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National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

ENVIRONMENTAL ASSESSMENT

On the Effects of the Issuance of a Permit to Conduct Research on Sea Turtles in Florida Bay

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Lead Agency: U.S. Department of Commerce
National Oceanic and Atmospheric Administration
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Office of Protected Resources

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Abstract: The National Marine Fisheries Service (NMFS) proposes to issue a scientific research permit for takes under the authority 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 five years from date of issuance. Research authorized under Permit No. 14622 would monitor the abundance of loggerhead (*Caretta caretta*) and green (*Chelonia mydas*) sea turtles; characterize the aggregations of loggerhead, Kemp's ridley (*Lepidochelys kempii*), and hawksbill (*Eretmochelys imbricata*) sea turtles; and determine the movements, behaviors, habitat-use, and reproductive status of loggerhead sea turtles in Florida Bay. 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. This EA evaluates the potential impacts to the human environment from issuance of the proposed permit.

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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 Allen Foley, Ph.D., Florida Fish and Wildlife Conservation Commission, 370 Zoo Parkway, Jacksonville, Florida 32218 (File No. 14622), NMFS proposes to issue a permit that authorizes scientific research pursuant to the Endangered Species Act of 1973 (ESA; 16 U.S.C. 1531 *et seq.*), and the regulations governing the taking, importing, and exporting of endangered and threatened species (50 CFR Parts 222-226).

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" 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 takes of threatened and endangered species, respectively, 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 would not have a significant adverse impact on the species or stock.

1.1.2 Research Objectives

Under Permit No. 14622 Dr. Foley would monitor the abundance of loggerhead (*Caretta caretta*) and green (*Chelonia mydas*) sea turtles; characterize the aggregations of loggerhead, Kemp's ridley (*Lepidochelys kempii*), and hawksbill (*Eretmochelys imbricata*) sea turtles; and determine the movements, behaviors, habitat-use, and reproductive status of loggerhead sea turtles in Florida Bay. This work would be part of a larger effort to establish and maintain index in-water sea turtle monitoring sites in Florida.

1.2 OTHER EA/EIS THAT INFLUENCE SCOPE OF THIS EA

Because Permit No. 14622 would be a continuation of Dr. Foley's current research on sea turtles, the action area and a majority of the proposed activities have been previously described and analyzed for his current permit, No. 1501-03. The EA prepared for his permit, *Environmental Assessment Scientific Research Permits to Conduct Research on Endangered and Threatened Sea Turtles Permit Files No. 1501 and 1506* (NMFS 2005), 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.

1.3 SCOPING SUMMARY

The purpose of scoping is to identify the issues to be addressed and the significant issues related to the Proposed Action, as well as identify and eliminate from detailed study the issues that are not significant or that have been covered by prior environmental review. 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.

1.3.1 Comments on the Application

Notice of Receipt for the application was published in the *Federal Register*, announcing the availability of the application for public comment (75 FR 9868, March 4, 2010). No public comments were received for the application.

1.4 APPLICABLE LAWS AND NECESSARY FEDERAL PERMITS, LICENSES, AND ENTITLEMENTS

This section summarizes federal, state, and local permits, licenses, approvals, and consultation requirements necessary to implement the proposed action, as well as who is responsible for obtaining them. Even when it is the applicant's responsibility to obtain such permissions, NMFS is obligated under NEPA to ascertain whether the applicant is seeking other federal, state, or local approvals for their action.

1.4.1 National Environmental Policy Act

The National Environmental Policy Act was enacted in 1969 and is applicable to all "major" federal actions significantly affecting the quality of the human environment. A major federal action is an activity that is fully or partially funded, regulated, conducted, or approved by a federal agency. NMFS issuance of permits for research represents approval and regulation of activities. While NEPA does not dictate substantive requirements for permits, licenses, etc., it requires consideration of environmental issues in federal agency planning and decision making. The procedural provisions outlining federal agency responsibilities under NEPA are provided in the CEQ's implementing regulations (40 CFR Parts 1500-1508).

NMFS has, through NOAA Administrative Order (NAO) 216-6, established agency procedures for complying with NEPA and the implementing regulations issued by the CEQ. NAO 216-6 specifies that issuance of scientific research permits under the ESA is among a category of actions that are generally exempted (categorically excluded) from further environmental review, except under extraordinary circumstances. When a proposed action that would otherwise be categorically excluded is the subject of public controversy based on potential environmental consequences, has uncertain environmental impacts or unknown risks, establishes a precedent or decision in principle about future proposals, may result in cumulatively significant impacts, or may have an adverse effect upon endangered or threatened species or their habitats, preparation of an EA or EIS is required.

Although issuance of scientific research permits is typically subject to a categorical exclusion, as described in NAO 216-6, NMFS is preparing an EA for these actions to provide a more detailed analysis of effects to ESA-listed species. This EA is prepared in accordance with NEPA, its implementing regulations, and NAO 216-6.

1.4.2 Endangered Species Act

Section 9 of the ESA, as amended, and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption such as by a permit. Permits to take ESA-listed species for scientific purposes, or for the purpose of enhancing the propagation or survival of the species, may be granted pursuant to Section 10(a) (1) (A) of the ESA.

