Environmental Assessment
FOR
ISSUANCE OF A SCIENTIFIC RESEARCH PERMIT TO COONAMESSETT FARM FOUNDATION, INC (FILE NO. 14249)

September 2009

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Location:	Mid-Atlantic bight from Cape Hatteras north to Long Island from coastal waters to the shelf break

Abstract: NMFS proposes to issue a scientific research permit to Ronald Smolowitz, Coonamessett Farm Foundation, Inc., 277 Hatchville Road, East Falmouth, MA 02536 under 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). The objectives of the permitted activity would be to evaluate modifications to scallop dredge gear that may reduce the probability of injurious sea turtle interactions with gear (Project 1); to study loggerhead sea turtle behavior; and collect biological and animal health information to help assess the loggerhead population and impact of anthropogenic activities on it (Project 2).

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CHAPTER 1 PURPOSE OF AND NEED FOR ACTION

1.1 DESCRIPTION OF ACTION

NMFS proposes to issue scientific research permits that authorize "takes"[1] under 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) to:

- Ronald Smolowitz, Coonamessett Farm Foundation, Inc. (CFarm), 277 Hatchville Road, East Falmouth, MA 02536

1.1.1 Purpose and Need

The primary purpose of the permit is to provide an exemption from the take prohibitions under the ESA to allow "takes". The need for issuance of the permit is related to NMFS's mandates under the ESA. 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, with only a few specific exceptions, including for scientific research and enhancement purposes. Permit issuance criteria require that research activities are consistent with the purposes and policies of the ESA and will not have a significant adverse impact on the species or stock.

1.1.2 Research Objectives

Study objectives include evaluating a modification to scallop dredge gear and understanding the behavior of loggerhead (*Caretta caretta*) sea turtles juveniles and adults in the mid-shelf area of the mid-Atlantic Ocean.

1.2 OTHER EA/EIS THAT INFLUENCE SCOPE OF THIS EA

NMFS is conducting a Programmatic Environmental Assessment (PEA) for sea turtle research in the Atlantic Ocean, Gulf of Mexico and Caribbean Sea. The PEA was released for public comment on January 14, 2008 and one comment was received and addressed. As NMFS analyzes the effectiveness of the PEA as a mechanism for issuing sea turtle research permits, individual permits would be issued. The PEA is analyzing issuance of permits over the next 5 years, and Permit No. 14249 would become part of the baseline in the PEA.

An EA was prepared for the issuance of the NMFS Northeast Fisheries Science Center Permit No. 1576. The FONSI for this action was signed November 1, 2006. This permit authorizes research to evaluate scallop dredge gear and effects of this gear on sea turtles.

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

1.3 SCOPING SUMMARY

The purpose of scoping is to:

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

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 application

A Notice of Receipt of the application was published in the *Federal Register*, announcing the availability of File No. 14249 (74 FR 8230, February 24, 2009) for public comment. Two public comments were received.

Attorneys for the Fisheries Survival Fund (FSF), an organization whose participants include full-time, limited access scallop fishermen from Massachusetts to Virginia submitted a letter stating that the research will assist the industry in its ongoing efforts to minimize the impacts of the scallop fishery on turtles and to help foster a better understanding of sea turtle behavior. FSF urged NMFS to approve and issue the permit as expeditiously as possible.

Oceana submitted comments noting that from review of the information provided in the permit application, it appears that the two research projects proposed by Ronald Smolowitz, are not designed with adequate rigor to yield scientifically valid answers to the questions they are intended to address. Oceana supported either rejecting the application as it now stands or having appropriate NMFS staff work with the applicant to create an experimental design that will yield more useful information. Oceana provided specific comments related to the projects. PR1 worked with the applicant, in coordination with the NMFS Northeast Fisheries Science Center (NEFSC) and Northeast Regional Office (NER) to address Oceana's comments and to ensure that the applicant's projects are in line with what the NEFSC priorities. The applicant is coordinating with the NEFSC to avoid duplication and unnecessary takes of sea turtles. PR1 also worked with the applicant to ensure that they have proper training to conduct proposed activities.

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

This section summarizes federal, state, and local permits, licenses, approvals, and consultation required to implement the proposed action. When it is the applicant's responsibility to obtain such permissions, NMFS is still obligated under The National Environmental Policy Act (NEPA) to ascertain whether the applicant is seeking other federal, state, or local approvals for their action.

1.4.1 National Environmental Policy Act

NEPA was enacted in 1969 and is applicable to "major" federal actions significantly affecting the quality of the human environment. A federal action is considered "major" if a federal agency fully or partially funds, regulates, conducts, or approves this action. NMFS issuance of research permits is considered a major federal action. NEPA requires consideration of environmental issues in federal agency planning and decision making. The Council on Environmental Quality's implementing regulations (40 CFR Parts 1500-1508) outline federal agency responsibilities under NEPA.

Through NOAA Administrative Order (NAO) 216-6, NMFS established agency procedures for complying with NEPA and the implementing regulations issued by the Council on Environmental Quality. NAO 216-6 specifies that issuance of scientific research permits under the MMPA and ESA are categorically excluded from further environmental review, except under extraordinary circumstances.

NMFS must prepare an EA or EIS when a proposed action:

- 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.

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 this action 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, without special exemption. 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 OMB-approved permit application instructions. 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 the Agency must find that the permit: was applied for in good faith; if granted and exercised will not operate to the disadvantage of the species; and will 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 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 recovering a species so that listing is no longer necessary, 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) 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 Other sections as needed

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.

CHAPTER 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

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

2.1 ALTERNATIVE 1 – NO ACTION

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 from the proposed research activities. However, it would not allow the research to be conducted, and the opportunity would be lost to collect information that would contribute to better understanding sea turtle populations and provide basic information that is necessary for NMFS to make important management decisions concerning these species and their habitat.

