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

Environmental Assessment
on
the Effects of Issuing Permit No. 16134 for Scientific Research
on Protected Sea Turtles in Mid-Atlantic Coastal Waters

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Location:	U.S. Mid-Atlantic coastal waters

Abstract: The National Marine Fisheries Service (NMFS) proposes to issue Scientific Research Permit No. 16134, pursuant to the Endangered Species Act of 1973 (ESA; 16 U.S.C. 1531 *et seq.*). The permit would be valid for five years from the date of issuance. The permit would exempt the holder from takes of sea turtles under the ESA during research. The purposes of the research are to: 1) update current knowledge of loggerhead and Kemp's ridley sea turtle abundance, distribution, health, and nutrition in Chesapeake Bay and nearshore Virginia waters, 2) compare the relative abundance, size distribution, sex ratio, health parameters and genetic diversity of loggerhead and Kemps ridley sea turtles in U.S. mid-Atlantic coastal waters, and 3) build baseline data on less common sea turtle species in the region.

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1.0 PURPOSE OF AND NEED FOR ACTION

Proposed Action: In response to an application from the Virginia Aquarium, (Mark Swingle, Responsible Party), NMFS proposes to issue Scientific Research Permit No. 16134, pursuant to the Endangered Species Act of 1973 as amended (ESA; 16 U.S.C. 1531 et seq.) for "takes"[1] of protected sea turtles.

Purpose and Need for Action: The ESA prohibits "takes" of threatened and endangered species with only a few specific exceptions. The applicable exception in this case is an exemption for scientific purposes related to species recovery under Section 10(a)(1)(A) of the ESA.

The purpose of the permit is to provide the applicant with an exemption from the take prohibitions under the ESA during conduct of research on threatened or endangered species that is consistent with the ESA issuance criteria.

The need for issuance of the permit is related to the purposes and policies of the ESA. NMFS has a responsibility to implement the ESA to protect, conserve, and recover threatened and endangered species under its jurisdiction. Facilitating research about species' basic biology and ecology or that identifies, evaluates, or resolves specific conservation problems informs NMFS management of protected species.

Scope of Environmental Assessment: This EA focuses primarily on effects on endangered and threatened sea turtles in the Atlantic Ocean. These are the target species of the applicant's research.

The National Oceanic and Atmospheric Administration (NOAA) has, in NOAA Administrative Order 216-6 (NAO 216-6; 1999), listed issuance of permits for research on protected species as a category of actions that "do not individually or cumulatively have a significant effect on the human environment…" and therefore do not require preparation of an environmental assessment (EA) or environmental impact statement (EIS). A possible exception to the use of this categorical exclusion is when the action may adversely affect species listed as threatened or endangered under the ESA (NAO 216-6 Section 5.05c). NMFS has prepared this EA, with a more detailed analysis of the potential for adverse impacts on endangered species resulting from takes of a specified number of the target sea turtles, to assist in making the decision about permit issuance under the ESA.

[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."

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

Alternative 1 - No Action: Under the No Action alternative, no permit would be issued and the applicant would not receive an exemption from the ESA prohibition against take.

Alternative 2 - Proposed Permit: Under the Proposed Permit alternative, a permit would be issued to exempt the applicant from the ESA take prohibition during conduct of research that is consistent with the purposes and policies of the ESA and applicable permit issuance criteria.

The purposes of the research are to: 1) update current knowledge of loggerhead and Kemp's ridley sea turtle abundance, distribution, health, and nutrition in Chesapeake Bay and nearshore Virginia waters (Project 1); 2) compare the relative abundance, size distribution, sex ratio, health parameters and genetic diversity of loggerhead and Kemps ridley sea turtles in U.S. mid-Atlantic coastal waters (Project 2); and 3) build baseline data on less common sea turtle species in the region during these projects.

Permitting will be deferred for the directed capture of sea turtles by trawling requested by the applicant because the NMFS Endangered Species Act Interagency Cooperation Division has not yet completed a section 7 consultation for that activity. However, we are including the description and an analysis of trawling in this EA in anticipation of processing a modification to the proposed permit to include this activity.

Action Area: The proposed research would take place in U.S. mid-Atlantic coastal waters from North Carolina to southern New Jersey. Figures 1 and 2 illustrate the general bounds of Projects 1 and 2, respectively.

Duration: This permit would be valid for five years from the date of issuance. Research would occur from April to December annually.

Methods: The research protocols are described in detail in the application on file for this action and are briefly summarized here. Juvenile, subadult and/or adult sea turtles of both sexes would be targeted for research. Researchers would directly capture sea turtles using tangle nets, trawl, by hand or by dip or hoop net. Sea turtles that are legally by-caught in Virginia pound net fisheries (per authority of ESA regulation 50 CFR 223.206(d)(10)) and dredge mitigating trawls (where the legal incidental take is authorized through an ESA Section 7 biological opinion for these activities) would also be obtained for sampling and research procedures. The following procedures would be conducted on sea turtles: epibiota removal, satellite tag, temporarily mark the carapace, flipper and passive integrated transponder (PIT) tag, measure, photograph, sample blood, feces, oral swab, scute (keratin) and tissue, weigh, and release. A subset of animals would be subject to transport to the laboratory, non-surgical muscle biopsy, lesion biopsy, ultrasound, and imaging. Up to 2 sea turtles of any species could be lethally taken annually during trawling. See Appendix 1 for details on take activities.

Target species or stocks: The permit would authorize takes of green (*Chelonia mydas*), Kemp's ridley (*Lepidochelys kempii*), hawksbill (*Eretmochelys imbricata*), leatherback (*Dermochelys coriacea*), and loggerhead (*Caretta caretta*) sea turtles. See Appendix 1 for take numbers.

