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

# SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

## FOR

## Issuance of a Modification to Scientific Research Permit No. 10022 to Conduct Research on Protected Sea Turtles

April 2010

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| **Lead Agency**: | U.S. Department of Commerce<br>National Oceanic and Atmospheric Administration<br>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<br>National Marine Fisheries Service<br>1315 East West Highway<br>Silver Spring, MD 20910<br>(301) 713-2289 |
| **Document Supplemented:** | Environmental Assessment. Scientific Research Permit to Dr. Raymond Carthy (Permit File No. 10022) to Conduct Research on Protected Sea Turtles |

**Abstract**: The National Marine Fisheries Service (NMFS), Office of Protected Resources, proposes to issue a modification to a scientific research permit for takes of sea turtles in the wild, 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). The purpose of the permitted research is to gather information regarding sea turtle species assemblage, population abundance, size classes, growth, seasonal movements, natal origin, and overwintering behaviors. The proposed modification would allow for further assessment of habitat use and determine if current recommendations for relocation distances of turtles captured in relocation trawler pre-sweeping operations are appropriate. The action area of the permit would not change: waters along the Florida Panhandle in the northern Gulf of Mexico. NMFS prepared an environmental assessment (EA) for issuance of the permit in 2008. Based on that analysis, NMFS determined that issuance of Permit No. 10022 would not significantly impact the quality of the human environment. In the EA NMFS determined that issuance of the permit would not have significant impacts on the physical, social, or economic environment but could result in harassment of sea turtles. The analyses focused on potential impacts to the biological environment. The proposed modification would authorize standard tagging procedures on sea turtles, including mitigation measures associated with those activities. The timing and location of research would not change. This supplemental EA (SEA) evaluates the potential impacts to the human environment from issuance of the proposed permit

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specifically those that may result from the proposed changes in field procedures.

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# CHAPTER 1 PURPOSE OF AND NEED FOR ACTION

## *1.1 DESCRIPTION OF ACTION*

In response to receipt of a request from Raymond Carthy, Ph.D. (Permit No. 10022), NMFS proposes to issue a modification to a scientific research permit that authorizes "takes"[1] of sea turtles in the wild 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 purpose and need is to determine the significance of Florida's northwest coastal bays to sea turtle development identified in the EA (NMFS 2008) prepared for the permit remains valid. In addition, the proposed modification would allow for further assessment of habitat use and determine if current relocation distances of turtles captured in relocation trawler pre-sweeping during nourishment dredging projects are appropriate. Dr. Carthy's research is needed to gather information that would assist NMFS' efforts to recover endangered and threatened sea turtles as it would provide crucial information to existing data gaps on pelagic turtle movements. To achieve this, a portion of captured sea turtles would be tagged with sonic or satellite transmitters.

## *1.2 OTHER EA/EIS THAT INFLUENCE SCOPE OF THIS EA*

An EA (NMFS 2008) was prepared for issuance of the original Permit (No. 10022) in 2008 which determined that issuance of the permit and conduct of the associated research would not have measurable impacts on the physical, social, or economic environment but could result in harassment, as defined in the ESA, of sea turtles. The analyses focused on potential impacts to the biological environment, especially sea turtles. NMFS determined that the proposed harassment to sea turtles would not result in significant impacts to any portion of the human environment. A biological opinion was prepared for this action finding that the permit would not jeopardize the continued existence of any threatened or endangered species or result in destruction or adverse modification of any critical habitat.

Since the proposed action would not change the timing or location of research activities, they are not re-examined in this SEA. Therefore, the scope of this SEA is limited to the potential impacts to sea turtles associated with the proposed research activities.

## *1.3 SCOPING SUMMARY*

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."

1.3.1 Public Comments

NMFS published a Federal Register notice (74 FR 50172) of receipt of the application on September 30, 2009. No comments were received. The amended permit would authorize standard, well known research techniques that are not controversial.

1.3.2 Programmatic Environmental Assessment (PEA)

NMFS is currently conducting a PEA for sea turtle research in the Atlantic, Gulf of Mexico and Caribbean. It was released for public comment on January 14, 2008 and one comment was received and addressed. The PEA is analyzing issuance of permits over the next five years, and Permit No. 10022-01 would become part of the baseline in the PEA should that PEA be finalized.

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

No changes in the applicable laws, permits, etc. would result from the proposed action. The 2008 EA identified the National Environmental Policy Act (NEPA), Endangered Species Act (ESA), Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) and Coastal Zone Management Act (CZMA). Note that the Proposed Action would not affect any physical environment or Essential Fish Habitat.