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

Under the Proposed Permit alternative, a permit would be issued for activities as proposed by the applicant, with the permit terms and conditions standard to such permits as issued by NMFS. These include conditions required by the ESA and NMFS regulations for research permits, and special conditions common to permits for research on sea turtles. The special conditions related to research on sea turtles are intended to mitigate potential adverse effects on animals caused by specific research methods. The permit conditions, including these mitigation measures that are part of the proposed permit alternative are listed in Appendix A. The permit would be valid for five years from the date of issuance.

The objectives of the permitted activity would be to evaluate modifications to scallop dredge gear that may reduce the probability of injurious sea turtle interactions with gear (Project 1); to study loggerhead sea turtle behavior; and collect biological and animal health information to help assess the loggerhead population and impact of anthropogenic activities on it (Project 2). NMFS Northeast Fisheries Science Center (NEFSC) currently holds a permit (Permit No. 1576) to evaluate scallop dredge gear so Project 1 would be closely coordinated with the NEFSC to avoid duplication of take. No new take would be authorized under Permit No. 14249 for Project 1, rather the permit would authorize Mr. Smolowitz to use take the NEFSC would not use in a given year. This would allow the NEFSC and Mr. Smolowitz to collaborate to conduct the necessary number of tows to accomplish mutual research objectives.

See Appendix B for a table outlining the proposed numbers of animals, research activities, etc. Tables 1 and 2 outline the number of protected species, by species, that would be authorized to be taken, and the locations and manner in which they would be taken. The takes listed in Table 1 for Project 1 Dredge Gear Modification would **NOT** become valid until the NMFS Permits

Division receives a copy of an annual letter from the NEFSC verifying Mr. Smolowitz has coordinated with the NEFSC for the upcoming season's research. This letter would confirm the number of takes the NEFSC are foregoing for that particular year under their Scallop Dredge Project (Table 1 of Permit No. 1576). This number of takes would become effective under Mr. Smolowitz's permit for that year. Mr. Smolowitz must communicate with the NEFSC prior to January 1st of each year to discuss the subsequent January 1 to December 31 period. Before initiating research each year, Mr. Smolowitz must receive a letter from the NEFSC and ensure that the Permits Division has received a copy of the letter they give him. Once Mr. Smolowitz reaches the take limits of his permit, which are issued for the course of the permit (not annual), he would not continue to conduct additional dredge gear modification research.

The proposed research would occur in the Mid-Atlantic bight from Cape Hatteras north to Long Island from coastal waters to the shelf break. The specific research methods are described in the Project Description section of the application (NMFS permit application file no. 14249).

Project 1: Dredge Comparison Study

Two paired dredges would be used. This paired design is an accepted standard in gear work and utilized to minimize unaccountable environmental variation. One of the two dredges would be a traditional scallop dredge that is in compliance with current scallop fishing regulations (with the exception of no turtle chain excluder) and representative of a commonly used dredge configuration (referred to as the traditional dredge). The other dredge would be fishing a modified dredge based on a design by CFarm and continued to be studied by CFarm and the scallop industry. The CFarm experimental dredge is a modification of a standard New Bedford style sea scallop dredge. The modifications consist of moving the cutting bar forward, removing all brace bars in the bale section, and adding several vertical round stock bars along the face of the dredge between the depressor or "pressure" plate and the cutting bar. Moving the cutting bar forward changes the geometry of the dredge frame, and the new wedge shape is thought to increase the probability of turtles going over the frame rather than under the cutting bar. Removing the brace bars from the bale section eliminated barriers that might hold a turtle under the bale rather than letting it pass through the bale and escape over the dredge frame. The round stock bars were added to keep contact with the seafloor and to add a structure that might help turtles move up and over the cutting bar. The design of the CFarm excluder dredge may continue to be changed if further modifications are likely to simultaneously reduce the threat to sea turtles and retain the target catch. Turtle interactions with the scallop dredge would mirror the interactions in the current scallop dredge fishery before the chain mat requirement. Injuries from these interactions may involve abrasions, cracked carapaces, other serious injuries, and death. It is possible that all or nearly all of the turtles could have injuries, so researchers are requesting that up to 100% of the scallop dredge interactions (Project 1) are authorized for serious injury or mortality.

Turtles involved in Project 1 would interact with the scallop dredge and be flipper tagged, Passive Integrated Transponder (PIT) tagged, tissue sampled, measured and weighed.

Project 2: Distribution and Behavioral Studies

Turtles captured under Project 2 would be captured by a handheld net or a breakaway hoopnet. Although the applicant proposed to use numerous capture methods, after discussions with

outside reviewers the Permits division is proposing to authorize only the use of dip net and hoop nets for capture. As in Project 1, turtles would be flipper and PIT tagged, measured, weighed, tissue sampled. They would also have satellite tags attached, be blood sampled, nasal and cloacal swabbed, and tracked with a Remote Observation Vehicle (ROV).

Capture

Handheld Net– A dip net would be placed under the turtle and it would be carefully lifted out of the water and placed on the deck of the research vessel's small boat and then transferred to the research vessel. Once brought onboard the collection boat the captured turtle would be transferred to the deck of the larger vessel using a cargo net. The turtle would be released using the cargo net.

Breakaway Hoopnet– Use of the breakaway hoop net to capture loggerheads is a method that has been used successfully to safely capture porpoise, pinnipeds, small cetaceans (Asper 1975) and leatherback turtles (James et al. 2005). The applicant has successfully captured loggerheads in the past using this method. There would be two people involved in the capture process - the person wielding the hoop net and the person on the control line. The animal would be pursued by boat and one of the researchers would be positioned on the bow, ready to guide the hoop net (fitted to a long guiding pole) over the animal. The breakaway hoop net would be custom made so that the hoop is wide enough to fit easily over the turtles front flippers loosely held at its side. The hoop net would be fitted with breakaway stays to a cast net, which would be pursed over the turtle. The hoop netter would place the net over the turtle from the bow and the other person would pull the control line once the net is in position on the turtle. The control line would break the net off of the hoop and close the net so the turtle is pursed at the surface. Researchers would use a small boat, capable of being launched and retrieved from the deck of the larger vessel. The turtle would be quickly brought alongside to the small boat and lifted onto the deck of the research vessel. Another alternative to lift the animal on to the vessel, if the turtle is large, would be to put a cargo net (wide, soft webbing) around the pursed turtle and pull on the cargo net rather than the lighter-weight net in which the turtle is initially pursed. The captured turtle, once brought onboard the collection boat, would be transferred to the deck of the larger vessel using a cargo net and released using a cargo net.

