ENVIRONMENTAL ASSESSMENT

On the Effects of the **Issuance of Scientific Research Permits to Llewellyn Ehrhart (Permit No. 14506) and Blair Witherington (Permit No. 14726)**

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Lead Agency:	U.S. Department of Commerce National Oceanic and Atmospheric Administration National Marine Fisheries Service Office of Protected Resources
Responsible Official:	James H. Lecky, Director, Office of Protected Resources
For Further Information Contact:	Office of Protected Resources National Marine Fisheries Service 1315 East West Highway Silver Spring, MD 20910 (301) 713-2289
Location:	Permit No. 14506- Atlantic coastal waters of Florida Permit No. 14726- Atlantic and Gulf of Mexico waters off Florida

Abstract: The National Marine Fisheries Service (NMFS) proposes to issue two scientific research permits 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). Both permits would be valid for five years from date of issuance. Research authorized under Permit No. 14506 would assess sea turtle population structure, trends in relative abundance, habitat utilization, sex rations, physiology, genetics, zoogeography, and epidemiology on Florida's Atlantic coast. Research authorized under Permit No. 14726 would locate and describe areas of the Atlantic Ocean and Gulf of Mexico off Florida that serve as developmental habitat for pelagic-stage neonate and juvenile sea turtles, quantify threats to pelagic sea turtles, and gather information on their life history, genetics, movements, behavior and diet. 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 these two permits NMFS prepared an 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 permits.

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CHAPTER 1 PURPOSE OF AND NEED FOR ACTION

1.1 DESCRIPTION OF ACTION

In response to receipt of requests from Llewellyn Ehrhart, Ph.D., Department of Biology, University of Central Florida, 4000 Central Florida Blvd., Orlando, Florida 32816-2368 (File No. 14506) and Blair Witherington, Ph.D., Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute, Melbourne Beach Field Laboratory, 9700 South A1A, Melbourne Beach, Florida 32951 (File No. 14726), NMFS proposes to issue scientific research permits that authorize 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 permits 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 permits 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

File No. 14506: The research objective for this proposed permit is to assess sea turtle population structure, trends in relative abundance, habitat utilization, sex rations, physiology, genetics, zoogeography, and epidemiology on Florida's Atlantic coast in: the Indian River Lagoon system (Project 1), the Sabellariid Worm Rock Reefs of Indian River County, Florida (Project 2); and the Trident Turning Basin, Cape Canaveral Air Force Station (Project 3).

File No. 14726: The objectives for the proposed permit are to locate and describe areas of the Atlantic Ocean and Gulf of Mexico that serve as developmental habitat for pelagic-stage neonate and juvenile sea turtles, quantify threats to pelagic sea turtles, and gather information on their life history, genetics, movements, behavior and diet.

1.2 OTHER EA/EIS THAT INFLUENCE SCOPE OF THIS EA

Because Permit No. 14506 would be a continuation of Dr. Ehrhart'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. 1507. The EA prepared for his permit, *Environmental Assessment Scientific Research Permit to Llewellyn Ehrhart to Conduct Research on Endangered and Threatened Sea Turtles Permit File No. 1507* (NMFS 2005a), 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.

Likewise, because Permit No. 14726 would be a continuation of Dr. Witherington's current research on sea turtles, the action area and a portion of the proposed activities have been previously described and analyzed for his current permit, No. 1506-02. An EA was prepared for his original permit, *Environmental Assessment Scientific Research Permits to Conduct Research on Endangered and Threatened Sea Turtles Permit Files No. 1501 and 1506* (NMFS 2005b), which found that the research would not have significant impacts to the human environment. A Supplemental EA was prepared for each of two amendments to the permit (NMFS 2006b and 2009) which also found that the modifications would not have significant impacts to the human environment. The proposed permit differs slightly from the current permit in the suite of take activities to be performed.

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 Applications

Notices of Receipt for the applications were published in the *Federal Register*, announcing the availability of the applications for public comment (File No. 14506: 74 FR 66618, December 16, 2009; File No. 14726: 74 FR 54021, October 21, 2009). A public comment was received for each application from the same commenter.

For File No. 14506, the commenter opined that the agency issues too many research permits and that the harassment is not warranted and that the sea turtles die from the stress. The commenter noted that the researcher has had a permit for many years and does not feel the work has done any good for America or turtles. He/she stated that permits should be given out to benefit the species, not to let someone bother animals in his/her spare time.

For File No. 14726, the commenter opined that the agency deny the request and that permits harass, injure, and kill hundreds of turtles resulting in a massive die-off due to research without producing anything of value.

In both cases, the commenter did not provide substantive information to support the comments and did not contact the Permits Division for additional information on the requests. NMFS is not aware of any massive die-offs that were the result of research. NMFS notes that the proposed permits do not authorize mortalities nor do the researchers expect that any mortality would occur during their research activities. The effects of harassment are expected to be short term in nature. Both applicants are well-respected sea turtle researchers in the scientific community that

will continue to publish their work in peer-reviewed journals and share their findings at international sea turtle research symposiums and conferences.

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 (NEPA) 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).

NOAA 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 MMPA and 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.

While 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 areas 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 objective, as well as alternatives eliminated from detailed study. This chapter also summarizes the expected outputs and any related mitigation of each alternative. One alternative is the "No Action" alternative where the proposed permits 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 applications for permits, 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 requests. 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 Permits with Standard Conditions)

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

2.2.1 Permit No. 14506

The applicant proposes three projects in which he would capture sea turtles using tangle nets and dip nets in three developmental habitats along the East coast of Florida to elucidate patterns and trends in the abundance, distribution, and population structure of these threatened and endangered species. This work would also give researchers a greater understanding of the attributes of the habitats utilized by these species, the anthropomorphic threats they face, and the zoogeography of these animals. For Project 1 researchers would annually capture, flipper tag, passive integrated transponder (PIT) tag, measure, weigh, blood sample, tissue biopsy sample, lavage, photograph, and/or remove epibiota from: 100 loggerhead (*Caretta caretta*), 260 green (*Chelonia mydas*), three Kemp's ridley (*Lepidochelys kempii*), two hawksbill (*Eretmochelys imbricata*), and one leatherback (*Dermochelys coriacea*) sea turtle. Up to 10 of the green sea turtles would have a transmitter attached to the carapace annually. For Project 2 researchers would annually capture, flipper tag, PIT tag, measure, weigh, blood sample, tissue biopsy sample, lavage, photograph, and/or remove epibiota from: 10 loggerhead, 140 green, two Kemp's ridley, and two hawksbill sea turtles. For Project 3 researchers would annually capture, flipper tag, PIT tag, measure, weigh, blood sample, tissue biopsy sample, lavage, mark the carapace with paint, and photograph, and/or remove epibiota from: 10 loggerhead, 140 green, one Kemp's ridley, one hawksbill, and one leatherback sea turtle. See Appendix 1 for the specific take activities that would be authorized for each species by project.