## CHAPTER 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter describes the range of potential actions (alternatives) determined reasonable with respect to achieving the stated objective, as well as alternatives eliminated from detailed study. This chapter also summarizes the expected outputs and any related mitigation of each alternative. One alternative is the No Action alternative where the proposed permit modification 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 modification to the permit, with standard permit terms and conditions specified by NMFS.

### *2.1 ALTERNATIVE 1 – No Action (Status Quo)*

Under the No Action alternative, Permit No. 10022-01 would not be issued for the activities proposed by the applicant. This alternative is the Status Quo because Dr. Carthy's current permit, No. 10022, would remain valid and the research could proceed as authorized until it expires, April 30, 2013. No other permits or permit requests would be affected by this alternative.

### *2.2 ALTERNATIVE 2 – Proposed Action (Issuance of Permit Modification with*

***Standard Conditions)***

Under the Proposed Action alternative, a permit modification would be issued for activities as proposed by the applicant, with the permit terms and conditions standard to such permits as issued by NMFS.

**Permit Summary**

Permit No. 10022 authorizes the permit holder to conduct research off the northwest coast of Florida for five years. Over five years, researchers may capture up to 40 loggerhead (*Caretta caretta*), 600 green (*Chelonia mydas*), and 110 Kemp's ridley (*Lepidochelys kempii*) sea turtles using strike-net or set-net capture techniques. Animals may be weighed, measured, photographed, skin biopsied, flipper and passive integrated transponder (PIT) tagged, and released.

The permit holder now requests authorization to use sonic or satellite telemetry to assess habitat use of sea turtles and study whether relocation distances for sea turtles captured in relocation trawlers are appropriate. The permit holder would attach transmitters to up to 12 green sea turtles already captured by their project by research nets in St. Joseph Bay, Apalachicola Bay, and St. Andrews Bay over the course of the permit. The permit holder would also attach transmitters to up to 25 green, hawksbill (*Eretmochelys imbricata*), Kemp's ridley, and loggerhead sea turtles (any combination) already legally captured by relocation trawlers in the St. Andrews Bay area. Relocation trawling would be associated with beach nourishment and U.S. Army Corps of Engineers dredging operations. These animals would also be flipper and PIT tagged, measured, photographed, tissue sampled and weighed by researchers before release. The modification would not increase the number of sea turtles authorized to be captured under the permit. The modification would be valid for the remainder of the permit through April 30, 2013.

Based on these changes, Tables 1 and 2 illustrate the proposed changes, shown in **bold** font, to the take tables for Permit No. 10022-01. Note that a new (third) row has been created in Table 1 because only a portion of captured green sea turtles would have a transmitter attached. The total number of turtles (120) authorized for capture would not change; this is reflected by the reduction in the number of green turtles authorized in row two from 120 to 108 takes.

| **Table 1: Proposed authorized annual takes of sea turtles under Permit No.10022-01. Research would occur year-round.** | | | | | |
|---|---|---|---|---|---|
| **Species** | **Life Stage** | **Sex** | **Number of Takes** | **Take Action** | **Location** |
| Loggerhead sea turtle (*Caretta caretta*) | Juvenile, subadult or adult | M,F | 8 | Capture by strike net or entanglement net, weigh, measure, photograph, skin biopsy, flipper tag, PIT tag, release | St. Joseph, St. Andrews, Apalachicola Bays, Florida |
| Green sea turtle (*Chelonia mydas*) | Juvenile, subadult or adult | M,F | **108** | Capture by strike net or entanglement net, weigh, measure, photograph, skin biopsy, flipper tag, PIT tag, release | St. Joseph, St. Andrews, Apalachicola Bays, Florida |
| **Green sea turtle (*Chelonia mydas*)** | **Juvenile, subadult or adult** | **M,F** | **12*** | **Capture by strike net or entanglement net, weigh, measure, photograph, skin biopsy, flipper tag, PIT tag, satellite tag, sonic tag, release, track** | **St. Joseph, St. Andrews, Apalachicola Bays, Florida** |
| Kemp's ridley sea turtle (*Lepidochelys kempii*) | Juvenile, subadult or adult | M,F | 22 | Capture by strike net or entanglement net, weigh, measure, photograph, skin biopsy, flipper tag, PIT tag, release | St. Joseph, St. Andrews, Apalachicola Bays, Florida |

