NOAA FISHERIES

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| **Proposed Action** | Issuing an Incidental Take Permit (File No. 27106) to the North Carolina Division of Marine Fisheries for the incidental take of ESA-listed sea turtles and sturgeon associated with the otherwise lawful commercial anchored gill net fisheries operating in the internal coastal waters of North Carolina. |
| **Type of Statement** | Draft Environmental Assessment |
| **Date** | August, 2023 |
| **Lead Agency** | U.S. Department of Commerce<br>National Oceanic and Atmospheric Administration<br>National Marine Fisheries Service<br>Office of Protected Resources |
| **Responsible Official** | Kimberly Damon-Randall<br>Director, Office of Protected Resources |
| **For Further Information** | Office of Protected Resources<br>National Marine Fisheries Service<br>1315 East West Highway<br>Silver Spring, MD 20910<br>(301) 427-8402 |
| **Location** | Internal coastal waters of North Carolina |

**Abstract:** The National Marine Fisheries Service proposes to issue an incidental take permit (ITP) to the North Carolina Division of Marine Fisheries (NCDMF), under section 10(a)(1)(B) of the Endangered Species Act (ESA) of 1973 as amended (16 U.S.C. 1531 et seq.), and the regulations governing the incidental taking of endangered and threatened species (50 CFR 222.307). If issued, the ITP would authorize the incidental capture, with some mortality, of endangered and threatened sea turtles and sturgeon, including the North Atlantic and South Atlantic Distinct Population Segments (DPSs) of green (*Chelonia mydas*), Kemp's ridley (*Lepidochelys kempii*), hawksbill (*Eretmochelys imbricata*), leatherback (*Dermochelys coriacea*), and Northwest Atlantic Ocean DPS of loggerhead (*Caretta caretta*) sea turtles, Gulf

of Maine, New York Bight, Chesapeake, Carolina, and South Atlantic DPSs of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), and shortnose sturgeon (*Acipenser brevirostrum*), associated with the otherwise lawful commercial fisheries operating in North Carolina (NC) internal coastal (inshore) waters using large and small-mesh anchored gill nets. The ITP would be valid for 10 years. As part of their conservation plan, NCDMF would continue to regulate these gill net fisheries through the fisheries rules adopted by the NC Marine Fisheries Commission and proclamations issued by the NCDMF Director. Regulations include mandatory net attendance, yardage limits, soak-time restrictions, net shot limits, net height tie-down requirements, closed areas, mesh size restrictions, minimum distance between fishing operations, marking requirements, permit mandates, and observer requirements.

On December 2, 2022, NCDMF submitted a complete application for an ESA section 10(a)(1)(B) ITP, including a conservation plan with an adaptive management program for the operation of their commercial inshore large and small-mesh anchored gill net fisheries to further monitor, minimize, and mitigate the impacts of incidental take of sea turtles and sturgeon in these fisheries to the maximum extent practicable.

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# CHAPTER 1 INTRODUCTION AND PURPOSE AND NEED

The National Marine Fisheries Service (NMFS) received an application from the North Carolina Division of Marine Fisheries (NCDMF) requesting an Incidental Take Permit (ITP) for take of threatened and endangered sea turtle and sturgeon species associated with the otherwise lawful operation of North Carolina (NC) internal coastal anchored large and small-mesh gill net fisheries. Estuarine gill-net fisheries in NC are termed the "NC Inshore Gillnet Fishery" in NMFS List of Fisheries (Marine Mammal Protection Act, 16 U.S.C. 1387(c)(1)) and thus the action area will be referred to as "inshore" throughout this document. NMFS authorizes take of threatened and endangered species pursuant to the Endangered Species Act (ESA), section 10(a)(1)(B) after receipt and review of an application and if certain findings and determinations are made. Under the National Environmental Policy Act (NEPA), 40 Code of Federal Regulations (CFR) Parts 1500 -1508[1], and the National Oceanic and Atmospheric Administration (NOAA) policy and procedures[2] NOAA reviews all proposals for major federal actions with respect to environmental consequences on the human environment. NMFS conducted an environmental review of the requested ITP and determined an Environmental Assessment (EA) is appropriate for NMFS consideration of whether to issue an ITP to NCDMF.

