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

ENVIRONMENTAL ASSESSMENT ON THE EFFECTS OF THE ISSUANCE OF A SCIENTIFIC RESEARCH PERMIT FILE NO. 16174 TO MICHAEL SALMON TO CONDUCT SEA TURTLE RESEARCH

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Location: Atlantic coastal waters of Florida

Abstract: The National Marine Fisheries Service (NMFS) proposes to issue a scientific research permit to Dr. Michael Salmon (Florida Atlantic University), under Section 10(a)(1)(A) of the Endangered Species Act of 1973 as amended (ESA) (16 U.S.C. 1531 et seq.) and the regulations governing the taking, importing, and exporting of endangered and threatened species (50 CFR 222-226). The permit would be valid for two years from the date of issuance. Research authorized under Permit No. 16174 would characterize the population structure, movements and spatial distribution of juvenile green sea turtles. This research would create a better understanding of green turtle habitat utilization in nearshore developmental habitats. Under NOAA Administrative Order 216-6, NMFS issuance of scientific research permits is generally categorically excluded from the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 et seq.) requirements to prepare an environmental assessment (EA) or environmental impact statement (EIS). However, for this permit NMFS prepared an Environmental Assessment (EA) to facilitate a more thorough assessment of potential impacts on endangered sea turtles.

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CHAPTER 1 PURPOSE OF AND NEED FOR ACTION

1.1 DESCRIPTION OF ACTION

In response to receipt of a request from Michael Salmon, Ph.D., [Florida Atlantic University] (File No. 16174), NMFS proposes to issue a scientific research permit that authorizes "takes"[1] pursuant to the Endangered Species Act of 1973 (ESA; 16 U.S.C. 1531 *et seq*.).

1.1.1 Purpose and Need

The primary purpose of the permit is to provide an exemption from the take prohibitions under the ESA to allow "takes" of endangered species, for bona fide scientific research. The need for issuance of the permit is related to NMFS's mandates under the ESA. Specifically, NMFS has a responsibility to implement the ESA to protect, conserve, and recover threatened and endangered species under its jurisdiction. The ESA prohibits take of threatened and endangered species, with only a few very specific exceptions, including for scientific research and enhancement purposes. Permit issuance criteria require that research activities are consistent with the purposes and polices of these federal laws and will not have a significant adverse impact on the species or stock.

1.1.2 Research Objectives

Study objectives include determining movements and distribution of separate age classes of green sea turtles (*Chelonia mydas*) in different coastal reef habitats of southeastern Florida.

1.2 OTHER EA/EIS THAT INFLUENCE SCOPE OF THIS EA

Because Permit No. 16174 would be a continuation of Dr. Salmon's past research on sea turtles, the action area and a majority of the proposed activities have been previously described and analyzed for the previous permit, No. 1397 (issued to Dr. Jeanette Wyneken (Permit Holder), with Dr. Salmon as the Principal Investigator). The Environment Assessment prepared for the previous permit, *Environmental Assessment Scientific Research Permit to Jeanette Wyneken, Ph.D., from Florida Atlantic University (Permit File No. 1397)* (NMFS 2003), found that the research would not have significant impacts to the human environment. The proposed permit differs slightly from the current permit in the suite of research activities and number of takes requested; however, the action area remains the same.

1.3 SCOPING SUMMARY

The purpose of scoping is to:

- identify the issues to be addressed
- identify the significant issues related to the proposed action
- identify and eliminate from detailed study the non-significant issues
- identify and eliminate issues that have been covered by prior environmental review

1 The ESA defines "take" as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." The term "harm" is further defined by regulations (50 CFR §222.102) as "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns including breeding, spawning, rearing, migrating, feeding, or sheltering."

An additional purpose of the scoping process is to identify the concerns of the affected public and Federal agencies, states, and Indian tribes. CEQ regulations implementing the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 et seq.) do not require that a draft EA be made available for public comment as part of the scoping process. A Notice of Receipt of the application was published in the *Federal Register*, announcing the availability of the application for public comment (76 FR 18725, April 5, 2011). No substantive public comments were received during the 30-day public comment period.

CHAPTER 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter describes the range of potential actions (alternatives) determined reasonable with respect to achieving the stated objective, as well as alternatives eliminated from detailed study. This chapter also summarizes the expected outputs and any related mitigation of each alternative. One alternative is the "No Action" alternative where the proposed permit would not be issued. The No Action alternative is the baseline for the rest of the analyses. The Proposed Action alternative represents the research proposed in the submitted application for a permit, with standard permit terms and conditions specified by NMFS.

2.1 ALTERNATIVE 1 – NO ACTION

Under the No Action alternative, no permit would be issued for the activities proposed by the applicant. This alternative would eliminate any potential risk to the environment from the proposed research activities. However, it would not allow the research to be conducted, and the opportunity would be lost to collect information that would contribute to better understanding sea turtle populations and provide basic information that is necessary for NMFS to make important management decisions concerning these species and their habitat.

2.2 ALTERNATIVE 2 – PROPOSED ACTION (ISSUANCE OF PERMIT WITH STANDARD CONDITIONS)

Under the Proposed Action alternative, a permit would be issued for activities as proposed by the applicant, with the permit terms and conditions standard to such permits as issued by NMFS. The proposed permit would be valid for two years from the date of issuance. Alternative 2 is the preferred alternative.

Dr. Salmon proposes to characterize juvenile green sea turtle abundance and distribution in nearshore developmental habitats off the East coast of southern Florida. No mortalities would be authorized under the permit.

Action Area

Turtles would be captured on nearshore reefs adjacent to Broward and Palm Beach counties off of the southeastern coast of Florida (see Appendix 1) and transported to the Florida Atlantic University (FAU) Marine Laboratory in Boca Raton, Florida. Two nearshore reef sites have been selected on the basis of water depth: the "shallow" reef site (2-6 m deep) and the "deeper" reef site (9-12 m deep).

The following sections describe the proposed research activities:

Capture and transport
A boat would transport divers to the reefs. SCUBA divers would hand capture the turtles at night as they rest on the bottom. The Co-Investigator would be the primary diver capturing turtles and would be assisted by properly trained field personnel in the water, who would be added to the permit after they have completed training. Divers would carry turtles to the surface where they would be handed to personnel on the boat. During transport in the boat (approx. 1 hour), the turtles would be covered with a moist towel and supported on soft moist padding inside a covered turtle transport box. Turtles would be taken ashore and transported to the FAU Marine Laboratory at Boca Raton using a climate controlled private vehicle. While in the laboratory, green turtles would be held in a circular, seawater-filled holding tank (1.78m in diameter, 0.76m deep, and 1891L capacity). Turtles would not be fed during captivity. Elapsed time between capture and transport to FAU lab would be under three hours. No more than 3 turtles would be captured and transported to the Laboratory during a single night. The Laboratory would be equipped to house a maximum of 6 turtles at any particular time. A total of 30 turtles would be captured annually. Release would take place within 12 hours of capture. Turtles would be transported (as described above) by boat to their capture site and released during the daylight hours, when they can see landmarks and avoid predators.

