hawksbills show fidelity to their foraging areas over several years (van Dam and Diéz 1998).

The hawksbill's diet is highly specialized and consists primarily of sponges (Meylan 1988). Other food items, notably corallimorphs and zooanthids, have been documented to be important in some areas of the Caribbean (van Dam and Diéz 1997, Mayor et al. 1998, León and Diéz 2000).

In the Western Atlantic, the largest hawksbill nesting population occurs in the Yucatán Peninsula of Mexico (Garduño-Andrade et al. 1999). With respect to the United States, nesting occurs in Puerto Rico, the U.S. Virgin Islands, and the southeast coast of Florida. Nesting also occurs outside of the United States and its territories in Antigua, Barbados, Costa Rica, Cuba, and Jamaica (Meylan 1999a). Outside of the nesting areas, hawksbills are relatively uncommon in the waters of the continental United States, preferring coral reefs, such as those found in the Caribbean and Central America. They have been documented off of the U.S. Gulf of Mexico states and along the eastern seaboard as far north as Massachusetts, although sightings north of Florida are rare (NMFS and USFWS 1993).

Population Dynamics and Status

Estimates of the annual number of nests at hawksbill sea turtle nesting sites are of the order of hundreds to a few thousand. Nesting within the southeastern United States and U.S. Caribbean is restricted to Puerto Rico (>650 nests/yr), the U.S. Virgin Islands (~400 nests/yr), and, rarely, Florida (0-4 nests/yr) (Eckert 1995, Meylan 1999a, Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute's Statewide Nesting Beach Survey data 2002). At the two principal nesting beaches in the U.S. Caribbean where long-term monitoring has been carried out, populations appear to be increasing (Mona Island, Puerto Rico) or stable (Buck Island Reef National Monument, St. Croix, USVI) (Meylan 1999a).

Threats

As described for other sea turtle species, hawksbill sea turtles are affected by habitat loss, habitat degradation, fishery interactions, and poaching in some parts of their range. There continues to be a black market for hawksbill shell products ("tortoiseshell"), which likely contributes to the harvest of this species.

Increasing protections for live coral habitat in the Atlantic, Gulf of Mexico, and Caribbean over the last decade that have limited fishing activity in live coral habitat, may also increase hawksbill survival rates in the marine environment. Benefits may also be gained by hawksbills from the implementation of larger-sized TED requirements.

3.2.2.3 Summary of Status for Hawksbill Sea Turtles

Worldwide, hawksbill sea turtle populations are declining. They face many of the same threats affecting other sea turtle species. In addition, there continues to be a commercial market for hawksbill shell products, despite protections afforded to the species under U.S. law and international conventions.

3.2.3 Leatherback Sea Turtle

The leatherback sea turtle was listed as endangered throughout its global range on June 2, 1970. Leatherbacks are widely distributed throughout the oceans of the world, and are found in waters of the Atlantic, Pacific, and Indian Oceans (Ernst and Barbour 1972). Leatherback sea turtles are the largest living turtles and range farther than any other sea turtle species. The large size of adult leatherbacks and their tolerance to relatively low temperatures allows them to occur in northern waters such as off Labrador and in the Barents Sea (NMFS and USFWS 1995). Adult leatherbacks forage in temperate and subpolar regions from 71°N to 47°S latitude in all oceans and undergo extensive migrations to and from their tropical nesting beaches. In 1980, the leatherback population was estimated at approximately 115,000 adult females globally (Pritchard 1982). That number, however, is probably an overestimation as it was based on a particularly good nesting year in 1980 (Pritchard 1996). By 1995, the global population of adult females had declined to 34,500 (Spotila et al. 1996). Pritchard (1996) also called into question the population estimates from Spotila et al. (1996), and felt it may be somewhat low, because it ended the modeling on data from a particularly bad nesting year (1994) while excluding nesting data from 1995, which was a good nesting year. However, Spotila et al. (1996) represents the best overall estimate of adult female leatherback population size.

3.2.3.1 Pacific Ocean

Based on published estimates of nesting female abundance, leatherback populations have collapsed or have been declining at all major Pacific basin nesting beaches for the last two decades (Spotila et al. 1996, NMFS and USFWS 1998c, Sarti et al. 2000, Spotila et al. 2000). For example, the nesting assemblage on Terengganu, Malaysia – which was one of the most significant nesting sites in the western Pacific Ocean – has declined severely from an estimated 3,103 females in 1968 to two nesting females in 1994 (Chan and Liew 1996). Nesting assemblages of leatherback turtles are in decline along the coasts of the Solomon Islands, a historically important nesting area (D. Broderick, pers. comm., in Dutton et al. 1999). In Fiji, Thailand, Australia, and Papua New Guinea (East Papua), leatherback turtles have only been known to nest in low densities and scattered colonies.

Only an Indonesian nesting assemblage has remained relatively abundant in the Pacific basin. The largest extant leatherback nesting assemblage in the Indo-Pacific lies on the north Vogelkop coast of Irian Jaya (West Papua), Indonesia, with over 3,000 nests recorded annually (Putrawidjaja 2000, Suarez et al. 2000). During the early-to-mid

1980s, the number of female leatherback turtles nesting on the two primary beaches of Irian Jaya appeared to be stable. More recently, this population has come under increasing threats that could cause this population to experience a collapse that is similar to what occurred at Terengganu, Malaysia. In 1999, for example, local Indonesian villagers started reporting dramatic declines in sea turtle populations near their villages (Suarez 1999). Unless hatchling and adult turtles on nesting beaches receive more protection, this population will continue to decline. Declines in nesting assemblages of leatherback turtles have been reported throughout the western Pacific region, with nesting assemblages well below abundance levels observed several decades ago (e.g., Suarez 1999).

In the western Pacific Ocean and South China Seas, leatherback turtles are captured, injured, or killed in numerous fisheries, including Japanese longline fisheries. The poaching of eggs, killing of nesting females, human encroachment on nesting beaches, beach erosion, and egg predation by animals also threaten leatherback turtles in the western Pacific.

In the eastern Pacific Ocean, nesting populations of leatherback turtles are declining along the Pacific coast of Mexico and Costa Rica. According to reports from the late 1970s and early 1980s, three beaches on the Pacific coast of Mexico supported as many as half of all leatherback turtle nests for the eastern Pacific. Since the early 1980s, the eastern Pacific Mexican population of adult female leatherback turtles has declined to slightly more than 200 individuals during 1998-99 and 1999-2000 (Sarti et al. 2000). Spotila et al. (2000) reported the decline of the leatherback turtle population at Playa Grande, Costa Rica, which had been the fourth largest nesting colony in the world. Between 1988 and 1999, the nesting colony declined from 1,367 to 117 female leatherback turtles. Based on their models, Spotila et al. (2000) estimated that the colony could fall to less than 50 females by 2003-2004. Leatherback turtles in the eastern Pacific Ocean are captured, injured, or killed in commercial and artisanal swordfish fisheries off Chile, Columbia, Ecuador, and Peru, purse seine fisheries for tuna in the eastern tropical Pacific Ocean, and California/Oregon drift gillnet fisheries. Because of the limited data, we cannot provide high-certainty estimates of the number of leatherback turtles captured, injured, or killed through interactions with these fisheries. However, between 8-17 leatherback turtles were estimated to have died annually between 1990 and 2000 in interactions with the California/Oregon drift gillnet fishery; 500 leatherback turtles are estimated to die annually in Chilean and Peruvian fisheries; 200 leatherback turtles are estimated to die in direct harvests in Indonesia; and before 1992, the North Pacific driftnet fisheries for squid, tuna, and billfish captured an estimated 1,000 leatherback turtles each year, killing about 111 of them each year.

Although all causes of the declines in leatherback turtle colonies in the eastern Pacific have not been documented, Sarti et al. (1998) suggest that the declines result from egg poaching, adult and sub-adult mortalities incidental to high seas fisheries, and natural fluctuations due to changing environmental conditions. Some published reports support this suggestion. Sarti et al. (2000) reported that female leatherback turtles have been killed for meat on nesting beaches like Píedra de Tiacoyunque, Guerrero, Mexico. Eckert

(1997) reported that swordfish gillnet fisheries in Peru and Chile contributed to the decline of leatherback turtles in the eastern Pacific. The decline in the nesting population at Mexiquillo, Mexico occurred at the same time that effort doubled in the Chilean driftnet fishery. In response to these effects, the eastern Pacific population has continued to decline, leading some researchers to conclude that the leatherback is on the verge of extinction in the Pacific Ocean (e.g., Spotila et al. 1996, Spotila et al. 2000). NMFS' assessment of three nesting aggregations in its February 23, 2004, opinion agrees with this conclusion: if no action is taken to reverse their decline, leatherback sea turtles nesting in the Pacific Ocean either have high risks of extinction in a single human generation (for example, nesting aggregations at Terrenganu and Costa Rica) or they have a high risk of declining to levels where more precipitous declines become almost certain (e.g., Irian Jaya) (NMFS 2004).

3.2.3.2 Atlantic Ocean

In the Atlantic Ocean, leatherbacks have been recorded as far north as Newfoundland, Canada, and Norway, and as far south as Uruguay, Argentina, and South Africa (NMFS SEFSC 2001). Female leatherbacks nest from the southeastern United States to southern Brazil in the western Atlantic and from Mauritania to Angola in the eastern Atlantic. The most significant nesting beaches in the Atlantic, and perhaps in the world, are in French Guiana and Suriname (NMFS SEFSC 2001). Genetic analyses of leatherbacks to date indicate that within the Atlantic basin there are genetically different nesting populations; the St. Croix nesting population (U.S. Virgin Islands), the mainland nesting Caribbean population (Florida, Costa Rica, Suriname/French Guiana), and the Trinidad nesting population (Dutton et al. 1999). When the hatchlings leave the nesting beaches, they move offshore but eventually utilize both coastal and pelagic waters. Very little is known about the pelagic habits of the hatchlings and juveniles, and they have not been documented to be associated with the *Sargassum* areas as are other species. Leatherbacks are deep divers, with recorded dives to depths in excess of 1,000 m (Eckert et al. 1989, Hayes et al. 2004).

Life History and Distribution

Leatherbacks are a long-lived species, living for over 30 years. They reach sexual maturity somewhat faster than other sea turtles (except Kemp's ridley), with an estimated range from 3-6 years (Rhodin 1985) to 13-14 years (Zug and Parham 1996). They nest frequently (up to 10 nests per year) during a nesting season and nest about every 2-3 years. During each nesting, they produce 100 eggs or more in each clutch and, thus, can produce 700 eggs or more per nesting season (Schultz 1975). However, a significant portion (up to approximately 30%) of the eggs can be infertile. Thus, the actual proportion of eggs that can result in hatchlings is less than this seasonal estimate. The eggs incubate for 55-75 days before hatching. Based on a review of all sightings of leatherback sea turtles of <145 cm curved carapace length (ccl), Eckert (1999) found that leatherback juveniles remain in waters warmer than 26°C until they exceed 100 cm ccl.

Although leatherbacks are the most pelagic of the sea turtles, they enter coastal waters on a seasonal basis to feed in areas where jellyfish are concentrated. Leatherback sea turtles feed primarily on cnidarians (medusa, siphonophores) and tunicates.

Evidence from tag returns and strandings in the western Atlantic suggests that adult leatherback sea turtles engage in routine migrations between boreal, temperate, and tropical waters (NMFS and USFWS 1992). A 1979 aerial survey of the outer continental shelf from Cape Hatteras, North Carolina to Cape Sable, Nova Scotia showed leatherbacks to be present throughout the area with the most numerous sightings made from the Gulf of Maine south to Long Island. Leatherbacks were sighted in waters where depths ranged from 1-4151 m, but 84.4% of sightings were in areas where the water was less than 180 m deep (Shoop and Kenney 1992). Leatherbacks were sighted in waters of a similar sea surface temperature as loggerheads; from 7-27.2ºC (Shoop and Kenney 1992). However, this species appears to have a greater tolerance for colder waters because more leatherbacks were found at the lower temperatures (Shoop and Kenney 1992). This aerial survey estimated the in-water leatherback population from near Nova Scotia, Canada to Cape Hatteras, North Carolina at approximately 300-600 animals.

Population Dynamics and Status

The status of the Atlantic leatherback population is less clear than the Pacific population. The total Atlantic population size is undoubtedly larger than in the Pacific, but overall population trends are unclear. In 1996, the entire western Atlantic population was characterized as stable at best (Spotila et al. 1996), with numbers of nesting females reported to be on the order of 18,800. A subsequent analysis by Spotila (pers. comm.) indicated that by 2000, the western Atlantic nesting population had decreased to about 15,000 nesting females. According to NMFS SEFSC (2001) the nesting aggregation in French Guiana has been declining at about 15% per year since 1987. However, from 1979-1986, the number of nests was increasing at about 15% annually which could mean that the current 15% decline could be part of a nesting cycle which coincides with the erosion cycle of Guiana beaches described by Schultz (1975). In Suriname, leatherback nest numbers have shown large recent increases (with more than 10,000 nests per year since 1999 and a peak of 30,000 nests in 2001), and the long-term trend for the overall Suriname and French Guiana population may show an increase (Girondot 2002 in Hilterman and Goverse 2003). The number of nests in Florida and the U.S. Caribbean has been increasing at about 10.3% and 7.5%, respectively, per year since the early 1980s, but the magnitude of nesting is much smaller than that along the French Guiana coast (NMFS SEFSC 2001). Also, because leatherback females can lay 10 nests per season, the recent increases to 400 nests per year in Florida may only represent as few as 40 individual female nesters per year.