This chapter presents a summary of NMFS' authority pursuant to the ESA to authorize take of threatened and endangered species associated with an applicant's specified activities (Section 1.1), a summary of the applicant's request (Section 1.2), and identifies NMFS' proposed action and purpose and need (Section 1.3). This chapter also explains the environmental review process (1.4) and provides other information relevant to the analysis in this EA, such as the scope of the analysis (Section 1.5). The remainder of this EA is organized as follows:

- Chapter 2 describes the applicant's activities, and the alternatives carried forward for analysis;
- Chapter 3 describes the baseline conditions of the affected environment;
- Chapter 4 describes the direct, indirect, and cumulative impacts on the affected environment, specifically impacts to ESA listed sea turtles and sturgeon associated with NMFS' proposed action and alternatives;
- Chapter 5 lists the preparers of the EA; and
- Chapter 6 lists references cited.

## 1.1 Overview of the Endangered Species Act and Relevant Authorities

The ESA establishes a national policy for conserving threatened and endangered species of fish, wildlife, plants and the habitat they depend on. An endangered species is a species in danger of

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[1] This EA is being prepared using the 2020 CEQ NEPA Regulations as modified by the Phase I 2022 revisions. The effective date of the 2022 revisions was May 20, 2022 and reviews begun after this date are required to apply the 2020 regulations as modified by the Phase I revisions unless there is a clear and fundamental conflict with an applicable statute. This EA began on December 2, 2022 and accordingly proceeds under the 2020 regulations as modified by the Phase I revisions.

[2][2] National Oceanic and Atmospheric Administration Administrative Order (NAO) 216-6A "Compliance with the National Environmental Policy Act and Executive Order 12114 Environmental Effects Abroad of Major Federal Actions 11988 and 13690 Floodplain Management; and 11990 Protection of Wetlands" and the Companion Manual for NAO 216-6A.

extinction throughout all or a significant portion of its range, and a threatened species is one that is likely to become endangered within the foreseeable future throughout all or in a significant portion of its range. The U.S. Fish and Wildlife Service (USFWS) and NMFS jointly administer the ESA and are responsible for listing a species as either threatened or endangered, as well as designating critical habitat where applicable, developing recovery plans for these species, and undertaking other conservation actions pursuant to the ESA. Section 9 of the ESA prohibits the "take"[3], including incidental take of endangered sea turtles and sturgeon. Pursuant to section 4(d) of the ESA, NMFS has issued regulations extending the prohibition of take, with exceptions, to threatened sea turtles (50 CFR 223.205 and 223.206) and to threatened sturgeon (50 CFR 223.211). NMFS may grant exceptions to the take prohibitions with an incidental take statement or an ITP issued pursuant to ESA section 7 or 10, respectively. To do so, NMFS must determine the activity that will result in incidental take is not likely to jeopardize the continued existence of the affected listed species.

Section 10(a) of the ESA includes allowable circumstances for permitting, which includes any act otherwise prohibited by section 9 for scientific purposes or to enhance the propagation or survival of the affected species, including, but not limited to, acts necessary for the establishment and maintenance of experimental populations (section 10(a)(1)(A)) or any taking otherwise prohibited by section 9(a)(1)(B) if such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity (section 10(a)(1)(B)).

As provided in 50 CFR 222.307, NMFS may issue section 10(a)(1)(B) ITPs to non-Federal entities to take threatened and endangered species when such taking is incidental to an otherwise lawful activity, and when specific issuance criteria have been met.

***Issuance criteria***

(1) In determining whether to issue a permit, the Assistant Administrator will consider the following:

(i) The status of the affected species or stocks;
(ii) The potential severity of direct, indirect, and cumulative impacts on the species or stocks and habitat as a result of the proposed activity;
(iii) The availability of effective monitoring techniques;
(iv) The use of the best available technology for minimizing or mitigating impacts; and
(v) The views of the public, scientists, and other interested parties knowledgeable of the species or stocks or other matters related to the application.