Measure, weigh, flipper and PIT tag
The following morphometric measurements would be recorded for each turtle:

- total straight-line carapace length
- standard straight-line carapace length
- minimum straight-line carapace length
- minimum curved carapace length
- straight-line carapace width at the widest point

Researchers would use Vernier calipers to measure straight lengths and flexible fiberglass tape to measure curved lengths. Weight would be measured to the nearest 0.1 kg with a spring scale. Notes on the condition of the turtle would be recorded if the animal was injured or deformed (e.g., tag scars, carapace and flipper wounds, fibropapillomas, etc.) and turtles would be photographed. Epibionts would be removed. Each turtle would be examined for external tags and scanned for internal tags. Untagged turtles would be double tagged with Inconel tags (Iconel 1005-681) on the trailing edge of each front flipper and a passive integrated transponder (PIT) tag (Destron-Fearing, Model TX1406L) inserted in the left front flipper per established protocols (Wyneken et al. 2010). A pre-packaged, sterilized PIT tag would be used for each turtle and PIT needles are disposed of after application.

Sonic tag attachment and carapace marking
Green sea turtles would be fitted with a sonic transmitter (Sonotronics Model DT-97; weight in water 19 g, frequency 32-83 kHz) once transported to the laboratory. The site of tag attachment would be swabbed with betadine solution. Two holes, each 3 mm in diameter, would be drilled using a drill bit sterilized in chlorohexadine solution. One sonic tag would be attached to the carapace and secured with plastic cable ties. Ties would be fitted snuggly around the transmitter, which would be stabilized in a shallow bed of epoxy (see Figure 1). A temporary, identifying number would be painted on the carapace of each green sea turtle to enable researchers to

quickly identify individuals after release. Temporary white gel coat paint would be applied to the scutes with no paint crossing sutures.

Figure 1: Left: sonic transmitter attached to posterior-most marginal scute. Right: Detail.

Gastric Lavage

The gastric lavage techniques used would be standard and have been described in several previous studies, including Forbes and Limpus (1993) and Makowski et al. (2006). Turtles would be placed on their carapace, head positioned downward and mouth forced open. A thin tube (approx. 3.5 mm diameter) would be lubricated using vegetable oil and passed down the esophagus until resistance is reached (the point where the stomach meets the esophagus). Four liters of seawater would be pumped through the tube to begin flushing of the stomach. Stomach contents would be collected in a bucket placed below the mouth. The tube would be removed when the sampling is complete. Lavage samples will be preserved in 5% formalin mixed with seawater.

Tracking

Tracking would begin 24 hours after the release of the tagged green sea turtles at the initial site of capture. Researchers would track tagged turtles from a boat using an omnidirectional hydrophone (Sonotronics, Inc., model DH-4; 18 cm, 700 g). To minimize disturbance while tracking, researchers would maintain a distance of $\geq$10 m from turtles. Once researchers have obtained a location of a tagged turtle, visual confirmation would be made by snorkeling (at the shallow reef site) or brief SCUBA dive (at the deeper reef site). Location of the turtle would be recorded using a global positioning system (GPS) device.

Mitigation Measures

In addition to the measures described above that would minimize the potential for harassment, harm, serious injury or mortality of sea turtles, conditions would be included in the permit to mitigate potential impacts to sea turtles and other protected species during research. This includes:

- taking precautions to minimize stress to captured animals;
- limiting the size or mass of equipment and tags;

- limiting procedures conducted on compromised turtles;
- avoiding repeated sampling and marking of an individual;
- using trained and experienced personnel to minimize disturbance or risk of injury;
- using sterile or appropriately sanitized equipment; and
- remaining a safe distance from non-target protected species.

CHAPTER 3 AFFECTED ENVIRONMENT

This chapter presents baseline information necessary for consideration of the alternatives, and describes the resources that would be affected by the alternatives, as well as environmental components that would affect the alternatives if they were to be implemented. The effects of the alternatives on the environment are discussed in Chapter 4.

3.1 SOCIAL AND ECONOMIC ENVIRONMENT

Economic and social factors are listed in the definition of effects in the NEPA regulations. However, the definition of human environment states that "economic and social effects are not intended by themselves to require preparation of an EIS." An EA must include a discussion of a proposed action's economic and social effects when these effects are related to effects on the natural or physical environment.

Although other human activities may occur in the action area, including recreational uses (such as fishing and boating) and ecotourism, the social and economic effects of the Proposed Action mainly involve the effects on the people involved in the research, as well as any industries that support the research, such as charter vessels and suppliers of equipment needed to accomplish the research. The research would not be expected to impact, inhibit, or prevent other human activities from occurring. More likely, researchers would have to adjust or modify their plans around such activities. No economic losses to other human activities would be expected as a result of the research. Permitting the proposed research could result in a low level of economic benefit to local economies in the action area. However, such impacts would be negligible on a national or regional (state) level and therefore are not considered significant. No significant social or economic impacts of the Proposed Action are interrelated with significant natural or physical environmental effects. Thus, the EA does not include any further analysis of social or economic effects of the proposed action.

3.2 PHYSICAL ENVIRONMENT

Under File No. 16174, turtles would be captured in the nearshore reefs of Palm Beach County, Florida, at two sites, a shallow reef (2-6 m) and a deeper reef (9-12 m). Both of these reefs are long and narrow, running parallel 100-300 m from shore at shallow depths. They consist of hardbottom Sabellariid worm rock, Hydroids, bryozons, zoonathids, nethic sponges, tunicates, algae, and hard and soft corals (Makowski et al. 2006). This research would not occur in any protected areas.

3.2.1 Sanctuaries, Parks, Historic Sites, etc.

There are no sanctuaries, parks or historic sites within the proposed action area.

3.2.2 Essential Fish Habitat

EFH has been designated for many of the fish species within the action area. Details of the designations and descriptions of the habitats within the action area can be found at http://www.nmfs.noaa.gov/habitat/habitatprotection/profile/southatlanticcouncil.htm.

Activities that have been shown to adversely affect EFH include disturbance or destruction of habitat from stationary fishing gear, dredging and filling, agricultural and urban runoff, direct discharge, and the introduction of exotic species. None of the proposed activities are expected to have an effect on designated EFH.

3.2.3 Designated Critical Habitat

Florida manatee (*Trichechus manatus latirostris)*

Critical habitat for the endangered Florida manatee was designated in the early 1970s (50 CFR 17.95(a)). The designation did not include primary or secondary constituent elements. On September 29, 2009 the US Fish and Wildlife Service (USFWS) announced the current designation was under review initiating a public comment period. USFWS is in the process of compiling the public's comments and making a final decision.

Activities proposed under File No. 16174 fall within the designated manatee critical habitat. However, NMFS expects no effects to critical habitat. As mentioned above, no gear would enter the water column, so substrate would not be disturbed. Therefore, NMFS expects that the Proposed Action would not likely adversely affect this designated critical habitat and it will not be considered further in this analysis. Upon USFWS recommendation, language would be included in the permit to avoid interactions with manatees. No impacts to the species or critical habitat are expected, and therefore no formal consultation was necessary.