In summary, the conflicting information regarding the status of Atlantic leatherbacks makes it difficult to characterize the current status. Numbers at some nesting sites are increasing, but are decreasing at other sites. Tag return data emphasize the wide-ranging nature of the leatherback and the link between South American nesters and animals found in U.S. waters. For example, a nesting female tagged May 29, 1990, in French Guiana was later recovered and released alive from the York River, Virginia. Another nester tagged in French Guiana on June 21, 1990, was later found dead in Palm Beach, Florida (Sea Turtle Stranding and Salvage Network Database). Genetic studies performed within the Northeast Distant Fishery Experiment indicate that the leatherbacks captured in the Atlantic highly migratory species pelagic longline fishery were primarily from the French Guiana and Trinidad nesting stocks (over 95%), though individuals from West African stocks were surprisingly absent (Rhoden et al. In press).

There are a number of problems contributing to the uncertainty of the leatherback nest counts and population assessments. The nesting beaches of the Guianas (Guyana, French Guiana, and Suriname) and Trinidad are by far the most important in the western Atlantic. However, beaches in this region undergo cycles of erosion and reformation, so that the nesting beaches are not consistent over time. Additionally, leatherback sea turtles do not exhibit the same degree of nest-site fidelity demonstrated by loggerhead and other hardshell sea turtles, further confounding analysis of population trends using nesting data. Reported declines in one country and reported increases in another may be the result of migration and beach changes, not true population changes. Nesting surveys, as well as being hampered by the inconsistency of the nesting beaches, are themselves inconsistent throughout the region. Survey effort varies widely in the seasonal coverage, aerial coverage, and actual surveyed sites. Surveys have not been conducted consistently throughout time, or have even been dropped entirely as the result of wars, political turmoil, funding vagaries, etc. The methods vary in assessing total numbers of nests and total numbers of females. Many sea turtle scientists agree that the Guianas (and some would include Trinidad) should be viewed as one population and that a synoptic evaluation of nesting at all beaches in the region is necessary to develop a true picture of population status (Reichart et al. 2001). No such region-wide assessment has been conducted recently.

The most recent, complete estimates of regional leatherback populations are in Spotila et al. (1996). As discussed above, nesting in the Guianas may have been declining in the late 1990s but may have increased again in the early 2000s. Spotila et al. estimated that the leatherback population for the Atlantic basin, including all nesting beaches in the Americas, the Caribbean, and West Africa totaled approximately 27,600 nesting females, with an estimated range of 20,082-35,133. We believe that the current population probably still lies within this range, taking into account the reported nesting declines and increases and the uncertainty surrounding them. We therefore choose to rely on Spotila et al.'s (1996) published total Atlantic population estimates, rather than attempt to construct a new population estimate here, based on our interpretation of the various, confusing nesting reports from areas within the region.

Threats

Zug and Parham (1996) pointed out that the main threat to leatherback populations in the Atlantic is the combination of fishery-related mortality (especially entanglement in gear and drowning in trawls) and the intense egg harvesting on the main nesting beaches. Other important ongoing threats to the population include pollution, loss of nesting habitat, and boat strikes.

Of sea turtle species, leatherbacks seem to be the most vulnerable to entanglement in fishing gear. This susceptibility may be the result of their body type (large size, long pectoral flippers, and lack of a hard shell), their attraction to gelatinous organisms and algae that collect on buoys and buoy lines at or near the surface, possibly their method of locomotion, and perhaps their attraction to the lightsticks used to attract target species in longline fisheries. They are also susceptible to entanglement in gillnets and pot/trap lines (used in various fisheries) and capture in trawl gear (e.g., shrimp trawls).

Leatherbacks are exposed to pelagic longline fisheries in many areas of their range. Unlike loggerhead turtle interactions with longline gear, leatherback turtles do not usually ingest longline bait. Instead, leatherbacks are foul hooked by longline gear (e.g., on the flipper or shoulder area) rather than mouth hooked or swallowing the hook. According to observer records, an estimated 6,363 leatherback sea turtles were caught by the U.S. Atlantic tuna and swordfish longline fisheries between 1992-1999, of which 88 were released dead (NMFS SEFSC 2001). The U.S. fleet accounts for only 5%-8% of the hooks fished in the Atlantic Ocean, and adding up the under-represented observed takes of the other 23 countries that actively fish in the area would lead to annual take estimates of thousands of leatherbacks over different life stages. Basin-wide, Lewison et al. (2004) estimated that 30,000-60,000 leatherback sea turtle captures occurred in Atlantic pelagic longline fisheries in the year 2000 alone (note that multiple captures of the same individual are known to occur, so the actual number of individuals captured may not be as high).

Leatherbacks are also susceptible to entanglement in the lines associated with trap/pot gear used in several fisheries. From 1990-2000, 92 entangled leatherbacks were reported from New York through Maine (Dwyer et al. 2002). Additional leatherbacks stranded wrapped in line of unknown origin or with evidence of a past entanglement (Dwyer et al. 2002). Fixed gear fisheries in the Mid-Atlantic have also contributed to leatherback entanglements. In North Carolina, two leatherback sea turtles were reported entangled in a crab pot buoy inside Hatteras Inlet (D. Fletcher, pers. comm. to S. Epperly in NMFS SEFSC 2001). A third leatherback was reported entangled in a crab pot buoy in Pamlico Sound near Ocracoke. This turtle was disentangled and released alive; however, lacerations on the front flippers from the lines were evident (D. Fletcher, pers. comm. to S. Epperly in NMFS SEFSC 2001). In the Southeast, leatherbacks are vulnerable to entanglement in Florida's lobster pot and stone crab fisheries. In the U.S. Virgin Islands, where one of five leatherback strandings from 1982 to 1997 was due to entanglement (Boulon 2000), leatherbacks have been observed with their flippers wrapped in the line of West Indian fish traps (R. Boulon, pers. comm. to J. Braun-McNeill in NMFS SEFSC 2001). Because many entanglements of this typically pelagic species likely go unnoticed, entanglements in fishing gear may be much higher.

Leatherback interactions with the southeast Atlantic shrimp fishery, which operates predominately from North Carolina through southeast Florida (NMFS 2002), have also been a common occurrence. Leatherbacks, which migrate north annually, are likely to encounter shrimp trawls working in the coastal waters off the Atlantic coast from Cape Canaveral, Florida, to the Virginia/North Carolina border. Leatherbacks also interact with the Gulf of Mexico shrimp fishery. For many years, TEDs required for use in these fisheries were less effective at excluding leatherbacks than the smaller, hard-shelled turtle species. To address this problem, on February 21, 2003, NMFS issued a final rule to amend the TED regulations. Modifications to the design of TEDs are now required in order to exclude leatherbacks and large and sexually mature loggerhead and green turtles.

Other trawl fisheries are also known to interact with leatherback sea turtles. In October 2001, a Northeast Fisheries Science Center observer documented the take of a leatherback in a bottom otter trawl fishing for *Loligo* squid off of Delaware; TEDs are not required in this fishery. The winter trawl flounder fishery, which did not come under the revised TED regulations, may also interact with leatherback sea turtles.

Gillnet fisheries operating in the nearshore waters of the mid-Atlantic states are also suspected of capturing, injuring, and/or killing leatherbacks when these fisheries and leatherbacks co-occur. Data collected by the Northeast Fisheries Science Center (NEFSC) Fisheries Observer Program from 1994 through 1998 (excluding 1997) indicate that a total of 37 leatherbacks were incidentally captured (16 lethally) in drift gillnets set in offshore waters from Maine to Florida during this period. Observer coverage for this period ranged from 54%-92%.

Poaching is not known to be a problem for nesting populations in the continental United States. However, NMFS SEFSC (2001) notes that poaching of juveniles and adults is still occurring in the U.S. Virgin Islands and the Guianas. In all, four of the five strandings in St. Croix were the result of poaching (Boulon 2000). A few cases of fishermen poaching leatherbacks have been reported from Puerto Rico, but most of the poaching is on eggs.

Leatherback sea turtles may be more susceptible to marine debris ingestion than other species due to their pelagic existence and the tendency of floating debris to concentrate in convergence zones that adults and juveniles use for feeding areas and migratory routes (Lutcavage et al. 1997, Shoop and Kenney 1992). Investigations of the stomach contents of leatherback sea turtles revealed that a substantial percentage (44% of the 16 cases examined) contained plastic (Mrosovsky 1981). Along the coast of Peru, intestinal contents of 19 of 140 (13%) leatherback carcasses were found to contain plastic bags and film (Fritts 1982). The presence of plastic debris in the digestive tract suggests that leatherbacks might not be able to distinguish between prey items and plastic debris (Mrosovsky 1981). Balazs (1985) speculated that the object might resemble a food item by its shape, color, size or even movement as it drifts about, and induce a feeding response in leatherbacks.

It is important to note that, like marine debris, fishing gear interactions and poaching are problems for leatherbacks throughout their range. Entanglements are common in Canadian waters where Goff and Lien (1988) reported that 14 of 20 leatherbacks encountered off the coast of Newfoundland/Labrador were entangled in fishing gear including salmon net, herring net, gillnet, trawl line and crab pot line. Leatherbacks are reported taken by many other nations that participate in Atlantic pelagic longline fisheries, including Taipei, Brazil, Trinidad, Morocco, Cyprus, Venezuela, Korea, Mexico, Cuba, U.K., Bermuda, People's Republic of China, Grenada, Canada, Belize, France, and Ireland (see NMFS SEFSC 2001, for a description of take records). Leatherbacks are known to drown in fish nets set in coastal waters of Sao Tome, West Africa (Castroviejo et al. 1994, Graff 1995). Gillnets are one of the suspected causes for the decline in the leatherback sea turtle population in French Guiana (Chevalier et al. 1999), and gillnets targeting green and hawksbill turtles in the waters of coastal Nicaragua also incidentally catch leatherback turtles (Lageux et al. 1998). Observers on shrimp trawlers operating in the northeastern region of Venezuela documented the capture of six leatherbacks from 13,600 trawls (Marcano and Alio-M 2000). An estimated 1,000 mature female leatherback sea turtles are caught annually in fishing nets off of Trinidad and Tobago with mortality estimated to be between 50%-95% (Eckert and Lien 1999). However, many of the turtles do not die as a result of drowning, but rather because the fishermen butcher them in order to get them out of their nets (NMFS SEFSC 2001).

3.2.3.3 Summary of Leatherback Status

In the Pacific Ocean, the abundance of leatherback turtle nesting individuals and colonies has declined dramatically over the past 10 to 20 years. Nesting colonies throughout the eastern and western Pacific Ocean have been reduced to a fraction of their former abundance by the combined effects of human activities that have reduced the number of nesting females. In addition, egg poaching has reduced the reproductive success of the remaining nesting females. At current rates of decline, leatherback turtles in the Pacific basin are a critically endangered species with a low probability of surviving and recovering in the wild.

In the Atlantic Ocean, our understanding of the status and trends of leatherback turtles is much more confounded, although the picture does not appear nearly as bleak as in the Pacific. The number of female leatherbacks reported at some nesting sites in the Atlantic Ocean has increased, while at others they have decreased. Some of the same factors that led to precipitous declines of leatherbacks in the Pacific also affect leatherbacks in the Atlantic: leatherbacks are captured and killed in many kinds of fishing gear and interact with fisheries in state, federal and international waters. Poaching is a problem and affects leatherbacks that occur in U.S. waters. Leatherbacks also appear to be more susceptible to death or injury from ingesting marine debris than other turtle species.

3.2.4 Loggerhead Sea Turtle

The loggerhead sea turtle was listed as a threatened species throughout its global range on July 28, 1978. It was listed because of direct take, incidental capture in various fisheries, and the alteration and destruction of its habitat. Loggerhead sea turtles inhabit the continental shelves and estuarine environments along the margins of the Atlantic, Pacific, and Indian Oceans. In the Atlantic, developmental habitat for small juveniles is the pelagic waters of the North Atlantic and the Mediterranean Sea (NMFS and USFWS 1991b). Within the continental United States, loggerhead sea turtles nest from Texas to

New Jersey. Major nesting areas include coastal islands of Georgia, South Carolina, and North Carolina, and the Atlantic and Gulf of Mexico coasts of Florida, with the bulk of the nesting occurring on the Atlantic coast of Florida.

3.2.4.1 Pacific Ocean

In the Pacific Ocean, major loggerhead nesting grounds are generally located in temperate and subtropical regions with scattered nesting in the tropics. Within the Pacific Ocean, loggerhead sea turtles are represented by a northwestern Pacific nesting aggregation (located in Japan) and a smaller southwestern nesting aggregation that occurs in eastern Australia (Great Barrier Reef and Queensland) and New Caledonia (NMFS SEFSC 2001). There are no reported loggerhead nesting sites in the eastern or central Pacific Ocean basin. Data from 1995 estimated the Japanese nesting aggregation at 1,000 female loggerhead turtles (Bolten et al. 1996). Recent genetic analyses on female loggerheads nesting in Japan suggest that this "subpopulation" is comprised of genetically distinct nesting colonies (Hatase et al. 2002) with precise natal homing of individual females. As a result, Hatase et al. (2002) indicate that loss of one of these colonies would decrease the genetic diversity of Japanese loggerheads; recolonization of the site would not be expected on an ecological time scale. In Australia, long-term census data has been collected at some rookeries since the late 1960s and early 1970s, and nearly all the data show marked declines in nesting populations since the mid-1980s (Limpus and Limpus 2003). The nesting aggregation in Queensland, Australia, was as low as 300 females in 1997.