(2) To issue the permit, the Assistant Administrator must find that—

(i) The taking will be incidental;
(ii) The applicant will, to the maximum extent practicable, monitor, minimize, and mitigate the impacts of such taking;
(iii) The taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild;

[3] Take, as defined in Section 3 of the ESA, means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

(iv) The applicant has amended the conservation plan to include any measures (not originally proposed by the applicant) that the Assistant Administrator determines are necessary or appropriate; and
(v) There are adequate assurances that the conservation plan will be funded and implemented, including any measures required by the Assistant Administrator.

The applicant must submit a completed application and conservation plan detailing the anticipated impact of the activity on listed species and/Distinct Population Segments (DPSs), the anticipated impacts to habitat, actions that will be taken to monitor, minimize, and mitigate such impacts, and the funding available to do so, as well as alternative actions that have been considered.

Section 7(a)(2) of the ESA requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of threatened and endangered species or adversely modify or destroy their designated critical habitat. Federal agencies must do so in consultation with NMFS (or the USFWS) for actions that may affect species listed per section 4 of the ESA as threatened or endangered or critical habitat designated for such species. Section 7(b)(3) of the ESA requires that at the conclusion of formal consultation, the consulting agency provides an opinion stating whether the federal action agency’s action is likely to jeopardize ESA-listed species or destroy or adversely modify designated critical habitat.

### 1.2 Incidental Take Permit Application Summary

Commercial and recreational fishers deploy gill nets in NC’s estuarine, inshore, and ocean waters. Gill net fishing in NC is regulated by NCDMF through fisheries rules adopted by the NC Marine Fisheries Commission (MFC) and proclamations issued by the NCDMF Director. Existing regulations include mandatory attendance for some areas and gear, yardage limits, soak-time restrictions, net shot limits, tie-down requirements, closed areas, mesh size restrictions, minimum distance between fishing operations, marking requirements, reporting requirements, and monitoring requirements. Gill net fisheries and related restrictions differ throughout the state depending on season, target species, location, and physical characteristics of the water body being fished. In general, there are three primary set techniques: anchored set nets, floating drift nets, and strike or runaround nets.

Since 2000, NMFS has issued six separate ITPs to NCDMF for the incidental take of sea turtles and sturgeon in inshore gill net fisheries. In the fall of 2000, NMFS issued ITP No. 1259 to NCDMF which authorized the incidental take of sea turtles in the deep and shallow-water gill net fishery in Pamlico Sound. The ITP established the Pamlico Sound Gill Net Restricted Area (PSGNRA). In the fall of 2001, NMFS issued ITP No. 1348 to NCDMF which authorized the incidental take of sea turtles in the fall gill net fisheries in Pamlico Sound and mandated further restrictions for the 2001 fishing season. In the summer of 2002, NMFS issued ITP No. 1398 to NCDMF which authorized the incidental take of sea turtles in shallow-water, large-mesh gill nets in Pamlico Sound for a period of 3 years, including the fall seasons of 2002, 2003, and 2004. The PSGNRA was incorporated into NMFS regulations in 2002 (67 FR 56931; 50 CFR 223.206 (d)(7) Exceptions to prohibitions relating to sea turtles). In 2005, NMFS issued ITP No. 1528 to NCDMF which authorized the incidental take of sea turtles in shallow-water, large-mesh gill nets in Pamlico Sound for a period of 6 years, including the fall seasons between 2005 and 2010. In the fall of 2013, NMFS issued ITP No. 16230 to NCDMF for the incidental take of sea turtles associated with the otherwise lawful commercial NC inshore large and small-mesh anchored gill net fisheries for a period of 10 years. In 2012, Atlantic sturgeon were listed under the ESA and as a result NCDMF submitted an ITP application and conservation plan, resulting in NMFS issuing ITP No. 18102 to NCDMF, in the summer of 2014, for the incidental take of Atlantic sturgeon DPSs associated with the otherwise lawful NC commercial inshore large and small-mesh anchored gill net fisheries for a period of 10 years. With ITPs No. 16230 and 18102 coming to the end of their coverage duration, NCDMF has applied for an ITP that would authorize the take of green (North Atlantic and South Atlantic DPSs), Kemp's ridley, hawksbill, leatherback, and loggerhead (Northwest Atlantic Ocean DPS) sea turtles, and Atlantic (Gulf of Maine, New York Bight, Chesapeake, Carolina, and South Atlantic DPSs) and shortnose sturgeon in the commercial gill net fisheries operating in NC inshore waters and deploying large and small-mesh anchored gill nets (*i.e.*, passive gill net sets deployed with an anchor or stake at one or both ends of the nets), which have been identified as incidentally capturing, with some mortality, ESA-listed sea turtles and sturgeon. The ITP, if issued, would provide an exemption to the ESA take prohibitions for 10 years and, through their developed conservation plan, NCDMF would monitor, minimize, and mitigate the impacts of the taking, to the maximum extent practicable, for the capture of ESA-listed sea turtles and sturgeon incidental to these fisheries.