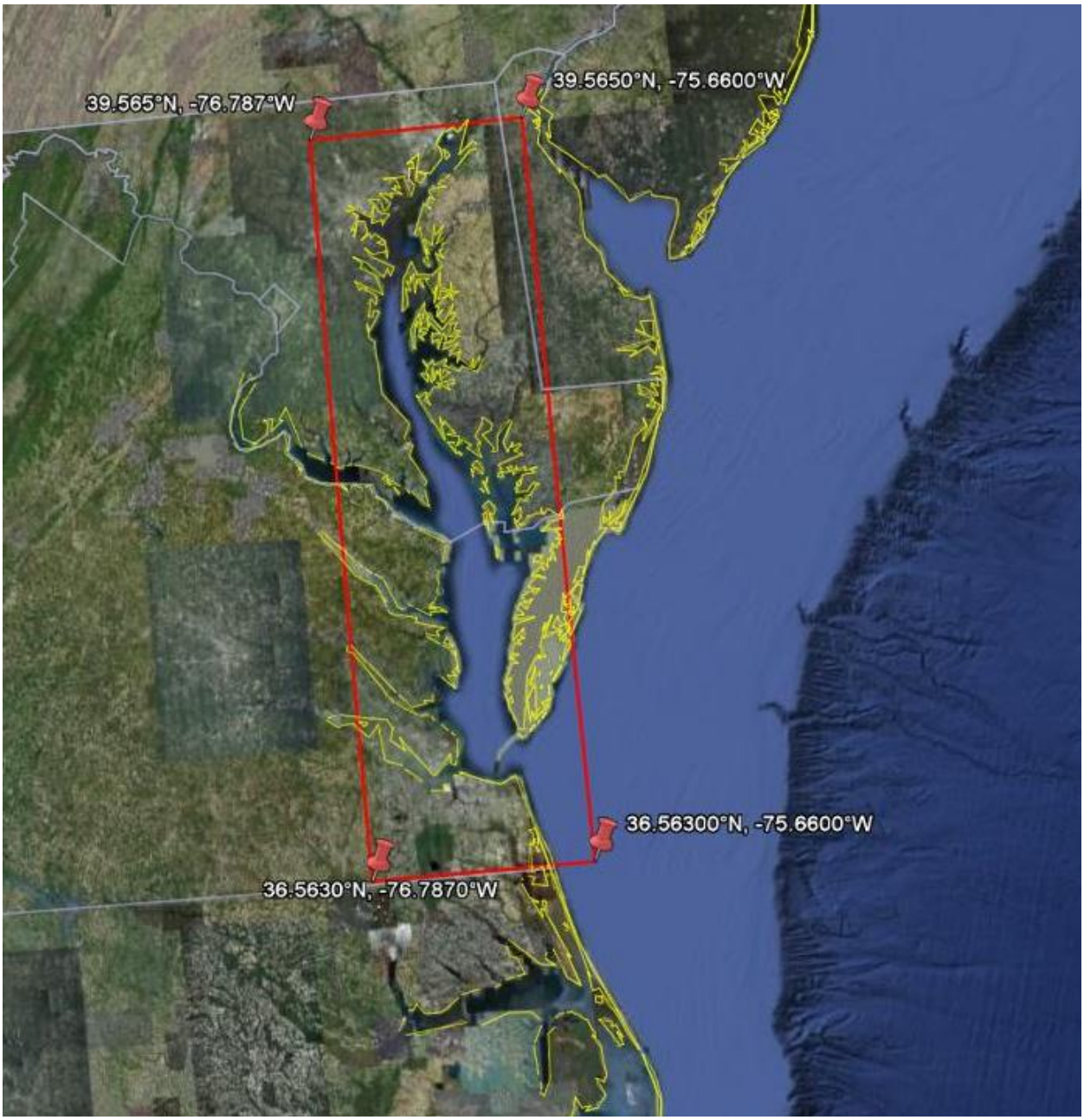

Figure 1: Project 1 general study area encompassing Virginia and Maryland portions of Chesapeake Bay and Virginia ocean waters in the vicinity of the Bay mouth.