Pacific loggerhead turtles are captured, injured, or killed in numerous Pacific fisheries including Japanese longline fisheries in the western Pacific Ocean and South China Seas; direct harvest and commercial fisheries off Baja California, Mexico; commercial and artisanal swordfish fisheries off Chile, Columbia, Ecuador, and Peru; purse seine fisheries for tuna in the eastern tropical Pacific Ocean; and California/Oregon drift gillnet fisheries. In addition, the abundance of loggerhead turtles on nesting colonies throughout the Pacific basin has declined dramatically over the past 10 to 20 years. Loggerhead turtle colonies in the western Pacific Ocean have been reduced to a fraction of their former abundance by the combined effects of human activities that have reduced the number of nesting females and reduced the reproductive success of females that manage to nest (e.g., due to egg poaching).

3.2.4.2 Atlantic Ocean

In the western Atlantic, most loggerhead sea turtles nest from North Carolina to Florida and along the Gulf coast of Florida. There are at least five western Atlantic subpopulations, divided geographically as follows: (1) a northern nesting subpopulation, occurring from North Carolina to northeast Florida at about 29^{o}N; (2) a south Florida nesting subpopulation, occurring from 29^{o}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 and 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. Fidelity for nesting beaches makes recolonization of nesting beaches with sea turtles from other subpopulations unlikely.

Life History and Distribution
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) estimated ages of maturity ranging from 20-38 years and benthic immature stage lasting from 14-32 years.

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, although some loggerheads may move back and forth between the pelagic and benthic environment (Witzell 2002). Benthic immature loggerheads (sea 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.

Tagging studies have shown loggerheads that have entered the benthic environment undertake routine migrations along the coast that are limited by seasonal water temperatures. Loggerhead sea turtles occur year round in offshore waters off of North Carolina where water temperature is influenced by the Gulf Stream. As coastal water temperatures warm in the spring, loggerheads begin to immigrate to North Carolina inshore waters (e.g., Pamlico and Core Sounds) and also move up the coast (Epperly et al. 1995a, Epperly et al. 1995b, Epperly et al. 1995c), occurring in Virginia foraging areas as early as April and on the most northern foraging grounds in the Gulf of Maine in June. The trend is reversed in the fall as water temperatures cool. The large majority leave the Gulf of Maine by mid-September but some may remain in Mid-Atlantic and Northeast areas until late fall. By December loggerheads have emigrated from inshore North Carolina waters and coastal waters to the north to waters offshore of North Carolina, particularly off of Cape Hatteras, and waters further south where the influence of the Gulf Stream provides temperatures favorable to sea turtles (≥11°C) (Epperly et al. 1995a-c). Loggerhead sea turtles are year-round residents of central and south Florida.

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 dwelling 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, Heppell et al. 2003) 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 and NMFS SEFSC 2001). Between 1989 and 1998, the total number of nests laid along the U.S. Atlantic and Gulf coasts ranged from 53,014 to 92,182, annually with a mean of 73,751 (TEWG 2000). On average, 90.7% of these nests were of the south Florida subpopulation and 8.5% were from the northern subpopulation (TEWG 2000). The TEWG (2000) assessment of the status of these two better-studied populations concluded that the south Florida subpopulation was increasing at that time, while no trend was evident (may be stable but possibly declining) for the northern subpopulation. However, a more recent analysis, including nesting data through 2003, indicates there is no discernable trend in the south Florida nesting subpopulation (Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute, Statewide and Index Nesting Beach Survey Programs).

Another consideration that may add to the importance and vulnerability of the northern subpopulation is the sex ratios of this subpopulation. NMFS scientists have estimated that the northern subpopulation produces 65% males (NMFS SEFSC 2001). However, new research conducted over a limited time frame has found different sex ratios (Wyneken et al. 2004) so further information is needed to clarify the issue. Since nesting female loggerhead sea turtles exhibit nest fidelity, the continued existence of the northern subpopulation is related to the number of female hatchlings that are produced. Producing fewer females will limit the number of subsequent offspring produced by the subpopulation.

The remaining three subpopulations (the Dry Tortugas, Florida Panhandle, and Yucatán) are much smaller but no less relevant to the continued existence of the species. Nesting surveys for the Dry Tortugas subpopulation are conducted as part of Florida's statewide survey program. Survey effort has been relatively stable during the 9-year period from 1995-2003 (although 2002 was missed). Nest counts ranged from 168-270 but with no detectable trend during this period (Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute, Statewide Nesting Beach Survey Data). Nest counts for the Florida Panhandle subpopulation are focused on index beaches rather than all beaches where nesting occurs. Currently, there is not enough information to detect a trend for the subpopulation (Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute, Index Nesting Beach Survey Database). Similarly, nesting survey effort has been inconsistent among the Yucatán nesting beaches and no trend can be determined for this subpopulation. However, there is some optimistic news. Zurita et al. (2003) found a statistically significant increase in the number of nests on seven of the beaches on Quintana Roo, Mexico from 1987-2001 where survey effort was consistent during the period.

The importance of maintaining these subpopulations in the wild is shown by the many examples of extirpated nesting assemblages in the world. Natal homing to the nesting beach provides the genetic barrier between these subpopulations, preventing recolonization by turtles from other nesting beaches. Recent fine-scale analysis of mtDNA work from Florida rookeries indicate that population separations begin to appear between nesting beaches separated by more than 100 km of coastline that does not host nesting (Francisco et al. 2000); and tagging studies are consistent with these findings (Richardson 1982, Ehrhart 1979, LeBuff 1990, CMTTP[5]). Nest site relocations greater than 100 km occur, but generally are rare (Ehrhart 1979; LeBuff 1974, 1990; CMTTP; Bjorndal et al. 1983).

Threats

The diversity of a sea turtle's life history leaves them susceptible to many natural and human impacts, including impacts while they are on land, in the benthic environment, and in the pelagic environment. Hurricanes are particularly destructive to sea turtle nests. Sand accretion and rainfall that result from these storms as well as wave action can appreciably reduce hatchling success. For example, in 1992, all of the eggs over a 90-mile length of coastal Florida were destroyed by storm surges on beaches that were closest to the eye of Hurricane Andrew (Milton et al. 1994). Also, many nests were destroyed during the 2004 hurricane season. Other sources of natural mortality include cold stunning and biotoxin exposure.

Anthropogenic factors that impact hatchlings and adult female turtles on land, or the success of nesting and hatching include: beach erosion, beach armoring and nourishment, artificial lighting, beach cleaning, increased human presence, recreational beach equipment, beach driving, coastal construction and fishing piers, exotic dune and beach vegetation, and poaching. An increase in human presence at some nesting beaches or close to nesting beaches has led to secondary threats such as the introduction of exotic fire ants, feral hogs, dogs and an increased presence of native species (e.g., raccoons, armadillos, and opossums) which raid and feed on turtle eggs. Although sea turtle nesting beaches are protected along large expanses of the northwest Atlantic coast (in areas like Merritt Island, Archie Carr, and Hobe Sound National Wildlife Refuges), other areas along these coasts have limited or no protection. Sea turtle nesting and hatching success on unprotected high density east Florida nesting beaches from Indian River to Broward County are affected by all of the above threats.

Loggerhead sea turtles are affected by a completely different set of anthropogenic threats in the marine environment. These include oil and gas exploration, coastal development,

[5] Unpublished Data. The Cooperative Marine Turtle Program was established by NMFS in 1980 to centralize the tagging programs among sea turtle researchers, distribute tags, manage tagging data, and facilitate exchange of tag information. Since 1999 the CMTTP has been managed by the Archie Carr Center for Sea Turtle Research at the University of Florida, Gainesville.

and transportation, marine pollution, underwater explosions, hopper dredging, offshore artificial lighting, power plant entrainment and/or impingement, entanglement in debris, ingestion of marine debris, marina and dock construction and operation, boat collisions, poaching, and fishery interactions. Loggerheads in the pelagic environment are exposed to a series of longline fisheries, which include the Atlantic highly migratory species (HMS) pelagic longline fisheries, an Azorean longline fleet, a Spanish longline fleet, and various longline fleets in the Mediterranean Sea (Aguilar et al. 1995, Bolten et al. 1994, Crouse 1999b). Loggerheads in the benthic environment in waters off the coastal United States are exposed to a suite of fisheries in federal and state waters including trawl, purse seine, hook and line, gillnet, pound net, longline, and trap fisheries (see further discussion in Section 4, Environmental Baseline).

Loggerheads may also be facing a new threat that could be either natural or anthropogenic. A little understood disease may pose a new threat to loggerheads sea turtles. From October 5, 2000, to March 24, 2001, 49 debilitated loggerheads associated with the disease were found in southern Florida from Manatee County on the west coast through Brevard County on the east coast (Foley 2002). From the onset of the epizootic through its conclusion, effected sea turtles were found throughout south Florida. Most (N=34) were found in the Florida Keys (Monroe County). The number of dead or debilitated loggerheads found during the epizootic (N=189) was almost six times greater than the average number found in south Florida from October to March during the previous ten years. After determining that no other unusual mortality factors appeared to have been operating during the epizootic, 156 of the strandings were likely to be attributed to disease outbreak. These numbers may represent only 10% to 20% of the turtles that were affected by this disease because many dead or dying turtles likely never wash ashore. Overall mortality associated with the epizootic was estimated between 156 and 2,229 loggerheads (Foley 2002). Scientists were unable to attribute the illness and epidemic to any one specific pathogen or toxin. If the agent responsible for debilitating these turtles re-emerges in Florida, and if the agent is infectious, nesting females could spread the disease throughout the range of the adult loggerhead population.

Actions have been taken to reduce anthropogenic impacts to loggerhead sea turtles from various sources, particularly since the early 1990s. These include lighting ordinances, predation control, and nest relocations to help increase hatchling survival, as well as measures to reduce the mortality of pelagic immatures, benthic immatures, and sexually mature age classes in various fisheries and other marine activities. Recent actions constitute significant steps towards reducing the negative impacts in the environmental baseline and improving the status of all loggerhead subpopulations. For example, the new TED regulation (68 FR 8456, February 21, 2003) represent a significant improvement in baseline impacts to loggerhead sea turtles.

3.2.4.3 Summary of Status for Loggerhead Sea Turtles

In the Pacific Ocean, loggerhead turtles are represented by a northwestern Pacific nesting aggregation (located in Japan) and a smaller southwestern nesting aggregation that occurs in Australia (Great Barrier Reef and Queensland) and New Caledonia. The abundance of loggerhead turtles on nesting colonies throughout the Pacific basin has declined dramatically over the past 10 to 20 years. Data from 1995 estimated the Japanese nesting aggregation at 1,000 female loggerhead turtles (Bolten et al. 1996), but it has probably declined since 1995 and continues to decline (Tillman 2000). The nesting aggregation in Queensland, Australia, was as low as 300 females in 1997.

In the Atlantic Ocean, absolute population size is not known, but based on extrapolation of nesting information, loggerheads are likely much more numerous than in the Pacific Ocean. NMFS recognizes five subpopulations of loggerhead sea turtles in the western north Atlantic based on genetic studies. Cohorts from all of these are known to occur within the action area of this consultation. There are no detectable nesting trends for the two largest western Atlantic subpopulations: the South Florida subpopulation and the northern subpopulation. Because of its size, the South Florida subpopulation may be critical to the survival of the species in the Atlantic Ocean. In the past, this nesting aggregation was considered second in size only to the nesting aggregation on islands in the Arabian Sea off Oman (Ross 1979, Ehrhart 1989, NMFS and USFWS 1991b). However, the status of the Oman colony has not been evaluated recently and 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 for sea turtles (Meylan et al. 1995). Given the lack of updated information on this population, the status of loggerheads in the Indian Ocean basin overall is essentially unknown.

All loggerhead subpopulations are faced with a multitude of natural and anthropogenic effects that negatively influence the status of the species. Many anthropogenic effects occur as a result of activities outside of U.S. jurisdiction (i.e., fisheries in international waters). The impact of international fisheries is a significant factor inhibiting sea turtle recovery. Additional information on the impacts of international fisheries is found in NMFS SEFSC (2001) and Lewison et al. (2004).

4.0 Environmental Baseline

This section identifies and discusses the effects of past and ongoing human and natural factors within the action area, leading to the current status of the species and their habitats. The anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process must also be evaluated (50 CFR 402.02).

4.1 Status of the Species within the Action Area

The four species of sea turtles occur within the action area. The DTNP is important nesting habitat for both loggerhead and green sea turtles, with 90% of the nesting within the park by these two species occurring on East and Loggerhead Keys. Hatchlings of these species are also known to occur within park waters as they migrate toward offshore areas where they spend their early years. Hawksbill and leatherbacks are also known to utilize the park’s waters, and in 2004 a leatherback turtle nested in the park for the first time. The species themselves are all highly migratory. 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. The migratory nature of these four species means their range-wide status, discussed in Section 3 above, accurately reflects the species' status within the action area.