Action Area
Research would occur along the East coast of Florida. Project 1 would occur in the Central Region of the Indian River Lagoon System. Project 2 would occur over the Sabellariid work rock reefs in the near-shore waters of Indian River County, Florida. Project 3 would occur in the Trident Turning Basin, Cape Canaveral Air Force Station, Cape Canaveral, Florida.

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

Project 1: Indian River Lagoon
The following activities as noted in Table 1 of Appendix 1 would be authorized for Project 1.

Net Deployment and Capture
Turtles would be captured by large-mesh tangle nets, constantly attended, deployed for up to six hours in the central region of the Indian River Lagoon System. Nets would consist of webbing hung from a braided polypropylene top line (0.635 cm in diameter) that is suspended at the surface by floats attached during deployment. The webbing would be made of 18 ga. twisted nylon twine, with a 40 cm knot-to-knot stretch mesh. The bottom line of each net would be made of No. 30 continuous lead core line. The nets would be 3.7 m deep and approximately 230 m in length set in water 2.5 meters deep. Two nets would be tied end-to-end and deployed. Net deployment begins with the rigging of an 8 kg Danforth-type anchor. A 1.5 m section of 0.8 cm chain would be shackled to the ring on the anchor shaft. Another shackle would attach a 15 m length of 1 cm nylon line to the chain. The other end of the line would be tied to the free end of the top line of the first net. The nets would be paid out from the uncovered bow of a 17 ft Boston Whaler boat operated in reverse. The bow would be free of all cleats and other hardware that would interfere with the deployment, tending and retrieval of the net. The anchor would be lowered to the bottom as the boat moves away and the entire length of anchor line would be paid out. It would be tested to assure that the anchor has penetrated the bottom and is holding. A float would be attached to the top line at the point where the webbing begins and the net mesh begins to enter the water. Two or three workers would tend the net as it is paid out, making sure that the bottom line does not get twisted over the top line and attaching floats at 10 m intervals. The time at which the mesh first begins to enter the water and at which the last of the mesh is soaked would be recorded. A second anchor, rigged in the manner described above, would be tied to the free end of the top line of the second net when the last of the webbing is deployed. A worker would hold onto the second anchor until the line is taut and then lower it overboard. Net deployment would always begin at the upwind end of the netting site and the boat operator would set a course that is at about a 45-degree angle to the wind. This assures that the wind will keep the stern and propeller away from the net during subsequent net tending. Once deployed the net would be continuously tended by personnel elevating the top line of the net from the bow of a Boston Whaler boat.

Two boats would be used to tend the net; as the personnel in one boat reach the mid-point of the net, the personnel in the second boat would start checking at the head of the net. This ensures that any given point along the net is checked by the elevation of the top line approximately every 10 minutes. Additionally, personnel on both boats would be in continuous visual contact with

the net. Large-hoop dip nets would be used to aid in the capture and boarding of entangled turtles.

Handling, Measuring, Weighing, Marking and Release

Captured turtles would be transferred to a third boat where they would be tagged, measured, weighed, a blood and/or tissue sampled, and photographed. Turtles would be covered with wet towels while held and would be held only long enough for data collection to be completed. The holding area or tubs would be disinfected with a mild bleach solution. Turtles would be released at or within a short distance of the capture location usually within a few hours, and no more than six hours for transmittered turtles, on the same day. Standard carapace and plastron morphometric measurements, and weight would be taken from each turtle upon capture, and all turtles would be scanned for previous tags and marked with tags if no tags are detected.

Captured turtles would be flipper tagged with Inconel metal tags on a scale proximal to the body on the trailing edge of each front flipper, and a passive integrated transponder (PIT) tag would be inserted subcutaneously in the right front flipper. The application and antiseptic protocol described in Research and Management Techniques for the Conservation of Sea Turtles (Eckert et al. 1999) would be used. The Inconel tag applicators would be cleaned with a mild bleach solution before use on each turtle and a separate set of applicators would be used with turtles afflicted with fibropapillomatosis. Prepackaged sterile PIT tags would be used and the site of injection would be wiped with alcohol swabs both before and after insertion.

In the rare case that a leatherback sea turtle is captured that is too large to remove from the water, animals would be restrained by the net webbing, with care being taken that they could easily raise their heads to breath. If possible, the rear flippers would in turn be elevated out of the water, the tag site dried and disinfected, the flipper tag applied, and the tag site disinfected again. If this cannot be done the flipper tags would not be applied. To apply a PIT tag, the head and shoulder of the animal would be elevated to stay dry after being toweled. The PIT tag injection area would be disinfected, the PIT tag applied, and then the injection area disinfected again.

Straight carapace length (standard carapace length; SCL), maximum SCL, straight carapace width, head width, and body depth would be measured with forestry calipers. Curved carapace length, curved carapace width, plastron length, and tail length measurements would be measured with a cloth tape. Turtles would be weighed with a spring scale. All measurements would follow the protocol described by Bolten (1999). The calipers and tape would be cleaned and disinfected with a mild bleach solution before each turtle is measured. A separate set of calipers and tapes would be used for turtles afflicted with fibropapillomatosis.

Sampling: Epibionts, Blood, Tissue, and Lavage

Medical exam gloves would be worn during all sampling procedures. Epibionts (leeches) would be removed with forceps. The removal site would then be swabbed with isopropyl alcohol or betadine.

Blood would be drawn following Owens (1999) using an antiseptic protocol from the dorsal cervical sinus of each hardshell turtle for genetic analysis to estimate population origins, for epidemiological research, and for sex determination. New sterile disposable needles would be

used on each animal. Attempts (needle insertions) to extract blood would be limited to a total of four, two on either side of the neck. Sample collection sites would always be scrubbed with alcohol or another antiseptic prior to sampling. During blood sampling, precautions would be taken to prevent a back and forth, or rocking movement of the needle once it is inserted. No blood sample would be taken should conditions on the boat preclude the safety and health of the turtle.

Tissue biopsies would be taken using the antiseptic protocol described by Dutton and Balazs (1995). The biopsy site would be scrubbed with an isopropyl alcohol swab before and after sampling. The tissue biopsy would be obtained using a 4-mm sterile biopsy punch from the trailing edge of a rear flipper when possible. If needed, a coagulant powder would be used to control any excessive bleeding afterwards. A new sterile biopsy punch would be used on each animal.