*** = Only 12 total transmitters may be attached over course of permit, not annually.**

| **Table 2. Proposed relocation trawler-related activities authorized under Permit No. 10022-01. Research would occur year-round.** | | | | | |
|---|---|---|---|---|---|
| **Species** | **Life Stage** | **Sex** | **Number of Takes** | **Take Action** | **Location** |
| **Loggerhead sea turtle (*Caretta caretta*)** | **Juvenile, subadult or adult** | **M,F** | **25*** | **Weigh, measure, photograph, tissue biopsy, flipper tag, PIT tag, satellite tag; release** | **St. Andrews Bay and surrounding waters of Gulf of Mexico, Florida** |
| **Green sea turtle (*Chelonia mydas*)** | **Juvenile, subadult or adult** | **M,F** | **25*** | **Weigh, measure, photograph, tissue biopsy, flipper tag, PIT tag, satellite tag; release** | **St. Andrews Bay and surrounding waters of Gulf of Mexico, Florida** |
| **Hawksbill (*Eretmochelys imbricata*)** | **Juvenile, subadult or adult** | **M,F** | **25*** | **Weigh, measure, photograph, tissue biopsy, flipper tag, PIT tag, satellite tag; release** | **St. Andrews Bay and surrounding waters of Gulf of Mexico, Florida** |
| **Kemp's ridley sea turtle (*Lepidochelys kempii*)** | **Juvenile, subadult or adult** | **M,F** | **25*** | **Weigh, measure, photograph, tissue biopsy, flipper tag, PIT tag, satellite tag; release** | **St. Andrews Bay and surrounding waters of Gulf of Mexico, Florida** |

***One transmitter would be attached to up to 25 animals, any species mix, over course of permit, not annually. I.e., researchers may attach 25 transmitters all on 25 animals of one species, or they may attach transmitters to each of the species, however the total is not to exceed attachment of 25 transmitters. NO capture would be authorized, animals would be already legally captured by authorized relocation trawlers.**

No changes would occur in the manner in which Gulf Sturgeon may be incidentally taken during research as a result of the Proposed Action. The take for this species is authorized through the ESA Section 7 Biological Opinion prepared for the permit.

**Research Activities**

The applicant's permit currently allows him to capture, handle, measure, weigh, photograph, skin biopsy, flipper and PIT tag, and release sea turtles. These activities would continue to be conducted as previously described and analyzed in the 2008 EA. The following tagging activities that would be added to the permit would address the applicant's current research objectives. Each activity would be conducted in accordance with conditions in the permit to mitigate potential effects of the activity.

Release Associated with Relocation Trawling

The 2008 EA noted that turtles authorized to be captured using netting techniques would be released at the capture site within two hours of capture (typically less, but not to exceed two hours). This would continue to be the method of release for turtles authorized in Table 1. However, release of animals captured by relocation trawlers (Table 2) would differ in that turtles

would be released within 4 hours of capture into designated safe release zones established by relocation trawler protocols. Within St. Andrews Bay Aquatic Preserve, turtles would be released approximately 5-km from the trawler. Turtles would first be transported to the boat launch at St. Andrews State Park where tag attachment would occur. Immediately following completion of tagging, turtles would be transported to the release site.

The following methods of transmitter attachment would be used for all authorized sea turtles (Tables 1 and 2).

Mounting the Satellite Transmitter

Satellite transmitters would be attached to sea turtles with a straight carapace length (SCL) over 30 cm. At the initiation of satellite tagging, epibionts would be removed from the carapace at the site of transmitter attachment. Transmitters would be attached at the highest point of the carapace where the first and second vertebral scutes meet. This would allow the tag's antenna to break the sea surface each time the turtle surfaces to breathe. Attachment media would also cover areas of the first and third vertebral scutes as well as the first and second costal scutes. These areas would be thoroughly scrubbed and rinsed with fresh water; then they would be dried and lightly sanded with sandpaper. When smooth, the entire area would be lightly wiped with an alcohol pad or a small amount of acetone. Transmitters would not exceed 5 percent of the turtle's body weight and attachment materials would be configured and streamlined to minimize effects of buoyancy and drag on the turtle's swimming ability. Based on tag configurations and battery life, researchers anticipate that tags would remain attached to turtles for approximately one year.