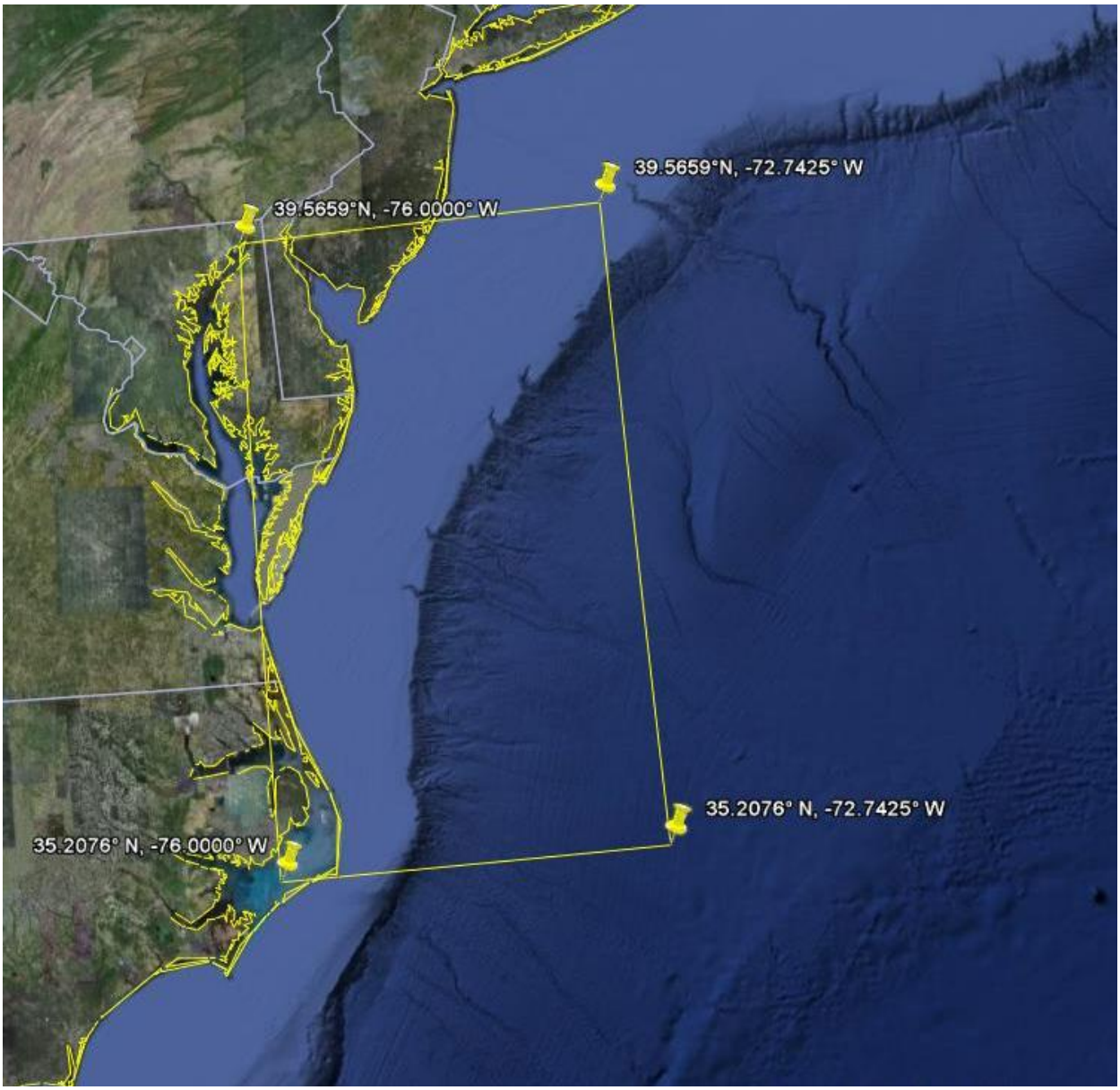

Figure 2: Project 2 general study area from southern New Jersey to Cape Hatteras, NC, including Delaware Bay.

Mitigation Measures

The applicant has identified the following measures to mitigate impacts to the target species and to other species found in the area:

- Procedures would follow the protocols in the NMFS Southeast Fisheries Science Center's research techniques manual for sea turtles (NMFS SEFSC 2008).
- Before deploying a tangle net, researchers would scan the area for marine mammals. If marine mammals are sighted within 500 m or are approaching the area from a greater

distance, researchers would not deploy the net. If, following deployment, marine mammals are sighted approaching the net within 150 m, researchers would remove the net from the water until the animals are greater than 500 m and are travelling away from the net. The net would not be re-deployed until the animals are out of the area.

- Tangle nets would be continuously monitored and only operated during daylight hours.
- Sea turtles legally taken in pound nets would be removed the next time the fisher visits the net, which is usually within 24 hrs. If the net would not be fished within 24 hrs, the applicant would attempt to get permission from the fishers to remove it without the fisher present in that 24 hrs. If the fisher does not intend to re-fish the net in 48 hours or if researchers don't know that they would be able to accompany the fisher within 48 hours, researchers would ask the fisher to release the turtle immediately.
- Sampling and tagging sites would be cleaned beforehand.
- Equipment would be cleaned and disinfected or sterile disposable gear would be used.
- Leatherback sea turtles would only be boarded for sampling if trained personnel feel it is safe to do so. If the turtle's size, behavior or the configuration of the vessel, net, etc. are not adequate to safely move and examine the animal, it would be released without sampling.
- Procedures conducted in the lab would be performed by a trained veterinarian.
- Sturgeon captured incidentally during research should be returned to neutral buoyancy by gently applying ventral pressure in a posterior to anterior direction. The specimen must then be propelled rapidly downward during release. If one sturgeon mortality occurs, trawl times would be reduced from 42 min to 30 min to reduce the likelihood of additional mortalities.

In addition to the applicant's stated methods and measures, the proposed permit would include language that would minimize impacts to the target animals and prevent impacts to non-target species.

3.0 AFFECTED ENVIRONMENT

Location

The action area is defined by where sea turtles would be taken, which is determined by the location of research: within U.S. mid-Atlantic coastal waters from North Carolina to southern New Jersey.

Status of Target ESA Species

ESA Endangered

Green sea turtle	*Chelonia mydas**
Kemp's ridley sea turtle	*Lepidochelys kempii*
Hawksbill sea turtle	*Eretmochelys imbricata*

Leatherback sea turtle	*Dermochelys coriacea*
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. ** Some populations of loggerhead sea turtles are listed as threatened. Due to the inability to distinguish between these species' populations away from the nesting beach, these species 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 USVI and Puerto Rico.

Green sea turtle mating occurs in the waters off the nesting beaches. 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

Kemp's ridleys have a very restricted range relative to other sea turtle species. Kemp's ridleys nest in daytime aggregations known as arribadas, primarily at Rancho Nuevo, a stretch of beach in Mexico. Most of the population of adult females nests in this single locality (Pritchard 1969). When nesting aggregations at Rancho Nuevo were discovered in 1947, adult female populations were estimated to be in excess of 40,000 individuals (Hildebrand 1963). By the early 1970s, the world population estimate of mature female Kemp's ridleys had been reduced to 2,500-5,000 individuals. The population declined further through the mid-1980s.