Samples of food items consumed by juvenile green turtles would be obtained by a lavage of the esophagus using a modification of the methods described by Legler (1977), Balazs (1980), and Forbes and Limpus (1993). Each turtle would be turned on its back with its posterior slightly elevated. After the turtle's mouth was opened, a standard veterinary canine oral speculum or similar mouth gag (small or medium, depending on the size of the turtle) would be inserted just posterior to the anterior tip of the rhamphotheca to keep the jaws from closing. Both the bars of the oral speculum and any pipe used for this purpose would be wrapped with soft, rubber tape to prevent damage to the rhamphotheca. A soft plastic veterinarian's stomach tube, lubricated with vegetable oil, would be carefully inserted through the mouth and down the length of the esophagus. A 9-mm outside diameter (OD), 6 mm inside diameter (ID) tube would be used for turtles 20 to 35 cm SCL; a somewhat larger tube, 13-mm OD and 8-mm ID tube would be used for turtles larger than 35 cm SCL. Water would be pumped through the tube using a veterinarian's double action stomach pump as the tube is gently moved up and down the length of the esophagus. After completion of lavage, the water flow would be stopped and the posterior of the turtle would be slightly elevated to allow the tube to drain. Once drained, the tube would be removed first, followed by the mouth gag or PVC pipe. The anterior part of the turtle's body would then be slightly elevated relative to the posterior to allow any remaining water to drain into the esophagus, away from the glottis, so that the turtle could take a breath.
Turtles would be lavaged for no more than 45 seconds and usually for less than 30 seconds. Only one sample would be obtained per individual. All lavage equipment would be disinfected between animals.

Satellite Tagging

Green sea turtles would be satellite tagged with Fast-lock GPS/Argos tags manufactured by Wildlife Computers, measuring 10.2 cm long, 5.7 cm wide, 3.1 cm high (not including the antenna), and weighing 225 g. Prior to tag attachment, the anterior portion of the carapace would be cleaned of sediment and algae. Researchers would thoroughly clean the first, second, and part of the third vertebral plus the first and second costal scutes on both sides, avoiding the seams between scutes, with a scrub brush, rinse with fresh water, dry with a towel, and then lightly sand with sandpaper. When smooth, researchers would lightly wipe the entire area with an alcohol pad. The satellite tag would be attached to the carapace using Sonic-Weld, an epoxy putty, and a fast setting a two-part epoxy, such as PowerFast, that cures releasing little heat that

would not be injurious to animals. The attachment process would take approximately two hours, depending on 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.

Project 2: Sabellariid work rock reefs

The following activities as noted in Table 2 of Appendix 1 would be authorized for Project 2.

Net Deployment and Capture

Similar to Project 1, turtles would be captured with a large mesh tangle net anchored at each end. The net would be 3.7 m deep, with a 40 cm stretch (knot to knot) mesh size, and 220 m long. It would be hung from a braided polypropylene top line that is suspended at the surface by floats attached at intervals during deployment. The bottom line would be made of No. 30 continuous lead core line. The net would be set over the sandy corridors between reefs in water that is 2 to 3.5 m deep. Relays of six swimmers, working in pairs, equipped with mask, snorkel, and fins would continuously patrol its length. Every two to four minutes any given point along the net would be monitored by a pair of swimmers. Within moments after a turtle becomes entangled, a swimmer would dive down and brings the turtle to the surface where it would be disentangled. Two boats would be used in the netting operation, a 19-foot Boston Whaler and either a 17-foot or a 15-foot Boston Whaler. One would be deploy and retrieve the net (the 19') and both would pick up captured turtles and serve as rest stations for swimmers.

Post-Capture Procedures

Captured turtles would be covered with wet towels and kept aboard the boats. If a turtle has symptoms of fibropapillomatosis it would be segregated from other turtles. The turtles would be worked up and released at the site of capture. Capture turtles would be photographed, measured, weighed, flipper and PIT tagged, lavaged, and have epibionts removed in the manner described for Project 1. No satellite tagging would occur for Project 2.

Project 3: Trident Turning Basin

The following activities as noted in Table 3 of Appendix 1 would be authorized for Project 3.

Net Deployment and Capture

Turtles would be captured using tangle nets and dip nets. Two tangle nets made of nylon twine mesh hung from a braided polypropylene top line with a No. 30 continuous lead core bottom line would be set individually. One net would be 238 m in length, 3.7 m in depth with a 40 cm stretch mesh size (knot to knot). The second net would be 229 m in length, 3.7 m in depth, and has a 30.5 cm stretch mesh size. The nets would be deployed at various locations along the walls over the shallow shelf on the perimeter of the basin. The nets would be suspended from floats attached at regular intervals to the top line during deployment. Each net would be checked on a regular basis by elevating the top line from the bow of a small boat. Any given portion of a tangle net would be checked approximately every 15 minutes by pulling hand over hand along the top line from the bow of a boat. Turtles would be also opportunistically captured with long handled, large-hoop dip nets.

Post-Capture Procedures

Following capture, the turtles would be transported to shore, where they would be flipper tagged, PIT tagged, measured, weighed, blood sampled, tissue sampled, lavaged, and photographed in the manner described in Project 1.

Holding and Release

Turtles would be held in large plastic mason's tubs in water and covered with moist towels during the time of data collection until they are released. Turtles with fibropapillomatosis would be kept in separate tubs from turtles without fibropapillomatosis. Tubs would be disinfected after their use. A separate set of measuring and tagging equipment would be used for infected animals. All turtles would be released back into the basin not more than 8 hours of their capture and generally within 6 hours. They would not be released immediately after being processed to avoid their recapture that day and to facilitate carapace painting.

Temporary Marking: Painting Carapace

To identify green sea turtles in the follow-up population estimation survey (described below), a unique number would be painted on the carapace of each captured green sea turtle using a non-toxic white spray paint which wears off within a few days. This would allow researchers to estimate the population size of juvenile green turtles in the Trident Basin using a modification of the Lincoln-Petersen mark and recapture method for closed populations.

Count/Survey

One or two days after the capture session, observers in a small boat slowly travel around the edge of the basin recording observations of painted and unpainted green turtles. Observed painted, i.e., marked, turtles are counted as "recaptures" and unpainted as new captures. No turtles would be captured during surveys.

2.2.2 Permit No. 14726

Dr. Witherington requests a 5-year research permit to conduct research on loggerhead, green, hawksbill, leatherback, and Kemp's ridley sea turtles. The purpose of his project is to locate and describe areas of the Atlantic Ocean and Gulf of Mexico near Florida that serve as developmental habitat for pelagic-stage juvenile and neonate sea turtles, to quantify threats to pelagic sea turtles, and to gather information on their life-history, genetics, movements, behavior, and diet. The level and manner of takes that would be authorized are identified in Table 1 of Appendix 2.

Action Area

Researchers would search for sea turtles in five target areas that include the margins of the Gulf Stream and Loop Current between 25 and 32 degrees North latitude off the coast of Florida (see Fig. 1). Searches would take place along lines of consolidated floating material (weedlines) from July through October when weather conditions are suitable for locating weedlines. Based on past capture rates, Dr. Witherington anticipates approximately 20 day trips to capture neonate and juvenile turtles each year.