Passive Integrated Transponder (PIT) Tag and Flipper tag

Each turtle would be thoroughly examined for pre-existing Inconel tags (visual exam) and pre-existing PIT tags (PIT tag scanner). If tags are found, tag code and tag location would be recorded and the original tagging organization contacted. Any damaged external tags would be removed and replaced with a new tag. If no tags are present, Inconel metal tags would be applied to the trailing edge of each rear flipper of all turtles. Tags would be cleaned of all oily residue left-over from the manufacturing process and the tagging site would be scrubbed with Betadine for a minimum of 30 seconds prior to tag application. Due to high Inconel tag loss rate in turtles, a PIT tag would be injected into the right shoulder muscle of all turtles. The PIT tagging site would be scrubbed with povidone-iodine for a minimum of 30 seconds prior to tag injection. Turtles with existing PIT tags would not receive additional PIT tags. The PIT tags should stay in place indefinitely, rendering the turtle identifiable despite Inconel tag loss. Researchers would still use Inconel tags despite the high rate of Inconel tag loss because many

turtle projects throughout the Atlantic do not have resources to purchase PIT tag readers and therefore cannot identify turtles by the PIT tag only.

Measure, Weigh

Curved carapace measurements would be taken with a tape measure and straight measurements with calipers. Weight would be taken with a battery operated platform scale used routinely for sea turtle weights.

Tissue Sample

Two skin/tissue biopsies per live animal would be taken with disposable, sterile 6 mm AcuPunch sample punches or other similar equipment from the trailing edge of rear flippers. The sampling site would be disinfected before sampling.

Salvage

Researchers would salvage dead carcasses to obtain information from them. This activity would have no negative effects to the species and is not analyzed further in this opinion.

Blood Sample

Blood would be collected from the dorsal cervical sinus of all turtles immediately after they are safely situated on deck. The blood collection site would be scrubbed for a minimum of 30 seconds with povidone-iodine prior to sampling. Blood gas and electrolyte parameters would be evaluated immediately using a Heska I-Stat portable blood analyzer, and additional blood would be submitted to Idexx veterinary diagnostic laboratory for complete blood cell count, plasma chemistry panel, protein electrophoresis, bacterial and fungal cultures. Blood would be analyzed at the Michigan State University Diagnostic Center for Population and Animal Health for Vitamin A, D, E, and beta-hydroxybutyrate values. Plasma concentrations of testosterone, estradiol, and corticosterone would be evaluated at the laboratory of Georgia Southern University to assess the reproductive status and physiological stress level of each turtle.

Nasal Swab, Cloacal Swab

Cloacal and nasal cultures would be obtained from each turtle, and evaluated at Idexx veterinary microbiology laboratory to improve knowledge of the microbial flora of loggerhead turtles and to survey for the presence of potentially zoonotic bacteria such as Salmonella and Campylobacter. Standard, readily available, sterile culturettes that include a sterile transport media would be purchased from a veterinary supply house. On the boat, a sterile package containing one culturette would be opened, the rayon tipped swab would be removed and carefully inserted approximately 1 cm into either the cloaca or the nares of the animal to be tested. The swab would then be removed and placed into the tube with sterile transport media and refrigerated until shipped to the laboratory.

Attach Transmitter

<u>Epoxy Attachment for Satellite Tags on Hardshell Turtles</u>

Holding – Researchers would use a circular or rectangular tub to safely hold the turtle in a natural prone position while attaching the transmitter. A foam pad would be placed on the bottom of the tub to cushion the turtle. The tub would serve to comfortably restrict movement of the turtle during the attachment procedure. A wet cloth would be draped over the turtle's eyes to

completely block vision which often reduces the turtle's desire to move. Researchers would shelter the turtle from direct sunlight, wind, and rain with a tarp during the attachment procedure.

Preparing the carapace – Researchers would remove epibionts (barnacles, algae, etc.) from the carapace at the mounting and bonding site of transmitter. Researchers would place the transmitter where the first and second vertebral scutes meet. This section of the carapace rises to a maximum point above the sea surface each time the turtle breathes, and the base antenna on the transmitter would break the plane of the water's surface. Attachment media would also encompass sections of the first and third vertebral scutes, as well as the first and second costal scutes. Researchers would thoroughly scrub these areas 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 or a small amount of acetone.

Mounting the transmitter on the carapace – Researchers would program and activate transmitters in the lab prior to entering the field. Researchers would coat all surfaces of the transmitter except the bottom with anti-fouling paint. The size and weight of the satellite transmitter used would depend on the size of the turtle.

Researchers would use a two-part cool setting epoxy (e.g. Power Fast ®) to secure the transmitter on to the carapace. They would use a small amount of epoxy (< 50 g) to create an even base for the transmitter to rest and to secure it to the carapace. Drying time would vary between 20 - 60 minutes depending on ambient temperature and humidity. When the base has hardened, researchers would use Power Fast® or Bondo® fiberglass cloth and resin to further secure the transmitter to the carapace from the edges and/or top to the surrounding scutes. Researchers would use a liberal coat of mixed resin on the transmitter and carapace where pre-cut strips of fiberglass cloth would be applied in two layers over the transmitter, allowing each layer to dry completely (approximately 15 – 20 minutes). Researchers would use two 5 cm wide by 11 cm long strips of fiberglass cloth and two 5 cm wide by 5 cm long squares of fiberglass cloth in the first layer – one piece on each edge of the tag. The second layer would consist of two 5 cm wide by 13 cm long strips of fiber glass cloth, one over the tag and one across the front of the tag. Researchers would take care to prevent fiberglass resin from running off the shell or coming in contact with the turtle's skin or eyes by wiping up drips immediately and would maintain adequate ventilation while using Bondo® fiberglass media. A coat of fiberglass anti-fouling paint may be applied over attachment media to prevent fouling on these materials. Researchers would sand the fiberglass to remove any sharp edges. Researchers expect that turtles would be held no longer than 1.5 hours, barring unforeseen weather or logistical events.