### 1.3 Proposed Action and Purpose and Need

NMFS is proposing to issue an ITP to NCDMF pursuant to section 10(a)(1)(B) of the ESA and the regulations governing the incidental taking of endangered and threatened species (50 CFR 222.307). The ITP would be valid for 10 years from the date issued and would authorize the incidental lethal and nonlethal take of ESA-listed sea turtles and sturgeon in NC commercial inshore large and small-mesh anchored gill net fisheries, require specific levels of observer monitoring, reporting protocols, and minimization and mitigation measures. The potential for take of ESA-listed sea turtles and sturgeon warrant a take authorization from NMFS in the form of an ITP. NMFS' proposed action is a direct outcome of NCDMF's request for an ITP to take ESA-listed sea turtles and sturgeon.

The NCDMF submitted a complete application on December 2, 2022, for an ITP to take ESA-listed sea turtles and sturgeon incidental to NC commercial inshore anchored gill net fisheries. The purpose of NMFS' action is to evaluate NCDMF's application pursuant to section 10(a)(1)(B) of the ESA, consider the impacts of the fishery on NMFS' ESA-listed species and designated critical habitat, and, if appropriate, issue the ITP. The need for NMFS' action is to meet its obligation to grant or deny the ITP request under the ESA. NCDMF submitted an adequate and complete application demonstrating the potential eligibility for the ITP thus NMFS has a corresponding duty to determine whether and how to authorize take of the ESA-listed sea turtles and sturgeon incidental to the activities described in the application. NMFS has a responsibility to implement the ESA and to protect, conserve, and recover threatened and endangered species under its jurisdiction. Applying for an ITP necessitates the development of a conservation plan. ITPs and associated conservation plans are in place to ensure the conservation and management of endangered and threatened species and minimize the impact of otherwise lawful activities, such as the operation of NC commercial inshore anchored gill net fisheries.

Working with state agencies to develop conservation plans for state managed actions, such as the operation of state fisheries, is a critical effort to reduce impacts from state managed actions and promote the conservation and recovery of species.

To authorize take of ESA-listed species, NMFS evaluates the ITP application and conservation plan to determine if they meet the issuance criteria (**Section 1.1**). NMFS cannot issue an ITP if these criteria cannot be met.

### 1.4 Environmental Review Process

Under NEPA, federal agencies are required to examine the environmental impacts of their proposed actions within the United States (U.S.) and its territories. An EA is a concise public document that provides an assessment of the potential effects a major federal action may have on the human environment. Major federal actions include activities that federal agencies fully or partially fund, regulate, conduct, or approve. Because the issuance of an ITP would allow for the taking of ESA-listed species, consistent with provisions under section 10(a)(1)(B) of the ESA, and incidental to the applicant's lawful activities, NMFS considers this to be a major federal action subject to NEPA; therefore, NMFS analyzes the environmental effects associated with authorizing takes of ESA-listed species and prepares the appropriate NEPA documentation. In addition, NMFS, to the fullest extent possible, integrates the requirements of NEPA with other regulatory processes required by law or by agency practice so that all procedures run concurrently, rather than consecutively. This includes coordination within the NOAA (*e.g.*, the Office of the National Marine Sanctuaries) and with other regulatory agencies (*e.g.*, the USFWS), as appropriate, during NEPA reviews prior to implementation of a proposed action to ensure that all applicable requirements are met.

#### 1.4.1 Compliance with Other Laws

NMFS must comply with all applicable federal environmental laws and regulations or Executive Orders (as applicable) necessary to implement a proposed action. NMFS' evaluation of and compliance with environmental laws and regulations is based on the nature and location of the applicant's proposed activities and NMFS' proposed action. Therefore, this section only summarizes environmental laws and consultations applicable to NMFS' consideration of whether to issue the ITP to NCDMF.