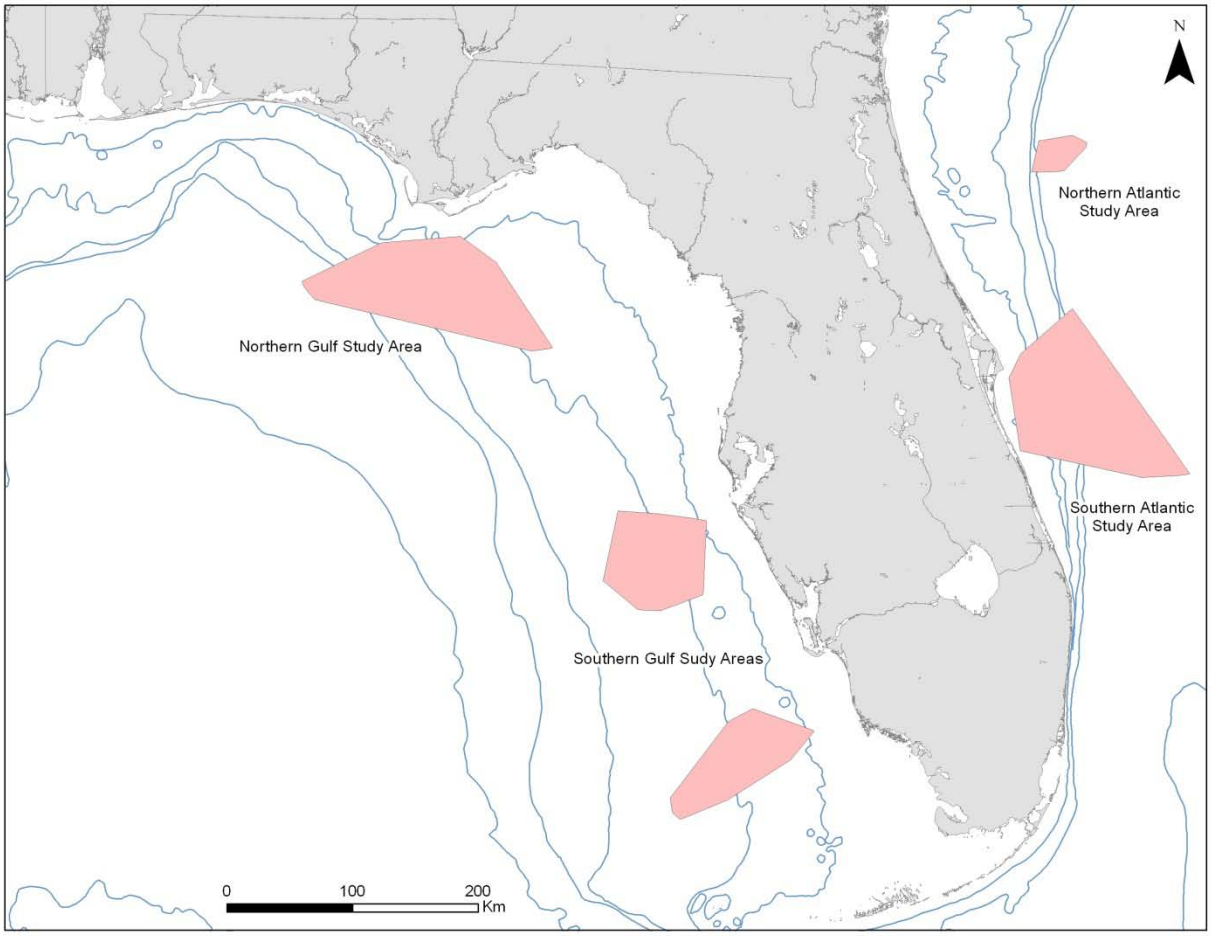

Figure 1. Proposed study sites in Gulf and Atlantic waters off Florida for File No. 14726.

Research Activities

The following section provides a description of the proposed research activities:

Capture and Release

Researchers would access neonate sea turtles and their habitat with an 8.2 m power catamaran vessel launched at ports along Florida's Gulf and Atlantic coasts. Turtles would be captured with long-handled dip nets. All turtles would be released at a similar habitat type as the original capture location within one hour of capture. Sampling along transects would be opportunistic based on weather. Ideal weather conditions would be needed for successful captures. For example, no sampling would be conducted when the marine forecast calls for directed winds greater than 10 kts.

Flipper and PIT Tagging

Captured turtles larger than 25 cm SCL would be tagged with Inconel flipper tags applied to the proximal trailing edge of one front flipper. Captured turtles larger than 20 cm straight carapace-length would be tagged with PIT tags inserted into one of the triceps superficialis muscle

complex locations. Tags would be applied following the Florida Fish and Wildlife Commission Marine Turtle Conservation Guidelines. Tag identifications would be provided to the Cooperative Marine Turtle Tagging Program, Archie Carr Center for Sea Turtle Research, University of Florida, a program developed to manage tagging data and facilitate exchange of tag information.

Skin biopsy

Biopsies would be collected in order to conduct genetic analyses using mitochondrial DNA sequencing and haplotype assignments. Haplotype data generated in this study, along with publicly available haplotype data from green turtle nesting populations, would be used to estimate contributions by nesting populations to the pelagic mixed stocks. No turtle smaller than 8 cm SCL would be sampled. Before biopsy, the site would be prepared by swabbing it with an antiseptic solution such as Betadine. Biopsies would be taken from the trailing margin of one rear flipper using a sterile 5-mm diameter biopsy punch, with the resulting plug less than the diameter of the punch. Following the biopsy, an additional antiseptic wipe would be used with modest pressure to stop any bleeding.

Oral Swab and Esophageal Lavage

Prior to lavage, any debris would be removed from the turtle's mouth with a sterile oral swab. Diet of captured turtles would be determined by the examination of items from esophageal lavage. Captured turtles greater than 5 cm SCL would be lavaged using the methods outlined by Forbes (1999), with modifications for lavaging small turtles (Witherington 2002). Modified techniques include the use of small-diameter (3--10 mm) silicone tubing, and a hand-pumped rubber bulb in lieu of a larger (overly powerful) stomach pump. Items from each lavage would be collected, strained from the water, and identified under microscopy to the lowest possible taxon. Special attention will be placed on the identification of marine debris.