Satellite Tag Specifications

Below is a list of tags currently in use or being considered for use in Project Two. This is not an exhaustive list of available tags, and additional tags may be considered for use in the future as new tags and technology become available in this dynamic field of technology. All tags and attachment materials would weigh less than 5% of a turtle's weight, and tags would be streamlined to minimize any effects of drag. Tag dimensions vary by manufacturer and tag type, but would be proportional to turtle size and consistent with weight restrictions.

SPLASH -Data-Collecting Argos Satellite tags (SPLASH) from Wildlife Computers, Inc. include sensors to measure depth, temperature, light level, and wet/dry periods (to determine surfacing). During the deployment, depth and temperature data are collected, analyzed, summarized, and compressed for transmission through the Argos satellites. The smallest configuration weighs less than 65 g in air (50cm L x 50cm W x 2cm H).

SPOT -Smart Position and Temperature (SPOT) transmitters from Wildlife Computers, Inc. come in two large molds weighing 185 g (3.25"L x 1.38"W) and 200 g (4.88"L x 1.88"W). The smaller SPOT tag weighs 95 g (3.19"L x 1.95"W). These tags collect dive data and provide location via triangulation by ARGOS satellites.

SMRU SRDL 7000 – The Sea Mammal Research Unit SRDL 7000 (Satellite Relayed Data Logger) collects data on depth, swim speed and salinity. The weight of the SRDL in air is 0.7 kg, and the dimensions are 10 cm x 8 cm x 5 cm high.

Crittercam Mounting: The VTDR (Crittercam) system consists of a Hi-8 video camera integrated with a time–depth recorder and on-board microcomputer (512 kb of memory). These components are packaged in a cylindrical aluminum housing (diameter: 10.1 cm; length: 31.7 cm) that has a hydrodynamically optimized dome and conical tail portion composed of incompressible syntactic foam. For recovery, these units are equipped with a very-high-frequency (VHF) radio transmitter (MOD 050, Telonics, Mesa, AZ, USA) and acoustic (ultrasonic) tag (CHP-87-L, Sonotronics, Tucson, AZ). VTDRs weigh 2 kg out of the water, but are slightly positively buoyant in water; however, this buoyancy would be rendered neutral during deployments due to the attachment of counterweights on the attachment base plate.

Researchers would attach VTDRs to the crown of each turtle's carapace with a 2-plate mechanism: the top plate connected to the housing with 2 hose clamps; the bottom plate fitted with a nylon-mesh apron, and attached to the carapace with 5 min quick-set epoxy. The front of these plates would be connected by an interlocking assembly, and the back would be linked with a burn-wire connector and backup corrosive (Mg) link. VTDRs would be programmed to detach 3 to 20 hours after deployment, at which time a charge from an on-board 9V battery would be sent to the burn-wire, causing the wire to corrode and break, disengaging the plates. Once detached from the counterweighted base plate, the slight positive buoyancy of the VTDR would bring it to the surface. The base plate would remain attached to the turtle until it is shed.

Track with ROV

Researchers plan to begin a transect holding a straight course based on the best sighting conditions (sea state, wind, glare, etc.) at a speed of 4 knots. Three observers would be on the lookout for turtles. One observer would be posted in the masthead crow's nest at an eye height of 14 m above the sea surface. Another observer would be posted on the foredeck at an eye height of 4 m above the sea surface. The third observer, usually the captain, would be in the pilot house with an eye height of 4 m above the sea surface. All observers use binoculars for scanning around the vessel. The masthead observer is also equipped with digital cameras and a GPS recorder. When a turtle is spotted the vessel would be directed to approach. Some turtles are spotted submerged 2-5 m deep very close to the vessel and others are spotted several hundred meters away on the surface. Researchers would stop the vessel for the turtles that are close and

maneuver to within 50 m for those spotted at a greater distance. Positions would be recorded and a continuous GPS plot maintained. For most of the dives, the ROV would be deployed from the rails of the vessel with 2 tether handlers on deck. The ROV would be launched maneuvered towards the turtle. The turtle would be approached from the turtle's front to avoid startling the animal and causing it to dive. Researchers would stop the ROV once the turtle was in view on the ROV video camera. They would then track the turtle maintaining a distance of 3 to 5 meters if possible. If the turtle approached the ROV researchers would let the turtle investigate the vehicle. When researchers lose video contact with the turtle they would use the BlueView sonar to search for the animal, as well as conduct visual searches from the vessel. The Blue View would operate at a frequency of 450 kHz and have low power; 10 watts. Its beam width would range from 1° to 15° and have a maximum range of 450 feet. It would be on during each ROV tow. If no contact was made they would then proceed to do a bottom search.

Bottom Search Mode: On a number of occasions researchers would send the ROV vehicle to the bottom in stages. The ROV would be equipped with an Onset Tidbit temperature recorder to record temperature on the way down and at the sea floor. Once at the sea floor researchers would go into a search pattern looking for turtles while also observing benthic fauna. Bottom searches take place when a) researchers lose track of a turtle that dives, b) researchers examine a fresh dredge path to see if turtles might be feeding, and c) after dark when there is nothing better to do with researcher time. Turtles could be followed up to approximately 8 hours.

Dredge Observations: On occasion researchers would tow the scallop dredge and use the ROV to search the dredge path for activity. Researchers may also utilize a two vessel strategy where the ROV vessel follows closely behind the towing vessel and observes the activity occurring in the water column in the vessels track. Researchers would also examine tow paths immediately after the dredges passed.