**ESA**: NMFS's issuance of an ITP is a federal action that is subject to consultation requirements under Section 7 of the ESA. As a result, the Office of Protected Resources (OPR) Marine Mammal and Sea Turtle Conservation Division and the Endangered Species Conservation Division are required to ensure the issuance of this ITP to NCDMF is not likely to jeopardize the continued existence of any threatened and endangered species or result in the destruction or adverse modification of designated critical habitat for these species.

Because the green (North Atlantic and South Atlantic DPSs), Kemp's ridley, hawksbill, leatherback, and loggerhead (Northwest Atlantic Ocean DPS) sea turtles, and Atlantic (Gulf of Maine, New York Bight, Chesapeake, Carolina, and South Atlantic DPSs) and shortnose sturgeon are ESA-listed species with confirmed occurrence in NC inshore waters the NMFS

OPR Marine Mammal and Sea Turtle Conservation Division and Endangered Species Division initiated formal ESA section 7 consultation with NMFS OPR ESA Interagency Cooperation Division on the proposed issuance of ITP, pursuant to section 7 of the ESA on May 22, 2023. The consultation is in-progress and a biological opinion will be issued by the ESA Interagency Cooperation Division at the conclusion of the consultation process. As appropriate, the final EA will be informed by the analysis in the final biological opinion.

**Magnuson-Stevens Fishery Conservation and Management Act (MSA):** Under Section 305(b)(2), federal agencies are required to consult with the Secretary of Commerce with respect to any action authorized, funded, undertaken, or proposed to be authorized, funded or undertaken, by such agency which may adversely affect essential fish habitat (EFH) identified under the MSA. OPR initiated consultation with the Southeastern Regional Office (SERO) on May 10, 2023, and SERO determined many of the proposed conservation measures in the NCDMF ITP application and Conservation Plan would also confer conservation benefits to EFH and that no additional EFH conservation recommendations under the MSA were necessary on May 16, 2023.

### 1.4.2 Public Involvement

Per the ESA, once NMFS receives a completed application with adequate information included, NMFS is required to publish a Notice of Receipt (NOR) in the *Federal Register*. In the NOR, NMFS presents information relevant to the environmental impacts associated with the agency's consideration of whether to issue the ITP for the activities and species described in the application.

NMFS received a draft ITP application from NCDMF on June 22, 2022, for incidental capture of ESA-listed sea turtle and sturgeon associated with the otherwise lawful commercial fisheries operating in inshore waters and deploying anchored gill nets. The application included a conservation plan and analytical methods for estimating potential takes. NMFS reviewed the draft application and requested additional information and clarification. After several draft submissions and reviews, on December 2, 2022, NCDMF submitted an adequate complete revised application.

A *Federal Register* notice was published to inform the public of receipt of the application and allow for comments to be submitted on the ITP application and conservation plan (ITP No. 27106). On December 22, 2022 (78 FR 41034), NMFS published the NOR of the December 2, 2022 ITP application and conservation plan from NCDMF. After receiving a request to extend the comment period, on January 23, 2023, NMFS published a notice in the *Federal Register* (88 FR 3971) extending the comment period by 30 days. The public comment period ended on February 22, 2023 and 231 comments were received. The comments received and their accompanying responses are located in **Appendix A** of this document. After additional discussions between NMFS and the applicant, additional revisions were made to the application and conservation plan to incorporate information from these comments, as appropriate and a revised application was submitted to NMFS for review on May 1, 2023. Revisions applicable to the NCDMF's proposed action and conservation plan are included in this draft EA.