Satellite Tagging

Satellite tracking would allow for an analysis of sea turtle movements relative to remotely sensed oceanographic features, including modeling of Sargassum habitat locations in the eastern Gulf of Mexico. Tagged turtles would be 23-27 cm SCL and 1.5 to 2.5 kg. Dr. Witherington proposes to tag animals with one of the smallest archival pop-up (PTT) tags available, the Wildlife Computers SPOT5 PTT with an AM-174 casting. The transmitter with antenna would weigh approximately 32 g. The small size of transmitters would allow tags to be attached with epoxy glue to a single carapacial scute. Prior to tag attachment, adjacent scutes would be covered with masking tape so that no silicone extends to other scutes. The transmitter site would be prepared by sanding (60 grit), cleaning (isopropanol and acetone), and a base application acrylic (human) nail base. The PTT would be attached by sealing it to the carapace with non-toxic silicone exclusively to the third vertebral scute (see Fig. 2). Elements of the attachment technique would come from two state-of-the-art studies of PTT attachment success on small sea turtles, (Mansfield et al. in prep; Seney et al. 2010) both of which recommended attachments that do not bridge scute seams with hard adhesive. The applicant proposes an attachment using the most conservative elements of each study: attachment with flexible silicone adhesive to a single scute. Four, small, hand-rolled balls of epoxy putty placed near the bottom corners of the transmitter would allow the transmitter to be positioned correctly over the uneven scute surface (the putty will not contact scute seams). Maximum time required for transmitter attachment would be two

hours, and expected attachment life is 60 days. Total weight of the SPOT5 PTT with sealant would be approximately 42 g, approximately 1.7 to 2.8 percent of the transmittered turtle's mass.

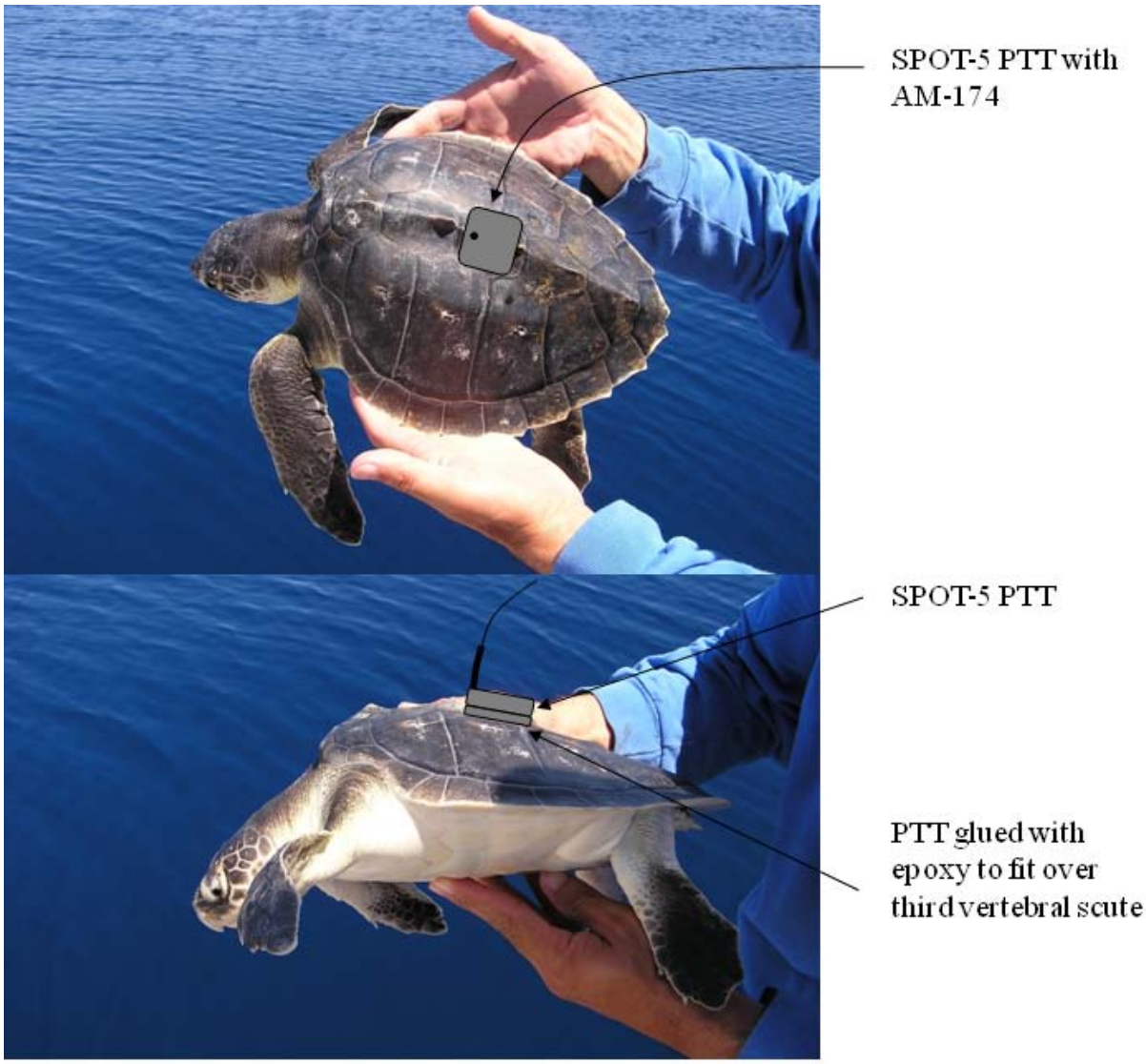

Figure 2. Tagging location for SPOT5 PTT with an AM-174 casting (32 g) attached to a juvenile Kemp's ridley with Slowset Powerfast epoxy glue. Tags are drawn to scale (turtle shown is 24 cm SCL).

2.2.3 Mitigation Measures

In addition to the measures described above that minimize the potential for harassment, 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;
- avoiding repeated sampling of an individual;
- using trained and experienced personnel to minimize disturbance;
- 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 a variety of human activities may occur in the action area such as commercial fishing, shipping, military activities, 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 for File No. 14506 would take place within portions of Indian River Lagoon on the East coast of Florida, in nearshore waters of Indian River County, Florida and at the Trident Turning Basin in Cape Canaveral, Florida. These areas serve as developmental habitat for green and in some cases, loggerhead sea turtles. The nearshore waters include the Sabellariid worm rock reefs. The Trident Turning Basin encompasses approximately one square kilometer. The Indian River Lagoon includes the Pelican Island National Wildlife Refuge, described below.

Activities for File No. 14726 would take place in five sites in Atlantic and Gulf waters around the coast of Florida between 25 and 32 degrees North latitude (see Fig. 1). Researchers would search for sea turtles in epipelagic habitat where Gulf and Atlantic surface waters converge (convergence lines) along lines of consolidated floating material (weedlines). Sargassum can be found in these weedlines. No protected areas are found within Dr. Witherington's study areas.