3.3 BIOLOGICAL ENVIRONMENT

In addition to the species that are the subject of the permit (target species), a wide variety of non-target species could be found within the action area, including other marine mammals, sea turtles, invertebrates, teleost and elasmobranch fish, and sea birds (don't forget terrestrial species if action is on or near land). Since merely being present within the action area does not necessarily mean a marine organism will be affected by the proposed action, the following discussion focuses not only the distribution and abundance of various species with respect to the timing of the action, but also on whether and by what means the proposed research activities may affect non-target species.

3.3.1 ESA Target Species Under NMFS Jurisdiction

ESA Endangered

Green sea turtle	*Chelonia mydas**

**Green turtles in U.S. waters are listed as threatened except for the Florida breeding population which is listed as endangered. Due to the inability to distinguish between these populations*

away from the nesting beach, green turtles are considered endangered wherever they occur in U.S. waters.

Green sea turtle

Green sea turtles are distributed around the world, mainly in waters between the northern and southern 20° C isotherms (Hirth 1971). The complete nesting range of the green sea turtle within the southeastern United States includes sandy beaches of mainland shores, barrier islands, coral islands, and volcanic islands between Texas and North Carolina and at the U.S. Virgin Islands (USVI) and Puerto Rico (NMFS and USFWS 1991). Principal U.S. nesting areas for green turtles are in eastern Florida, predominantly Brevard through Broward counties. Green sea turtle nesting also occurs regularly on the USVI and Puerto Rico.

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 to 14 day intervals. Mean clutch size is highly variable among populations, but averages 110-115 eggs. After hatching, green sea turtles go through a post-hatchling pelagic stage where they are associated with drift lines of algae and other debris.

The green sea turtle was listed as threatened in 1978, except for the Florida and Pacific coast of Mexico breeding populations that were listed as endangered. Critical habitat for the green sea turtle has been designated for the waters surrounding Isla Culebra, Puerto Rico and its associated keys from the mean high water line seaward to 3 nautical miles (5.6 km). These waters include Culebra's outlying Keys including Cayo Norte, Cayo Ballena, Cayos Geniqui, Isla Culebrita, Arrecife Culebrita, Cayo de Luis Pena, Las Hermanas, El Mono, Cayo Lobo, Cayo Lobito, Cayo Botijuela, Alcarraza, Los Gemelos, and Piedra Steven. Key physical or biological features essential for the conservation of the green sea turtle found in this designated critical habitat include important food resources and developmental habitat, water quality, and shelter.

3.3.2 Non-Target Species Found in the Action Area

Due to the nature of Dr. Salmon’s proposed hand capture method and that no gear would be set in the water, NMFS does not expect the issuance of Permit No. 16174 to adversely affect non-target species. However, they are identified here because they occur in the action area.

<u>Kemp's ridley sea turtle, *Lepidochelys kempii*</u>

Of the seven extant species of sea turtles of the world, the Kemp's ridley has declined to the lowest population level. This species has a very restricted range relative to other sea turtle species. Kemp’s ridleys nest in daytime aggregations known as arribadas, primarily at Rancho Nuevo, a stretch of beach in Mexico. Most of the population of adult females nests in this single locality (Pritchard 1969). When nesting aggregations at Rancho Nuevo were discovered in 1947, adult female populations were estimated to be in excess of 40,000 individuals (Hildebrand 1963). By the early 1970s, the world population estimate of mature female Kemp's ridleys had been reduced to 2,500-5,000 individuals. The population declined further through the mid-1980s. Recent observations of increased nesting suggest that the decline in the ridley population has stopped and there is cautious optimism that the population is now increasing (Turtle Expert Working Group (TEWG) 1998). The number of nests has grown from a low of approximately

702 nests in 1985, to greater than 1,940 nests in 1995, to approximately 5,800 nests in 2000, to approximately 8,300 nests in 2003, to approximately 10,300 nests in 2005. USFWS recorded approximately 12,000 nests in 2006 suggesting that the adult nesting female population is about 7,400 individuals.

It appears that adult Kemp's ridley sea turtles are restricted somewhat to the Gulf of Mexico in shallow near shore waters, although adult-sized individuals sometimes are found on the eastern seaboard of the United States. Juvenile/subadult Kemp's ridleys have been found along the eastern seaboard of the United States and in the Gulf of Mexico. Atlantic juveniles/subadults travel northward with vernal warming to feed in the productive, coastal waters of Georgia through New England, returning southward with the onset of winter to escape the cold (Lutcavage and Musick 1985; Henwood and Ogren 1987; Ogren 1989). In the Gulf, juvenile/subadult ridleys occupy shallow, coastal regions. The near shore waters of the Gulf of Mexico are believed to provide important developmental habitat for juvenile Kemp's ridley sea turtles. Ogren (1988) suggests that the Gulf coast, from Port Aransas, Texas, through Cedar Key, Florida, represents the primary habitat for subadult ridleys in the northern Gulf of Mexico. Ogren (1989) suggested that in the northern Gulf this species moves offshore to deeper, warmer water during winter. Studies suggest that subadult Kemp's ridleys stay in shallow, warm, nearshore waters in the northern Gulf of Mexico until cooling waters force them offshore or south along the Florida coast (Renaud 1995). Little is known of the movements of the post-hatching, planktonic stage within the Gulf. Studies have shown the post-hatchling pelagic stage varies from 1-4 or more years, and the benthic immature stage lasts 7-9 years (Schmid and Witzell 1997).

The Kemp's ridley was listed as endangered on December 2, 1970. There is no designated critical habitat for the Kemp's ridley sea turtle.

Hawksbill sea turtle, *Eretmochelys imbricata*

The hawksbill sea turtle occurs in tropical and subtropical seas of the Atlantic, Pacific, and Indian Oceans. The species is widely distributed in the Caribbean Sea and western Atlantic Ocean, with representatives of at least some life history stages regularly occurring in southern Florida and the northern Gulf of Mexico (especially Texas); in the Greater and Lesser Antilles; and along the Central American mainland south to Brazil.

Within the United States, hawksbills are most common in Puerto Rico and its associated islands, and in the USVI. In the continental United States, hawksbill sea turtles have been recorded from all the Gulf States and from along the eastern seaboard as far north as Massachusetts, with the exception of Connecticut, but sightings north of Florida are rare (Meylan and Donnelly 1999). 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. At least some life history stages regularly occur in southern Florida and the northern Gulf of Mexico (especially Texas); in the Greater and Lesser Antilles; and along the Central American mainland south to Brazil.

In Florida, hawksbills are observed with some regularity on the reefs off Palm Beach County, where the warm Gulf Stream current passes close to shore, and in the Florida Keys. Texas is the

only other state where hawksbills are sighted with any regularity. Most sightings involve post-hatchlings and juveniles.

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), followed by residency in developmental habitats (foraging areas where immature turtles reside and grow) in coastal waters. Adult foraging habitat, which may or may not overlap with developmental habitat, is typically coral reefs, although other hard-bottom communities and occasionally mangrove-fringed bays may be occupied. Hawksbills show fidelity to their foraging areas over periods of time as great as several years (van Dam and Diez 1998).