4.2 Factors Affecting Sea Turtles Within the Action Area

The environmental baseline for this opinion includes activities that affect the survival and recovery of threatened and endangered species within the action area. The federal, state, and private activities most apposite to this environmental baseline are vessel operations. This analysis also addresses ways the potential indirect effects of marine pollution, and acoustic interference may impact sea turtles.

4.2.1 Federal Actions

Vessel and Military Operations
The U.S. Coast Guard, NMFS, and Florida Fish and Wildlife Conservation Commission (in conjunction with Florida Keys National Marine Sanctuary) all operate vessels within the action area to conduct law enforcement operations. The U.S. Coast Guard also conducts operations within the park to maintain navigational aids. The Environmental Protection Agency has also operated vessels within the park during research operations. The Immigration and Customs Enforcement department also conducts law enforcement operations from time to time within the park (B. Culhane pers. comm. 2005). No section 7 consultations have been conducted on any of these activities.

4.2.2 State or Private Actions

Vessel Traffic
State and private marine traffic, both commercial and recreational, also occurs within the park. Vessels ferry visitors to and from the park, conducting guided fishing charters, and engaging in scuba/snorkeling trips. The park is also open, with little restriction, to all recreational boaters willing and able to make the voyage to the park. These activities may adversely affect sea turtles via propeller and boat strikes.   The Sea Turtle Stranding and Salvage Network (STSSN) reports many records of vessel interaction (propeller injury) with sea turtles off Gulf of Mexico coastal states such as Florida, where vessel traffic levels are high. Data on sea turtles strandings within the action area do not suggest that any of those events were a result of boat or propeller strikes.

4.2.3 Conservation and Recovery Actions

There are no conservation and recovery actions separate from the proposed action. Currently, sea turtle nesting beaches are closed to the public, and limited sea turtle nesting monitoring occurs. These programs are addressed under the proposed action. As a result, there are no other conservation or recovery actions appropriate for consideration in this section.

5.0 Effects of the Action

In this section of the opinion, we assess the direct and indirect effects of the proposed action on listed species. This section forms the foundation for our jeopardy analysis in section 7.0. A jeopardy determination is reached if we would reasonably expect a proposed action to cause reductions in numbers, reproduction, or distribution of a species that appreciably reduces its likelihood of surviving and recovering in the wild. The status of each listed sea turtle species likely to be adversely affected by the proposed action is reviewed in Section 3.0 of this opinion. Sea turtle species are listed because of their global status; a jeopardy determination must therefore find the proposed action will appreciably reduce the likelihood of survival and recovery for a species globally.

The qualitative and quantitative analyses in this section are based upon the best scientific and commercial data available on sea turtle biology and the effects of the proposed action. Frequently, the best available information may include a range of values for a particular aspect under consideration, or different analytical approaches may be applied to the same data set. In cases where uncertainty exists regarding a parameter that bears on evaluating impacts of an action on listed species, the uncertainty should be resolved in favor of the species. The U.S. Congress provided guidance to this end [House of Representatives Conference Report No. 697, 96th Congress, Second Session, 12 (1979)] and NMFS generally selects the value yielding the most conservative outcome, to provide the "benefit of the doubt" to threatened and endangered species (i.e., would lead to conclusions of higher, rather than lower, risk to threatened or endangered species).

Our analysis begins by evaluating any direct effects the proposed action may have on threatened or endangered species. Direct effects are the immediate effects of the proposed actions. We started by what activities permitted in the park (beach use, swimming, SCUBA diving, boating and vessel traffic, and recreational fishing) may adversely affect the four species of turtle. We believe only the continued authorization of recreational fishing within the park may directly affect the four sea turtle species. We believe beach use is extremely unlikely to adversely affect turtles. When sea turtle nesting occurs, those beaches will be closed to the public, and sea turtles do not otherwise utilize beaches. This set of circumstances so greatly reduces the possibility of adverse affects occurring from beach use that we believe any adverse affects will be discountable.

Swimming and diving are also extremely unlikely to adversely affect sea turtles. Anecdotal information indicates some sea turtles change their route to avoid coming in close proximity to swimmers/divers, whereas others appear unaware of their presence. We believe any behavioral effects resulting from the presence of swimmer/divers will be insignificant.

We also believe vessel traffic is extremely unlikely to adversely affect sea turtles. Vessels operating within the park are required to take certain measures to mitigate potential impacts on turtles. Careful navigation and posted lookouts are required. Instituting course changes or stopping to avoid turtles is also required (NPS 2005). There are no records of boaters striking a sea turtle in the park. Nor is there any evidence to suggest that such an event has ever occurred. We believe these vessel operating requirements greatly reduces the risk to sea turtles. This position is supported by the lack of any evidence suggesting boat strikes have occurred within the park. With these operating requirements in place, we believe any adverse affects from the boating will be discountable.

We do believe the continued authorization of recreational fishing within the park may adversely affect sea turtles. This action may lead to interactions between fishers and sea turtles that may result in the capture, injury, or death of an individual turtle. The recreational fishing gear authorized under the proposed action would be dependent upon the type of fish targeted. Only vertical hook-and-line gear would be authorized to take finfish, while baitfish could be harvested with vertical hook-and-line, as well as dip nets and cast nets. Dip nets and cast nets would also be authorized to harvest shrimp (NPS 2005). Our analysis focuses on the potential impacts of sea turtle physically interaction with these recreational fishing gears.

We do not believe dip nets and cast nets will have any adverse effect on sea turtles based on the low likelihood of gear interactions between sea turtles and these gears. Both nets require an active fishing technique that is most effective when target prey can be seen and the nets must be tended constantly. Due to the dynamic nature of these fishing techniques, it is highly unlikely that a sea turtle or hatchling would be accidentally entangled in these gears. No record exists of sea turtle or hatchling entanglement in cast nets (Epperly et al. 2002). There is no data on sea turtle or hatchling dip net interactions, but it is highly unlikely that accidental entanglement would occur with this type of gear.

We next evaluated whether there are likely to be any indirect effects from the proposed action on the four sea turtle species. Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Indirect effects include aspects such as habitat degradation and the reduction of prey or foraging base. NMFS does not believe any indirect effects will result from the proposed action. Recreational fishing within the action area is not expected to impact any habitat features of significance to sea turtles. Since recreational fishers do not target or incidentally catch species sea turtles forage or prey on, prey competition is not considered a concern. The remainder of our analysis therefore focuses on the direct effects of vertical line hook-and-line fishing on sea turtles.

5.1 Impacts of Vertical Line Gear Interactions on Sea Turtles

The recreational vertical line gear authorized for use in the action area is known to adversely affect sea turtles via entanglement, hooking, and the trailing line remaining after a hooking event. Sea turtles released alive may later succumb to injuries sustained at the time of capture or from exacerbated trauma from fishing hooks or lines that were ingested, entangling, or otherwise still attached when they were released. Of the sea turtles hooked or entangled that do not die from their wounds, some may suffer from all or a combination of impairments including: impaired swimming or foraging abilities, altered migratory behavior, or altered breeding or reproductive patterns. The following discussion summarizes in greater detail the available information on how individual sea turtles may be affected by interactions with hook-and-line gear.

Entanglement

Sea turtles are particularly prone to entanglement as a result of their body configuration and behavior. Records of stranded or entangled sea turtles reveal that hook-and-line gear can wrap around the neck, flipper, or body of a sea turtle and severely restrict swimming or feeding. In severe cases, entanglement can force the turtle to remain submerged, causing it to drown. If the sea turtle is entangled when young, the fishing line becomes tighter and more constricting as the sea turtle grows, cutting off blood flow and causing deep gashes, some severe enough to remove an appendage (Balazs 1985).

Hooking

In addition to being entangled in hook-and-line gear, sea turtles are also injured and killed by being hooked. Hooking can occur as a result of a variety of scenarios, some of which depend on foraging strategies and diving and swimming behavior of the various species of sea turtles. Sea turtles are either hooked externally (generally in the flippers, head, shoulders, armpits, or beak) or internally (inside the mouth or when the animal has swallowed the bait and the hook is ingested into the gastro-intestinal tract), where a majority of hooking occurs (E. Jacobson in Balazs et al. 1995). Loggerheads caught on J-hooks most often swallow the hooks (67% of interactions in Watson et al. [2003]). The use of circle hooks, however, has been shown to significantly reduce the rate of hook ingestion by loggerheads, reducing the post-hooking mortality associated with the interactions. This is because the circle hook's design promotes hooking of the lower jaw and not swallowing (Watson et al. 2003).

Turtles that swallow hooks are the greatest concern. The esophagus is lined with strong conical papillae directed caudally towards the stomach (White 1994). The presence of these papillae in combination with an S-shaped bend in the esophagus make it difficult to see hooks when looking through a turtle's mouth, especially if the hooks have been deeply ingested. Because of a turtle's digestive system structure, deeply ingested hooks are also very difficult to remove without seriously injuring the turtle. A turtle's esophagus is attached firmly to underlying tissue; therefore, if a turtle swallows a hook and tries to free itself or is hauled on board a vessel, the hook can pierce the turtle's esophagus or stomach and can pull organs from their connective tissue. These injuries can cause the turtle to bleed internally or can result in infections, both of which can kill the turtle.

If a hook does not lodge into, or pierce, a turtle's digestive organs, it can pass through to the turtle's colon or it can pass through the turtle entirely (E. Jacobson in Balazs et al. 1995; Aguilar et al. 1995) with little damage (Work 2000). If a hook passes through a turtle's digestive tract without getting lodged, the hook probably has not harmed the turtle. Tissue necrosis that may have developed around the hook may also get passed along through the turtle as a foreign body (E. Jacobson in Balazs et al. 1995).

Trailing Line

Trailing line (i.e., line left on a turtle after it has been captured and released), particularly line trailing from an ingested hook, poses a serious risk to sea turtles. Line trailing from an ingested hook is likely to be swallowed, which may occlude the gastrointestinal tract, or it may prevent or hamper foraging, eventually leading to death. Sea turtles that swallow monofilament still attached to an embedded hook may suffer from the "accordion effect" described by Mediterranean sea turtle researchers. This condition is often fatal and occurs when the intestine, perhaps due to peristaltic action attempting to pass the unmoving monofilament line through the alimentary canal, coils and wraps upon itself (Pont, pers. comm. 2001). Trailing line may also become snagged on a floating or fixed object, further entangling a turtle and potentially lacerating its appendages. Such injuries can affect a turtle's ability to swim, feed, avoid predators, or reproduce. Sea turtles have been found trailing gear that has been snagged on the bottom, or has the potential to snag, thus anchoring them in place (Balazs 1985; Hickerson, pers. comm. 2001). Long lengths of trailing gear are likely to entangle the turtle eventually, leading to impaired movement, constriction wounds, and potentially death.

5.2. Characteristics of Sea Turtle-Recreational Fishing Interactions

Information on recreational hook-and-line/sea turtle interactions in U.S. EEZ waters is limited, especially on hooking, entanglement, or trailing line, but anecdotal information indicates recreational fishermen do occasionally take sea turtles. Observations of state recreational fisheries have shown that loggerhead, leatherback, Kemp's ridley, and green sea turtles are known to bite baited hooks, and loggerheads and Kemp's ridleys frequently ingest those hooks. Hooked sea turtles have been reported by the public fishing from boats, piers, the beach, banks, and jetties (TEWG 2000). Most known occurrences of sea turtles incidentally caught on hook-and-line are from fishing piers. Fishing piers are suspected of actually attracting sea turtles that learn to forage there for discarded bait and fish carcasses. Offshore reefs popular with recreational fishers, like those found inside the DTNP, may have a similar affect. If so, these reefs may increase the likelihood of sea turtle takes within the action area. DTNP is also home to several sea turtle nesting beaches. With a number of turtles transiting park waters to access these beaches, the likelihood of sea turtle interactions with recreational fishing gear may also increase during nesting season. Available evidence, coupled with sea turtle foraging behavior that increases the risk of take by recreational fishers, leads us to believe the continued authorization of recreational fishing under the proposed rule may adversely affect sea turtles.

5.3 Estimated Impacts of the Proposed Action on Sea Turtles

Since sea turtles may be adversely affected by the proposed action, we must assess if those adverse affects will jeopardize the continued existence of any of these four turtle species. We began our assessment by estimating the nature and extent of adverse effects that may result from the proposed action. Data is very limited on sea turtle and recreational fisher interactions, and no such data is available for these interactions within the park. Our affects assessment necessitates the use of the best scientific and commercial data available in lieu of applicable recreational interaction data from the park. The best scientific and commercial data available for our assessment is from datasets for federally-managed commercial and recreational fisheries using very similar gear types.

Given the limited data availability for recreational fishing effort inside the park, we established a metric to approximate the number of sea turtles taken per square mile within the action area. That calculation relies on portions of data and analyses presented in the NMFS biological opinion on the continued authorization of reef fish fishing under the RFFMP (hereafter, the "RFFMP opinion") (NMFS 2005). The RFFMP opinion is appropriate to aid our analysis because the gears and techniques used by fishers in that fishery are very similar to those used inside the action area.

Given the substrate, depth, and species composition within the park[6], we assume that reef fish are the primary target species of anglers fishing in the park. Our calculations also assume recreational fishing effort that is constant for all statistical zones within the federal waters of the Gulf of Mexico off Florida (Figure 5.1).