The number of Kemp's ridley nests has grown from a low of approximately 702 nests in 1985 to over 13,302 nests in 2010. From 2005 through 2010, the number of nests from all monitored beaches indicates that there are approximately 5,500 females nesting each season in the Gulf of Mexico (NMFS, U.S. Fish and Wildlife Service, and SEMARNAT 2011). The updated population model in the second revision of the Kemp's ridley Recovery Plan predicts the population will grow 19% per year for the near future, and there could be at least 10,000 nesting

females per season on the major beaches in Mexico by 2011 (NMFS, U.S. Fish and Wildlife Service, and SEMARNAT 2011).

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

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

Hawksbill sea turtle

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

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

In Florida, hawksbills are observed with some regularity on the reefs off Palm Beach County, where the warm Gulf Stream current passes close to shore, and in the Florida Keys. Texas is the only other state where hawksbills are sighted with any regularity. Most sightings involve post-hatchlings and juveniles.

The life history of hawksbills consists of a pelagic stage that lasts from the time they leave the nesting beach as hatchlings until they are approximately 22-25 cm in straight carapace length (Meylan 1988), followed by residency in developmental habitats (foraging areas where immature turtles reside and grow) in coastal waters. Adult foraging habitat, which may or may not overlap with developmental habitat, is typically coral reefs, although other hard-bottom communities and occasionally mangrove-fringed bays may be occupied. Hawksbills show fidelity to their foraging areas over periods of time as great as several years (van Dam and Diez 1998).

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

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

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

Loggerhead sea turtle

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

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

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

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

Leatherback sea turtle

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

The leatherback ranges farther than any other sea turtle species, exhibiting broad thermal tolerances (NMFS and USFWS 1995). Leatherbacks are widely distributed throughout the oceans of the world, and are found throughout waters of the Atlantic, Pacific, Caribbean, and the Gulf of Mexico. Adult leatherbacks forage in temperate and subpolar regions from 71° N to 47° S latitude in all oceans and undergo extensive migrations between 90° N and 20° S, to and from the tropical nesting beaches. In the Atlantic Ocean, leatherbacks have been recorded as far north as Newfoundland, Canada, and Norway, and as far south as Uruguay, Argentina, and South Africa (NMFS SEFSC 2001). Female leatherbacks nest from the southeastern United States to southern Brazil in the western Atlantic and from Mauritania to Angola in the eastern Atlantic. The most significant nesting beaches in the Atlantic, and perhaps in the world, are in French Guiana and Suriname (NMFS SEFSC 2001). Leatherbacks are predominantly pelagic, however they can be found in near shore waters.

The TEWG (2007) estimated the adult leatherback sea turtle population of the North Atlantic to be approximately 34,000-94,000 animals. The range of the estimate is large, reflecting the Working Group's uncertainty in nest numbers and their extrapolation to adults. The Working Group believes that as estimates improve the range would likely decrease. However, this is the most current estimate available. It is important to note that while the analysis provides an estimate of adult abundance for all populations in the greater North Atlantic, it does not provide estimates for the number or origin of leatherbacks in specific foraging areas, nor does it provide an estimate of subadult abundance. Trends in the adult population size estimate were not possible since trends in sex ratio and remigration rates were not available (TEWG 2007).

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

Non-Target Species Potentially Affected by the Proposed Action

Although marine mammals such as bottlenose dolphins (*Tursiops truncatus*), could occur in the action area, researchers would not interact with them and the permit would not authorize take of marine mammals. Conditions in the permit and the applicant's stated mitigation efforts (see Ch. 2) would minimize the potential for interactions with marine mammals.

Endangered Species Susceptible to Incidental Capture

Shortnose Sturgeon

Endangered shortnose sturgeon (*Acipenser brevirostrom*) are benthic fish that mainly occupy the deep channel sections of large rivers. They can be found in rivers along the western Atlantic coast from St. Johns River, Florida (possibly extirpated from this system), to the Saint John River in New Brunswick, Canada. The species is anadromous in the southern portion of its range (*i.e.*, south of Chesapeake Bay), while some northern populations are amphidromous. Because the experimental trawling would not occur in or near the rivers where concentrations of shortnose sturgeon are most likely found, it is highly unlikely that shortnose sturgeon would be incidentally captured in trawls. Tangle nets would be continuously monitored and only operated during daylight hours, therefore if shortnose sturgeon are incidentally captured in tangle nets they would be released immediately.

Atlantic Sturgeon

The Endangered New York Bight, Chesapeake Bay, and Carolina Distinct Population Segments of Atlantic sturgeon (*A. oxyrinchus oxyrinchus*) may be found in the Action Area. Atlantic sturgeon are anadromous. They spawn in moderately flowing water (46-76 cm/s) in deep parts of large rivers. Juveniles usually reside in estuarine waters for months to years. Subadults and adults live in coastal waters and estuaries when not spawning, generally in shallow (10-50 m depth) nearshore areas dominated by gravel and sand substrates. Long distance migrations away from spawning rivers are common.

Based on trawling information from 2002-2010 described in the application, the applicant anticipates up to seven sturgeon of either species could be captured each year. Sturgeon captured incidentally during research would be disentangled and released immediately. As a condition of the permit, researchers would be required to attempt to return sturgeon to neutral buoyancy by gently applying ventral pressure in a posterior to anterior direction. The specimen must then be propelled rapidly downward during release. The applicant expects to release sturgeon alive, but up to two mortalities might occur each year. If one mortality occurs, trawl times would be reduced from 45 min to 30 min to reduce the likelihood of additional mortalities. Based on the low level of incidental catch the effects to sturgeon are not considered further.