## 1.5 Scope of the Environmental Assessment

This draft EA was prepared in accordance with NEPA (42 USC 4321, et seq.), 40 CFR 1500-1508 and NOAA policy and procedures (NOAA Administrative Order [NAO] 216-6A and the Companion Manual for the NAO 216-6A). The analysis in this EA addresses potential direct, indirect, and cumulative impacts green (North Atlantic and South Atlantic DPSs), Kemp's ridley, hawksbill, leatherback, and loggerhead (Northwest Atlantic Ocean DPS) sea turtles, and Atlantic (Gulf of Maine, New York Bight, Chesapeake, Carolina, and South Atlantic DPSs) and shortnose sturgeon, and their ESA-designated critical habitat resulting from NMFS' proposed action to authorize incidental take associated with the operation of commercial anchored gill net fisheries in the Internal Coastal Waters of NC (estuarine–Internal Coastal Waters are all Coastal Fishing Waters except the Atlantic Ocean, MFC Rule 15A NCAC 03I .0101(c)), referred to in this EA as "inshore" waters. However, the scope of this analysis is limited to the decision for which NMFS is responsible (*i.e.*, whether to issue the ITP). This EA is intended to provide focused information on the primary issues and impacts of the proposed action, which is the issuance of an ITP to NCDMF, authorizing the incidental take of green (North Atlantic and South Atlantic DPSs), Kemp's ridley, hawksbill, leatherback, and loggerhead (Northwest Atlantic Ocean DPS) sea turtles, and Atlantic (Gulf of Maine, New York Bight, Chesapeake, Carolina, and South Atlantic DPSs) and shortnose sturgeon and the mitigation and monitoring measures to minimize the effects of that take (*i.e.*, the proposed ITP would only authorize incidental take of ESA-listed sea turtles and sturgeon so NMFS anticipates effects will be limited to these species). In addition, the action area is limited to the inshore waters of NC, which has been divided into six Management Units (MUs; A, B, C, D1, D2, E) which are presented in **Figure 1** and defined in section **3.1 Physical Environment**. For these reasons, this EA does not provide a detailed evaluation of the effects to the elements of the human environment listed in **Table 1** below.

**Table 1:** Elements of the human environment not evaluated in this EA.

| Biological | Physical | Socioeconomic/Cultural |
|---|---|---|
| • Benthic Communities<br>• Coral Reef Systems<br>• Fisheries Resources<br>• Humans<br>• Invertebrates<br>• Invasive Species | • Air Quality<br>• Farmland Geography<br>• Geology/Sediments<br>• Land Use<br>• Oceanography<br>• State Marine Protected Areas<br>• Federal Marine Protected Areas<br>• National Marine Sanctuaries<br>• National Wildlife Refuge<br>• Park Lands<br>• Water Quality<br>• Wetlands<br>• Wild and Scenic Rivers | • Indigenous Cultural Resources<br>• Low-Income Populations<br>• Military Activities<br>• Minority Populations<br>• Other Marine Uses: Military activities, shipping marine transport, and Boating<br>• Recreational Fishing<br>• Public Health and Safety |