5.3.1 Method for Estimating Sea Turtle Impacts

The foundation of our analysis is the sea turtle catch rate per hook-hr in the Gulf of Mexico commercial vertical line reef fish sector, presented in the RFFMP opinion (NMFS 2005).[7] That calculation, coupled with data from the Marine Recreational Fishing Statistical Survey (MRFSS) and the SEFSC Headboat Survey (MRFSS, SEFSC Headboat Survey, unpublished data 2005) allowed us to approximate the average number of turtles captured in the Florida recreational vertical line fishery. Applying that figure to the total square miles in the ten statistical grids ("Florida fishing area") (Figure 5.1) yielded the Florida recreational catch rate per square mile. By multiplying the Florida recreational catch rate per square mile by square mileage of the action area, we arrived at our estimated annual incidental sea turtle take for the park: 0.12 turtles. Based on the best available information, we believe basing our effects analysis on these numbers is appropriate. A formulaic representation of the analysis is below.

- SDDP Number Turtles Taken ÷ SDDP Number of Vertical Line Hook-Hours = Turtle Catch Rate (Data from RFFMP opinion)
- Turtle Catch Rate × MRFSS and Headboat Survey Data on Fishing Effort = Estimate of Florida Recreational Fishing Turtle Catch
- Florida Recreational Turtle Catch ÷ Square Mileage of Statistical Grids = Turtles Caught Per Sq. Mile of Florida Fishing Area
- Turtles Caught Per Sq. Mile of Florida Fishing Area × Size of Action Area = Turtles Caught Within Action Area

Since our capture estimate yielded a number less than one, we will adjust it to the nearest whole number and set it at one sea turtle (either green, loggerhead, hawksbill, or

[6] Information on these features and species composition can be found in Ault et al. (2002).
[7] For a more comprehensive discussion of the methodology used in our take estimate, see Appendix C.

leatherback) annually. To produce the most conservative estimate, we also assume that capture will result in mortality of that individual.

Our analysis applies the data extrapolations[8] presented in the RFFMP opinion. The data for those extrapolations came from the Coastal Fisheries Logbook Program (CFLP); NMFS', Southeast Fisheries Science Center Observer Data; the SEFSC Supplementary Discard Data Program (SDDP); Mote Marine Lab Cooperative Longline Sampling Observer Data; and other information.[9] In general, this data was collected in federal waters beyond 10 fathoms. The majority of the data used in that analysis came from the SDDP data from the past three reporting years (Aug 2001 through July 2004) (NMFS 2005).

The Supplementary Discard Data Program (SDDP) was implemented in August 2001 by the SEFSC to address bycatch reporting in Southeast fisheries (Poffenberger 2004). The SEFSC developed a supplemental form that is used with the CFLP[10] to collect discard data as mandated by the Sustainable Fisheries Act. Commercial reef fishers are now required, if selected, to report the number and average size of fish being discarded by species and the reasons for those discards (regulatory or market conditions). The sampling system is designed so that the 20% of fishermen selected to report for a given year are not selected for the next four years so that over the course of a 5-year period, 100% of reef fish permit holders will have been required to report in one of the five years. Failure to comply with reporting requirements can result in sanctions precluding permit renewal.

NMFS did not validate any of the reported species identifications and cannot attest to the knowledge of fishermen regarding the identity of various sea turtle species. Thus, some of the sea turtles reported by species may be falsely identified. Leatherbacks are easy to identify and distinguish from hardshell species, but hardshell species can be difficult to distinguish from one another. Only two of the 11 sea turtles caught on vertical line gear were identified (a loggerhead and a leatherback) (Table 5.1, pg. 36). Of the identified species, therefore, we are only confident in the accuracy of the one leatherback reported and that all other identified captures were not leatherbacks. On the same basis, we also assume all unidentified sea turtles reported were hardshell sea turtles, believing any leatherbacks would have been identified because of their uniqueness from other species (NMFS 2005).

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[8] An extrapolation is an inference about some hypothetical situation based on known facts and observations. In mathematical terms, it is a calculation of the value of a function outside the range of known values.

[9] See Appendix B for information on each data source.

[10] . The Coastal Fisheries Logbook Program (CFLP) is used to gather catch and effort data on a per trip basis for commercial fishing trips.

Figure 5.1 Map of Statistical Areas Used to Calculate Florida Fishing Area

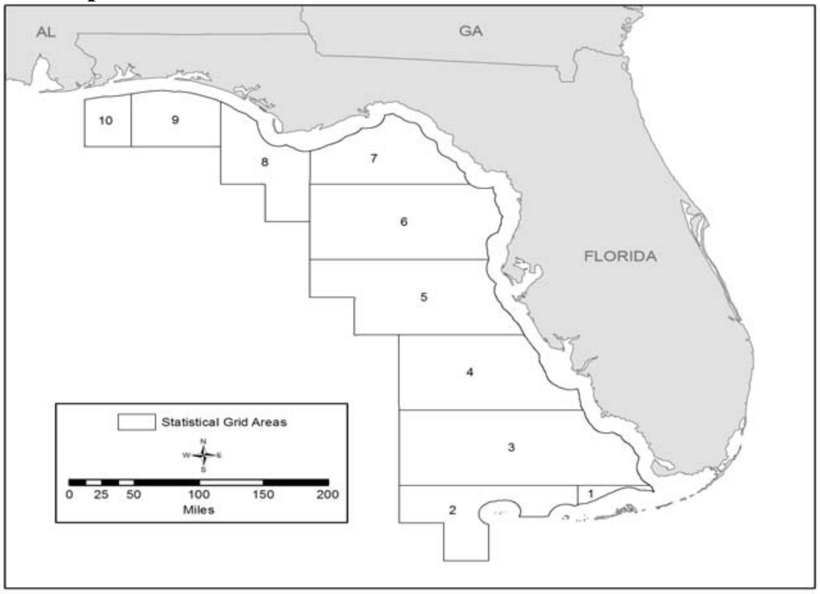

Table 5.1 SDDP Gulf of Mexico Commercial Reef Fish Sea Turtle Catch Data

Period	Month	Trip Area (Statistical Zone)	Species Caught	Number Caught	Average Weight	Discard Condition
Vertical Line Sea Turtle Catch Data						
1	August	7	Loggerhead	1	NR	Alive
1	April	6	Unidentified	2	NR	Alive
1	August	4	Unidentified	1	NR	Alive
1	October	4	Unidentified	1	NR	Alive
1	January	7	Unidentified	1	NR	NR
1	January	7	Unidentified	1	NR	NR
1	October	4	Unidentified	1	NR	Alive
1	August	4	Unidentified	1	NR	Alive

6.0 Cumulative Effects

Cumulative effects include the effects of future state, tribal, local, or private actions reasonably certain to occur within the action area considered in this opinion (i.e., within the boundaries of the DTNP). Future 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.

Since the DTNP is a federally-managed area, it is difficult to conceive of any future state or private actions that are reasonably certain to occur, which would not have a corresponding federal action(s) associated with them. One possible exception is marine debris/pollution. In Florida, marine debris ingestion by sea turtles is known to occur (Plotkin and Amos 1990 and Bolten and Bjorndal 1991), and is reasonably certain to continue into the future. The permeable boundaries of the action area make it likely marine debris may pass into the park because of ocean currents or wind.

Beyond these concerns, NMFS is not aware of any proposed or anticipated changes in other human-related actions (e.g., poaching, habitat degradation) or natural conditions (e.g., over-abundance of land or sea predators, changes in oceanic conditions, etc.) that would substantially change the impacts that each threat has on the sea turtles covered by this opinion. Therefore, NMFS expects that the level of sea turtle take described herein will continue at a similar level into the foreseeable future.

7.0 Jeopardy Analyses

The analyses conducted in the previous sections of this opinion provide a basis to determine whether the proposed action would be likely to jeopardize the continued existence, range wide, of the sea turtle species found within the DTNP. In Section 5.0, we outlined how interactions with recreational vertical line reef fish gear can affect sea turtles and the extent of those effects in terms of the estimated number of sea turtles captured and killed. Now we turn to an assessment of each species' response to this impact. A species response is evaluated in terms of the overall population effects from the estimated take, and whether those effects, when evaluated in light of the status of the species (see Section 3.0), the environmental baseline (see Section 4.0), and the cumulative effects (see Section 6.0), will jeopardize the continued existence of the ESA listed sea turtles that may interact with recreational fishing gear deployed inside the DTNP.

"To jeopardize the continued existence of," means to engage in an action that reasonably would be expected, directly or indirectly to reduce appreciably the likelihood of both the survival and the recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02). Thus, in conducting this analysis for each species, we first look at whether there will be a reduction in the reproduction, numbers, or distribution. Then, if there is a reduction in one or more of these elements, we explore whether it will cause an appreciable reduction in the likelihood of both the survival and the recovery of the species globally.

7.1 Green Sea Turtles

The proposed action may capture and kill up to one green sea turtle every year. Based on our knowledge of green turtles in the action area, we expect this take would involve either a benthic immature or adult individual of either sex.

The loss of one green sea turtle in any given year would reduce the number of green sea turtles for that time period. This take could also result in reduced future reproduction if this individual is female and would have survived other threats and reproduced in the future. Reductions in the distribution of green sea turtles range wide would not occur, as this randomly occurring take would have no significant effect on the overall position, arrangement, or frequency of green sea turtle occurrences.

Whether the reduction in numbers and reproduction of green sea turtles attributed to the proposed action would appreciably reduce the green sea turtle's likelihood of survival and recovery depends on the probable effect the changes in numbers and reproduction would have on the population's growth rate, and whether the growth rate would allow the species to recover from this loss of an individual. Although caution is warranted about optimistically interpreting the future of green sea turtle populations, the nesting trend data, presented in Section 3.0 (i.e., Status of the Species), from major nesting beaches in Florida, Yucatán, and Tortuguero indicate green sea turtle populations are increasing. The proportional change in overall survival of benthic immature and adult green sea turtles from the loss of one individual on an annual basis would therefore likely be undetectable. The death of one individual and its future reproductive value is likely to be exceeded by the number of younger green sea turtles recruiting into the adult or subadult population (i.e., increased survivability of benthic adults from the new TED rule) and their future potential reproductive value. As a result, we believe the proposed action will not appreciably reduce the green turtles' likelihood of surviving and recovering in the wild.

7.2 Hawksbill Sea Turtles

The proposed action may capture and kill up to one hawksbill annually. Based on our knowledge of hawksbills in the action area, we expect this take would involve either a benthic immature or adult individual of either sex.

The loss of one hawksbill in any given year would result in a reduction in the number of hawksbills for that time period. This lethal take could also result in a potential reduction in future reproduction assuming the individual is female and would have survived other threats and reproduced in the future. Reductions in the distribution of hawksbills range wide would not occur as this randomly occurring take would have no significant effect on the overall position, arrangement, or frequency of hawksbills occurrences.

Whether the reductions in numbers and reproduction attributed to proposed action would appreciably reduce the hawksbill's likelihood of survival and recovery depends on the probable effect the changes in numbers and reproduction would have on the population's growth rate and whether the growth rate would allow the species to recover from this relatively small number of deaths. As noted in Section 3 of this opinion, hawksbill populations appear to be increasing or stable at the two principal nesting beaches in the U.S. Caribbean where long-term monitoring has been carried out (Meylan 1999a). Although today's nesting population is only a fraction of what it was, nesting activity in recent years by hawksbills has increased on well-protected beaches in Mexico, Barbados, and Puerto Rico (Caribbean Conservation Corporation 2005). The proportional change in overall survival rates of benthic immature and adult hawksbills from the loss of one individual annually would be insignificant. The death of this individual and its future reproductive value is likely to be exceeded by the number of younger hawksbills recruiting into the adult or subadult population and their future potential reproductive value. As a result, we believe the proposed action will not appreciably reduce the hawksbill's likelihood of surviving and recovering in the wild.

7.3 Leatherback Sea Turtles

The proposed action may capture and kill up to one leatherback annually. Based on our knowledge of leatherbacks in the action area, we expect this take would involve either a benthic immature or adult individual of either sex.

The lethal removal of a leatherback sea turtle in any given year period would result in a reduction in the number of leatherbacks for that time period. This lethal take could also result in a potential reduction in future reproduction, assuming the individual taken is female and would have survived other threats and reproduced in the future. Reductions in leatherback distribution would not occur because this randomly intermittent take would have no significant effect on the overall position, arrangement, or frequency of leatherbacks occurrences.

The best available stock assessment for evaluating Atlantic leatherback populations is from NMFS SEFSC (2001). That assessment is somewhat confounded by the near absence of data or high uncertainty for estimates of juvenile and adult survival and mortality, age and growth; also, by the intermittence of nesting data from the major leatherback nesting beaches on the north coast of South America. Nevertheless, a very strong signal of declining nesting was detected for the nesting aggregation of Suriname and French Guiana, the largest remaining leatherback nesting aggregation in the world. Nesting there had been declining at about 15% per year since 1987 through the 1990s. From the period 1979-1986, however, the number of nests had been increasing at about 15% annually. As explained in Section 3 of this opinion, there is a great degree of uncertainty and inconsistency regarding the leatherback sea turtle population status and trends. The uncertain trends in nesting at U.S. beaches versus South American beaches complicate our evaluation. Additionally, because of a lack of sufficient data, the population modeling scenarios performed for loggerhead sea turtles are not possible at this point for leatherback sea turtles. Therefore, we use Spotila et al. (1996) as the latest, most complete estimation of leatherback populations throughout the Atlantic basin (from all nesting beaches in the Americas, the Caribbean, and West Africa) (approximately 27,600 nesting females with an estimated range of 20,082-35,133).