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

There are a variety of human activities that 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. 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. There are no significant social or economic impacts of the proposed action 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

3.2.1 Sanctuaries, Parks, Historic Sites, etc.

Cape Hatteras National Seashore (CHNS) and Assateague Island National Seashore (AINS) are within the proposed action area. CHNS was established in 1953 as the first national seashore established to preserve the barrier islands between the Atlantic Ocean and Pamlico Sound. The 70 miles is filled with a wide diversity of plants and animals living in the salt marshes, forests, beaches and ocean. AINS was established in 1965 to protect the 37 miles of barrier islands between the Atlantic Ocean and Chincoteague Bay. Like CHNS, AINS is home to a number of plants and animals. The proposed action is not expected to affect the seashores since the action will occur in the open ocean and not near the protected lands.

The Monitor National Marine Sanctuary is located off of Cape Hatteras, North Carolina. The Sanctuary protects the wreckage of the Civil War vessel the USS Monitor. The wreckage is 16 miles off the coast of Cape Hatteras in approximately 230 feet of water. No proposed research would be conducted in this Marine Sanctuary.

3.2.2 Essential Fish Habitat

EFH has been designated for many of the fish species within the action area. Details of the designations and descriptions of the habitats are available in the Atlantic Fishery Management Plans. Activities that have been shown to 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 activities in the Proposed Action are directed at or likely to have any impact on any designated EFH. Project 1 would take place in areas that are currently part of the scallop dredge fishery. The effects to EFH were previously analyzed in the Framework Adjustment 18 to the Atlantic Sea Scallop FMP (NEFMC 2005). Project 2 would not involve fishing gear or dredging.

3.2.3 Designated Critical Habitat

There is no designated critical habitat within the action area.

3.3 BIOLOGICAL ENVIRONMENT

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*

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.

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 U.S. includes sandy beaches of mainland shores, barrier islands, coral islands, and volcanic islands between Texas and North Carolina and at the U.S. Virgin Islands (USVI) and Puerto Rico (NMFS and USFWS 1991). Principal U.S. nesting areas for green turtles are in eastern Florida, predominantly Brevard through Broward counties. Regular green sea turtle nesting also occurs on the U.S. Virgin Islands 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 growing trend in total number of nests suggests that the adult nesting female population is about 7,400 individuals.

Table 3: Total number of nests at Rancho Nuevo

Year	# of Nests
1985	702
1995	1,940
2000	5,800
2003	8,300
2005	10,300
2006	12,000

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

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° degrees N to 47° degrees S latitude in all oceans and undergo extensive migrations between 90° degrees N and 20° degrees 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. Leatherbacks are predominantly distributed pelagically, however but can be found in nearshore waters. Shoop and Kenney (1992) also observed concentrations of leatherbacks during the summer off the south shore of Long Island and off New Jersey. Leatherbacks in these waters are thought to be following their preferred jellyfish prey.

Recent analysis suggests that seven stocks exist in the Atlantic including Florida, Northern Caribbean, Western Caribbean, Southern Caribbean-Guyana Shield-Trinidad, West Africa, South Africa, and Brazil (TEWG 2007). The primary western Atlantic leatherback nesting beaches occur in French Guiana, Suriname, Trinidad, and Costa Rica-Panama while important nesting in the eastern Atlantic occurs on the coast of central western Africa (TEWG 2007).

The Turtle Expert Working Group (2007) estimated the population growth trends of six of the Atlantic nesting stocks (due to data constraints, trends for West Africa could not be estimated). Except for the Western Caribbean, these stocks appeared to be increasing. However, they cautioned that the trend estimates were based only on information of nesting females (one segment of the population). They estimated the adult population of the North Atlantic to be approximately 34,000 to 94,000 animals. The range of the estimate is large, reflecting the Group's uncertainty in the nest numbers and their extrapolation to adults. The Group believes that as estimates improve the range will likely decrease.

The leatherback was listed as endangered on June 2, 1970. Critical habitat for the leatherback includes the waters adjacent to Sandy Point, St. Croix, U.S. Virgin Islands, 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.

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 U.S. and throughout the Caribbean Sea. Non-nesting, adult female loggerheads are reported throughout the U.S. 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 (TEWG 1998) suggest that loggerheads (benthic immatures and adults) in U.S. waters are distributed in the following proportions:

- 54% in the southeast U.S. Atlantic
- 29% in the northeast U.S. Atlantic
- 12% in the eastern Gulf of Mexico
- 5% in the western Gulf of Mexico

Five nesting subpopulations exist in northwestern Atlantic. Low gene flow and strong nesting site fidelity may make these subpopulations vulnerable.

Annual nesting trends of Northwest Atlantic Recovery Units (NMFS and USFWS 2008)

Name	Location	Percent Decrease	Year
Northern	FL/GA Border to S. VA	1.3	Since 1983
Peninsular Florida	FL/GA Border through Pinellas County	41	Since 1998
Dry Tortugas	islands of the Dry Tortugas, near Key West	Not enough information	--
Northern Gulf of Mexico	Franklin County, FL through TX	Appears to be declining	--
Greater Caribbean	Mexico, French Guiana, Bahamas, Lesser and Greater Antilles	Not enough information	--

It is important to note that these trend analyses numbers are not compared to larger historical numbers, and only reflect one segment of the population (just nesting females). Nesting females are the only segment of the population for which we have reasonably good data and are cautiously used as one measure of the possible trend of populations.

The loggerheads in the major different geographic areas represent differing proportions of the western Atlantic subpopulations. The northern nesting subpopulation produces about 9 percent of the loggerhead nests; however, they comprise more loggerheads found in foraging areas.

Northern nesting subpopulation sea turtles in foraging areas

Foraging Area	Percent	Reference
Maine to Georgia	25-59	Sears 1994, Norrgard 1995, Sears et al. 1995, Rankin-Baransky 1997, Bass et al. 1998
Central Florida	10	Witzell 2002
Gulf of Mexico	10	--

Another consideration adding to the vulnerability of the northern subpopulation is that NMFS scientists estimate, using genetics data from Texas, South Carolina, and North Carolina in combination with juvenile sex ratios from those states, that the northern subpopulation produces 65% males, while the south Florida subpopulation is estimated to produce 80% females (NMFS SEFSC 2001). It is possible that the high proportion of males produced in the northern subpopulation is an important source to the entire southeast U.S. nesting population. Further declines or loss of the northern subpopulation and its disproportionate share of males could contribute to a serious population decline over the entire region (NMFS SEFSC 2001).