NMFS has promulgated regulations to implement the permit provisions of the ESA (50 CFR Part 222) and has produced Office of Management and Budget-approved application instructions that prescribe the procedures necessary to apply for permits. All applicants must comply with these regulations and application instructions in addition to the provisions of the ESA.

Section 10(d) of the ESA stipulates that, for NMFS to issue permits under section 10(a) (1) (A) of the ESA, the Agency must find that the permit: was applied for in good faith; if granted and exercised would not operate to the disadvantage of the species; and would be consistent with the purposes and policy set forth in Section 2 of the ESA.

Section 2 of the ESA sets forth the purposes and policy of the Act. The purposes of the ESA are to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in section 2(a) of the ESA. It is the policy of the ESA that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of the ESA. In consideration of the ESA's definition of conserve, which indicates an ultimate goal of bringing a species to the point where listing under the ESA is no longer necessary for its continued existence (i.e., the species is recovered), exemption permits issued pursuant to section 10 of the ESA are for activities that are likely to further the conservation of the affected species.

Section 7 of the ESA requires consultation with the appropriate federal agency (either NMFS or the U.S. Fish and Wildlife Service (USFWS)) for federal actions that "may affect" a listed species or adversely modify critical habitat. NMFS issuance of a permit affecting ESA-listed species or designated critical habitat, directly or indirectly, is a federal action subject to these Section 7 consultation requirements. Section 7 requires federal agencies to use their authorities in furtherance of the purposes of the ESA by carrying out programs for the conservation of endangered and threatened species. NMFS is further required to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any threatened or endangered species or result in destruction or adverse modification of habitat for such species. Regulations specify the procedural requirements for these consultations (50 Part CFR 402)

1.4.3 Magnuson-Stevens Fishery Conservation and Management Act

Under the MSFCMA Congress defined Essential Fish Habitat (EFH) as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802(10)). The EFH provisions of the MSFCMA offer resource managers means to accomplish the goal of giving heightened consideration to fish habitat in resource management. NMFS Office of Protected Resources is required to consult with NMFS Office of Habitat Conservation for any action it authorizes (e.g., research permits), funds, or undertakes, or proposes to authorize, fund, or undertake that may adversely affect EFH. This includes renewals, reviews or substantial revisions of actions.

EFH has been designated for federally managed fisheries. 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.*

CHAPTER 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter describes the range of potential actions (alternatives) determined reasonable with respect to achieving the stated objectives, 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 under which the proposed permit would not be issued. The No Action alternative is the baseline for rest of the analyses. The Proposed Action alternative represents the research proposed in the submitted permit application, with standard permit terms and conditions specified by NMFS.

2.1 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 the environment (e.g., harassment to animals) 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, Permit No. 14622 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 five years from the date of issuance. Alternative 2 is the preferred alternative.

Dr. Foley proposes to monitor the abundance of loggerhead and green turtles; characterize the aggregations of loggerheads, Kemp's ridleys, and hawksbills; and determine the movements, behaviors, habitat-use, and reproductive status of loggerheads in Florida Bay. See Appendix 1 for the specific level of take and activities that would be authorized for each species. No mortalities would be authorized under the permit. Work would be conducted in March or June of each year.

Action Area

Research would occur within the boundaries of the Everglades National Park (ENP) around the vicinity of the Arsnicker Keys, Rabbit Keys, and Twin Keys in southwestern Florida Bay. The applicant has a permit from the ENP to work in the park and would follow all ENP protocols for the use of vessels.

Research Activities

The following sections provide a description of the proposed research activities by project.

June Fieldwork

Annual June fieldwork would involve determining the relative abundances of loggerheads and green turtles, determining the absolute abundance of loggerheads, and capturing loggerheads, Kemp's ridleys, and hawksbills to more specifically characterize these turtles in the action area.

Visual Count/Survey

The relative abundances of loggerheads and green turtles would be determined during haphazard unmarked nonlinear transect surveys (HUNTS). During HUNTS, each of two pairs of observers would be stationed on a 2-m tower that is affixed to a 6.5 m long, 2.4 m wide, flat-bottomed vessel (21' Carolina Skiff). Observers would search for turtles on opposite sides of each vessel while the vessels travel at slow speeds (generally < 8 kph). A Global Positioning System (GPS) unit would be used to determine the coordinates during the search. When a turtle is sighted, the HUNT would end and the coordinates and species of the sighted turtle would be noted. Depending upon the species, an attempt could be made to capture the sighted turtle. After the release of any captured turtles, a new HUNT would then be initiated unless it is the end of the day. Multiple separate HUNTS would be conducted each day.

Hand Capture, Handle, and Release

Dr. Foley would regularly attempt to capture target sea turtles sighted during HUNTS except for green turtles. Conditions at the study site and the vessel type make attempts at capturing green turtles unproductive. Capture attempts would also be made for sea turtles sighted opportunistically when not conducting HUNTS.