In the Western Atlantic, the largest hawksbill nesting population occurs in the Yucatán Peninsula of Mexico, where several thousand nests are recorded annually in the states of Campeche, Yucatán, and Quintana Roo (Garduño-Andrade et al. 1999). Important but significantly smaller nesting aggregations are documented elsewhere in the region in Puerto Rico, the USVI, Antigua, Barbados, Costa Rica, Cuba, and Jamaica (Meylan and Donnelly 1999). Estimates of the annual number of nests for each of these areas are of the order of hundreds to a few thousand. Nesting within the southeastern United States and U.S. Caribbean is restricted to Puerto Rico (>650 nests/yr), the USVI (~400 nests/yr), and, rarely, Florida (0-4 nests/yr) (Eckert 1992; Meylan and Donnelly 1999, Florida Statewide Nesting Beach Survey database). At the two principal nesting beaches in the U.S. Caribbean where long-term monitoring has been carried out, populations appear to be increasing (Mona Island, Puerto Rico) or stable (Buck Island Reef National Monument, St. Croix, USVI) (Meylan and Donnelly 1999).

The hawksbill sea turtle was listed as endangered under the ESA in 1970, and is considered Critically Endangered by the International Union for the Conservation of Nature (IUCN) based on global population declines of over 80 percent during the last three generations (105 years) (Meylan and Donnelly 1999). Critical habitat for the hawksbill sea turtle is designated under 50 CFR 226.209. It includes the waters surrounding the islands of Mona and Monito, Puerto Rico from the mean high water line seaward to 3 nautical miles (5.6 km).

Critical habitat for the hawksbill sea turtle includes the waters surrounding the islands of Mona and Monito, Puerto Rico from the mean high water line seaward to 3 nautical miles (5.6 km).

Loggerhead sea turtle, *Caretta caretta*

Loggerheads occur throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans and inhabit continental shelves and estuarine environments. Developmental habitat for small juveniles includes the pelagic waters of the North Atlantic Ocean and the Mediterranean Sea.

Adults have been reported throughout the range of this species in the United States and throughout the Caribbean Sea. Non-nesting, adult female loggerheads are reported throughout the United States and Caribbean Sea; however, little is known about the distribution of adult males who are seasonally abundant near nesting beaches during the nesting season. Aerial surveys suggest that loggerheads (benthic immatures and adults) in U.S. waters are distributed in the following proportions: 54 percent in the southeast U.S. Atlantic, 29 percent in the northeast

U.S. Atlantic, 12 percent in the eastern Gulf of Mexico, and 5 percent in the western Gulf of Mexico (TEWG 1998).

The loggerhead was listed as a threatened species in 1978. Critical habitat has not been designated for the loggerhead. The recent loggerhead status review (Conant et al. 2009) concluded that there are nine loggerhead distinct population segments (DPSs). These include the North Pacific Ocean DPS; the South Pacific DPS; the North Indian Ocean DPS; the Southeast Indo-Pacific Ocean DPS; the Southwest Indian Ocean DPS; the Northwest Atlantic Ocean DPS; the Northeast Atlantic Ocean DPS; the Mediterranean Sea DPS; and the South Atlantic Ocean DPS. The information provided in the status review represents the most recent and available information relative to the status of this species. On September 16, 2011 NMFS formally designated the loggerhead with these nine DPS' worldwide. Of these DPS', five are listed as endangered: Northeast Atlantic Ocean DPS, Mediterranean Sea DPS, North Indian Ocean DPS, North Pacific Ocean DPS and South Pacific Ocean DPS.

Leatherback sea turtle, *Dermochelys coraicea*

Leatherback sea turtles may be found in the action area but are not a target of the proposed research. Because the applicant would only hand capture or dip net the target hardshell species upon sighting, researchers would easily avoid interactions with leatherbacks. Leatherbacks are easily identifiable prior to capture because they do not have a hardshell like other sea turtle species. A brief description of this species follows.

Leatherbacks utilize both coastal and pelagic waters. In the western Atlantic, adults routinely migrate between boreal, temperate and tropical waters, presumably to optimize both foraging and nesting opportunities (Bleakney 1965; Lazell 1980). Leatherbacks are deep divers, with recorded dives to depths in excess of 1000 m (Eckert et al. 1989), but they may come into shallow waters if there is an abundance of jellyfish near shore. TDR data recorded by Eckert et al. (1989) indicate that leatherbacks are night feeders.

The leatherback ranges farther than any other sea turtle species, exhibiting broad thermal tolerances (NMFS and USFWS 1995). Leatherbacks are widely distributed throughout the oceans of the world, and are found throughout waters of the Atlantic, Pacific, Caribbean, and the Gulf of Mexico (Ernst and Barbour 1972). Adult leatherbacks forage in temperate and subpolar regions from 71° N to 47° S latitude in all oceans and undergo extensive migrations between 90° N and 20° S, to and from the tropical nesting beaches. In the Atlantic Ocean, leatherbacks have been recorded as far north as Newfoundland, Canada, and Norway, and as far south as Uruguay, Argentina, and South Africa (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). Leatherbacks are predominantly pelagic, however they can be found in near shore waters.

The TEWG (2007) estimated the adult leatherback sea turtle population of the North Atlantic to be approximately 34,000-94,000 animals. The range of the estimate is large, reflecting the Working Group's uncertainty in nest numbers and their extrapolation to adults. The Working Group believes that as estimates improve the range would likely decrease. However, this is the

most current estimate available. It is important to note that while the analysis provides an estimate of adult abundance for all populations in the greater North Atlantic, it does not provide estimates for the number or origin of leatherbacks in specific foraging areas, nor does it provide an estimate of subadult abundance. Trends in the adult population size estimate were not possible since trends in sex ratio and remigration rates were not available (TEWG 2007).

The leatherback was listed as endangered on June 2, 1970. Critical habitat for the leatherback includes the waters adjacent to Sandy Point, St. Croix, USVI, up to and inclusive of the waters from the hundred fathom curve shoreward to the level of the mean high tide with boundaries at 17° 42'12" North and 65°50'00" West. Key physical or biological features essential for the conservation of the leatherback sea turtle found in this designated critical habitat include elements important for reproduction.

Florida Manatee

Manatees are listed as endangered under the ESA and protected under the Marine Mammal Protection Act. They inhabit both marine and fresh water of sufficient depth (1.5 meters to usually less than 6 meters) throughout their range of the southeastern United States. The West Indian manatee is divided into two subspecies, the Antillean manatee (*T. m. manatus*) and the Florida manatee. Florida manatees may be encountered in canals, rivers, estuarine habitats, saltwater bays, and on occasion have been observed as much as 3.7 miles off the Florida Gulf coast. Researchers do not intend or expect to interact with the Florida manatee as previously descibed. Further, as a precautionary measure, Permit No. 16174 would contain conditions for Florida manatees to ensure that interactions are avoided. Therefore this species is not considered further in this analysis.