The proportional change in overall survival of leatherbacks from the loss of a single individual annually would be insignificant. With an estimate of 20-35,000 nesting females, we believe that the effects of this loss will not result in a detectable change in leatherback populations. Further, we believe the number of younger turtles recruiting into the adult or subadult population and their future potential reproductive value would exceed the future reproductive value of the individual lost. As a result, we believe the proposed action will not appreciably reduce the leatherback's likelihood of surviving and recovering in the wild.

7.4 Loggerhead Sea Turtles

The proposed action may capture and kill up to one loggerhead annually. Based on our knowledge of loggerheads in the action area, we expect this take would involve either a benthic immature or adult individual of either sex.

The lethal removal of a loggerhead sea turtle in any given year period would result in a reduction in the number of loggerheads for that time period. This lethal take could also result in a potential reduction in future reproduction, assuming the individual taken is female and would have survived other threats and reproduced in the future. Reductions in loggerhead distribution would not occur because this randomly intermittent take would have no significant effect on the overall position, arrangement, or frequency of loggerhead occurrences.

As discussed in the Section 3 .0, five northwestern Atlantic loggerhead subpopulations have been identified (NMFS SEFSC 2001), with the south Florida nesting and the northern nesting subpopulations being the most abundant. Based on Bowen et al. (2004), approximately 90.2% of loggerheads in the Gulf of Mexico are from the southwest Florida subpopulation, 5.8% are from the northern nesting subpopulation, 2.5% are from the Yucatán, Mexico subpopulation, 0.8% are from the northwest Florida (Panhandle subpopulation) and 0.3% are from the Dry Tortugas.

The TEWG (2000) was able to assess the status of the south Florida nesting and the northern nesting subpopulations, and concluded that the south Florida subpopulation is increasing, while no trend is evident for the northern subpopulation, which is thought to be stable. However, more recent analysis, including nesting data through 2003, indicate that there is no discernible trend over the past 15 years in the south Florida nesting subpopulation (Witherington, pers. comm. 2004). For the three smaller nesting aggregations (Yucatán, Florida Panhandle, and Dry Tortugas), there are not sufficient or consistent data to determine trends, as explained in Section 3.0 of this opinion.

Although nesting trends can provide an important indicator of subpopulation status, they cannot be viewed in isolation. Loggerheads mature at a late age (20-30 years); therefore, current nesting trends reflect natural and anthropogenic effects on female loggerheads that occurred over the last two decades. Using nesting trend data to make conclusions about the status of the entire subpopulation, therefore, requires making certain assumptions. These assumptions are that the current impacts to mature females are experienced to the same degree among all age classes regardless of sex, and/or that the impacts leading to the current abundance of nesting females are affecting the current immature females to the same extent.

Given the late maturity of loggerheads, the benefits of many of these actions in terms of positive effect on nesting trends will not be apparent for many years to come. Current modeling data suggests that all western loggerhead subpopulations should experience positive or at least stabilizing subpopulation growth as a result of new TED regulations (NMFS SEFSC 2001). Management action to increase pelagic immature survival in the

U.S. Atlantic longline fisheries is expected to further drive the subpopulations toward positive growth. Based on SEFSC (2001) models, the proportional change in overall survival of loggerheads from the loss of an individual annually and its future reproductive value would be insignificant. The loss is likely to be exceeded by the number of younger turtles recruiting into the adult or subadult population and their future potential reproductive value.

Due to the location of action area, we acted with precaution and assumed any loggerheads captured there belonged to the Dry Tortugas subpopulation. This subpopulation's small size means the removal of individuals from it may have a disproportionately greater impact. However, we believe the take anticipated from this action is so low (up to one loggerhead annually), that even if a loggerhead were taken, it would have a minimal impact on the Dry Tortugas subpopulation. As a result, we believe the proposed action will not appreciably reduce the loggerhead's likelihood of surviving and recovering in the wild.

8.0 Conclusion

We have analyzed the best available data, the current status of the species, environmental baseline, effects of the proposed action, and cumulative effects to determine whether the proposed action is likely to jeopardize the continued existence of any sea turtle species. Our sea turtle analyses focused on the impacts and population response of sea turtles in the Atlantic Basin. However, the impact of the effects of the proposed action on the Atlantic populations must be directly linked to the global populations of the species, and the final jeopardy analysis is for the global populations as listed in the ESA. Because the proposed action will not reduce the likelihood of survival and recovery of any Atlantic populations of sea turtles, it is our opinion that the proposed rule to implement the Final General Management Plan Amendment/Environmental Impact Statement is not likely to jeopardize the continued existence of green, hawksbill, leatherback, or loggerhead sea turtles.

9.0 Incidental Take Statement (ITS)

Section 9 and protective regulations issued pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as an act meant to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or 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 RPAs and terms and conditions of the ITS.

Section 7(b)(4)(c) of the ESA specifies that in order to provide an incidental take statement for an endangered or threatened species of marine mammal, the taking must be authorized under section 101(a)(5) of the MMPA. Since no incidental take of listed marine mammals is expected or has been authorized under section 101(a)(5) of the MMPA, no statement on incidental take of endangered whales is provided and no take is authorized. Nevertheless, NPS must immediately notify (within 24 hours, if communication is possible) NMFS' Office of Protected Resources should a take of a listed marine mammal occur.

9.1 Anticipated Amount or Extent of Incidental Take

NMFS anticipates the lethal take of one sea turtle annually. This take will be one of either a green, hawksbill, leatherback, or loggerhead sea turtle.

9.2 Effect of the Take

NMFS has determined the level of anticipated take specified in Section 5.2 is not likely to jeopardize the continued existence of green, hawksbill, leatherback, or loggerhead sea turtles.

9.3 Reasonable and Prudent Measures (RPMs)

Section 7(b)(4) of the ESA requires NMFS to issue a statement specifying the impact of any incidental take on listed species, which results from an agency action otherwise found to comply with section 7(a)(2) of the ESA. It also states that the RPMs necessary to minimize the impacts of take and the terms and conditions to implement those measures must be provided and must be followed to minimize those impacts. Only incidental taking by the federal agency or applicant that complies with the specified terms and conditions is authorized.

The RPMs and terms and conditions are specified as required by 50 CFR 402.14 (i)(1)(ii) and (iv) to document the incidental take by the proposed action and to minimize the impact of that take on sea turtles. These measures and terms and conditions are non-discretionary, and must be implemented by NPS in order for the protection of section 7(o)(2) to apply. NPS has a continuing duty to regulate the activity covered by this incidental take statement. If NPS fails to adhere to the terms and conditions of the incidental take statement through enforceable terms, and/or fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of the incidental take, NPS must report the progress of the action and its impact on the species to NMFS as specified in the incidental take statement [50 CFR 402.14(i)(3)].

NMFS has determined that the following RPMs are necessary and appropriate to minimize impacts of the incidental take of sea turtles.

1. NPS must ensure that the DTNP Sea Turtle Monitoring Program is maintained and capable of both detecting any adverse effects resulting from recreational fishing inside the park and assessing the actual level of incidental take in comparison with the anticipated incidental take documented in this opinion.

2. NPS must implement outreach programs seeking to increase awareness among park anglers and visitors of protected species within the park and ways to reduce encounters with those species.

3. NPS must provide NMFS' Southeast Regional Office Protected Resources Division (F/SER3) with sufficient information to monitor this ITS.

9.4 Terms and Conditions

To be exempt from liability for take prohibited by section 9 of the ESA, NPS must comply with the following terms and conditions, which implement the RPMs described above. These terms and conditions are non-discretionary.

To implement RPM No. 1:

1. NPS must increase its sea turtle stranding surveillance to at least twice weekly. This surveillance should be split equally between shore and in water surveys when feasible.

2. NPS must establish a reporting system that requires anglers or charter boat guides to report interactions between their fishing party and sea turtles.

To implement RPM No. 2:

3. NPS must develop and implement an outreach program to educate recreational fishers on sea turtle handling protocols emphasizing release procedures that minimize stress and maximize survival potential.

4. NPS must supply recreational fishers with verbal and/or written information on fishing gear that can reduce sea turtle bycatch (i.e., circle hooks).

To implement RPM No. 3:

5. NPS must notify F/SER3 immediately if they believe a sea turtle stranding is related in any way to fishing activities within the park.

6. NPS shall monitor sea turtle strandings to ensure incidental take levels do not exceed the authorized level. If at any time, the take level stated in this opinion is exceeded, NPS must notify F/SER3 immediately. Stranding reports shall be submitted to F/SER3 annually. Submitted reports must include any information on the causes of strandings, with special attention paid to any fishing gear associated with the animal.

10.0 Conservation Recommendations

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

1. NPS should ensure the four primary goals[11] of the DTNP Sea Turtle Monitoring Program are being conducted with equal emphasis.

2. NPS should ensure staff and volunteers follow the STSSN protocol when documenting sea turtle strandings, ensuring photographs are taken and any anthropogenic debris associated with the event is collected and submitted appropriately.

3. NPS should establish as a part of their proposed permitting system for private recreational boaters within the park, a means of collecting data on recreational fishing activity within the park.

4. NPS should remain in close contact with Florida Fish and Wildlife Research Institute to remain abreast of upcoming sea turtle stranding training opportunities or changes in STSSN protocol.

5. NPS should supply recreational fishers with outreach material about the sea turtles found within the park that highlights foraging habits or other behaviors which may increase their potential for accidental hooking.

6. NPS should conduct or fund sea turtle research on the demographic, behavioral, spatial, and temporal patterns of sea turtles inside the DTNP to improve understanding of the co-occurrence between recreational fishers and sea turtles.

11.0 Reinitiation of Consultation

This concludes formal consultation on the proposed actions for the DTNP. As provided in 50 CFR 402.16, reinitiation of formal consultation is required if 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 the taking specified in the incidental take statement is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat (when designated) in a manner or to an extent not previously considered; (3) the identified action is subsequently modified in a manner that causes an

[11] Four primary goals of the DTSTMP are: (1) to establish and maintain a baseline inventory and monitoring program for sea turtle nesting and hatching activities with DTNP, (2) to identify and monitor the temporal and spatial distributions of sea turtle activity within the park and its waters, (3) to participate in and support the Sea Turtle Stranding and Salvage Network (STSSN) year-round and (4) to identify the natural and anthropogenic threats to sea turtles, their nests and hatchlings, and devise means to mitigate those threats.

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. An increase in sea turtle strandings in the DTNP could indicate a change in recreational fisheries' effects on sea turtles and may represent information that would require NMFS and NPS to reinitiate section 7 consultation.

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Appendix A: Recreational Fishing Regulations Applicable to the DTNP.

Source: Florida Fish and Wildlife Conservation Commission, Basic Recreational Saltwater Fishing Regulations, Issue 27, July 2005.
(http://myfwc.com/marine/Regulations/FWC_REGS_SPREAD_JULY_2005.pdf)

This is a brief summary of regulations governing the taking of saltwater species in Florida for personal use. It is not intended or designed to provide specific information on commercial harvesting of these species. The failure to include complete laws, rules, and regulations in this summary does not relieve persons from abiding by those laws, rules, or regulations. State waters extend to 3 nautical miles on the Atlantic and 9 nautical miles on the Gulf. Federal rules apply beyond state waters. For species that do not have an established bag limit, more than 100 pounds or 2 fish per person per day (whichever is greater), is considered commercial quantities. A saltwater products license and commercial vessel registration is required to harvest commercial quantities of unregulated species.