Turtles would be captured by hand by a snorkeler who would dive from a boat near the turtle. Researchers would use large, flat bottom boats with large moveable bimini tops to provide shade over the turtle. In addition, researchers would have large umbrellas on hand if additional shade is required. Each captured turtle would be carefully brought on board a boat and placed in an area with overhead shading on padded mats which provide a safe location to keep the turtles secure during procedures. Each boat would have a part of the gunwale that has been lowered so it is only about 30 cm above the surface of the water. This area of the gunwale would be approximately 150 cm in length, rounded and smooth, and free from any obstructions such as cleats. Typically, only one captured turtle would be held at a time on each boat. Occasionally, researchers would need to hold more than one turtle on a boat at the same time. In this case, one person on the boat would be specifically tasked with constantly supervising the turtles to make sure they do not bite or otherwise injure each other. Researchers also would use a small, smooth, wet towel to cover the head and eyes (not covering the nares) of each turtle.

After procedures have been performed, all turtles would be released at the site of capture within one hour except turtles that receive satellite transmitters (see below).

Measure, Weigh, and Photograph

Captured turtles would be measured with forestry calipers to obtain straight carapace length (SCL), carapace width, head width, and plastron length. A flexible tape measure would be used to obtain curved carapace length, carapace width, and tail length. Turtles would be weighed to the nearest 0.5 kg using a digital hanging scale. Turtles would be gently turned onto their carapace (within the padded and shaded portion of the boat) and into the center of a square piece

of small mesh (2 cm) soft cotton net. Two corners of the net would each be brought over one shoulder of the turtle and the other two corners would be brought over the carapace near each back flipper. The two sides of the net along each side of the carapace would also be pulled up to completely enclose the turtle (except for the front flippers and head - the latter to avoid covering the eyes). The four corners and the middle edges of the net would be secured together with a short piece of looped rope with clips on each end. The hanging scale would be hung from the center of a padded metal pole. The hook at the bottom of the scale would then be placed through the loop on the rope that is clipped to the netting and the netting and turtle would be gently lifted by two people (one on each end of the pole) just high enough to clear the floor padding. Turtles also would be photographed and carefully examined. During external examinations, the size and location of any tumors characteristic of fibropapillomatosis (FP) would be noted. A separate set of equipment would be used to measure and weigh turtles with FP. All equipment coming in contact with turtles would be cleaned between uses.

Mark: Flipper and PIT tagging and Carapace Painting

Prior to release, all turtles would be checked for existing external flipper tags or internal Passive Integrated Transponders (PIT tags). If a turtle has not been previously tagged, inconel metal flipper tags would be applied to the proximal trailing edge of each front flipper typically in either the first or second scale. Prior to tagging, tags would be cleaned and soaked in alcohol to remove any residue. Antibiotic ointment would be applied to the cutting tip of each tag just prior to attachment. These tags are expected to last up to several years. A PIT tag would be placed, using a sterile 12-gauge hypodermic needle, into the dorsal surface of the front flipper in the flexor carpi ulnaris muscle (between the trailing-edge scutes of the flipper and the ulna). These tags are expected to last indefinitely. Prior to the insertion of any tag, the skin in the target area would be scrubbed with 10% povidone-iodine. If a previously tagged turtle is missing any of its original tags, replacement tags would be applied.

A temporary, identifying number would be painted on the carapace of each turtle to enable observers to identify and record recently captured turtles from a distance (without actual recapture) as part of a within-year capture-mark-recapture population estimation technique. A temporary white gel coat would be applied to the scutes with no paint crossing sutures.

Sampling: Blood, Scute, and Skin

A 5-6 ml blood sample would be drawn from the dorsal cervical sinus of each turtle immediately following capture using a 21-gauge, 3.8 cm vacutainer needle and a 6-7 ml heparinized vacutainer tube. The blood sample would be immediately centrifuged and the plasma and blood cells placed separately into cryotubes and stored frozen in an on-board liquid nitrogen tank for later testosterone analysis (plasma) and determination of genetic identity (cells). To predict gender, plasma samples would be sent to Dr. David Owens (Co-Investigator) of the Grice Marine Laboratory at the College of Charleston. These samples would be analyzed using a radioimmunoassay to determine testosterone concentration. To evaluate genetic identity, samples of blood cells would be sent to Dr. Peter Dutton, National Marine Fisheries Service, Southwest Fisheries Science Center (SWFSC).

To investigate foraging strategies and the isotopic niche width of loggerheads in a foraging habitat, researchers would collect two types of epidermal tissue from loggerhead sea turtles: skin

from the shoulder region and keratin from the third lateral scute of the carapace. The surface of the epidermis (of scute or skin) would be cleaned with three applications of alcohol prior to sample collection, and a sterile 6-mm diameter biopsy punch designed for collecting epidermis samples from humans would be used to yield a tissue sample between 0.5 to 2 mm in depth. Biopsy punches would be discarded after each use. Samples would be transferred to the Archie Carr Center for Sea Turtle Research for microlayering of epidermal scute tissues and determination of isotopic signatures within these microlayers and in epidermal skin samples. Niche breadth among individuals would be compared in the population.