A diversity of other non-target species may be captured in trawls, with composition highly-dependent on trawling location. Large mesh trawl nets result in relatively low levels of by-catch. Because of the net design, smaller (less than 10cm fork length) fish and invertebrates are expected to pass through the net's mesh without being caught. Finfish are expected to belong to one of several families (Sciaenidae, Carangidae, Paralichthyidae, Serranidae) and most invertebrates are expected to be classified as decapod crabs, horseshoe crabs, echinoderms, whelks, and jellyfishes. By-catch survival rates would likely vary from species to species, but every reasonable attempt to release by-catch alive would be made. The applicant estimates that 80% of by-catch would be released alive.

Other non-target species that may be captured in tangle nets, in addition to sturgeon, include sharks, rays, skates, and large fish such as red and black drum. Researchers would continuously monitor tangle nets and release non-target species alive.

Hand netting techniques target an individual sea turtle and do not catch non-target species.

Because of the minimal number of non-target animals that could be caught by any method and the mitigation measures employed by the applicant, NMFS expects that the capture of these species would have a negligible impact on their populations and therefore they are not considered further in this EA.

Biodiversity and Ecosystem Function

The proposed action is directed at the target sea turtles and would not interfere with benthic productivity, predator-prey interactions or other biodiversity or ecosystem functions. Sea turtles would not be removed from the ecosystem or displaced from habitat, nor would the permitted takes affect their diet or foraging patterns. Although a minimal number of non-target species could be incidentally caught, their take is not expected to rise to a level that would affect benthic productivity, predator-prey interactions or other biodiversity or ecosystem functions. Further, the proposed action does not involve activities known or likely to result in the introduction or spread of non-indigenous species, such as ballast water exchange or movement of vessels among water bodies. Thus, effects on biodiversity and ecosystem function will not be considered further.

Ocean and Coastal Habitats and Unique Areas

Project 1 would occur in Chesapeake Bay and the near shore ocean waters of Virginia. Locations of tangle net captures would be determined by aerial survey data, and would be located in water less than 30 ft deep and away from underwater structure such as wrecks and artificial reefs. Bottom sediment in the area is sand, mud and/or silt so anchors would not cause damage and nets would not be dragging along the bottom.

Project 2 trawl capture surveys would occur in Delaware Bay estuary and coastal ocean waters of the mid-Atlantic region. Trawl activities would not be conducted in protected areas. Most of the area is sand bottom and researchers would use a bottom machine to scan for potential obstructions prior to deploying nets. In Delaware Bay, researchers would avoid sea grass areas and target sand or sand/mud bottom.

Based on the proposed research methods and mitigating conditions of the permit, the proposed action would not involve substantial alteration of substrate, movement of water or air masses, or other interactions with physical features of ocean and coastal habitat. Although essential fish habitat (EFH) may be found in the area, the nature of the research is not expected to result in impacts to EFH.

Research would not occur in any National Marine Sanctuaries.

No prime farmlands, wetlands, or wild and scenic rivers are found within the action area. The proposed action is directed at sea turtles and as noted above would not alter or affect habitat, unique areas, including any components of EFH. Thus, effects on habitat and these areas will not be considered further.

Historic Places, Scientific, Cultural, and Historical Resources
There are no districts, sites, highways or structures listed in or eligible for listing in the National Register of Historic Places in the action area. The proposed action represents non-consumptive use of sea turtles and does not preclude their availability for other scientific, cultural, or historic uses. Thus, effects on such resources will not be considered further.

Social and Economic Resources
The proposed action does not affect distribution of environmental burdens, access to natural or depletable resources or other social or economic concerns. It does not affect traffic and transportation patterns, risk of exposure to hazardous materials or wastes, risk of contracting disease, risk of damages from natural disasters, food safety, or other aspects of public health and safety. Thus, effects on such resources will not be considered further.

4.0 ENVIRONMENTAL CONSEQUENCES

Effects of the No Action Alternative
There are no direct or indirect effects on the environment of not issuing the permit. The takes of sea turtles resulting from the applicant's research would not be exempted.

Effects of the Proposed Action Alternative
Impacts of the Proposed Action would be limited to the biological environment, specifically the target sea turtles and small numbers of incidentally captured species. The type of action proposed in the permit request would be unlikely to affect the physical or socioeconomic environment or pose a risk to public health and safety.

Individual animals may experience short-lived stress or minimal injury during the proposed procedures; however NMFS expects that animals would recover from most of the proposed activities within the course of a day and that minor wounds (e.g., biopsies) would heal over a short period of time. No mortalities or serious injuries are expected; however mortalities are always a possibility when capturing animals. Therefore, two mortalities of any sea turtle species

would be authorized annually during trawling. All proposed procedures have been previously analyzed in the EAs for Permit Numbers 1551, 1527, 1570, and 16253 in the Atlantic Ocean (NMFS 2006a, b, c; 2012). Those assessments each concluded that no significant impacts would result from the proposed activities and are hereby incorporated by reference. Those analyses determined that:

- The short-term stresses (separately and cumulatively) to sea turtles resulting from the non-lethal research activities were expected to be minimal and dissipate within a day.
- Capture by trawl (Permit Nos. 1570 and 16253) would subject animals to forced submergence, which can lead to metabolic changes that impair a sea turtle's ability to function. Based on permit conditions concerning animal handling and follow-up monitoring NMFS did not expect trawl capture to result in more than short-term effects on most of the individual animals.
- A limited number of accidental mortalities were authorized during trawling for Permit Nos. 1570 and 16253, but none were expected. These takes would kill the individual animal, but were not expected to have a measureable effect on the numbers or reproduction of the affected populations.
- No marine mammals were expected to be adversely affected.
- The proposed actions were not expected to adversely affect other portions of the environment, including the physical or socioeconomic environment, or result in any cumulatively significant effects on them.
- Activities were not expected to have more than short-term effects on target populations, either separately or cumulatively.
- Effects of the proposed research activities were not expected to adversely affect the survival, longevity, or lifetime reproductive success of any age class of sea turtle species.