Species	Minimum Size limits	Closed Season	Daily Rec. Bag Limit	Remarks
Amberjack - Greater	28” fork		1 per person per day	
Amberjack - Lesser & Banded Rudderfish ▲	Not less than 14” or more than 22” fork		5 aggregate of lesser amberjack and banded rudderfish	
Billfish ▲	Sailfish 63” Blue Marlin 99”White Marlin 66”		1 per person per day aggregate bag limit	Measured tip of lower jaw to fork. Federal regulations apply in state waters. All landed fish must be reported to NOAA within 24 hours 800-894-5528. HMS permit required.
Black Drum ▲ ♦ T	Not less than 14” or more than 24”		5 per person per day	May possess one over 24”.
Bluefish ▲	12” fork		10 per person per day	
Bonefish ♦	18”		1 per person per day	
Clams-Hard	1” thick across hinge	May not harvest half hour after official sunset until half hour before official sunrise	One 5 gal. bucket per person or 2 per vessel, whichever is less per day (whole in shell)	Illegal to harvest from closed areas. Go to *www.floridaaquaculture.com* for allowable harvesting areas.
Cobia (Ling) ▲	33” fork		1 per person or 6 per vessel per day whichever is less	A saltwater products license and a restricted species endorsement are needed to sell Cobia or exceed the one-fish daily bag limit.
Crab-Blue		Sept 20 - Oct 4 Gulf state waters beyond 3 miles closed to traps; federal waters closed to traps	10 gallons whole per person per day	5 traps maximum. Trap requirements apply. Harvest of egg-bearing crabs prohibited.
Crab-Blue Land		July 1 - Oct 31	20 per person per day	Trapping prohibited, harvest of egg-bearing females prohibited, harvest prohibited in state parks and from the right-of-way of federal, state or county maintained roads.
Crab-Stone	2 3/4” claw	May 16 – Oct 14	1 gal. Stone Crab claws per person or 2 gal. per vessel, whichever is less	5 traps maximum. Trap requirements apply. Illegal to possess whole crab. Harvest of egg-bearing crabs prohibited.
Crawfish ▲ (Spiny Lobster)	Larger than 3” carapace measured in the water	April 1 – Aug 5 Exception: Sport Season - last consecutive Wed & Thurs of July each year	Regular season: 6 per person per day	Recreational trapping prohibited. Crawfish permit required when license required. Special bag limit for 2-day Sport season. Call DLE for current information on Sport season.
Dolphin ▲	20” fork Atlantic		10 per person per day, not to exceed 60 per vessel per day statewide	A saltwater products license, a restricted species endorsement and a federal commercial vessel permit are needed to sell Dolphin, exceed the 10-fish bag limit, or exceed 60 per vessel per day statewide.
Flounder ▲ ♦ T	12”		10 per person per day	May be harvested by spearing.
Grouper-Black & Gag ▲ ♦	24” Atlantic & Monroe County; 22” Gulf (excluding Monroe County)		2 per person per day Atlantic & Monroe County; 5 per person per day Gulf (excluding Monroe County)	Included within 5 per person per day Grouper aggregate bag limit.
Grouper-Red ▲ ♦	20”		2 per person per day- Gulf	Included within 5 per person per day Grouper aggregate bag limit

Grouper- Yellowfin & Yellowmouth ▲ ♦	20”		Included within 5 per person per day Grouper aggregate bag limit	
Grouper-Scamp ▲ ♦	20” Atlantic & Monroe County; 16” Gulf (excluding Monroe County)		Included within 5 per person per day Grouper aggregate bag limit	
Grouper-Warsaw & Speckled Hind▲			1 per vessel per day of each species	Included within 5 per person per day Grouper aggregate bag limit.
Grouper-all others ▲			Included within 5 per person per day Grouper aggregate bag limit	Includes: Coney, Graysby, Misty, Red Hind, Rock Hind, Snowy, Tiger & Yellowedge.
Hogfish ▲	12” fork		5 per person per day	
Mackerel-King ▲	24” fork		2 per person per day	Bag limit in Gulf-Atlantic fishery reduced to 1 when federal waters are closed to all harvest. Call DLE for details.
Mackerel-Spanish ▲	12” fork		15 per person per day	Transfer of Spanish Mackerel to other vessels at sea is prohibited.
Mullet-Striped (Black) & Silver			Feb 1 - Aug 31, 50 per person per day, aggregate of striped & silver mullet maximum 100 aggregate per vessel	Sept 1 - Jan 31, 50 per person or per vessel. Contact DLE for additional restrictions in Pinellas & Charlotte counties.
Oysters	3”	June, July, Aug. in Dixie, Wakulla, Levy counties. July, Aug., Sept. in all other areas	2 bags per person or vessel, whichever is less per day. 1 Bag = 60 lbs. or two 5 gal. Buckets (whole in shell)	Apalachicola Bay has summer & winter seasons/areas. Harvest from approved shellfish areas only. Go to **www.floridaaquaculture.com** for allowable harvesting areas.
Permit & Pompano ▲ T	Not less than 11” or more than 20” fork		6 per person per day aggregate of Permit and Pompano	May possess one over 20” of either Permit or Pompano. Vessel restriction: no more than 2 permit and pompano over 20” fork length at any time in any combination. Gigging, spearing, snatching prohibited.
Pompano-African ▲ T	Not less than 24” fork		2 fish per person or per vessel per day whichever is less	Hook & line gear only.
Red Drum (Redfish) ▲ ♦ T	Not less than 18” or more than 27”		1 per person per day	Gigging, spearing, snatching prohibited.
Red Porgy ▲ ♦	14” Atlantic		1 per person per day Atlantic	
Scallops-Bay		Sept 11– June 30	2 gallons whole or 1 pint meat per person per day, no more than 10 gallons whole, or 1/2 gallon meat per vessel anytime	Harvest allowed only in state waters of the Gulf of Mexico from the Pasco- Hernando county line (near Aripeka-latitude 28 degrees, 26.016 minutes North), to the west bank of the Mexico Beach Canal in Bay County (longitude85 degrees, 25.84 minutes West). Any bay scallops harvested and possessed must be landed within the allowable harvesting area.
Sea Bass-Black ▲ ♦	10”		20 per person per day Atlantic	American, Alabama & Hickory are part of aggregate limit. Hook & line gear only.
Shad			10 aggregate per person per day	
Sheepshead ▲ ♦ T	12” (see Remarks)		15 per person per day	Snatching prohibited.
Shrimp		April & May closed to Nassau, Duval, St. Johns, Putnam, Flagler & Clay counties	5 gallons heads on per person or vessel per day, whichever is less	Must be landed in a whole condition. Contact DLE for closed areas
Snapper-Black & Wenchman ▲			Included within 10 per person per day Snapper aggregate bag limit	
Snapper-Cubera ▲ ♦	Not less than 12” or more than 30” (see remarks)		Included within 10 per person per day snapper aggregate bag limit if under 30”	Allowed 2 Cubera Snapper over 30” per person or vessel per day which ever is less. 30” or larger not included within the Snapper aggregate bag limit.
Snapper- Gray (Mangrove) ▲ ♦	10”		5 per person per day	Included within 10 per person per day Snapper aggregate bag limit
Snapper-Lane ▲ ♦	8”		Included within 10 per person per day Snapper aggregate bag limit if harvested from Atlantic	Lane Snapper harvested from the Gulf of Mexico not included within the Snapper aggregate bag limit
Snapper-Mutton ▲ ♦	16”		Included within 10 per person	

			per day Snapper aggregate bag limit	
Snapper-Red ▲ ♦	20” Atlantic; 16” Gulf	Nov 1 - April 14 Gulf Only	2 per person per day Atlantic; 4 per person per day Gulf	Included within 10 per person per day Snapper aggregate bag limit
Snapper- Schoolmaster ▲ ♦	10”		Included within 10 per person per day Snapper aggregate bag limit	
Snapper Vermilion ▲ ♦	10”		10 per person per day Atlantic	Vermilion Snapper not included within the Snapper aggregate bag limit. **Note: Changes in size and bag limit have been proposed. Go to http://myfwc.com/marine/lines.htm for current information**
Snapper- all other ▲	12”		Included within 10 per person per day Snapper aggregate bag limit	Includes: Blackfin, Dog, Mahogany, Queen, Silk & Yellowtail.
Snook ▲ ♦ T (All species)	Not less than 26” or more than 34”	Dec 15 - Jan 31 statewide; June, July, Aug Atlantic; May, June, July, Aug Gulf Monroe County, Everglades Nat. Park	2 per person per day Atlantic; 1 per person per day Gulf, Monroe County, Everglades Nat. Park	Snook permit required when saltwater license required. State regulations apply in federal waters. Illegal to buy or sell snook. Snatch hooks and spearing prohibited
Sponge- Commercial	Greater than 5” in greatest dimension		10 per person per day	Includes: Sheepswool, Yellow, Grass, Glove, Finger, Wire, Reef & Velvet sponge
Spotted Seatrout ▲ ♦ T	Not less than 15” or more than 20” (statewide) except one fish over 20” per person	Nov & Dec S. Region; Feb N.E. and N.W Regions (See regional definitions below)	4 per person per day South Region; 5 per person per day N.E. and N.W. Regions	See regional definitions below
Swordfish ▲	47” lower jaw fork length		1 per person or 3 per vessel whichever is less	Lower jaw fork length is the straight-line measurement from the tip of the lower jaw to the fork of the tail. All landed fish must be reported to NOAA within 24 hours 800-894-5528. HMS permit required
Tarpon			2 fish possession limit	Requires $50 tarpon tag to posses or harvest. Snatching prohibited. Boca Grande Pass has seasonal regulations. Contact DLE for current information
Triggerfish (Gray) ▲ ♦	12”			All species of Triggerfish except Gray and Ocean have live landing & live well requirements.
Tripletail ▲ ♦ T	15”		2 per person per day	Hook & line gear only. No snatch hooks.
Wahoo ▲				A saltwater products license, a restricted species endorsement and a federal commercial vessel permit are needed to sell Wahoo or exceed the 2-fish bag limit
Weakfish ▲ ♦ T	12”		4 per person per day	

▲ Must remain in whole condition until landed ashore (heads & tails intact) ♦ Measured as total length. T Harvest prohibited by or with the use of any multiple hook in conjunction with live or dead natural bait.

ORNAMENTAL TROPICAL FISH AND PLANTS

MINIMUM SIZE LIMIT (Total length) Spanish Hogfish 2” Spotfin Hogfish 3” Porkfish 11/2”

MAXIMUM SIZE LIMIT (Total length) Angelfish (except Rock Beauty) 8” Butterflyfish, Jawfish 4” Rock Beauty 5” Gobies 2” Spanish Hogfish 8” Spotfin Hogfish 8”

BAG LIMIT Fishes / Invertebrates: 20 per person per day. No more than 5 Angelfish and no more than 6 Octocoral colonies **PLANTS:** 1 gallon per person per day Live landing and live well requirements. Harvest in Biscayne National Park & John Pennekamp State Park prohibited.

PROTECTED SPECIES

It is unlawful to harvest, possess, land, purchase, sell, or exchange the following species: Nassau Grouper, Goliath Grouper (Jewfish), Sawfish, Basking Shark, Whale Shark, Spotted Eagle Ray, Sturgeon, White Shark, Sand Tiger Shark, Bigeye Sand Tiger Shark, Manta Ray, Spiny Dogfish, Longspine Urchin, Stony, Hard and Fire Corals, Fans, Florida Queen Conch and Bahama Starfish. Harvest of live rock in state waters is prohibited

SEATROUT REGIONS

“Northeast Region” means all state waters lying north of the Flagler-Volusia County Line to the Florida-Georgia border, and adjacent federal Exclusive Economic Zone (EEZ) waters.

“Northwest Region” means all state waters north and west of a line running due west from the westernmost point of Fred Howard Park Causeway (28E9.350’N 82E48.398’W), which is approximately 1.17 nautical miles south of the Pasco-Pinellas County Line to the Florida-Alabama border, and adjacent federal EEZ waters.

“South Region” means state waters lying between the Flagler-Volusia County Line on the Atlantic Ocean and the southern boundary of the Northwest Region on the Gulf of Mexico in Pinellas County and adjacent federal EEZ waters.

Appendix B: Sources of Data for Estimating Sea Turtle Take Rates

NMFS, SEFSC Observer Data
In December 1993, in cooperation with the commercial fishing industry and the GMFMC, the SEFSC implemented a scientific observer program to characterize the reef fish fishery of the eastern U.S. Gulf of Mexico. The primary objective was to quantify and document release mortality and bycatch levels aboard reef fish vessels. Catch and effort data for targeted and bycatch species were collected and analyzed by area, season, and gear type. Opportunistic sighting of sea turtles were also documented.

Between April 1994 and May 1995, the SEFSC observed 13 trips aboard nine bottom longline vessels operating primarily off the west coast of Florida from Steinhatchee to the Dry Tortugas. A total of 317 sets (229,467 hooks) were sampled during 112 sea days of observations. Although one loggerhead and three unidentified sea turtles species were sighted at set locations or during travel between sites, no sea turtles were observed captured (Scott-Denton 1996, Scott-Denton, pers. comm. 2004).

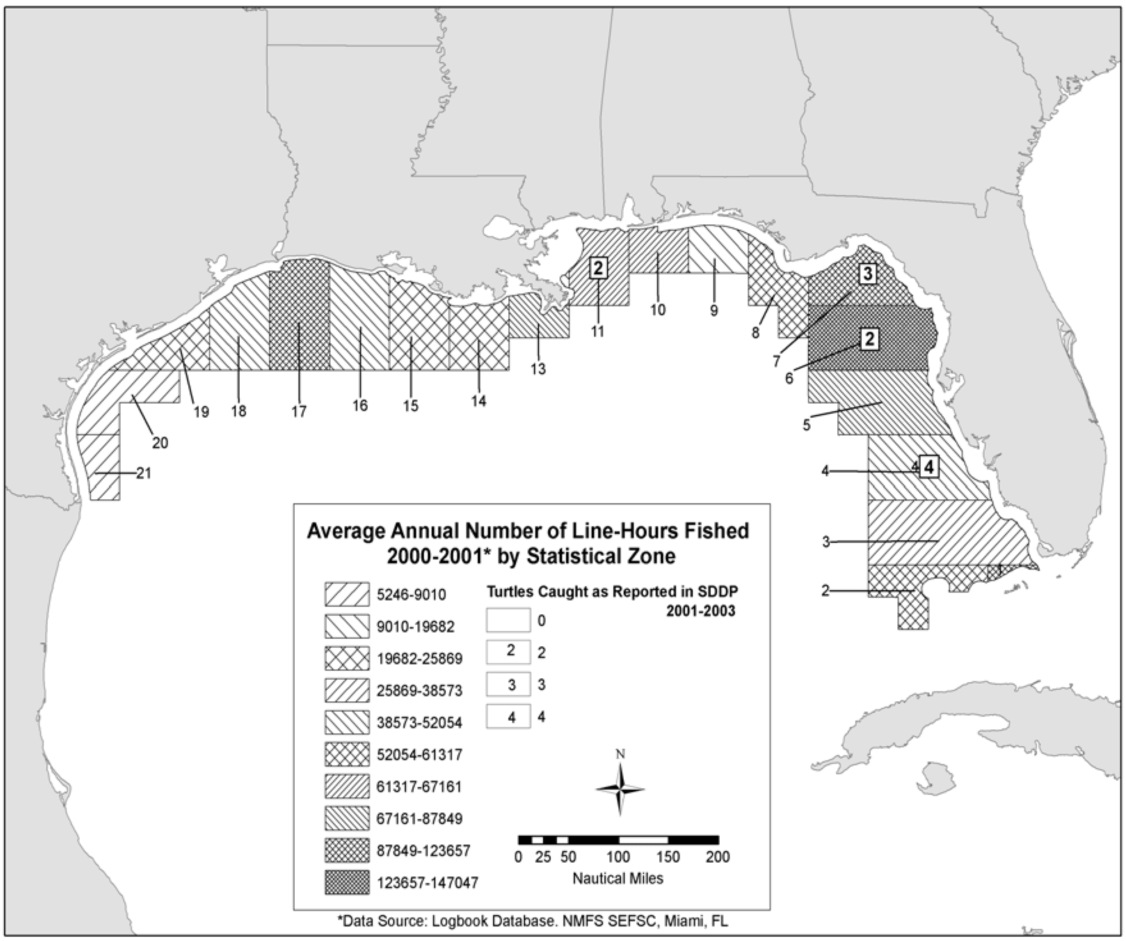
Between January and July 1995, the SEFSC observed 16 trips aboard bandit-rigged vessels resulting in 81 sea days of observation. A contractor, Russell Research and Associates, observed an additional six trips. As on the bottom longline trips, sea turtles (ten loggerheads and five unidentified) were sighted at set locations or during travel between sites but none captured (Scott-Denton 1996, Scott-Denton, pers. comm. 2004).