Ultrasonography

To assist in determining gender of large loggerheads, researchers would conduct ultrasonography on loggerheads over 75 cm SCL (the size at which serum testosterone levels may not be indicative of gender). Ultrasonography would be conducted by Dr. Owens using a portable ultrasound machine on board the research vessel. To conduct an ultrasound, researchers would gently turn a loggerhead onto its carapace on a rubber car tire (staying within the padded, shaded portion of the boat). Turtles remain largely impassive while inverted on a tire; however, two assistants would be present to gently restrain the front flippers if necessary. A clear, water-based gel would be applied to the inguinal area of the turtle and a smooth-ended transducer would then be pushed up against the skin and used to visualize the area within the coelomic cavity around the gonads. The ultrasound would be completed within 10 minutes (usually within a few minutes).

Satellite Tagging

Over the life of the permit, a total of 10 loggerheads would be outfitted with GPS-linked ARGOS transmitters to provide information on habitat-use, help establish geographic boundaries for capture-mark-recapture density estimates, and improve appraisals of assumptions used in estimates of survival rates. No more than five of these animals would be tagged in a given year; additional animals would be tagged in the following years provided that the total number of tagged turtles does not exceed 10 loggerheads over the life of the permit. Satellite transmitters would be Wildlife Computers' MK10-AFB transmitting fast-GPS tags (10 cm long, 5 cm wide, 2-3 cm high, and weigh 250 g). Satellite tagging would take place on board the boat, usually while tied up at a stable docking point. Transmitters would be mounted on the second vertebral scute of the carapace. Transmitters would be attached with one of two bonding methodologies: 1) silicone elastomer with resin or 2) epoxy. Silicone elastomer (a splinting agent used in human medicine that does not generate heat) would be used to create a stable base beneath the transmitter (and on top of the carapace) and would allow the transmitter to be removed (or fall off) without damage to the carapace at a later date. Once the silicone elastomer has cured, three layers of polyester resin over fiberglass cloth strips would be applied to encase the transmitter onto the carapace. The layers of resin would be very thin and generate very little heat.

In the event that the above method is unsuccessful in retaining the tag, an alternative epoxy-based method would be used for tag attachment at the same location on the carapace. This is a common tag attachment protocol recommended by the sea turtle research community (see www.seaturtle.org). Researchers would remove epibiota from the carapace tagging site using a scraper, steel wool, and water. The site would be thoroughly cleaned with acetone and rags and dried. The carapace scutes and bottom of the tag unit would be lightly sanded with 150 grit sandpaper. The satellite tag would be attached to the carapace using an epoxy that cures

releasing little heat that would not be injurious to animals. Epoxy would be applied in two to three thin layers, allowing 10-15 minutes between layers for each layer to set and avoid excessive heat. The attachment process would take approximately two hours or less, depending on the ambient air temperature. The weight of transmitters would not exceed 5 percent of the turtle's body mass. Each attachment would be made as hydrodynamic as possible and so that there is no risk of entanglement.

Tag attachment would be conducted in a well-ventilated area and extreme care would be taken to ensure that no resin or epoxy drips onto the skin of the turtle. Satellite tagged turtles would be released within three hours of capture.

March Field and Laboratory work

In March of each year, up to 50 adult-sized loggerheads would be spotted and captured in the same manner described above to study the reproductive movements and behaviors of adult male and female loggerheads. March research would involve capturing animals in the field and transporting them back to the laboratory for procedures and examination. In addition, prior to release, all turtles captured during March research would be measured, weighed, flipper and PIT tagged, externally examined, and photographed as described above. The following describes the additional laboratory procedures that would be performed on captured turtles. All turtles would be released at the site of capture within 24 hours.

Transport

Turtles would be transported by boat (held under the conditions described above) to the Keys Marine Lab at Long Key (a land-based facility adjacent to the in-water study site). Turtles would be moved from the boat to the dock using a NMFS-designed sea turtle stretcher consisting of non-abrasive vinyl cloth and velcro closures. This system ensures that the turtle cannot slide out or drop out while being transferred to shore. Turtles would be kept in the stretcher and moved from the dock to the lab using a large plastic wheelbarrow cushioned with poly buoys. Transport would typically take 30 minutes and last no longer than 90 minutes from capture to arrival at the lab.

Ultrasonography, Laparoscopy, and Organ Biopsy

Ultrasonography (described earlier) would be used initially to help evaluate the gonadal condition of the turtles. When ultrasound is inconclusive, laparoscopy would be used to directly visualize the gonads. A testicular biopsy may also be taken from adult male turtles during this procedure to determine reproductive status, if necessary. Researchers would use a laparoscopic procedure that has been specifically developed for sea turtles and has been used successfully in the field by Dr. Foley and other sea turtle researchers. Dr. David Owens of the University of Charleston, who helped pioneer this procedure, would conduct the ultrasounds and laparoscopies. Dr. Al Segars, a veterinarian with broad sea turtle experience would assist Dr. Owens and continually monitor each animal before, during, and after the procedure. Dr. Segars would have the final say as to whether any particular animal should or should not undergo ultrasound or laparoscopy. To conduct the laparoscopies, turtles would be carefully restrained in an inverted position (using a custom-made, padded metal stand). The inguinal area would be scrubbed with three alternating applications of 70% ethanol and surgical iodine soap. A local anesthetic, lidocaine, then would be injected into the muscle and dermis of the peritoneal wall of