No sea turtle mortalities or takes of marine mammals have been reported in annual reports for Permit Numbers 1551, 1527, 1570, and 16253 for the types of activities in the Proposed Action.

Although the applicant has not held a permit to conduct these activities before, the effects of the Proposed Action to the target sea turtles are not expected to differ from those analyzed in past EAs for other applicants. In addition, some sturgeon may be incidentally caught during tangle netting and trawls. However, the majority are expected to be released alive and unharmed given the mitigating measures of the permit for their safe handling and release. The Biological Opinion prepared for the Proposed Action, not including the proposed trawling activities, concluded that the effects were not likely to jeopardize targeted sea turtle species or Atlantic and shortnose sturgeon captured incidental to tangle netting. Up to seven sturgeon of either species and any Distinct Population Segment would be incidentally captured each year. Takes would not occur during trawling until and unless a future ESA section 7 consultation and resulting biological opinion concludes that the effects of taking sea turtles and sturgeon are not likely to jeopardize those species, at which time the proposed permit would be modified to include the requested trawling activities.

The effects of the proposed activities would primarily be limited to short-term changes in behavior and minor injuries of individual sea turtles, with a limited number of unintentional mortalities. Conditions in the proposed permit would be similar to those in Permit Numbers 1551, 1527, 1570, and 16253, and were designed to minimize effects to individual sea turtles and non-target species.

Cumulative Impacts

Summary of Effects from Total Number of Permits: In general, takes of sea turtles during permitted research using the proposed methodologies have not been shown to result in long-term or permanent adverse effects on individuals regardless of the number of times taking occurs. The frequency and duration of the capture and disturbance under the proposed permit would allow adequate time for animals to recover from adverse effects such that additive or cumulative effects of the action on its own are not expected.

No measurable effects on population demographics are anticipated because any sub-lethal effects – disturbance and minor wounds – are expected to be short-term, with the animals recovering within a day from most procedures, and the proposed action is not expected to result in mortality or serious injury of any animals, although a small number of mortalities would be authorized in the unlikely event that they might occur during trawling. There is no evidence that current or past levels of permitted takes have resulted in cumulative population or species level effects.

Twenty permits authorize taking for research on the target species in the Atlantic Ocean. Nearly all the permits are for a smaller study area or region, reducing the chance of repeated takes of individual sea turtles by researchers. Most of this research does not overlap in area or timing. However, some spatial overlap exists.

Several of the active permits would expire soon after the proposed effective date of Permit No. 16134. NMFS expects that some researchers would request new permits, or renewals, to continue their work once their current permit expires. NMFS cannot predict with certainty the level of take of each species that may be requested in the future but, conservatively, expects the amount of future research to be similar to or slightly greater than current levels as interest in marine conservation, biology, and management of these species grows.

NMFS does not expect cumulative impacts since effects of research activities would dissipate within a short period of time, with most effects dissipating within a day, as previously discussed, before animals could be targeted again by researchers. Moreover, researchers working under NMFS permits are required to notify the appropriate NMFS Regional Office in advance of field work. The Regional Office is tasked with coordinating activities under multiple permits for the action area to ensure there is not unnecessary duplication of research.

Summary of Other Actions: The target sea turtle populations may be exposed to other human activities including subsistence harvest, entanglement in fishing gear, and noise from vessel traffic. Effects of past and ongoing human and natural factors (fisheries, ecotourism, existing NMFS research permits and other activities) occurring in or near the action area that have

contributed to the current status of the species are described in Ch. 3 and the baseline section of the attached biological opinion prepared for the ESA Section 7 Consultation for this permit. General threats facing sea turtle species range-wide are also discussed in the opinion. These activities and threats are expected to continue into the future.

The conclusion of the biological opinion was that the proposed action, not including the proposed trawling activities, would not likely jeopardize the continued existence of any of the species and would not likely destroy or adversely modify designated critical habitat. NMFS expects the proposed research activities would not likely reduce the fitness of any individual. Because the fitness of individuals is not threatened, population viability and species persistence are not threatened. Takes would not occur during trawling until and unless a future ESA section 7 consultation and resulting biological opinion concludes that the effects of taking sea turtles and sturgeon are not likely to jeopardize those species, at which time the proposed permit would be modified to include the requested trawling activities.

Summary: Overall, the proposed action would not be expected to have more than short-term effects on endangered and threatened sea turtles. The incremental impact of the action when added to other past, present, and reasonably foreseeable future actions discussed here would be minimal and not significant. The data generated by the research 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 and recover threatened and endangered species and would outweigh any adverse impacts that may occur. The proposed action would not be expected to have any more than short-term effects on any marine life species or other portions of the environment and would not result in any cumulatively significant effects.

5.0 LIST OF PREPARERS AND AGENCIES AND PERSONS CONSULTED

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

No other agencies were consulted in the preparation of this EA.

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Appendix 1: Proposed Take Tables for Permit No. 16134

Table 1. Proposed Annual Takes for Project 1: MD,NC,VA; Chesapeake Bay, Virginia, and Maryland waters.