3.2.1 Sanctuaries, Parks, Historic Sites, etc.

Pelican Island National Wildlife Refuge

For Permit No. 14506, The Indian River Lagoon netting site is located within the boundaries of the Pelican Island National Wildlife Refuge. Established in 1903, the refuge consists of 5,413 acres located within the Indian River Lagoon. The refuge is located in a temperate and subtropical overlap zone and is important to a number of temperate and subtropical species. The ecosystem consists of sea grass beds, oyster bars, mangrove islands, salt marsh, and maritime hammocks. The sea grass beds found within the refuge include manatee grass, turtle grass, shoal grass and the Johnson's sea grass. These sea grass areas provide spawning, nursery, and foraging habitat for numerous aquatic species, including spotted sea trout, redfish (red drum), snook, tarpon, mullet, sheepshead, pompano, seahorses, blue crabs, hermit crabs, pink shrimp, scallops, clams, marine worms, marine snails, manatees, juvenile sea turtles, and other species. Over thirty species of birds use the refuge. Besides the manatee and sea turtles, the endangered or threatened species that can be found in the refuge include the wood stork, eastern indigo snake, bald eagle, and piping plover. Because researchers are responsible for obtaining any other permits, or comply with any other Federal, State, local, or international laws or regulations necessary to carry out the action, Dr. Ehrhart has applied for a permit to work in the Pelican Island National Wildlife Refuge.

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 latirostri)*

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. 14506 fall within the designated manatee critical habitat. NMFS expects no effects to critical habitat. As mentioned above the applicant would not set on sea grass and nets would remain in the water column so there would be little substrate disturbance. Therefore, NMFS has concluded the proposed action would not likely adversely affect this designated critical habitat and will not be considered further in this analysis.

Johnson's sea grass (*Halophila johnsonii*)
Although threatened Johnson's sea grass and designated critical habitat can be found in or near the lagoon areas of Dr. Ehrhart's action area, the researchers would not be authorized to conduct research activities on or around this species or its critical habitat as a condition of the permit. Therefore, NMFS has concluded the proposed action would not likely adversely affect this designated critical habitat and will not be considered further in this analysis.

3.3 BIOLOGICAL ENVIRONMENT

In addition to the species that are the subject of the permit (target species), a wide variety of non-target species could be found within the action area, including 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 the 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*
Leatherback sea turtle	*Dermochelys coriacea*
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 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.

Leatherback sea turtle

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.

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.

BP Oil Spill

In addition to the above information on the target sea turtle species, 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. Impacts to sea turtles from the oil spill and associated response activities are identified and discussed in Ch. 4. The Biological Opinion (BO; NMFS 2010) 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.

3.3.2 Non-Target Species Potentially Affected by the Proposed Action

Due to the nature of Dr. Witherington's proposed capture method (dipnet) and location (further offshore) of research, NMFS does not expect the issuance of Permit No. 14726 to adversely affect non-target species. Because Dr. Ehrhart's research proposed in File No. 14506 is inshore and involves the use of nets that would contact the substrate, the following species may potentially be affected during his research.

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. For File No. 14506, the USFWS (Ms. Nicole Adimey, Jacksonville, FL) was contacted regarding the potential impacts of the proposed research on the Florida manatee and responded that the research is not likely to adversely affect the species. The USFWS asked that standard language be added to the permit requiring researchers to take precautionary measures to ensure that interactions are avoided. Hence, Permit No. 14506 would contain conditions designed to prevent interactions with endangered Florida manatees, and this species is not considered further in this analysis.

Sea grasses

Sea grasses could be disturbed by Dr. Ehrhart's (File No. 14506) research activities (netting and anchoring). However, the permit would be strictly conditioned such that no research activities would be conducted over, on, or immediately adjacent to Johnson's sea grass or in Johnson's sea grass critical habitat. Additionally, researchers would be required to avoid conducting research over, on, or immediately adjacent to any non-listed sea grass species. If these non-listed species cannot be avoided, then avoidance/minimization measures would be implemented as conditioned by the permit. No gear would be set, anchored on, or pulled across coral or hard/live bottom habitats. Given the precautionary conditions the permit would contain to minimize the impact of the research, the low level of impact to sea grasses, and that there would be no expected population effects, these species are not considered further in this analysis.

Sharks and rays

Based on past experience, Dr. Ehrhart could incidentally catch an assortment of sharks and rays when using the entanglement net method of capture. Species previously caught include nurse sharks, bonnetheads, tiger sharks, bull sharks, southern rays, eagle rays, and cow-nose rays; approximately 10 sharks and up to 100 rays could be caught during the life of the permit. None of these species are listed as protected or imperiled. All animals would be released alive and

unharmed. The proposed research is a continuation of the previous research and NMFS would expect approximately the same level of bycatch.

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 requests. 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 the researchers from collecting valuable information on sea turtle species throughout 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. Ehrhart's (File No. 14506) proposed research would elucidate patterns and trends in the abundance, distribution, and population structure of sea turtles and help NMFS gain a better understanding of the attributes of habitats used by turtles, anthropomorphic threats, and zoogeography of these animals. Dr. Witherington's (File No. 14726) proposed research would identify and describe areas that serve as developmental habitat for pelagic-stage neonate and juvenile sea turtles, quantify threats to pelagic sea turtles, and gather information on their life history, genetics, movements, behavior and diet. The information these permits would yield are 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 requests 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

<u>Effects on Target Species: Sea Turtles</u>

Visual Transect Surveys

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 carry out. While reactions to the vessel could result in a change in behavior, it would be similar to other natural behaviors such as predator avoidance. 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 should 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.

Capture

Capture of a turtle by the proposed netting methods could result in stresses due to interaction with the gear, and drowning could potentially occur as a result of forced submergence. The mitigation measures that would be incorporated into research permits for capture techniques should minimize the more serious effects of netting turtles and subjecting them to a continued submerged state. Researchers would be required to monitor all capture techniques and activities under this alternative.

Hand Capture or Dip Net: These types of capture are simple and not invasive. However, these methods can lead to an increased level of stressor hormones in the turtle. Turtles would be handled in a manner to minimize stress. Based on studies and results of previous research, NMFS expects that this would result in short-term stress to individual turtles. No injury or mortality would be expected. As these are direct capture methods there would be no incidental capture of non-target species.

Entanglement Net: Hoopes et al. (2000) found that entanglement netting produced notable changes in blood chemistry in wild Kemp's ridley sea turtles, with plasma lactate concentrations at capture elevated up to 6-fold above those measured 6 to 10 hours post capture. However, they note that the lactate response resulting from the stress of capture in entanglement netting was relatively slight compared with that reported from trawl capture of sea turtles. Although it appears that entanglement netting can result in temporary changes in blood chemistry of sea turtles, it appears that animals that are immediately placed back into a marine environment after removal from the gear can recover from the short-term stress of capture (Hoopes et al. 2000). Animals captured during the proposed research would be removed immediately from the nets, and any blood acidosis could be ameliorated by animal hyperventilation after removal from the net. Hoopes et al. (2000) conclude that entanglement netting is an appropriate "low-stress" method for researchers working on turtles in shallow, coastal areas.