the inguinal area. A 1-2 cm incision would be made just through the skin and the trocar and sleeve would be used to push through the muscles and peritoneal wall into the body cavity. Particular caution would be taken to avoid an entry that is too far posterior (where the trocar might strike the kidney) or an entry that goes too deep (where the trocar might strike the lung or gut). After entry into the peritoneal cavity is achieved, it would be verified with the laparoscope prior to inflating the body cavity with filtered air. Inflation (known as insufflation) would be necessary to visualize the internal organs. When the examination is complete, all air would be removed prior to suturing the wound. It is currently common practice to avoid the use of general anesthetics (with veterinary approval) for this particular surgery since a local anesthetic incurs less risk of mortality, is adequate for reducing apparent pain, and allows a much shorter post-operative observation period.

After ultrasound and laparoscopy, turtles would be classified by sex and reproductive status. Detailed descriptions of the condition of the gonads would also be recorded. Loggerheads that undergo laparoscopic examinations would be kept for up to 24 hours to assure recovery and to make sure turtles are not buoyant before being released. Turtles would be kept individually in six-foot diameter fiberglass tanks with two to three feet of natural, filtered salt water. The tanks would be drained and cleaned with a weak bleach solution before and after holding each turtle. No obstructions or debris would be in the tanks.

Satellite Tagging

A total of 15 adult loggerheads captured and determined to be reproductively active would be outfitted with GPS-linked ARGOS transmitters over the life of the permit. No more than 10 of these animals would be tagged in a given year; additional adult loggerheads would be tagged in the following years provided that the total number of tagged turtles does not exceed 15 loggerheads over the life of the permit. Transmitters would be the same type, size and weight and attached in the same manner as described above. Dr. Foley would use tag turtles to determine the movements and diving patterns of loggerheads during reproductive activity and use GIS analyses to characterize oceanographic features associated with the locations of these turtles. He would identify routes used during reproductive migrations and possible breeding areas. For the adult females, Dr. Foley also would use these transmitters to determine internesting habitat, clutch frequency, and nest-site fidelity.

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 amount of blood that can be drawn;
- 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

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

Activities would take place within the ENP in southwestern Florida Bay around the vicinity of the Arsnicker Keys, Rabbit Keys, and Twin Keys. The applicant has a permit to conduct the proposed research in the ENP. In addition, conditions in the permit would require researchers to identify and avoid conducting research over, on, or immediately adjacent to submerged aquatic vegetation, coral, live or hard bottom habitat, and seagrasses. No gear would be set or anchored on coral or live or hard bottom habitat.

3.2.1 Sanctuaries, Parks, Historic Sites, etc.

<u>Everglades National Park</u>

The Everglades National Park spans the southern tip of the Florida peninsula and most of Florida Bay and is the only subtropical preserve in North America. It contains both temperate and tropical plant communities, including sawgrass prairies, mangrove and cypress swamps, pinelands, and hardwood hammocks, as well as marine and estuarine environments and is home to several large wading birds, such as the roseate spoonbill, wood stork, great blue heron and a variety of egrets. The Park has been designated a World Heritage Site, an International Biosphere Reserve, and a Wetland of International Importance.

3.2.2 Essential Fish Habitat

Congress defined Essential Fish Habitat (EFH) as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802(10)). The EFH provisions of the Magnuson-Stevens Fishery Conservation and Management Act offer resource managers means to accomplish the goal of giving heightened consideration to fish habitat in resource management. EFH has been designated for federally managed fisheries. 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 1970's (50 CFR 17.95(a)). The designation did not include primary or secondary constituent elements. On September 29, 2009 the 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. 14622 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. NMFS contacted the USFWS on potential impacts to manatees and proposed critical habitat. The USFWS concurred by email (dated January 25, 2011) that no impacts to the species are expected. Upon USFWS recommendation, language would be included in the permit to avoid interactions with manatees. Therefore no formal consultation was necessary.

3.3 BIOLOGICAL ENVIRONMENT

In addition to the target species, a wide variety of non-target species could be found within the action area, including marine mammals, invertebrates, and fish. Since merely being present within the action area does not necessarily mean a marine organism would 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**
Kemp's ridley sea turtle	*Lepidochelys kempii*
Hawksbill sea turtle	*Eretmochelys imbricata*

ESA Threatened
Loggerhead sea turtle *Caretta caretta***

**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.*

*** NMFS is currently accepting comments on changing the listing of the loggerhead sea turtle to endangered (75 FR 12598).*

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. Regular green sea turtle nesting also occurs 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.

Kemp's ridley sea turtle

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

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 1999b). 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 1999a, Florida Statewide Nesting Beach Survey database). At the two principal nesting beaches in the U.S. Caribbean where long-term monitoring has been carried out, populations appear to be increasing (Mona Island, Puerto Rico) or stable (Buck Island Reef National Monument, St. Croix, USVI) (Meylan 1999b).