Other Species

In addition to manatees, other species listed as endangered or threatened present in the action area include: Elkhorn coral (*Acropora palmata*), Staghorn coral (*Acropora servicomis*), American crocodile (*Crocodylus acutus*), Johnson's seagrass (*Halophila johnsonii*), and Wood stork (*Mycteria americana*).

These other species that occur within the action area were considered; however, research is not directed at these species and none are expected to be taken or affected. Additionally, the permit would be conditioned to require the Holder to notify the Chief, Permits, Conservation and Education Division if any ESA-listed species not authorized in the permit is killed, injured, or collected during the course of authorized research activities. Directed research activities would be suspended pending review of the circumstances surrounding the incident.

Given the nature of the proposed research and proposed permit conditions that would mitigate the potential for impacts to non-target species, NMFS does not expect non-target species to be significantly impacted by the proposed action. The applicant would be using a small boat operated at slow speeds with no measurable chance of striking an animal. In previous research, the applicant has not reported any adverse affects to non-target species during research activities. Therefore non-target species are not considered further in this EA.

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

This chapter represents the scientific and analytic basis for comparison of the direct, indirect, and cumulative effects of the alternatives. Regulations for implementing the provisions of NEPA require consideration of both the context and intensity of a proposed action (40 CFR Parts 1500-1508).

4.1 EFFECTS OF ALTERNATIVE 1: No Action

An alternative to the proposed action is no action, i.e., denial of the permit request. This alternative would eliminate any potential risk to all aspects of the environment from the proposed research activities. It would prohibit researchers from gathering information that could help endangered and protected sea turtles.

More specifically, the No Action alternative would prohibit researchers from collecting valuable information on sea turtle species in the action area. Without good information on the foraging ecology, habitat use, and movement of sea turtles, management decisions may be too conservative or not sufficiently conservative to ensure a species to recover. Dr. Salmon's proposed research would characterize juvenile green sea turtles' habitat utilization in nearshore reef habitat off the coast of southern Florida. The information the permit would yield is especially important to wildlife managers and agencies responsible for making decisions concerning recovery and conservation of sea turtles, and designating critical habitat for these species.

4.2 EFFECTS OF ALTERNATIVE 2: Issue permit with standard conditions

Impacts of the proposed action would be limited primarily to the biological environment, specifically the animals that would be studied or affected by the research. The type of actions proposed in the permit request would minimally affect the physical environment and would be unlikely to affect the socioeconomic environment or pose a risk to public health and safety.

4.2.1 Effects on the Biological Environment-- Sea Turtles

This section analyzes the potential impacts of each proposed research activity to sea turtles. Many of the activities are non-invasive and would result in no more than temporary disturbance of target animals. None of the proposed activities are expected to result in serious injury, mortality or reduced fecundity of target animals. Moreover, the permit would contain conditions to mitigate and minimize adverse impacts to turtles during authorized activities. Animals are expected to recover from the proposed activities within a day. In addition the applicant would be required to follow procedures designed to minimize the risk of either introducing a new pathogen into a population or amplifying the rate of transmission from animal to animal of an endemic pathogen when handling and sampling animals. In addition, all of the proposed activities were considered in the 2003 EA prepared for issuance of Permit No. 1397 for the target species. Species and lifestages for the Proposed Action would remain the same as previously authorized. The annual number of animals that would be taken under the new permit would be slightly increased (within the same order of magnitude) from the annual number of sea turtles previously authorized under No. 1397.

Capture and transport
This is a simple, non-invasive method that has no risk of entanglement or forced submergence of sea turtles. Therefore, this capture method is not likely to result in serious injury or mortality of sea turtles. However, it can lead to an increased level of stressor hormones in the turtle and result in short-term stress to individual turtles. Turtles would be handled in a manner to minimize stress. Because this is a direct capture method, no incidental capture of non-target species would occur. Given the precautions that would be taken by the researchers to ensure the safety of the turtles, the permit conditions relating to transport and holding, and that this activity has been successfully conducted by NMFS authorized research projects, NMFS expects the transport would have minimal and insignificant effects on the animals. For example, during the 15+ years that the NMFS Southeast Fisheries Science Center has been conducting sea turtle research, they have had no injuries or mortalities to turtles as a result of their handling protocol which includes transport (NMFS SEFSC 2008); the applicant used the same techniques under the previous permit (File No. 1397) with no apparent adverse effect. During release, turtles would be lowered as close to the water's surface as possible, to prevent potential injuries.

Measure, weigh, flipper and PIT tag
NMFS does not expect that individual turtles would experience more than short-term stresses during the handling, measuring, weighing, or photography process. These are non-invasive procedures from which no injury or mortality would be expected. Turtles would be worked up as quickly as possible to minimize stresses resulting from their capture. Researchers have taken measurements on thousands of turtles in the proposed manner with no apparent ill effect (NMFS SEFSC 2008). In addition, the permit holder would be required to follow procedures designed to minimize the risk of either introducing a new pathogen into a population or amplifying the rate of transmission from animal to animal of an endemic pathogen when handling animals during all research activities.

All tag types have negatives associated with them, especially concerning tag retention. Plastic tags can become brittle, break and fall off underwater and titanium tags can bend during implantation and thus not close properly, leading to tag loss; tag malfunction can result from rusted or clogged applicators or applicators that are worn from heavy use (Balazs 1999). Turtles whose tags have failed are re-tagged if captured again at a later date, which subjects them to additional effects of tagging. PIT tags have the advantage of being encased in glass, which makes them inert, and are positioned inside the turtle where loss or damage due to abrasion, breakage, corrosion, or age over time is virtually non-existent (Balazs 1999). Turtles may experience some discomfort during the application of external and/or internal tagging procedures, and these procedures would likely produce some level of pain. The discomfort appears highly variable between individuals (Balazs 1999). Most seem to barely notice, while some exhibit a marked response. NMFS expects the stresses to be minimal and short-term, and that the small wound-site resulting from a tag applied to the flipper would heal completely in a short period of time. NMFS does not expect that individual turtles would experience more than short-term stresses during the application of the PIT tags. These tags have been used for cattle and pets for years without any adverse effects. The proposed tagging methods have been regularly employed in sea turtle research with little lasting impact on the individuals tagged and handled (Balazs 1999). Additionally, in the 17+ years that the NMFS SEFSC has been Inconel flipper tagging turtles, all turtles exhibited normal behavior shortly after being tagged and swam

normally once released. Of the close to 1,000 tagged turtle recaptures the NMFS SEFSC Beaufort Laboratory has encountered, no turtles have shown adverse effects of being tagged in this manner (NMFS 2006). In the nine years that the NMFS SEFSC has been PIT tagging turtles, turtle behavior indicative of discomfort was observed to be temporary, and the turtles exhibited normal behavior shortly after tagging and swam normally after release. Of the close to 1,000 tag recaptures that the NMFS Beaufort Laboratory has encountered, none show any adverse effects of being tagged in this manner (NMFS 2006). In addition, the permit holder would be required to follow procedures designed to minimize the risk of either introducing a new pathogen into a population or amplifying the rate of transmission from animal to animal of an endemic pathogen when handling animals.