The entire transmitter, except the bottom, would be coated with a copper-based, ablative anti-fouling paint commonly used in marine applications. Tags would be attached to the carapace using a two-part epoxy. The tag and attachment materials would not exceed 5 percent of the turtle's body weight. Tag attachment would follow standard techniques following Mitchell (2000) and Rice et al. (2000). Researchers would be working outdoors (i.e., a well ventilated area) and wear disposable gloves during application to protect personnel. To safeguard turtles, the tags would be masked so that no anti-fouling paint is applied within 0.5 cm of exposed carapace. Paint would not contact skin or eyes which would be covered with a towel during attachment. The epoxy emits no odor and produces minimal heat when activated. It is commonly used among sea turtle researchers for tag attachment. Drying time would vary between 20 to 60 minutes, depending on ambient temperatures and humidity.

Mounting the Sonic Transmitter and Tracking

Sonic transmitters would be attached to juveniles that are between 20 and 30cm SCL. Sonic transmitters would be attached to turtles at the base of the carapace, near the tail. Small holes would be drilled through the outer edges of the marginal scutes and the instrument would then be wired and glued in place. The tag would be placed under the margin of the carapace rather than on top of the carapace to avoid scute abrasion. Sonic tagged turtles would be tracked using hand-held hydrophones from an 18-foot Boston Whaler. Relocation and tracking of the animals would take place daily following tag attachment.

Holding and Transporting Turtles

Turtles held for transmitter attachment would be held in a rectangular tub that would be used to safely hold the turtle. The tub size would be approximately 2 feet wide x 3 feet long and at least one foot deep. Researchers would place a foam pad on the bottom of the tub to cushion the turtle. A cloth would be placed over the turtle's eyes to block vision, which typically calms turtle and reduces movement. Turtles would be sheltered from direct sunlight, wind, or rain during the attachment.

Turtles would not be transported unless severe weather conditions or an unforeseen emergency (i.e. physical injury to personnel, etc.) require transport. In the rare case turtles are onboard and researchers must return to shore, turtles would be held in individual plastic tubs with their heads covered with towels. When under transport, the entire carapace would be covered with a towel per Florida Fish and Wildlife Commission transport guidelines. Tubs holding turtles would be placed on the bottom of the boat and stabilized manually. Once onshore, turtles would remain inside their individual tubs, and tubs would be hand-carried to shore. As soon as conditions permit, the tub and turtle would be transported back to the release site.

Mitigation Measures

In addition to the measures the applicant has identified, NMFS would add language to the permit to reduce the chance of stress, harm or injury to the target sea turtles. This includes:

- Limiting the holding time of animals from the initial time of capture by trawlers;
- Requiring that relocation trawlers contact researchers and that researchers have a way to be reached in the event a turtle is captured;
- Minimizing the potential for entanglement of tag units;
- Reducing hydrodynamic drag and energetic costs of tag units; and
- Minimizing the risk of harm and infection to turtles during tag attachment.

No other changes to Dr. Carthy's research would occur as a result of issuing Permit No. 10022-01.

## CHAPTER 3 AFFECTED ENVIRONMENT

The affected environment would not change as a result of the Proposed Action and would remain as previously described in the 2008 EA. Research is authorized to occur in waters of St. Joseph Bay, Apalachicola Bay, and St. Andrews Bay along the Florida Panhandle in the northern Gulf of Mexico. Because the Proposed Action involves sea turtles that would already be authorized for capture, either by the current permit or by relocation trawlers, the affected environment is limited to the biological environment, essentially, the target sea turtles. The physical, social, and economic environment would not be affected by the Proposed Action and are not considered further in this SEA.

## 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*

The No Action alternative would eliminate any potential risk to the environment from the proposed research activities. The target sea turtles would not be impacted by the additional activities. However, activities currently authorized by Permit No. 10022 would continue under the Status Quo. The scientific community would lose the opportunity to collect valuable data from turtles caught during relocation trawling activities and information that could aid the understanding of turtle habitat use in the action area.

## *4.2 EFFECTS OF ALTERNATIVE 2: Issue permit modification with standard conditions*

Because this modification focuses on activities that would occur to sea turtles already authorized for capture, any impacts of the proposed action would be limited primarily to the biological environment. The type of activities proposed in the permit modification request would be unlikely to affect the physical environment, socioeconomic environment or pose a risk to public health and safety.

**Environmental Consequences to the Biological Environment – Sea Turtles**

Modification of Permit No. 10022 would allow Dr. Carthy to attach sonic or satellite transmitters to captured sea turtles. The permit modification would contain conditions specific to each activity to mitigate adverse impacts to sea turtles (see Ch. 2). An analysis of the effects of the issuance of the modification request follows.