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

On November 15, 2007 Oceana and the Center for Biological Diversity petitioned NMFS to designate the western North Atlantic subpopulations of the loggerhead sea turtle as a distinct population segment and to reclassify the western North Atlantic subpopulations as endangered. On March 5, 2008 NMFS announced that the petition is possibly warranted and NMFS is currently conducting a status review to assess if change in the status of this species is warranted.

3.3.2 Non-Target Species

Project 1 would result in some bycatch of the following species: goosefish (*Lophius americanus*), yellowtail flounder (*Limanda ferruginea*), summer flounder (*Paralichthys dentatus*), winter flounder (*Pseudopleurinectes americanus*), Atlantic halibut (*Hippoglossus hippoglossus*), little skate (*Raja erinacea*), and winter skate (*Raja ocellata*).

American plaice (*Hippoglossoides platessoides*), witch flounder (*Glyptocephalus cynoglossus*), windowplane flounder (*Scopthalmus aquosus*), thorny skate (*Raja radiata*), smooth skate (*Raja senta*), and rosette skate (*Raja garmani*) may also be caught in the scallop dredge fishery, however; these species' distribution have minimal overlap with scallop distribution.

The capture of this bycatch was previously analyzed in the EA for issuance of Permit No. 1576 (FONSI signed November 1, 2006). The amount of bycatch due to the scallop dredge fishery has been reduced in recent years due to mitigation measures including a reduction in bottom contact time, introduction of a 4" ring in 2004, and the use of a larger twine top mesh. The New England Fishery Management Council has worked to minimize bycatch to the greatest extent that is practicable. Framework Adjustment 18 to the Atlantic Sea Scallop Fishery Management Plan (FMP) suggests rotational area management as another possible way to reduce the amount of bycatch. The total Vessel Trip Report dredge hours for June- November 2004 were 367,220.3 (Murray 2005). Assuming all hauls last about an hour the proposed action of 5000 hauls would represent less than 1% (5000/367,220) of the total scallop fishing effort. The amount of bycatch resulting from the proposed action would be less than the bycatch resulting from the whole scallop fishery.

NMFS has determined the proposed research is not likely to adversely affect North Atlantic right whales (*Eubalaena glacialis*), humpback whales (*Megaptera novaengliae*), fin whales (*Balaenoptera physalus*), sei whales (*Balaenoptera borealis*), blue whales (*Balaenoptera musculus*), and sperm whales (*Physeter* macrocephalus) all of which are listed as endangered species under the ESA (Biological Opinon on the Issuance of Scientific Research Permit No. 14249 Under the Provisions of Section 10(a) of the ESA October 2009).

Right whales, humpback whales, and fin whales occur in Mid-Atlantic and New England waters over the continental shelf. Sei whales typically occur over the continental slope or in basins situated between banks (NMFS 1998b). During the University of Rhode Island's Cetacean and Turtle Assessment Program (CeTAP) study, sperm whales were observed along the shelf edge, centered around the 1000 meter depth contour but extending seaward out to the 2000 meter depth contour (CeTAP 1982). Although blue whales are occasionally seen in U.S. waters, they are more commonly found in Canadian waters (Waring et al. 2000). The only known interaction

between a cetacean and scallop gear occurred in 1983 when a humpback whale became entangled in the cables of scallop dredge gear off of Chatham, Massachusetts. The entanglement was reported and responded to by disentanglement personnel. Although this event shows that interactions between large cetaceans and scallop gear can occur, nevertheless such interactions are expected to be unlikely to occur given that these whale species are larger than a scallop dredge or trawl opening, and have the speed and maneuverability to get out of the way of oncoming scallop fishing gear. Thus, these species will not be considered further in this EA.

Project 2 would not affect non-target species. The proposed capture methods would not result in any bycatch or affect any non-target species. Capture by hoopnet and dipnet allow the researchers to focus on an individual turtle and does not result in the disturbance of other animals.

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.

4.2 EFFECTS OF ALTERNATIVE 2: Issue permit with standard conditions

Any 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 action 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 Biological Environment

Effects of the action on the target species (sea turtles) are discussed below.

Project 1: Scallop Dredge Modification

The effects of this action were previously analyzed in the EA for the NMFS NEFSC Permit No. 1576. The FONSI for this action was signed November 1, 2006. In summary, turtles that would be captured would be subject to injuries from these interactions and may involve abrasions, cracked carapaces, other serious injuries, and death. More information on turtle interactions with the scallop dredge industry can be found in the Biological Opinion resulting from 2004 ESA Section 7 Consultation on the Atlantic Sea Scallop Fishery Management Plan. While NMFS expects the sea turtle interactions with the modified scallop dredge would be less injurious than the interactions in the current scallop dredge fishery, nevertheless, serious injuries could result. In contrast to other activities like major fisheries, the proposed action has a finite period of performance, strict limits on the total level of take, and all takes will be known and reported, rather than being a continuous on-going activity with a limited ability to track and control sea turtle take and mortality as it occurs.

No new takes would be issued under the proposed action. The applicant would use takes already issued to NMFS NEFSC to conduct his research therefore the number of turtles affected by the scallop dredge project would not change from what was previously authorized. No new mortality takes would be authorized or are requested.

Project 2: Health Assessment

Capture by hoopnet or dipnet

Capture by hoopnet or dipnet can result in raised levels of stressor hormones and the harassment of individual turtles during capture and handling could disrupt their resting or foraging cycles. However, this capture method is simple and not invasive and allows the researcher to remove the turtle from the net and water immediately while it giving complete attention during the capture activity. The turtles would be held in a manner to minimize stress. NMFS expects that individual turtles would experience no more than short-term stress during this type of capture activity and this stress would be expected to be less than that experienced by turtles captured by net. No injury or mortality would be expected.