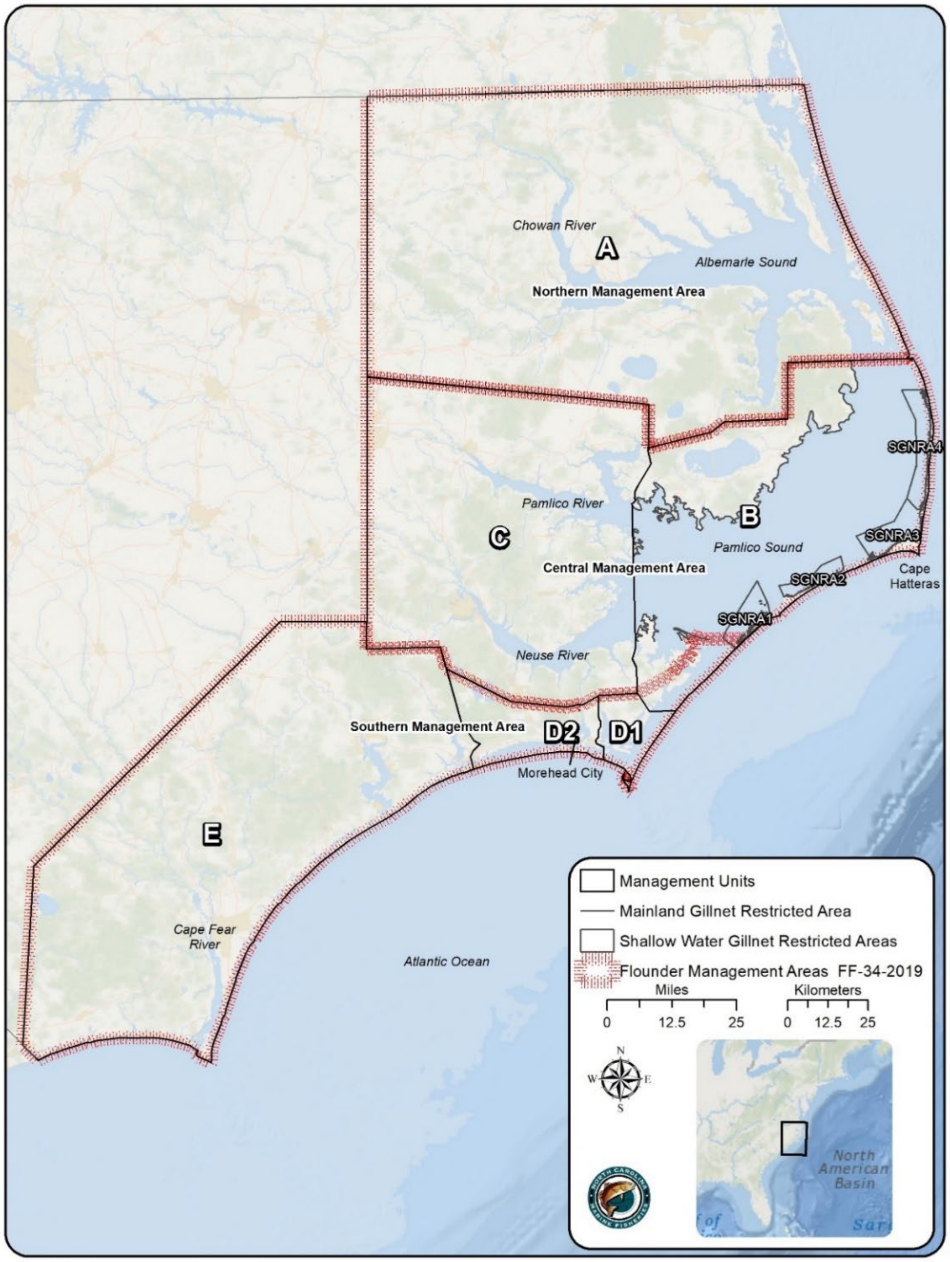


**Figure 1.** Management units (MUs; A, B, C, D1, D2, and E). The three Southern Flounder Management Areas described in Proclamation FF-34-2019 are also shown with red hatched lines: northern, central, and southern.

# CHAPTER 2 ALTERNATIVES

As described in Chapter 1, NMFS' proposed action is issuance of an ITP to NCDMF, which would authorize take of threatened and endangered sea turtle and sturgeon species associated with the otherwise lawful operation of NC commercial inshore large and small-mesh anchored gill net fisheries and require implementation of a conservation plan, in accordance with the requirements of the ESA. NMFS' proposed action is triggered by NCDMF's request for an ITP under section 10(a)(1)(B) of the ESA. In accordance with NEPA and the Council on Environmental Quality (CEQ) Regulations, NMFS is required to consider a reasonable range of alternatives to a proposed action as well as the no action alternative. The evaluation of alternatives under NEPA assists NMFS with assessing alternate ways to achieve the purpose and need for their proposed action that may result in less environmental harm. For the purposes of this EA, an alternative will only meet the purpose and need if it satisfies the requirements under section 10(a)(1)(B) of the ESA. Therefore, NMFS applied the screening criteria and considerations outlined below to identify which alternatives to carry forward for analysis.

*Considerations for Selecting Alternatives*

Section 10(a)(2)(B) of the ESA specifies that an ITP may be issued if the issuance criteria are met (**Section 1.1**). Under Section 10 of the ESA, NMFS's primary responsibility in evaluating an ITP application is to determine if the applicant's application and conservation plan meet the issuance criteria. Per NMFS regulation found at 50 CFR 222.307, NMFS will evaluate the sufficiency of the application and conservation plan. To issue an ITP, NMFS must determine that the issuance criteria are met. NMFS has worked with NCDMF since the first draft application was received to ensure these criteria have been met.