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

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 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. While NMFS has not yet officially recognized these DPSs, the information provided in the status review represents the most recent and available information relative to the status of this species. On March 16, 2010 NMFS published a Notice of a Proposed Rule (75 FR 12598) to formally designate the loggerhead with these nine DPS' worldwide. The notice also stated that NMFS plans to reclassify both DPS' within the United States as endangered (N. Pacific DPS and Northwest Atlantic Ocean DPS). The public has until September 13, 2010 to comment on the proposed rule.

The loggerhead was listed as a threatened species in 1978. Critical habitat has not been designated for the loggerhead.

3.3.2 Non-Target Species Potentially Affected by the Proposed Action

Due to the nature of Dr. Foley's proposed hand capture method and that no gear would be set in the water, NMFS does not expect the issuance of Permit No. 14622 to adversely affect non-target species. However, they are identified here because they occur in the action area.

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 MMPA. 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 stock 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 described in Ch. 3.2.3. Further, as a precautionary measure, Permit No. 14622 would contain conditions for Florida manatees to ensure that interactions are avoided. Therefore this species is not considered further in this analysis.

In addition to manatees, other species listed as endangered or threatened present in the action area include: American crocodile (*Crocodylus acutus*), Cape Sable seaside sparrow (*Ammodramus maritima mirabilis*), Wood stork (*Mycteria americana*), Red-cockaded woodpecker (*Picoides borealis*), and Garber's Spurge (*Chamaesyce garberi*).

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. 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. Foley's proposed research would monitor the abundance of loggerhead and green sea turtles; characterize the aggregations of loggerhead, Kemp's ridley, and hawksbill sea turtles; and determine the movements, behaviors, habitat-use, and reproductive status of loggerhead sea turtles in Florida Bay. 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 permits 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, except

scute scrapings and visual count surveys, were considered in the 2005 EA prepared for issuance of Permit No. 1501 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 reduced (within the same order of magnitude) from the annual number of sea turtles previously authorized under No. 1501. Further, no green sea turtles would be captured under the Proposed Action, rather only counted during vessel surveys. This also is a reduction from what was previously authorized as green turtles were authorized for capture and subsequent procedures under the past permit.

Visual Count/Survey

This is a simple activity that does not involve direct contact with sea turtles. NMFS is not aware of any studies that have examined stress levels (e.g., blood chemistry changes) in turtles after exposure to vessel surveys; these types of studies would be extremely difficult to conduct. Although reactions to the vessel could result in a change in behavior, it would be similar to other natural behaviors such as predator avoidance for the target sea turtles. The reaction is likely to result in some level of stress for the turtles, but the avoidance reaction is not expected to result in harm and is within the normal spectrum of behaviors the animal might experience naturally. NMFS has authorized numerous research activities involving approach by boat and hand capture (e.g., rodeo) that would elicit the same avoidance behavior and stress, and more (struggle to escape); these animals experience more stress than what would result from the proposed vessel surveys and have been released unharmed, some even tracked with telemetry for months after release (indicating they resumed migrations, feeding, etc.). This suggests that the effects during surveys would be minimal and very transitory. Turtles would be exposed very briefly to the survey activity and are expected to maintain or resume normal behavior after the boat leaves the area.

Hand Capture and Release

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. During release, turtles would be lowered as close to the water's surface as possible, to prevent potential injuries.

Handle, Measure, Weigh, and Photograph

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.

Marking: Flipper and PIT Tagging and Carapace Painting

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). No problems with tagging have been reported by NMFS permit holders. The NMFS SEFSC Galveston Laboratory has flipper and PIT tagged up to 56 loggerheads per year from 1999 to present holding the animals for approximately 3 years after tagging. Turtles were held in a laboratory setting, did fine, and were later released. This suggests that if a turtle is tagged using proper techniques and protocol and released back into a suitable environment, the chances for problems associated with the tagging are negligible. 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.

The gel coat/paint that would be used to temporarily mark the turtle carapace is considered to be toxic but many of the health risks associated with it are attributed to ingestion and inhalation, which 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 one to two weeks. This field application arguably is comparable to cosmetic applications of fingernail polishes, which contain many of the same or similar chemicals. According to Dr. Foley (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.

Sampling: Blood, Scute, and Skin

NMFS does not expect that individual turtles would experience more than short-term stresses during blood sampling. Taking a blood sample from the dorsal side of the neck is a routine procedure when conducted by trained personnel following proper guidelines (Owens 1999). According to Owens (1999), with practice it is possible to obtain a blood sample 95 percent of the time, and the sample collection time should take about 30 seconds. Sample collection sites would always be disinfected with alcohol or other antiseptics, prior to sampling. The permit would be conditioned to limit blood sampling volume to a conservative amount based on the size of the turtle captured. Blood hormones and heart rate have been measured in animals that have had blood drawn from them and no stress has been observed. According to Dr. Foley, this sampling protocol has been used on hundreds of green and hawksbill turtles that have been recaptured a year after having been sampled in this manner and in all cases the biopsy sites have completely healed leaving no trace of the location of the biopsy.