The environmental consequences to the biological environment for currently authorized research activities (net capture, weigh, handle, measure, photography, skin biopsy, flipper and PIT tagging, and release of sea turtles) have not changed from how they were described in the 2008 EA. Hence, the following discussion focuses on the effects of research activities that would be new to the permit.

<u>Effects of Sonic and Satellite Tagging</u>

Transmitters attachments, as well as biofouling that can occur on them, increase hydrodynamic drag and can 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. However, based on the study results of hardshell sea turtles equipped with this and other tag setups NMFS is unaware of transmitters resulting in any serious injury to sea turtle species. Attachment of satellite, sonic, or radio transmitters with epoxy is a commonly used and permitted technique by NMFS. Transmitters attached directly to the scutes are unlikely to become entangled and would eventually be shed, posing no long-term risks to the turtle. The use

of anti-fouling paint would reduce the degree of biofouling and resultant hydrodynamic drag. The paint is not expected to result in serious injury or harm to tagged turtles based on the facts that:

- paint would not be applied within 0.5 cm of exposed carapace,
- the turtle's eyes would be covered with a towel during tagging which would prevent irritation from any vapors,
- researchers would wear gloves and apply paint in a well-ventilated area and measures to minimize risks to turtles and personnel, and
- paint would not contact into direct contact with any part of the turtle during application.

Further, because the tag would be located on the carapace of the turtle, the paint does not pose a risk of ingestion by tagged animals. A veterinarian, Dr. Brian Stacy (pers. comm. 2010), evaluated the proposed application of the paint and determined that its use would not result in a significant effect or risk to sea turtles. He also stated that the dilutional effect of seawater upon release of the paint would minimize concerns about proximity or exposure.

*Sonic Tag Tracking*
Tracking would be conducted from a distance that the sea turtle would not detect the presence of the researchers. Tracking would not affect sea turtle behavior or harm them in any manner.

*Acoustic Energy*
Sea turtles have low-frequency hearing sensitivity and are potentially affected by sound energy in the band below 1,000 Hz (Lenhardt 2003). Bartol et al. (1999) found the effective bandpass of the loggerhead sea turtle to be between at least 250 and 1000 Hz. Ridgeway et al. (1969) found the maximum sensitivity of the green sea turtle hearing range to fall within 300-500 Hz with a sharp decline at 750 Hz. Since the frequencies that would be authorized would be well above this hearing threshold they would not be heard by the turtles.

Studies found that shark hearing is not as sensitive as in other tested fishes and that sharks are most sensitive to low frequency sounds (Kritzler and Wood 1961; Banner 1967; Casper et al., 2003). No increased predatory risks for sea turtles would be expected, as sharks would not be expected to hear the sonic tag and would not be attracted to sea turtles.

In summary, NMFS believes that unintentional mortality or serious injury would not be likely to occur as a result of the proposed action. Impacts to individual sea turtles are likely to be minimal and short-lived. Any effects of the proposed research activities are not expected to adversely affect the survival, longevity, or lifetime reproductive success of any age class of species. Therefore, NMFS does not expect that the proposed individual activities would adversely affect any species at the population or species levels or have significant effects on them.

**Environmental Consequences to the Biological Environment – Other Species**
Because research activities would occur solely on sea turtles already captured, NMFS does expect any non-target species to be impacted by the proposed action.

**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 permit modification 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 Dr. Carthy 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 applicant 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, the modification to Permit No. 10022, as proposed, would not likely jeopardize the continued existence of the species and would not likely destroy or adversely modify designated critical habitat. Because the activities would only be conducted on turtles authorized for capture by the permit, NMFS does not expect the proposed action to significantly impact any non-target species or other portions of the human environment.

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

As summarized below, NMFS has determined that the proposed research is consistent with the purposes, policies, and applicable requirements of the ESA, and NMFS regulations. NMFS issuance of the permit modification 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 period on the application 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 SEA represented NMFS' assessment of the potential biological impacts. The conclusion of the opinion (NMFS 2010) 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 limit environmental effects to those analyzed in the 2008 EA, 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 implementing regulations. The Proposed Action alternative would only impact individual sea turtles already captured by researchers or relocation trawlers. However, the effects would be minimal and this alternative would allow the collection of valuable information that could help NMFS' efforts to recover sea turtles. Neither the No Action or Proposed Action are anticipated to have adverse population or stock-level effects on sea turtles. 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 modification to Permit No. 10022, if approved, would require the applicant to adhere to permit conditions discussed in Ch. 2 to minimize and mitigate any effects of the proposed procedures. These include conditions that will minimize the potential for injury and stress during procedures. All mitigation and minimization measures currently in the existing permit would remain in effect.