Sonic tag attachment and carapace marking

As described in Ch. 2, Dr. Salmon would take measures to prevent harm to turtles during tagging. The permit would also require that Dr. Salmon provide adequate ventilation around the turtle's head during the attachment of all transmitters. To prevent skin or eye injury due to the chemicals in the resin during the transmitter application process, transmitter attachment procedures would not take place in the water. The layers of bonding agents would be very thin and generate very little heat and applied in a manner to prevent harm from excessive heat to the turtles.

Transmitters, as well as biofouling of the instrument, attached to the carapace of turtles increase hydrodynamic drag and affect lift and pitch. For example, Watson and Granger (1998) performed wind tunnel tests on a full-scale juvenile green turtle and found that at small flow angles representative of straight-line swimming, a transmitter mounted on the carapace increased drag by 27-30 percent, reduced lift by less than 10 percent and increased pitch moment by 11-42 percent. It is likely that this type of transmitter attachment would negatively affect the swimming energetics of the turtle. However, based on the results of studies of hardshell sea turtles equipped with this tag setup, there is no evidence of transmitters resulting in any serious injury to these species. Attachment of satellite, sonic, or radio tags via drill attachment with epoxy is a commonly used and permitted technique by NMFS (e.g., File Nos. 1397 and 13544). These tags are unlikely to become entangled due to their streamlined profile. Furthermore, tagged individuals would be recaptured at the conclusion of the study for the removal of the satellite tags. The applicant has employed this practice in the past, and has no reason to believe that the tagged turtles would not be recaptured for gear removal (Dr. Salmon, pers. communication). However, in the event that tagged green turtles could not be recaptured for gear removal, the satellite tags would typically be naturally shed in about one year, posing no long-term risks to the turtle.

Long-distance movements of satellite-tagged juvenile and adult male loggerheads also substantiate the idea that sea turtles can survive the tagging experience as well as continue normal activities. The SCDNR reported that 15 adult male loggerheads dispersed from Cape Canaveral, FL, to locations as far away as Panama City, FL; Andros Island in the Caribbean; and off the coast of New Jersey. SCDNR reported that several juvenile loggerheads have traveled from SC to GA and NC, with one juvenile loggerhead traveling as far north as Delaware Bay.

During a study of sonic tracked turtles by Seminoff et al. (2002), green turtles returned to areas of initial capture, suggesting that the transmitters and the tagging experience left no lasting effect on habitat use patterns. During previous tracking sessions in San Diego Bay by the NMFS Southwest Fisheries Science Center, both telemetered and non-telemetered turtles were seen in the same areas exhibiting roughly similar surface behavior, even swimming within meters of their tracking vessel, suggesting negligible effects of the transmitter packages.

Based on this information, NMFS does not expect that the proposed tags would significantly impact turtle health, biology, physiology, behavior, or their ability to forage.

The gel coat/paint that would be used to temporarily mark the turtle carapace is considered to be nontoxic so health risks associated with it are not of concern in the proposed field application. The thick protective keratin that comprises carapace scutes is considerably different from the skin of the sea turtles considered when assigning hazardous potential. This paint marking has been used successfully for over 10 years by the applicant. Paint on the shell is expected to last for 3-4 months. This field application arguably is comparable to cosmetic applications of fingernail polishes, which contain many of the same or similar chemicals. According to Dr. Allen Foley, who is authorized to conduct this procedure under File No. 14622-01 (pers. comm. 2010), no acute negative effects resulting from use on turtle carapaces have been observed following numerous field applications, including examination of marked turtles during subsequent recapture. Furthermore, the margins of the scutes where keratin is thinnest, would be avoided. Lastly, contact with gel coat is very infrequent over an animal's lifespan (one application for many cases), thus chronic exposure is not a concern.

Gastric Lavage

Prey preferences of turtles can be determined by a variety of methods, but the preferred technique is gastric lavage or stomach flushing. This technique has been successfully used on green, hawksbill, olive ridley, and loggerhead turtles ranging in size from 25 to 115 inches curved carapace length. (Forbes 1999) states that many individual turtles have been lavaged more than three times without any known detrimental effect. Individuals have been recaptured from the day after the procedure up to three years later and appear healthy and are feeding normally. Laparoscopic examination following the procedure has not detected any swelling or damage to the intestines. While individual turtles are likely to experience discomfort during this procedure, NMFS does not expect individual turtles to experience more than short-term stress. The applicant is experienced in this technique and has not reported any injuries or mortalities occurring as a result of this procedure.

Tracking

Signals from sonic tags would be tracked underwater using a directional hydrophone. The sonic transmitters would have a frequency of approximately 32 to 83 kHz. This frequency level is not expected to adversely affect turtles. Sea turtles have low-frequency hearing sensitivity and are potentially affected by sound energy in the band below 1,000 Hz (Lenhardt 2003). Bartol et al. (1999) found the effective bandpass of the loggerhead sea turtle to be between at least 250 and 1,000 Hz. Ridgeway et al. (1969) found the maximum sensitivity of green sea turtle hearing to fall within 300-500 Hz with a sharp decline at 750 Hz. Since the sonic tags authorized for sea turtle tracking research would be well above this hearing threshold, these tags would not be

heard by the turtles. Therefore, NMFS would not expect the transmitters to interfere with turtles' normal activities after they are released.

Another important consideration is whether the sounds emitted by the sonic transmitters would attract potential predators, primarily sharks. Unfortunately, hearing data on sharks is somewhat limited. However, Casper and Mann (2004) examined the hearing abilities of the nurse shark (*Ginglymostoma cirratum*), and results showed that this species detects low-frequency sounds from 100 to 1,000 Hz, with best sensitivity from 100 to 400 Hz. Also, Hueter et al. (2004) explained that audiograms have been published on elasmobranchs. Although we do not have hearing information for all the sharks that could potentially prey on sea turtles within the action area, these estimates for hearing sensitivity in available studies provided ranges of 25 to 1,000 Hz. Therefore, these studies support the argument that shark hearing is not as sensitive as in other tested fishes, and that sharks are most sensitive to low-frequency sounds (Kritzler and Wood 1961; Banner 1967; Casper et al. 2003). Thus, it appears that the sonic transmitters would not attract potential shark predators to the turtles, because the frequency of the sonic tags is well above the 1,000-Hz threshold.

Summary of Effects

The short-term stresses resulting from the research activities discussed above are expected to be minimal. Animals would be released within 12 hours of capture and should recover from the procedures within the same day. The permit would contain conditions to mitigate adverse impacts to turtles from these activities. Turtles would be worked up as quickly as possible to minimize stress resulting from the research and the permit holder also would be required to follow procedures designed to minimize the risk of either introducing a new pathogen into a population or amplifying the rate of transmission from animal to animal of an endemic pathogen when handling animals. The applicant would be required to exercise care when handling and sampling animals to minimize any possible injury. During release, turtles would be lowered as close to the water's surface as possible, to prevent potential injuries. Overall, the individual and combined impacts of the proposed research activities are not expected to have more than short-term effects on individual sea turtles.