Similarly, NMFS does not expect that individual turtles would experience more than short-term stress during tissue sampling. Based on the described methods of cleansing and disinfection, infection of the sampling site would not be expected. Researchers who examined turtles caught two to three weeks after sample collection noted the sample collection site was almost completely healed. During the more than five years of tissue biopsying using sterile techniques, NMFS SEFSC researchers have encountered no infections or mortality resulting from this procedure (NMFS 2006). Scute sampling is a minimally invasive procedure that involves collecting a small amount of keratin from the outermost edge of the marginal scutes of the carapace, or turtle shell. Bjorndal et al. (2010) investigated the effects of repeated skin, blood and scute sampling on juvenile loggerhead growth. Turtles were sampled for each tissue type three times over a 120-day period. The authors found that repeated sampling had no effect on growth rates; growth rates of sampled turtles were not significantly different from control animals. Turtles exhibited rapid healing at the sampling site with no infection or scarring. Further, all turtles increased in body mass during the study proving that sampling did not have a negative impact on growth or weight gain. The authors conclude that the sampling did not adversely impact turtle physiology or health (Bjorndal et al. 2010).

Based on this information, NMFS expects that the proposed sample collection would cause no more than minimal additional stress or discomfort to the turtle beyond what was experienced during capture, collection of measurements, tagging, etc.

Ultrasound

This is a quick, non-invasive technique commonly used in human medicine, has been used widely on sea turtles (Owens 1999), and does not require anesthetic. This technique is expected to have little to no effect to turtles. Any stresses associated with this activity are expected to be minimal and short-term with animals recovering within minutes.

Satellite Tagging

As described in Ch. 2, Dr. Foley would take measures to prevent harm to turtles during tagging. The permit would also require that Dr. Foley 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 with epoxy is a commonly used and permitted technique by NMFS. These tags are unlikely to become entangled due to their streamlined profile and would typically be shed in about one year, posing no long-term risks to the turtle.

South Carolina Department of Natural Resources (SCDNR) researchers satellite-tagged 36 juvenile loggerheads (56.6-76.8 cm SCL min) during 2004-2007 and 29 adult male loggerheads (86.6-107 cm SCL min) during 2006-2007. Their track durations for tags on juveniles have ranged from 30 days to 496 days, with an average for expired tags of 169 days. Track durations for adult males ranged from 7 to 238 days, with an average for expired tags of 117 days. Satellite transmitter attachments may affect the hydrodynamic drag (and thus things like swimming speed or efficiency); however, long track durations suggest animals are not severely compromised. Shorter track durations have multiple possible explanations, including tag-shedding; physical damage to transmitter; and biological fouling which interferes with data transmission. Although mortality of the tagged individual is also a theoretically possible explanation of short track durations, it is impossible to establish this or to determine whether it occurred directly or indirectly as a result of satellite-tagging (or as a result of some other cause).

Dr. Foley has used this attachment methodology on approximately 100 sea turtles throughout Florida and the Caribbean with excellent success and with no evidence of complications (including 10 loggerheads originally captured in Florida Bay, outfitted with a satellite transmitter, and later recaptured in healthy condition). These archival tags were designed to record turtle behavior. During 24-hr monitoring periods, archival-tagged turtles dove, floated at the surface, and swam vigorously enough to make their recapture difficult. 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.

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 fifteen 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.

Transport: 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 2006).

Laparoscopy and Organ Biopsy

Laparoscopy is an invasive form of surgery that utilizes a miniature telescope to directly view inside the peritoneal cavity. It is currently common practice to avoid using general anesthetics for laparoscopy and gonad biopsy since local anesthetics are adequate for reducing apparent pain and allow for a shorter post-operative observation and recovery period. A nonsteroidal anti-inflammatory drug may be administered to reduce post-operative pain. Owens (1999) reports a mortality rate of 1-2% associated with the procedure in sea turtles. The two most common sources of mortality are excessive bleeding due to poor placement and death due to non-specific symptoms in a turtle that has already been compromised due to other conditions. For example, sea turtles with a heavy parasite load, a severe bacterial infection, or obesity may succumb during surgery (Owens 1999). All laparoscopic procedures would be conducted by or under the direct guidance of a veterinarian or well-trained biologist. In some cases animals may float and be unable to dive properly after the procedure. When given adequate recovery time in controlled conditions, the animal can absorb or expel excess air. In those cases where this does not occur, a special effort to remove the excess air may have to be made. No animals would be released until they are swimming normally. Only uncompromised turtles would be subjected to these procedures, and they would only be released after they have recovered, and a veterinarian has given approval for release.

Dr. Foley has successfully conducted laparoscopies using these procedures on approximately 100 loggerheads under previous permits (e.g., No. 1501) with no complications. He has documented an increase in circulating corticosterone for up to a few hours due to capture stress and surgical manipulations. Researchers have also noted that in the inverted recumbency position used during laparoscopy, the turtle's eyes swell some and become hyperemic. However, this condition quickly dissipates with no known lasting effects when the turtle's body is returned to a normal inclination at the end of the short surgery. Transient physiological alterations, such as increased blood lactic acid and heart rate, are inevitable in any animal capture due to

physical activity and expected response to handling. NMFS anticipates that these brief alterations would return to normal via homeostatic mechanisms relatively rapidly because there is no significant risk for overexertion or prolonged/forced submergence using the proposed capture techniques. Animals would recover from lab procedures within a day. Therefore, NMFS expects any effects to be short-lived with no long-term implications on health or survival.