Logbook Data (CFLP and SDDP Data)
As discussed in Section 2.1.2 of the RFFMP opinion, all Gulf of Mexico commercial reef fish fishers are required to report their catch and effort data via the CFLP and approximately 20% of Gulf of Mexico commercial reef fish fishers are also required to submit discard data via the recent SDDP. Sample selections for the SDDP are made in July of each year, and the selected fishermen (vessels) are required to complete and to submit discard forms along with their CFLP logbook forms for each trip they make during August through July of the following year. Over the past three reporting periods (i.e., August 2001 through July 2004) participants in the SDDP, representing 11% to 13% of all Gulf of Mexico reef fish CFPL fishing effort, reported catching 20 sea turtles: one leatherback, one loggerhead, and nine unidentified sea turtles on vertical lines; and one green, three loggerheads, and five unidentified sea turtles on bottom longlines.

Reported sea turtle catch data vertical lines reveals no obvious take pattern. Nine of the eleven sea turtles caught on vertical lines were all caught during the first reporting period. Captures during that period were fairly spread out, however, occurring in the months of January, April, and August through November. Estimated average weights were reported for two of the eleven sea turtles caught on vertical lines. Given anecdotal information indicating most fishers reportedly just cut the line, as well as describe the sea turtles caught as being large, we have no confidence in the reported average weight estimates and believe they are highly inaccurate.

Figure 1 depicts commercial vertical line effort and the number of sea turtles reported in the SDDP for each zone. The greatest concentrations of commercial vertical line effort occur in zones 6 and 7, the region collectively known as Florida's Northern Big Bend, including offshore of the Econfina River west to the Apalachicola River, and also off of the western coastline of Louisiana. Sea turtles were caught in statistical zones four, six, seven, and 11. Five of the 11 sea turtles were caught in statistical zones six and seven, where fishing effort is most concentrated. Four sea turtles were caught in zone four. The remaining two sea turtles caught were from zone 11, off the Alabama- Mississippi border.

Figure 1. Gulf of Mexico Reef Fish Commercial Vertical Line Effort and Sea Turtle Bycatch By Statistical Zone



MML Cooperative Longline Sampling Observer Data
MML is currently conducting a project titled "Cooperative longline sampling of the west Florida shelf shallow-water grouper complex: characterization of life history, undersized bycatch and targeted habitat." Bycatch data and biological samples are collected for the project by a MML observer aboard commercial reef fish longline vessels fishing off southwest Florida. Of the ten trips (10-14 days each) observed to date, only one trip caught sea turtles (N. Parnell, pers. comm. 2004). On May 20, 2004, an unidentified sea

turtle was caught during a deepwater grouper 10-mile set (1200-1500 hooks) around 27.05EN latitude, 84.09EW longitude at 17:30 hours in 325 ft of water. The total set and haul time was five hours. A second sea turtle take occurred on May 21, 2004, at 27.03EN latitude, 84.07EW longitude at 17:35 hours in 315 ft of water. Total duration of this 10-mile set with a comparable number of hooks was three hours.

Additional Anecdotal Information
Commercial Gulf of Mexico reef fish fishers typically say they see sea turtles in the water when fishing with vertical line and bottom longline gear, but only rarely catch them (K. Burns, pers. comm. 2004). This characterization seems consistent with observed and reported data, which suggests takes are infrequent. There is one anecdotal report of a vessel catching 35 to 40 sea turtles during one 2004 trip, but the incident was reportedly "the talk of the dock" because it was so highly unusual and incredible (K. Burns, pers. comm. 2004). The captain of the vessel was said to be a transient fisherman, who does not regularly fish in the Gulf of Mexico. Given the stir among fishers created by this incident, it is not believed to be indicative of the normal catch. Our attempts to verify the accuracy and source of this incident were unsuccessful.

For-hire Charter Vessels and Private Recreational Fishing Vessels
Harvest and bycatch in the recreational for-hire charter vessel sector and the private recreational sector have been consistently monitored since 1979. Monitoring is accomplished primarily through MRFSS and the Texas Parks and Wildlife Department's Coastal Sport Fishing Survey. The survey uses a combination of random-digit-dialed telephone intercepts of coastal households for effort information and dock-side intercepts of individual trips for catch information to statistically estimate total trips, catch, and discards by species, for each subregion, state, mode, primary area and wave.[12] Bycatch is enumerated by a disposition code for each fish caught but not kept. Texas conducts its own survey, which provides similar data.

Prior to 2000, sampling of the charter vessel sector resulted in highly variable estimates of catch. In 2000, however, a new charter vessel sampling methodology was implemented. A 10% sample of charter vessel captains is called weekly to obtain trip level information. In addition, the standard dockside intercept data are collected from charter vessels, and charter vessel clients are sampled through the standard random digit dialing of coastal households. Precision of charter vessel effort estimates has improved by more than 50% due to these changes (Van Voorhees et al. 2000).

For-hire Headboats
Harvest from headboats has been monitored by the NMFS, SEFSC, Beaufort Laboratory since 1986, but no bycatch information is routinely collected. Prior to 1986, headboats were monitored through the MRFSS. Daily catch records (trip reports) are filled out by headboat operators; or, in some cases, by the NMFS-approved headboat samplers based on their personal communications with captains or crew. Headboat samplers sub-sample headboat trips for data on species' lengths and weights. Biological samples (scales,

[12] Waves are two-month sampling periods.

otoliths, spines, gonads, and stomachs) are taken as time permits. Occasionally, onboard headboat samplers will record lengths of discarded fish; however, these trips are rare, and the data do not become part of the headboat database.

Appendix C: Methodology for Estimating Sea Turtle Take

The take estimate used in our analysis was established by integrating portions of the RFFMP opinion. That opinion used available summary Gulf of Mexico reef fish vertical line CFLP effort data for the past three reporting periods (Table 1) to calculate the number of hook-hours fished (3,538,328) over the three-year reporting period (NMFS 2005).[13]

Table 1 Recent Gulf of Mexico Reef Fish Commercial Fishing Effort

Reporting Period	Hooks Fished	Days Fished	Hook-hours Fished	Hours Fished	Lines Fished
SDDP Participant Reported Vertical Line Effort					
Period 1	21,662	2,706	897,905	24,254	3,248
Period 2	70,655	5,071	1,496,646	41,676	7,027
Period 3	40,993	4,242	1,143,777	37,047	4,747
Periods 1-3	133,310	12,019	3,538,328	102,977	15,022
All Reported Reef fish Vertical Line Effort					
Period 1	345,321	36,497	10,648,713	314,853	45,237
Period 2	360,897	36,736	11,615,869	318,547	44,021
Period 3	284,633	30,585	8,549,019	261,230	34,489
Periods 1-3	990,851	103,818	30,813,601	894,630	123,747

By dividing the number of turtles reported taken over that same period (Table 2) by the number of hook hours fished, an estimate of the number of turtles caught per hook-hr within that sector of the fishery was attained.

Table 2. SDDP Gulf of Mexico Commercial Reef Fish Sea Turtle Catch Data (NMFS 2005)

Period	Month	Trip Area (Statistical Zone)	Species Caught	Number Caught	Average Weight	Discard Condition
Vertical Line Sea Turtle Catch Data						
1	August	7	Loggerhead	1	NR	Alive
1	April	6	Unidentified	2	NR	Alive
1	August	4	Unidentified	1	NR	Alive
1	October	4	Unidentified	1	NR	Alive
1	January	7	Unidentified	1	NR	NR
1	January	7	Unidentified	1	NR	NR
1	October	4	Unidentified	1	NR	Alive
1	August	4	Unidentified	1	NR	Alive

To utilize that take rate in our analysis we first needed an estimate of vertical line recreational fishing effort in Florida. Data from the Marine Recreational Fishing Statistical Survey (MRFSS) and the SEFSC Headboat Survey[14] provided such an estimate (35,181,068 hook-hours) (MRFFSS, SEFSC Headboat Survey, unpublished

[13] Effort data are measured using a variety of variables reported in logbooks including hooks, days, hours, hook-hours, and lines fished.
[14] See Appendix D below for methodology for calculating recreational fishing effort

data). By multiplying our figure for Florida recreational fishing effort, by the turtle catch rate established in the RFFMP opinion, we established a total take estimate for all of the Florida recreational vertical line fishery of 80 (79.5) sea turtles. That figure was then divided by the square mileage of fishing area (66,330 sq. miles) to achieve an estimate of .0012 turtles taken by vertical line recreational fishers per square. Our final incidental take estimate for turtles taken per square mile of action area was achieved by multiplying .0012 by the square mileage of the action area (100 sq. miles) to yield an estimated sea turtle take of 0.12.

Appendix D: Methodology for Calculating Florida Recreational Vertical Line Fishing Effort

Data from the Marine Recreational Fishing Statistical Survey (MRFSS) and the SEFSC Headboat Survey was then used to calculate the number of hook-hours in the Florida recreational fishery (MRFSS and SEFSC Headboat Survey, unpublished data). For private angler and charter boat (non-headboat) reef fish effort, we used MRFSS data. Reef fish trips were defined in our analysis as any trip where reef fish included in the Gulf of Mexico reef fish management unit were either reported as one of the target species or caught. For each fishing mode and year, we multiplied the total estimated number of reef fish trips in the Florida by the average number of reported hours fished per trip. This produced the total estimated number of reef fish fishing hours in Florida. We then had to estimate the number of hooks fished per angler hour to derive total hook-hours. Anecdotal information indicates some private anglers fishing for reef fish use one hook per line while others use two per line, so we estimated an average of 1.5 hooks were fished per private angler hour. On charter trips one hook per angler line is probably most common, but two hooks are still used by some anglers (R. Zales, pers. comm. 2004). For hooks fished per charter angler hour therefore we again estimated an average of 1.5 hooks per angler hour were used, to be precautionary. This estimate was multiplied by our total estimated number of reef fish fishing hours in Florida to estimate recreational vertical line reef fish fishing effort in total hook hours.

Appendix E: Information Regarding Data Sources of Recreational Fishing

Data from the Marine Recreational Fishing Statistical Survey (MRFSS) and the SEFSC Headboat Survey was then used to calculate the number of hook-hours in the Florida recreational fishery (MRFSS, SEFSC Headboat Survey, unpublished data). Using the catch rate and number of hook-hours in Florida we were able to estimate the number of turtles taken in the Florida recreational vertical line fishery.

For-hire Charter Vessels and Private Recreational Fishing Vessels
Harvest and bycatch in the recreational for-hire charter vessel sector and the private recreational sector have been consistently monitored since 1979. Monitoring is accomplished primarily through MRFSS and the Texas Parks and Wildlife Department's Coastal Sport Fishing Survey. The survey uses a combination of random-digit-dialed telephone intercepts of coastal households for effort information and dock-side intercepts of individual trips for catch information to statistically estimate total trips, catch, and discards by species, for each subregion, state, mode, primary area and wave.[15] Bycatch is enumerated by a disposition code for each fish caught but not kept. Texas conducts its own survey, which provides similar data.

Prior to 2000, sampling of the charter vessel sector resulted in highly variable estimates of catch. In 2000, however, a new charter vessel sampling methodology was implemented. A 10% sample of charter vessel captains is called weekly to obtain trip level information. In addition, the standard dockside intercept data are collected from charter vessels, and charter vessel clients are sampled through the standard random digit dialing of coastal households. Precision of charter vessel effort estimates has improved by more than 50% due to these changes (Van Voorhees et al. 2000).

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[15] Waves are two-month sampling periods.