Handle, Measure, Weigh, Photograph

NMFS does not expect that individual turtles would experience more than short-term stresses during the handling, measuring, weighing, or photography process. No injury would be expected from these activities. 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 Southeast Fisheries Science Center (SEFSC) researchers have conducted the oral measurements on over 200 turtles with no reported ill effects (NMFS SEFSC 2008). The permit holders would also 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.

Marking: Flipper and PIT Tagging

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 2006a). 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 2006a). In addition, the permit holders 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.

Oral Swabbing and Lavage

Oral swabbing is a minimally invasive procedure that is not expected to harm sea turtles. Rather, removing foreign debris, such as tar and plastics, is expected to have a positive impact by eliminating the risk of ingestion of non-food items that could otherwise result in the harm, injury or death (e.g., through starvation or internal injury) of target animals.

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

Epibiota, Blood and Tissue Sampling

The permits would contain conditions to mitigate adverse impacts to turtles. The applicants 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. Epibiota sampling is not expected to result in serious injury to target animals. Based on the described methods of cleansing and disinfection, infection of the attachment site would not be expected. At most, NMFS expects turtles would experience brief, minimal discomfort during the removal process. It is not expected that individual turtles would experience more than short-term stress during tissue sampling. 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 2006a).

Likewise, NMFS does not expect that individual turtles would experience any 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 permits 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. 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.

Acoustic and Satellite Tags

As described in Ch. 2, the applicants would take measures to prevent harm to turtles during tagging. The permit would also require that the applicants 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.

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. Witherington expects his tags to remain attached for approximately 60 days. Slightly larger archival tags than Dr. Witherington’s proposed tag units have been used on four Kemp's ridleys of the same size with no detectable adverse effects (Witherington pers. comm. 2010). 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.

Effects on Non-Target Species

Sharks and rays

Although it is not possible to accurately estimate the amount of bycatch mortality, based on Dr. Ehrhart's past experience, NMFS expects bycatch mortality would be rare. Researchers would continuously monitor the nets and immediately retrieve the non-target species if one is captured. In past projects, non-target species were safely handled and quickly released in good condition resulting in zero mortality. Any stress the non-target species experience would be short-lived and dissipate quickly (within a day).

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 of capture and should recover from the procedures within the same day. The permits 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 permit holders would also 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 applicants would be required to exercise care when handling 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 Nos. 14506 and 14726, 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

While 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 that would 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 and possibly individual sharks and rays. However, the effects would be minimal and the preferred alternative would allow the collection of valuable information that could help NMFS' efforts to recovery 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 Nos. 14506 and 14726, if approved, would follow certain procedures in order to minimize and mitigate effects of the proposed action. The permits 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 and injury to captured sea turtles and non-target sharks or rays (temporarily interrupting normal activities such as feeding). 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 the proposed action area for a variety of activities, examples of which include vessel surveys, photo-identification, capture, handling, biopsy sampling, lavage, laparoscopy, attachment of scientific instruments, and release. 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 3, 13 active NMFS research permits, allow research on the target species in areas that could overlap with the proposed action areas. Two of these permits are held by the applicants and would expire on issuance of the proposed action. Work conducted under Permit No. 14655 may have a small overlap in action area with File No. 14506 for work conducted near Cape Canaveral, Florida. However, NMFS does not expect that nets would be set by the applicants concurrently in the same area and researchers would be required to coordinate the timing of their activities to reduce the potential for repeated harassment of individual sea turtles. 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 are also 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 permits, animals in the action area would be disturbed by research year-round 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. However, 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 are also 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, including the 2010 BP oil spill, discussed below. Of these activities, lethal takes of turtles and the 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 the proposed research activities.

<u>BP Oil Spill</u>

It is difficult to predict the exact nature and magnitude of impacts from the Deepwater Horizon spill at this time. Injuries to natural resources, including sea turtles from oil spills are dependent on multiple factors including oil composition, oil quantity, dispersal techniques, contact with organisms, etc. Broadly speaking, impacts may occur in the nueston (or upper meter or so of the water column), mid-level mixing layer (through dispersal of oil and toxic components) and at the sea floor. Dispersed and dissolved oil (comprised of polycyclic aromatic hydrocarbons, PAHs) in the water can result in exposure of sea turtles and other marine life to the toxicological effects of PAHs. Sea turtles may be exposed to chemicals in oil or to chemicals in products such as dispersants used in two ways: internally (eating or swallowing oil, consuming prey containing oil based chemicals, or inhaling of volatile oil related compounds) and externally (swimming in oil or dispersants). This contact in the water column may be exacerbated by use of surfactants, weather conditions and other dispersal methods which increase mixing. PAHs can cause direct toxicity (mortality) to marine mammals, sea turtles, fish, and aquatic invertebrates through smothering and other physical and chemical mechanisms. Besides direct mortality, PAHs can also cause sublethal effects such as: DNA damage, liver disease, cancer, and reproductive, developmental, and immune system impairment in fish and other organisms. PAHs can accumulate in invertebrates, which may be unable to efficiently metabolize the compounds.

PAHs can then be passed to higher trophic levels, such as sea turtles and marine mammals, when they consume prey. During past oil spills in the Gulf of Mexico NOAA has documented direct toxic impacts to commercially important aquatic fauna including blue crabs, squid, shrimp and different finfish species. Injuries to protected areas, such as habitats for NOAA trust resources are likely to occur. Additionally, the presence of discharged oil in the environment may cause decreased habitat utilization of the area, altered migration patterns, altered food availability, and disrupted life cycles.

Clean up and response activities as a result of the spill may impact sea turtles; these include controlled burns, skimming, dredging, and boom placement. NMFS is also mitigating the impacts of these activities by conducting vessel and aerial surveys and sending monitors or observers out in conjunction with clean-up activities to search for and respond to stranded, oiled and/or injured animals. To date, over 1,000 green, hawksbill, loggerhead, and Kemp's ridley sea turtles combined have stranded since the spill, about 50 percent of them alive and 50 percent dead. Over 70 percent of stranded turtles have been Kemp's ridleys, followed by approximately 20 percent greens, less than one percent being loggerhead or hawksbill sea turtles, and the remaining being unidentified. Of the live stranded animals, 446 turtles had visible oil. To date, 155 sea turtles have been rehabilitated and released back into the wild. Most of the dead animals have not been processed yet but of the 99 dead that have been evaluated, only 17 turtles were visibly oiled. Cause of death is not available at this time. To help determine the type and amount of restoration needed to compensate the public for harm to natural resources as a result of the spill, a Natural Resources Damage Assessment is being conducted by NOAA and other Federal and State agencies. The oil spill has also led to the closure of a number of commercial fisheries, including some that are known to incidentally take sea turtles, such as shrimp fisheries, in the Gulf of Mexico. The closures therefore may reduce impacts to sea turtles populations that otherwise would seriously injure or kill sea turtles.