### *4.6 UNAVOIDABLE ADVERSE EFFECTS*

Because the research involves wild animals that are not accustomed to being captured, the research activities will unavoidably result in some harassment. The research activities would cause disturbance and stress to sea turtles already captured. The research is not expected to have more than a minimal effect on individuals, and no effect on populations with animals recovering within the day of the procedures. While individual animals 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 minimization measures imposed by permit conditions are intended to reduce, to the maximum extent practical, the potential for adverse effects of the research on these species. Since the Proposed Action would only occur on sea turtles already captured, no other portion of the human environment would be affected in a manner not already considered in the 2008 EA.

### *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.

Overall, the nature of cumulative impacts to sea turtle have not changed from those identified in the 2008 EA. These include: scientific research, incidental take during other Federal actions, historic harvest, natural mortality, disease and strandings, habitat degradation and pollution, military activities, commercial fisheries, and conservation and recovery efforts. This section

identifies cumulative impacts to sea turtles that have changed since the 2008 EA. Changes are largely due to the expiration and issuance of research permits since 2008.

### 4.7.1 Other Research Permits and Authorizations

Table 3 lists the active scientific research permits that study the target sea turtle populations. Some of these occur outside of the action area but have been included here to illustrate the level of research on the target sea turtle populations. Since the 2008 analysis, 11 permits have expired. Three new permits, denoted with an asterisk, have been issued. None of these actions are focused in Dr. Carthy's action area.

Table 3. Active NMFS Permits for Sea Turtle Research

| Permit Number | Permit Holder | Location | Expiration Date |
|---|---|---|---|
| 1506 | Blair Witherington, Florida Fish and Wildlife Conservation Commission | Florida coastal waters, Keys, Gulf Stream | March 31, 2011 |
| 1522 | Kenneth Lohmann | Eastern FL waters | June 1, 2010 |
| 1501 | Florida Marine Research Institute | FL Bay; Everglades | March 31, 2011 |
| 1507 | Ehrhart | Indian River Lagoon, FL | March 31, 2011 |
| 1526 | Andre Landry | Coastal LA & TX | August 1, 2010 |
| 1518 | Carlos Diez | Puerto Rico | August 31, 2010 |
| 1540 | State of South Carolina | Coastal SC to Cape Canaveral, FL | April 1, 2011 |
| 1527 | Jack Musick | Chesapeake Bay | April 1, 2011 |
| 1552 | NMFS SEFSC | North Atlantic Ocean | June 30, 2011 |
| 1557 | Molly Lutcavage | Cape Cod; Savannah, GA—Cape Canaveral, FL | June 30, 2011 |
| 1570 | NMFS SEFSC | North Atlantic Ocean | December 31, 2011 |
| 1571 | NMFS SEFSC | North Atlantic Ocean | December 31, 2011 |
| 1576 | NMFS NEFSC | Western Atlantic Ocean | September 30, 2011 |
| 1599 | Inwater Research Group Inc. | Key West | June 30, 2012 |
| 13306* | Karen Holloway-Adkins | Brevard Co., FL | June 30, 2013 |
| 13307* | Kristen Hart | Dry Tortugas | June 30, 2013 |
| 13544* | Jeff Schmid | Lee Co., FL | April 30, 2014 |

NMFS currently authorizes mortality in a minor number of research permits. Permit No. 1576 authorizes the lethal take of up to 23 loggerhead, 1 green, 1 leatherback, 1 Kemp's ridley sea turtles annually, and up to 1 loggerhead and 1 Kemp's ridley over the course of the permit, through 2011. 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.

NMFS does not expect the combination of these activities to negatively affect sea turtle populations. Most of these permitted actions will not overlap in space and time with the Proposed Action because they are not located in or have a focus in the waters of St. Joseph Bay, Apalachicola Bay, or St. Andrews Bay. Further, NMFS has taken steps to limit repeated harassment of individual turtles and avoid 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.

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. Even if an animal was exposed to additional research effort (e.g., a week later), no significant cumulative effects would be expected given the nature of the effects. NMFS expects the authorization of the proposed research activities of the preferred alternative to not appreciably reduce the species likelihood of survival and recovery in the wild by adversely affecting their birth rates, death rates, or recruitment rates. In particular, NMFS expects the proposed research activities to not 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 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.

## CHAPTER 5 LIST OF PREPARERS AND AGENCIES CONSULTED

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

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