The Proposed Action is not expected to cause serious injury or mortality of any animals. Thus the research would not result in a permanent decrease in a sea turtle species' or populations' reproductive success, lead to a long-term reduction in prey availability, the survival of young turtles, or the number of young turtles that annually recruit into the breeding populations of any of the sea turtle species. Given this analysis of impacts to sea turtles, NMFS does not expect the proposed action to result in significant impacts to the target sea turtles, their populations or species. As determined in the associated biological opinion, Permit No. 16174, as proposed, would not likely jeopardize the continued existence of the species and would not likely destroy or adversely modify designated critical habitat. In addition, NMFS does not expect the proposed action to significantly impact any non-target species or other portions of the human environment.

4.3 SUMMARY OF COMPLIANCE WITH APPLICABLE LAWS, NECESSARY FEDERAL PERMITS, LICENSES, AND ENTITLEMENTS

As summarized below, NMFS has determined that the proposed research is consistent with the purposes, policies, and applicable requirements of the ESA, and NMFS regulations. NMFS issuance of the permit would be consistent with the ESA.

4.3.1 Endangered Species Act

To comply with section 7 of the regulations (50 CFR 402.14(c)), a consultation was initiated by NMFS PR under the ESA. In accordance with section 7, a biological opinion was prepared for the Proposed Action and NMFS concluded that issuance of Permit No. 16174 is not likely to jeopardize the continued existence of loggerhead, green, hawksbill, leatherback, and Kemp's ridley sea turtles and is not likely to destroy or adversely modify designated critical habitat (NMFS 2011).

4.4 COMPARISON OF ALTERNATIVES

Although the No Action alternative would have no environmental effects, the opportunity would be lost to collect information that would contribute to better understanding sea turtles and provide information to NMFS that is needed to implement NMFS management activities. This is important information that would help conserve and manage sea turtles as required by the ESA and NMFS's implementing regulations. The Proposed Action would affect the environment, primarily individual sea turtles. However, the effects would be minimal and the preferred alternative would allow the collection of valuable information that could aid NMFS' efforts to recover sea turtles. Neither the No Action nor the Proposed Action alternative is anticipated to have adverse population or stock-level effects on sea turtles or other non-target species. Given the Proposed Action's minimal impact to the environment and the potential positive benefits of the research, it is the most desirable action to pursue.

4.5 MITIGATION MEASURES

The activities authorized under proposed Permit No. 16174, if approved, would follow certain procedures in order to minimize and mitigate effects of the Proposed Action. The permit would require specific conditions to ensure compliance with appropriate research protocols. These include conditions that will minimize the potential for injury and stress during procedures.

4.6 UNAVOIDABLE ADVERSE EFFECTS

The research activities would cause disturbance and stress to captured sea turtles. However, the research is not expected to have more than a minimal, temporary effect on individuals, and no effect on populations. While individual sea turtles may experience short-term stress or discomfort in response to the activities of researchers, the impact to individual animals is not expected to be significant. The minimization measures imposed by permit conditions are intended to reduce, to the maximum extent practical, the potential for adverse effects of the research on all species.

4.7 CUMULATIVE EFFECTS

Cumulative effects are defined as those that result from incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of which

agency (federal or nonfederal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions that take place over a period of time.

4.7.1 Other research permits and authorizations

Sea turtles have been the focus of field studies for decades. The primary purpose of most studies is to monitor populations and gather data on behavior and ecology. Over time, NMFS has issued dozens of permits for takes of sea turtles in or near the proposed action area for a variety of activities, examples of which include vessel surveys, photography, capture, handling, biopsy sampling, lavage, laparoscopy, and tagging. The number of permits and associated takes indicate that a portion of the populations of turtle species in the proposed action area have been subject to varying levels of stress due to research activities. This research is due to interest in developing appropriate management and conservation measures to recover and conserve this species.

Research on sea turtles in the United States, and particularly in Florida, is carefully controlled and managed so that it does not operate to the disadvantage of the species. In addition to permits issued by NMFS for the scientific research of sea turtles in the marine environment, similar ESA Section 10 federal permits are issued by the USFWS for the taking of endangered and threatened sea turtles on land for activities and efforts that aid the conservation and recovery of these species.

As summarized in Appendix 3, 12 active NMFS research permits allow research on the target species in areas that could overlap with the proposed action area. It is a standard condition of NMFS research permits that researchers coordinate their activities with those of other permit holders to avoid unnecessary disturbance of animals. Further, to mitigate the risk of negative cumulative effects to turtles, researchers would be required to scan turtles for existing PIT tags before applying new tags; turtles that have existing PIT and flipper tags would not be re-tagged. Permitted researchers also are required to notify the appropriate NMFS Regional Office at least two weeks in advance of any planned field work so that the Regional Office can facilitate the coordination of research permits and other human activities in the area and take steps appropriate to minimize disturbance from multiple activities.

Under the proposed permit, animals in the action area would be disturbed by research year round for up to 2 years. Whether this frequency of disturbance, by itself or in combination with disturbance from other permitted research, would result in cumulative adverse effects depends on how long the effects of each disturbance last, whether the animals have sufficient time between disturbance events to resume or compensate for disrupted activities, and whether the effects of repeated disturbance are additive, synergistic or accumulate in some other way. Other research permits authorize take of the target species beyond the action area, for instance in the Gulf of Mexico or other Florida waters; however, impacts from other researchers would dissipate before turtles could be encountered or captured by Dr. Salmon. The effects of many individual research activities (e.g., a survey, a field trip to capture animals) are short-term, dissipating within hours to days following the research event, impacting individual animals. Further, as previously discussed, NMFS limits repeated harassment of individual turtles and avoids unnecessary duplication of research efforts by requiring coordination among permit holders. All scientific research permits also are conditioned with mitigation measures to ensure that the research

impacts target and non-target species as minimally as possible. The proposed activities are not likely to result in the serious injury, mortality or reduced fecundity of target animals. Given this low degree of adverse impacts and the mechanisms in place to limit repeated disturbance of individual animals, NMFS does not expect the combination of research activities in the action area to significantly impact sea turtles at the population or species level.

4.7.2 Other activities

Historically, one of the major contributors to declines in sea turtle populations was the commercial harvest of eggs and turtles. Today, target sea turtles may be adversely affected by human activities including commercial and recreational fishing (as bycatch via entrapment and entanglement in fishing gear), habitat degradation, and tourism and recreation (via harassment from human approach and presence) within the action area. Of these, disturbance that results in mortality or displacement of animals or abandonment of behaviors such as feeding or breeding by groups of animals are more likely to have cumulative effects on the species than entanglement of animals in fishing gear. In addition, the target species benefit from other human activities operated by Federal, state, and or local agencies and organizations including management, conservation, and recovery efforts, nest monitoring, education and outreach, and stranding response programs.