Summary of Effects

The short-term stresses resulting from the research activities discussed above are expected to be minimal. Animals would be released within hours (a day, for lab procedures) 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. 14622, 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 permits would be consistent with the ESA.

4.3.1 Endangered Species Act

This section summarizes conclusions resulting from consultation as required under section 7 of the ESA. The consultation process was concluded after close of the comment periods on the applications to ensure that no relevant issues or information were overlooked during the initial scoping process summarized in Chapter 1. For the purpose of the consultation, the draft EA represented NMFS' assessment of the potential biological impacts. The conclusion of the opinion was that the proposed action would not likely jeopardize the continued existence of any of the species and would not likely destroy or adversely modify designated critical habitat.

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 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. 14622, 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 Research permits

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, photo-identification, 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 these 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 2, six active NMFS research permits allow research on the target species in areas that could overlap with the proposed action area. One of these permits, No. 1501, is held by the applicant and would expire upon issuance of the proposed action. 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 during the months of March and June annually for up to 5 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. Foley. 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. Further, 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. These 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

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.

BP Oil Spill

In addition to the impacts on the target sea turtle species discussed here and in Ch. 3, the 2010 Deepwater Horizon oil well blowout has impacted green, Kemp's ridley, loggerhead, and hawksbill sea turtles in the Gulf of Mexico. The event has resulted in the live or dead stranding of tens to hundreds of animals of each species. The overall degree and extent to which the populations and species have been impacted is not known at this time; however, researchers and managers are currently working to assess and quantify impacts. The Biological Opinion (BO) prepared for this action evaluated the potential impacts of the spill to the target sea turtle species, including the exposure to oil, use of dispersants, and other response activities that could harm sea turtles. The BO concluded that the Proposed Action would not likely jeopardize the continued existence of any of the species and would not likely destroy or adversely modify designated critical habitat.

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.

The incremental impact of the action when added to other past, present, and reasonably foreseeable future actions discussed here would not be significant at a population level. The data generated by the tagging, measuring, and sampling activities associated with the proposed action would help determine the movement and habitat use of sea turtles found in the waters of the action area. The research would provide information that would help manage, conserve, and recover threatened and endangered species and would outweigh any adverse impacts that may occur.

CHAPTER 5 LIST OF PREPARERS AND AGENCIES CONSULTED

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

Agency consulted: U.S. Fish and Wildlife Service

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APPENDIX 1: Proposed Takes for Permit No. 14622.

The following table would authorize takes of sea turtles on an annual basis, except where footnoted, in Florida Bay.

SPECIES	LIFESTAGE	NO. ANIMALS	OBSERVE/COLLECT METHOD	PROCEDURES	SEASON
Turtle, green sea	Juvenile	50	Survey, vessel	Count/survey	March
Turtle, hawksbill sea	Adult/ Subadult/ Juvenile	5	Hand and/or Dip Net	Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Weigh	March
Turtle, Kemp's ridley sea	Adult/ Subadult/ Juvenile	10	Hand and/or Dip Net	Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Weigh	March
Turtle, loggerhead sea	Adult/ Subadult/ Juvenile	35	Hand and/or Dip Net	Laparoscopy; Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, organ biopsy; Sample, scute scraping; Sample, tissue; Transport; Ultrasound; Weigh	March
Turtle, loggerhead sea	Adult	10[a]	Hand and/or Dip Net	Instrument, epoxy attachment (e.g., satellite tag, VHF tag); Laparoscopy; Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, organ biopsy; Sample, scute scraping; Sample, tissue; Transport; Ultrasound; Weigh	March
Turtle, loggerhead sea	Adult/ Subadult/ Juvenile	70	Hand and/or Dip Net	Count/survey; Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, scute scraping; Sample, tissue; Weigh	June
Turtle, loggerhead sea	Adult/ Subadult/ Juvenile	50	Hand and/or Dip Net	Count/survey; Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, scute scraping; Sample, tissue; Ultrasound; Weigh	June

SPECIES	LIFESTAGE	NO. ANIMALS	OBSERVE/COLLECT METHOD	PROCEDURES	SEASON
Turtle, loggerhead sea	Adult/ Subadult/ Juvenile	5[b]	Hand and/or Dip Net	Count/survey; Instrument, epoxy attachment (e.g., satellite tag, VHF tag); Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, scute scraping; Sample, tissue; Ultrasound; Weigh	June

[a] = Up to 10 animals may be taken annually, not to exceed 15 animals over the life of the permit.
[b] = Up to 5 animals may be taken annually, not to exceed 10 animals over the life of the permit.

APPENDIX 2: 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
1501	Florida Marine Research Institute	March 31, 2011*
1551	NMFS SEFSC	July 1, 2013
1570	NMFS SEFSC	December 31, 2011
1571	NMFS SEFSC	December 31, 2011
1576	NMFS NEFSC	September 30, 2011
13306	Karen Holloway-Adkins	June 30, 2013

* = This permit would expire on the date noted or upon issuance of Permit No. 14622, whichever occurs first.

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.