Measure, weigh, flipper and PIT tag

NMFS does not expect that individual turtles would experience more than short-term stresses during the handling, measuring, and weighing. 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 with no apparent ill effect; NMFS Southeast Fisheries Science Center researchers have conducted the oral measurements on greater than 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.

All tag types have problems 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 any of the NMFS permit holders.

The NMFS Southeast Fisheries Science Center 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. It

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 Southeast Fisheries Science Center has been Inconel (metal) 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 Southeast Fisheries Science Center Beaufort Laboratory has encountered, no turtles show any adverse effects of being tagged in this manner (NMFS 2006). In the nine years that the NMFS Southeast Fisheries Science Center has been PIT tagging turtles, turtle behavior indicative of discomfort was observed to be temporary, and the turtles exhibited normal behavior shortly after tagging and swam normally after release. Of the close to 1,000 tag recaptures that the NMFS Beaufort Laboratory has encountered, none show any adverse effects of being tagged in this manner (NMFS 2006). 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.

Tissue sample

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. It is not expected that individual turtles would experience more than short-term stresses 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 Southeast Fisheries Science Center researchers have encountered no infections or mortality resulting from this procedure (NMFS 2006).

NMFS expects that the collection of a tissue sample would cause minimal additional stress or discomfort to the turtle beyond what was experienced during capture, collection of measurements, tagging, etc.

Nasal and Cloacal Swab

Swabbing is minimally invasive. Each turtle would be sampled using a sterile swab. These procedures could result in minor discomfort to the turtle with no lasting effects. NMFS expects that the animal would experience discomfort but that the stress from these procedures would be insignificant and short-term. No injury would be expected to occur from these procedures.

Blood Sample

NMFS does not expect that individual turtles would experience more than short-term stresses during blood sampling. Taking a blood sample from the sinuses in the dorsal side of the neck is now a routine procedure (Owens 1999). According to Owens (1999), with practice, it is possible to obtain a blood sample 95% of the time and the sample collection time should be about 30 seconds in duration. Sample collection sites would be disinfected with alcohol prior to sampling and attempts (needle insertions) to extract blood will be limited to two on either side of the neck. The researchers would have to follow blood volume guidelines to ensure safe amounts are drawn from the animal.

Attach satellite tag/crittercam

The researchers plan to attach a variety of tracking devices to the sea turtles. Up to 10 loggerhead sea turtles would be tagged annually. The permit would require that the total weight of transmitter attachments for any one turtle not exceed 5% of the body mass of the animal. Each attachment would be made so that there is no risk of entanglement. Tags would have no gap between the transmitter and the turtle that could result in entanglement. Low heat producing marine epoxy will be used to attach equipment in order to prevent harm to the animal. 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, the transmitter attachment procedures would not take place in the water.

Transmitters attached to the carapace of turtles have the potential to 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%, reduced lift by less than 10% and increased pitch moment by 11-42%. It is likely that this type of transmitter attachment would negatively affect the swimming energetics of the turtle. However, based on the results of past tracking of hardshell sea turtles equipped with this tag set-up NMFS is unaware of the transmitters resulting in any serious injury to this species. Additionally, the epoxy molding technique that would be employed by this researcher should help to minimize drag.

Based on past experience with these techniques used by turtle researchers and the documented effects of transmitter attachment, NMFS expects that the turtles would experience some small additional stress from attaching radio/satellite transmitters to turtles taken during this research, but not significant increases in stress or discomfort to the turtle beyond what was experienced during capture and other research activities. NMFS does not expect the transmitters to significantly interfere with the turtle’s normal activities after they are released.

Although portions of the critter cam used in this research could be shed into the ocean, given the very small amount of debris they would represent and the fact that they do not contain any highly dangerous or radioactive materials, NMFS does not expect them to have any significant effect on the environment.

Track with ROV

Researchers would follow turtles with a ROV to observe them underwater. The turtle would be approached from the front to avoid startling it. If the turtle approaches the ROV the ROV would remain still and let the turtle investigate it. NMFS expects the turtle to experience minimal disturbance from the ROV. The turtle is free to swim away from the ROV at any time.

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

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

4.3.1 Endangered Species Act

To comply with section 7 of the regulations (50 CFR 402.14(c)), a section 7 consultation was initiated by NMFS PR under the ESA. In accordance with Section 7 of the ESA of 1973, as amended (16 U.S.C. 1531 et seq.), a biological opinion was prepared for this proposed action and it concluded that after reviewing the current status of listed sea turtles, the environmental baseline for the action area, the effects of the take authorized in the permit, and probable cumulative effects, it is NMFS' biological opinion that issuance of Permit No. 14249, as proposed, is not likely to jeopardize the continued existence of any listed sea turtles, or any other NMFS ESA-listed species and is not likely to destroy or adversely modify designated critical habitat.

4.4 COMPARISON OF ALTERNATIVES

While the no action alternative would have zero 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 preferred alternative would affect the environment, primarily individual sea turtles. However, the effects would be minimal and the alternative would allow the collection of valuable information that could help NMFS' efforts to recovery sea turtles. Neither the no action nor the preferred alternatives are anticipated to have adverse population or stock-level effects on sea turtles.

4.5 MITIGATION MEASURES

There are no additional mitigation measures beyond those conditions that would be required by permit. The conditions that would be required if a permit were issued are outlined in Appendix A. All of these conditions are intended to minimize unavoidable adverse effects of the various research activities. The permit conditions also require regular reports on the effectiveness of the research at achieving the applicant's stated objectives (and thus at achieving the purpose and need of the federal action) and on the effectiveness of the mitigation measures required by the permit. By statute, regulation, and permit conditions, NMFS has authority to modify the permit or suspend the research if information suggests it is having a greater than anticipated adverse impact on target species or the environment.

4.6 UNAVOIDABLE ADVERSE EFFECTS

The research activities would cause disturbance and stress and injury to the captured sea turtles (temporarily interrupting normal activities such as feeding). The research is not expected to have more than a minimal effect on individuals, and no effect on populations. While individual sea turtles may experience short term stress and discomfort in response to the activities of researchers, the impact to individual animals is not expected to be significant.