SPECIES	LIFESTAGE	NUMBER OF ANIMALS	TAKE ACTION	OBSERVE/COLLECT METHOD	PROCEDURES	DETAILS
Loggerhead	Subadult/ Adult	10	Capture/ Handle/ Release	Net, Tangle	Epibiota removal; Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, fecal; Sample, oral swab; Sample, scute scraping; Sample, tissue; Weigh	
Loggerhead	Subadult/ Adult	20	Capture/ Handle/ Release	Net, Tangle	Collect, tumors; Epibiota removal; Imaging (e.g., MRI, CT, CAT, X-Ray); Instrument, epoxy attachment (e.g., satellite tag, VHF tag); Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, fecal; Sample, muscle biopsy; Sample, oral swab; Sample, scute scraping; Sample, tissue; Ultrasound; Weigh	Tagging & non-surgical muscle biopsy subset.
Kemps	Adult/ Subadult/ Juvenile	6	Capture/ Handle/ Release	Net, Tangle	Epibiota removal; Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, fecal; Sample, oral swab; Sample, scute scraping; Sample, tissue; Weigh	

SPECIES	LIFESTAGE	NUMBER OF ANIMALS	TAKE ACTION	OBSERVE/COLLECT METHOD	PROCEDURES	DETAILS
Kemps	Adult/ Subadult/ Juvenile	7	Capture/ Handle/ Release	Net, Tangle	Epibiota removal; Instrument, epoxy attachment (e.g., satellite tag, VHF tag); Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, fecal; Sample, oral swab; Sample, scute scraping; Sample, tissue; Weigh	Tagging subset.
Green	Adult/ Subadult/ Juvenile	5	Capture/ Handle/ Release	Net, Tangle	Epibiota removal; Instrument, epoxy attachment (e.g., satellite tag, VHF tag); Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, fecal; Sample, oral swab; Sample, scute scraping; Sample, tissue; Weigh	
Hawksbill	Juvenile/ Subadult	1	Capture/ Handle/ Release	Net, Tangle	Epibiota removal; Instrument, epoxy attachment (e.g., satellite tag, VHF tag); Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, fecal; Sample, oral swab; Sample, scute scraping; Sample, tissue; Weigh	

SPECIES	LIFESTAGE	NUMBER OF ANIMALS	TAKE ACTION	OBSERVE/COLLECT METHOD	PROCEDURES	DETAILS
Leatherback	Juvenile/ Subadult	2	Capture/ Handle/ Release	Net, Tangle	Mark, carapace (temporary); Mark, flipper tag; Measure; Photograph/Video	Leatherbacks will not be boarded. Procedures would occur alongside the inflatable or trawl vessel.
Loggerhead	Subadult/ Adult	10	Handle/ Sampling/ Release	Capture under other authority	Epibiota removal; Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, fecal; Sample, oral swab; Sample, scute scraping; Sample, tissue; Weigh	Animals may come from pound net fishermen or dredge/trawl activities that authorize the legal take of sea turtles.
Loggerhead	Subadult/ Adult	20	Handle/ Sampling/ Release	Capture under other authority	Collect, tumors; Epibiota removal; Instrument, epoxy attachment (e.g., satellite tag, VHF tag); Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, fecal; Sample, muscle biopsy; Sample, oral swab; Sample, scute scraping; Sample, tissue; Transport; Ultrasound; Weigh	Tagging and non-surgical muscle biopsy subset. Animals may come from pound net fishermen or dredge/trawl activities that authorize the legal take of sea turtles. Animals from pound nets or dredge/trawl may be transported if necessary for human or turtle safety.

SPECIES	LIFESTAGE	NUMBER OF ANIMALS	TAKE ACTION	OBSERVE/COLLECT METHOD	PROCEDURES	DETAILS
Kemps	Adult/ Subadult/ Juvenile	6	Handle/ Sampling/ Release	Capture under other authority	Epibiota removal; Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, fecal; Sample, oral swab; Sample, scute scraping; Sample, tissue; Transport; Weigh	Animals may come from pound net fishermen or dredge/trawl activities that authorize the legal take of sea turtles. Animals from pound nets or dredge/trawl may be transported if necessary for human or turtle safety.
Kemps	Adult/ Subadult/ Juvenile	7	Handle/ Sample/ Release	Capture under other authority	Epibiota removal; Instrument, epoxy attachment (e.g., satellite tag, VHF tag); Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, fecal; Sample, oral swab; Sample, scute scraping; Sample, tissue; Transport; Weigh	Tagging subset. Animals may come from pound net fishermen or dredge/trawl activities that authorize the legal take of sea turtles. Animals from pound nets or dredge/trawl may be transported if necessary for human or turtle safety.
Green	Adult/ Subadult/ Juvenile	5 (1 from pound net)	Handle/ Sampling/ Release	Capture under other authority	Epibiota removal; Instrument, epoxy attachment (e.g., satellite tag, VHF tag); Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, fecal; Sample, oral swab; Sample, scute scraping; Sample, tissue; Transport; Weigh	Animals may come from pound net fishermen or dredge/trawl activities that authorize the legal take of sea turtles. Animals from pound nets or dredge/trawl may be transported if necessary for human or turtle safety.

SPECIES	LIFESTAGE	NUMBER OF ANIMALS	TAKE ACTION	OBSERVE/COLLECT METHOD	PROCEDURES	DETAILS
Hawksbill	Juvenile/ Subadult	1	Handle/ Sampling/ Release	Capture under other authority	Epibiota removal; Instrument, epoxy attachment (e.g., satellite tag, VHF tag); Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, fecal; Sample, oral swab; Sample, scute scraping; Sample, tissue; Transport; Weigh	Animals may come from dredge/trawl activities that authorize the legal take of sea turtles. Animals from dredge/trawl may be transported if necessary for human or turtle safety.