4.7.3 Summary of cumulative effects

It is likely that issuance of the proposed permit may have some cumulative adverse effects on the target animals due to the frequency of the disturbances associated with research activities. These adverse effects would likely be additive to those resulting from disturbance under other permits, and to disturbances related to other human activities in the action area. Some animals may be acclimated to a certain level of human activity and may be able to tolerate disturbance associated with these activities with little adverse impacts on population or species vital rates. However, even animals acclimated to a certain level of disturbance may be adversely affected by additive effects that exceed their tolerance threshold. Based on the review of past, present and future actions that impact the target species, the incremental contribution of the short-lived impacts associated with the proposed action is not anticipated to result in significant cumulative impacts to the human environment.

Overall, the preferred alternative would not be expected to have more than short-term effects on endangered and threatened sea turtles species. The impacts of the non-lethal research activities are not expected to have more than short-term effects on individual sea turtles and any increase in stress levels from the research would dissipate within approximately a day and injuries caused by tagging and sampling are expected to heal. Even if an animal is exposed to additional research effort (e.g., a week later), no significant cumulative effects of research would be expected given the nature of the effects. NMFS does not expect the authorization of the proposed research activities of the preferred alternative to appreciably reduce the species' likelihood of survival and recovery in the wild because it would not likely adversely affect their birth rates, death rates, or recruitment rates. In particular, NMFS does not expect the proposed research activities to affect adult female turtles in a way that appreciably reduces the reproductive success of adults, the survival of young, or the number of young that annually recruit into the breeding populations of any of the target species.

CHAPTER 5 LIST OF PREPARERS AND AGENCIES CONSULTED

This EA was prepared by the National Marine Fisheries Service, Office of Protected Resources in Silver Spring, Maryland.

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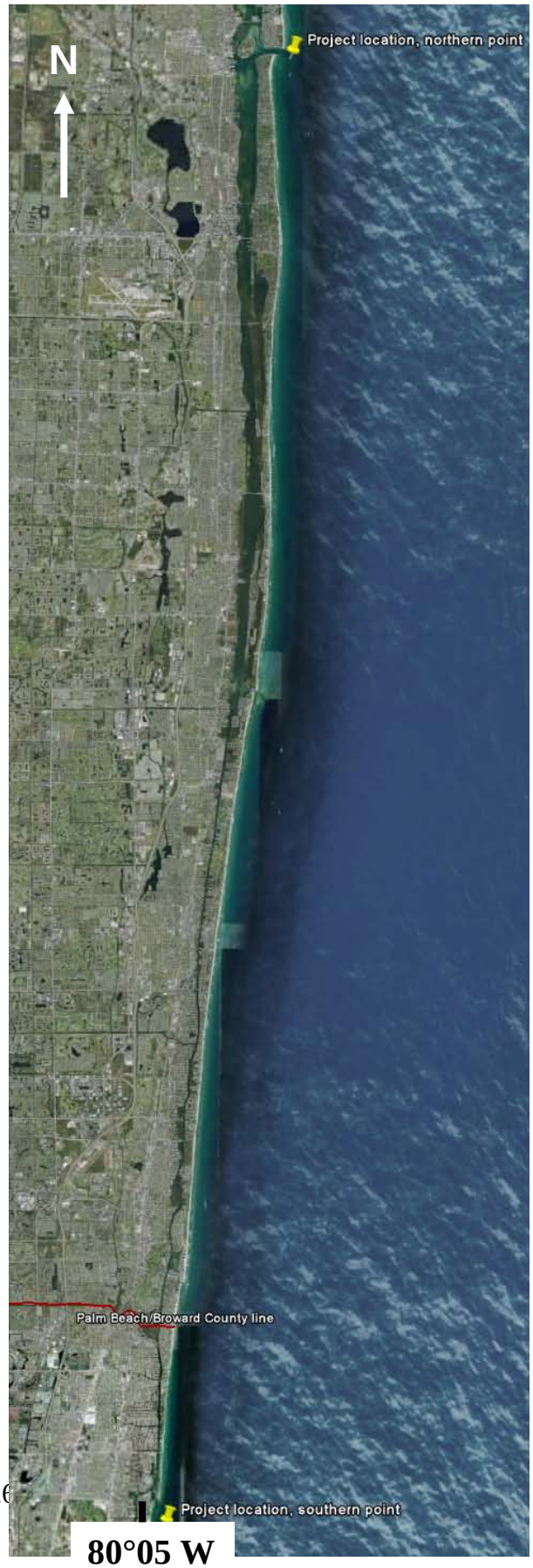
APPENDIX 1: Map of Action Area



26°46 N

58 km

26°14 N

Palm Beach County
Broward County

80°05 W

APPENDIX 2: Proposed takes for permit No. 16174

Table Specifying the Kind(s) of Protected Species, Location(s), and Manner of Taking

SPECIES	LIFESTAGE	NO. ANIMALS PER YEAR	TAKES PER ANIMAL*	OBSERVE/ COLLECT METHOD	PROCEDURES	DETAILS
Turtle, green sea	Juvenile	10	2	Hand and/or Dip Net	Instrument, drill carapace attachment; Instrument, epoxy attachment (e.g., satellite tag, VHF tag); Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Tracking; Transport; Weigh; Gastric lavage; Recapture for gear removal	Takes for this row would occur at the shallow reef (2-6m deep).
Turtle, green sea	Juvenile	20	2	Hand and/or Dip Net	Instrument, drill carapace attachment; Instrument, epoxy attachment (e.g., satellite tag, VHF tag); Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Tracking; Transport; Weigh; Gastric lavage; Recapture for gear removal	Takes for this row would occur at the deeper reef (9-12m deep).

*Two takes per animal; initial tagging and gear removal.

APPENDIX 3: Permits Authorizing Directed Takes for the Target Sea Turtle Species in the Action Area

Existing Permits Authorizing Takes for the Target Sea Turtle Species In the Action Area.

Permit Number	Permit Holder	Expiration Date
14856	Jeanette Wyneken	November 30, 2015
14506	Llewellyn Ehrhart	September 15, 2015
14726	Blair Witherington	September 15, 2015
13544	Jeffrey Schmid	April 30, 2014
13573	Michael Salmon	May 1, 2012
13306	Karen Holloway-Adkins	June 30, 2013
14655	Jane Provancha	June 1, 2015
14508	Inwater Research Group, Inc.	June 1, 2015
1551	NMFS SEFSC	July 1, 2013
1570	NMFS SEFSC	December 31, 2011
1571	NMFS SEFSC	December 31, 2011
1576	NMFS NEFSC	September 30, 2011

Authorized Mortality

Permit No. 1576 authorizes the lethal take of up to 23 loggerhead, 1 green, 1 leatherback, and 1 Kemp's ridley sea turtles annually, and up to 1 loggerhead and 1 Kemp's ridley over the course of the permit, through 2011. However, deaths are authorized as part of gear testing in the Northeast Atlantic, not in Florida waters.

Permit No. 1570 authorizes the lethal take of up to 3 loggerhead, 2 green, 1 leatherback, 2 Kemp's ridley, 1 hawksbill, and 1 olive ridley sea turtle over the course of the permit through 2011.