The measures required by permit conditions are intended to reduce, to the maximum extent practical, the potential for adverse effects of the research on all species. Because the research involves wild animals that are not accustomed to being captured, the research activities would unavoidably result in harassment; however, the harassment would not rise to significant levels.

4.7 CUMULATIVE EFFECTS

Cumulative effects are defined 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. 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.

Research under the action alternative is not expected to result in more than localized disturbance of animals in the action area. It is likely the effects of the disturbance would be short-term and that the affected areas would recover between disturbances and following conclusion of the permitted research.

4.7.1 Research permits

There are 2 active permits that, in combination, allow research year-round on the four target species in areas that could overlap with the proposed action areas:

- Permit No. 1576- NMFS NEFSC expires on October 31, 2011
- Permit No. 1557- Dr. Molly Lutcavage expires on June 30, 2011

The proposed activities are already closely coordinated with the NMFS NEFSC. Permit No. 1557 targets leatherback sea turtles as opposed to the hardshell species proposed by Permit No. 14249, so it is unlikely that the proposed action and the actions of Permit No. 1557 will result in an increase in disturbance to sea turtles.

There is not enough information about the exact location and timing of the research under the various permits to specifically identify the extent of overlap in time and space of all of the permitted research, or to identify the frequency with which any given local population may be disturbed. However, it is a standard condition of NMFS permits for research on sea turtles (see Appendix A) that researchers coordinate their activities with those of other permit holders to avoid unnecessary disturbance of animals. 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 this coordination and take other steps appropriate to minimize disturbance from multiple permits.

4.7.2 Other human activities

Within the action area the target sea turtles are adversely affected by human activities including commercial and recreational fishing (via entrapment and entanglement in fishing gear), and tourism and recreation (via harassment from human approach and presence). Of these, disturbance that results in displacement of animals or abandonment of behaviors such as feeding or breeding by groups of animals are more likely to have cumulative effects on the species than entanglement of a few animals in fishing gear.

4.7.3 Summary of cumulative effects

It is likely that issuance of the proposed permit 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

Permits, Conservation, and Education Division, Office of Protected Resources, National Marine Fisheries Service, Silver Spring, MD

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APPENDIX A: PERMIT CONDITIONS

In an effort to mitigate the effects of research the proposed permits would be conditioned with the following requirements:

- No mortality is expected under Project 2 and none is authorized; therefore, researchers must suspend activities in the event of a serious injury or mortality or if the level of authorized take is exceeded.
- Researchers must submit annual reports each year the permit is valid and a final report summarizing the research results.
- Researchers must notify the appropriate NMFS regional office at least two weeks before beginning the field season. This is will help to coordinate the level of research occurring in the action area.

The following conditions are specific to sea turtle permits and would accompany the general conditions listed above:

- Tagging, measuring, and weighing instruments and equipment must be cleaned and disinfected between animals.
- Researchers must use care when handling live animals to minimize any possible injury, and appropriate resuscitation techniques must be used on any comatose turtle prior to returning it to the water.
- Total weight of transmitter attachments would not exceed 5% of the body mass of the animal. Each attachment would be made so that there is no risk of entanglement.
- Crittercams may not be attached to animals smaller than 70 cm CCL.
- New disposable needles must be used when blood sampling. A single sample must not exceed 3 ml per 1 kg of animal.
- New biopsy punch must be used on each animal.

APPENDIX B: PROPOSED TAKES

Table 1 (Takes only valid after coordination requirements with NMFS NEFSC are met.) Mid-Atlantic bight from Cape Hatteras north to Long Island from coastal waters to the shelf break.

Project 1 take of sea turtles in northeastern U.S. waters, Dredge Gear Modification OVER COURSE OF PERMIT
This research only authorized through October 31, 2011.

SPECIES	LISTING UNIT	LIFESTAGE	SEX	EXPECTED TAKE	TAKE ACTION*
Loggerhead sea turtle	Range-wide (NMFS Threatened)	Adult, subadult, juvenile	Unknown	23	Capture, Handle, flipper tag; PIT tag; measure; photograph, tissue sample, release, salvage (carcass, tissue, parts), import; unintentional mortality
Kemp's ridley	Range-wide (NMFS Endangered)	Adult, subadult, juvenile	Unknown	1	Capture, Handle, flipper tag; PIT tag; measure; photograph, tissue sample, release, salvage (carcass, tissue, parts), import; unintentional mortality
Leatherback	Range-wide (NMFS Endangered)	Adult, subadult, juvenile	Unknown	1	Capture, Handle, flipper tag; PIT tag; measure; photograph, tissue sample, release, salvage (carcass, tissue, parts), import; unintentional mortality
Green	NMFS Endangered	Adult, subadult, juvenile	Unknown	1	Capture, Handle, flipper tag; PIT tag; measure; photograph, tissue sample, release, salvage (carcass, tissue, parts), import; unintentional mortality

*Capture occurs by control and experimental dredge gear during bycatch reduction experiments. This is not annual take, it is over the course of the permit. This research only authorized through October 31, 2011, unless extended in writing by the NMFS Permits Office for additional years through 2014.

Table 2 Mid-Atlantic bight from Cape Hatteras north to Long Island from coastal waters to the Shelf break

Project 2 annual take of sea turtles in northeastern U.S. waters from July 2009- May 2014, Distribution and Behavior Studies

SPECIES	LISTING UNIT	LIFESTAGE	SEX	EXPECTED TAKE	TAKE ACTION*
Loggerhead sea turtle	Range-wide (NMFS Threatened)	Adult, subadult, juvenile	Unknown	10	Capture, Handle, flipper tag, PIT tag, measure, weigh, photograph, tissue sample, blood sample, nasal swab, cloacal swab, attach transmitter**, release, follow with ROV
Loggerhead sea turtle	Range-wide (NMFS Threatened)	Adult, subadult, juvenile	Unknown	90	Track with ROV, photograph

*Capture by handheld net or hoop net. Only animals captured by the researchers may be used, i.e., animals captured from other sources may not be used.
**Satellite tag OR Crittercam