In addition, the target species benefit from other human activities operated by Federal, state, and or local agencies and organizations including management, conservation, and recovery efforts, nest monitoring, education and outreach, and stranding response programs.

4.7.3 Summary of Cumulative Effects

It is likely that issuance of the proposed permits would 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 was 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. 14506.

Table 1. Proposed annual take of sea turtles for Project 1 in the Indian River Lagoon System.

SPECIES	LIFESTAGE	SEX	NUMBER OF ANIMALS	TAKE ACTION	COLLECT METHOD	PROCEDURES
Green	Adult/ Subadult/ Juvenile	Male and Female	250	Capture/Handle/Release	Net, Tangle	Epibiota removal; Lavage; Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, tissue; Weigh
Green	Juvenile/ Subadult	Unknown	10	Capture/Handle/Release	Net, Tangle	Instrument, epoxy attachment (e.g., satellite tag, VHF tag); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, tissue; Tracking; Weigh
Loggerhead	Adult/ Subadult/ Juvenile	Male and Female	100	Capture/Handle/Release	Net, Tangle	Epibiota removal; Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, tissue; Weigh
Kemp's ridley	Adult/ Subadult/ Juvenile	Unknown	3	Capture/Handle/Release	Net, Tangle	Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, tissue; Weigh
Hawksbill	Adult/ Subadult/ Juvenile	Unknown	2	Capture/Handle/Release	Net, Tangle	Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, tissue; Weigh

SPECIES	LIFESTAGE	SEX	NUMBER OF ANIMALS	TAKE ACTION	COLLECT METHOD	PROCEDURES
Leatherback	Adult/ Subadult/ Juvenile	Unknown	1	Capture/Handle/Release	Net, Tangle	Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, tissue

Table 2. Proposed annual take of sea turtles for Project 2 in the Sabellariid Worm Rock Reefs, Indian River County.

SPECIES	LIFESTAGE	NUMBER OF ANIMALS	TAKE ACTION	COLLECT METHOD	PROCEDURES
Green	Adult/ Subadult/ Juvenile	140	Capture/Handle/Release	Net, Tangle	Epibiota removal; Lavage; Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, tissue; Weigh
Loggerhead	Adult/ Subadult/ Juvenile	10	Capture/Handle/Release	Net, Tangle	Epibiota removal; Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, tissue; Weigh
Hawksbill	Adult/ Subadult/ Juvenile	2	Capture/Handle/Release	Net, Tangle	Epibiota removal; Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, tissue; Weigh
Kemp's ridley	Adult/ Subadult/ Juvenile	2	Capture/Handle/Release	Net, Tangle	Epibiota removal; Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, tissue; Weigh

Table 3. Proposed annual take of sea turtles for Project 3 in the Trident Turning Basin, Cape Canaveral Air Force Station.

SPECIES	LIFESTAGE	NUMBER OF ANIMALS	TAKE ACTION	COLLECT METHOD	PROCEDURES
Green	Adult/ Subadult/ Juvenile	140	Capture/Handle/Release	Net, Tangle or Net, Dip	Count/survey; Epibiota removal; Lavage; Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, tissue; Weigh
Loggerhead	Adult/ Subadult/ Juvenile	10	Capture/Handle/Release	Net, Tangle or Net, Dip	Epibiota removal; Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, tissue; Weigh
Kemp's ridley	Adult/ Subadult/ Juvenile	1	Capture/Handle/Release	Net, Tangle or Net, Dip	Epibiota removal; Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, tissue; Weigh
Hawksbill	Adult/ Subadult/ Juvenile	1	Capture/Handle/Release	Net, Tangle or Net, Dip	Epibiota removal; Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, tissue; Weigh
Leatherback	All except hatchling	1	Capture/Handle/Release	Net, Tangle or Net, Dip	Epibiota removal; Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, tissue

APPENDIX 2: Proposed takes for Permit No. 14726

Table 1. Proposed take of pelagic juvenile and neonate sea turtles annually along the Atlantic and Gulf coasts of Florida.

SPECIES	NUMBER OF ANIMALS	TAKE ACTION	COLLECT METHOD	PROCEDURES
Loggerhead	150	Capture/Handle/Release	Dip Net	Count/survey; Mark, flipper tag; Mark, PIT tag; Measure; Sample, oral swab; Weigh
Loggerhead	100	Capture/Handle/Release	Dip Net	Count/survey; Lavage; Mark, flipper tag; Mark, PIT tag; Measure; Sample, oral swab; Sample, tissue; Weigh
Green	100	Capture/Handle/Release	Dip Net	Count/survey; Lavage; Mark, flipper tag; Mark, PIT tag; Measure; Sample, oral swab; Sample, tissue; Weigh
Hawksbill	50	Capture/Handle/Release	Dip Net	Count/survey; Lavage; Mark, flipper tag; Mark, PIT tag; Measure; Sample, oral swab; Sample, tissue; Weigh
Kemp's ridley	45	Capture/Handle/Release	Dip Net	Count/survey; Lavage; Mark, flipper tag; Mark, PIT tag; Measure; Sample, oral swab; Weigh
Kemp's ridley	5	Capture/Handle/Release	Dip Net	Count/survey; Instrument, epoxy attachment (e.g., satellite tag, VHF tag); Lavage; Mark, flipper tag; Mark, PIT tag; Measure; Sample, oral swab; Weigh
Leatherback	10	Capture/Handle/Release	Dip Net	Count/survey; Lavage; Mark, flipper tag; Mark, PIT tag; Measure; Sample, oral swab; Weigh

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

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

Permit Number	Permit Holder	Expiration Date
1506-03	Blair Witherington, FFWCC	March 31, 2011*
1507-03	Llewellyn Ehrhart	March 31, 2011*
1501	Florida Marine Research Institute	March 31, 2011
14508	Inwater Research Group Inc.	June 1, 2015
1540	State of South Carolina	April 1, 2011
1551	NMFS SEFSC	July 1, 2013
1552	NMFS SEFSC	June 30, 2011
1570	NMFS SEFSC	December 31, 2011
1571	NMFS SEFSC	December 31, 2011
1576	NMFS NEFSC	September 30, 2011
1599	Inwater Research Group Inc.	June 30, 2012
13306	Karen Holloway-Adkins	June 30, 2013
14655	Jane Provancha	June 1, 2015

* = These permits would expire on the date noted or upon issuance of the new permits within the Proposed Action, 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 associated with scallop dredging, in addition to the death of 1 loggerhead and 1 Kemp's ridley over the course of the permit, through 2011, for their satellite tagging project.

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.