Table 2. Proposed Annual Takes for Project 2: DE,MD,NC,NJ,VA; Mid-Atlantic ocean coast from Cape Hatteras, NC to Atlantic City, NJ from, including waters inside the Delaware Bay.

SPECIES	LIFESTAGE	NUMBER OF ANIMALS	TAKE ACTION	OBSERVE/COLLECT METHOD	PROCEDURES	DETAILS
Loggerhead	Subadult/ Adult	30	Capture/ Handle/ Release	Sources of animals may be: capture by tangle net, hand, dip net, hoop net, or trawl OR be animals that were legally taken by dredge/trawl under another authority.	Epibiota removal; Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, fecal; Sample, oral swab; Sample, scute scraping; Sample, tissue; Weigh	
Loggerhead	Subadult/ Adult	20	Capture/ Handle/ Release	Sources of animals may be: capture by tangle net, hand, dip net, hoop net, or trawl OR be animals that were legally taken by dredge/trawl under another authority.	Collect, tumors; Epibiota removal; Imaging (e.g., MRI, CT, CAT, X-Ray); Instrument, epoxy attachment (e.g., satellite tag, VHF tag);Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, fecal; Sample, muscle biopsy; Sample, oral swab; Sample, scute scraping; Sample, tissue; Ultrasound; Weigh	Tagging and non-surgical muscle biopsy subset.

SPECIES	LIFESTAGE	NUMBER OF ANIMALS	TAKE ACTION	OBSERVE/COLLECT METHOD	PROCEDURES	DETAILS
Kemps	Adult/ Subadult/ Juvenile	22	Capture/ Handle/ Release	Sources of animals may be: capture by tangle net, hand, dip net, hoop net, or trawl OR be animals that were legally taken by dredge/trawl under another authority.	Epibiota removal; Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, fecal; Sample, oral swab; Sample, scute scraping; Sample, tissue; Weigh	
Kemps	Adult/ Subadult/ Juvenile	8	Capture/ Handle/ Release	Sources of animals may be: capture by tangle net, hand, dip net, hoop net, or trawl OR be animals that were legally taken by dredge/trawl under another authority.	Epibiota removal; Instrument, epoxy attachment (e.g., satellite tag, VHF tag); Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, fecal; Sample, oral swab; Sample, scute scraping; Sample, tissue; Weigh	Tagging subset.
Green	Adult/ Subadult/ Juvenile	12	Capture/ Handle/ Release	Sources of animals may be: capture by tangle net, hand, dip net, hoop net, or trawl OR be animals that were legally taken by dredge/trawl under another authority.	Epibiota removal; Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, fecal; Sample, oral swab; Sample, scute scraping; Sample, tissue; Weigh	

SPECIES	LIFESTAGE	NUMBER OF ANIMALS	TAKE ACTION	OBSERVE/COLLECT METHOD	PROCEDURES	DETAILS
Green	Adult/ Subadult/ Juvenile	8	Capture/ Handle/ Release	Sources of animals may be: capture by tangle net, hand, dip net, hoop net, or trawl OR be animals that were legally taken by dredge/trawl under another authority.	Epibiota removal; Instrument, epoxy attachment (e.g., satellite tag, VHF tag); Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, fecal; Sample, oral swab; Sample, scute scraping; Sample, tissue; Weigh	
Hawksbill	Juvenile/ Subadult	2	Capture/ Handle/ Release	Sources of animals may be: capture by tangle net, hand, dip net, hoop net, or trawl OR be animals that were legally taken by dredge/trawl under another authority.	Epibiota removal; Instrument, epoxy attachment (e.g., satellite tag, VHF tag); Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, fecal; Sample, oral swab; Sample, scute scraping; Sample, tissue; Weigh	Tagging subset.
Leatherback	Juvenile/ Subadult	2	Capture/ Handle/ Release	Sources of animals may be: capture by tangle net or trawl OR be animals that were legally taken by dredge/trawl under another authority.	Mark, carapace (temporary); Mark, flipper tag; Measure; Photograph/Video	Leatherbacks will not be boarded. Procedures would occur alongside the inflatable or trawl vessel.
Unidentified sea turtle	Adult/ Subadult/ Juvenile	2	Unintentional mortality	Net, trawl	Salvage (carcass, tissue, parts)	Mortality associated with trawl capture only.

Appendix 2. Types of research activities authorized by active permits in the Atlantic Ocean. The sex and age class of animals affected varies by permit, as does the time of year and frequency of activity.

File No.	Expires	Capture	Blood sampling	Fecal sampling/ lavage	Laparoscopy	Tissue sampling	Attach instruments	Tags or marks	Mortality
15552	7/25/2016					√		√	
1576	10/31/2012	√				√		√	√
13306	6/30/2013	√	√			√	√	√	
13307	6/30/2013	√	√	√		√	√	√	
1551	7/1/2013	√	√	√	√	√	√	√	
13543	4/30/2014							√	
13544	4/30/2014	√		√		√	√	√	
14272	6/30/2014	√	√			√	√	√	
14249	10/31/2014	√	√			√	√	√	√
14655	6/1/2015	√	√			√	√	√	
14508	6/1/2015	√	√	√		√		√	
14506	9/15/2015	√	√	√		√		√	
14726	9/15/2015	√		√		√	√	√	
15112	1/1/2016					√		√	
14622	2/28/2016	√	√		√	√	√	√	
15606	3/30/2016	√	√	√		√	√	√	√
14949	4/29/2016	√	√	√		√	√	√	√
15566	4/30/2016	√	√	√		√	√	√	√
16253	1/31/2017	√				√		√	√
16174	11/18/2016	√					√	√	