Given that NMFS has already worked collaboratively with the applicant to refine the application and conservation plan, the only alternatives NMFS is considering in this EA are the no action alternative (*i.e.*, not issuing the ITP) and issuing the ITP as requested in the revised application and conservation plan. The applicant provided several alternatives for their operation to minimize take in their application (see application Section 7.2 Alternatives Considered), all of which they deemed unacceptable as they would either be detrimental to the State and its constituents or the listed species, or to be non-feasible for the continued operation of the gill net fisheries. Set gill nets can be further divided into sink or float gill nets (Steve et al. 2001). Sink gill nets fish from the bottom up into the water column by having a lead line (bottom line) heavy enough to sink to the bottom. Float gill nets fish from the surface down into the water column by having the top line with buoys sufficient for floating on the surface of the water. Depending on net height and water depth, sink and float nets may fish a portion of or the entire water column. Soak times vary depending on factors such as target species, water temperature, season, waterbody, and regulations (NCDMF 2018).

Mesh sizes used in gill nets, including set gill nets, are selected according to the target species. Commonly used mesh sizes in NC inshore waters range from 2.5 to 6.5 Inches Stretched Mesh (ISM) (6.35 to 16.5 Centimeters Stretch Mesh (CSM)) and cover the range of allowable mesh sizes in NC inshore waters (MFC Rule 15A NCAC 03.J.0103). Limitations on mesh size are established by fisheries rules and proclamations, some of which are borne out of various Fishery Management Plans (FMPs).

### 2.1 Description of Activities

*Set (Anchored) Gill Nets*

The predominant gill-net method used in NC is set (anchored) gill nets. A description of anchored gill nets and description of the fisheries and their associated is included in the application (see Section 5.B.1). They are described briefly here.

Mesh sizes used in gill nets, including set gill nets, are selected according to the target species. Commonly used mesh sizes in NC inshore waters range from 2.5 to 6.5 ISM (6.35 to 16.5 CSM) and cover the range of allowable mesh sizes in NC inshore waters (MFC Rule 15A NCAC 03.J .0103). For the purposes of the ITP, consistent with NC's Trip Ticket Program (TTP), large-mesh gill nets are defined as having ≥5 ISM (≥12.7 CSM), and small-mesh gill nets are defined as having <5 ISM (12.7 CSM).

Anchored large-mesh gill nets are used in NC's inshore waters to target Southern flounder (*Paralichthys lethostigma*), American shad (*Alosa sapidissima*), and catfishes (*Ictalurus spp.*). Striped bass (*Morone saxatilis*) and red drum (*Sciaenops ocellatus*) are also harvested from anchored large-mesh gill nets but are managed as a non-targeted bycatch fishery. From April 15 through December 15, gill nets cannot be used in internal waters if they are between 5.0 ISM (12.7 CSM) to <5.5 ISM (14 CSM) (MFC Rule 15A NCAC 03J .0103 (a) (2)).

The Southern flounder gill-net fishery occurs statewide, but most gill net effort and landings come from Albemarle and Pamlico sounds (NCDMF 2019). The State's regulations require that any landings of flounder coming from gill nets can only be harvested using a mesh size between 6.0-6.5 ISM (15.2-16.5 CSM) to reduce bycatch of undersized flounder (NCDMF Proclamations M-16-2021 and M-17-2021). Gill net fisheries for American shad primarily occur during February and March in MUs A and C. The maximum amount of yardage allowed in the shad fishery is currently 700 yards (yd) (0.64 kilometers (km)) in MU A (NCDMF Proclamation M-5-2022) and 1,500 yd (1.37 km) in MU C (NCDMF Proclamation M-4-2022).

The allowed season for anchored gill nets configured for harvesting American shad in MU A is March 3 through March 24, since 2014 (NCDMF and NCWRC 2017). In MU C, the American shad harvest season is from February 15 through April 14, although Proclamation M-6-2019, effective March 2019, prohibited the use of all gill nets upstream of the Bayview to Aurora ferry line in the Tar-Pamlico River and the Minnesott Beach to Cherry Branch ferry line in the Neuse River. However, this prohibition is currently being debated and is under review by the MFC. The anchored gill-net fishery for American shad in the upper Cape Fear River was closed in April 2016 due to an observed incidental take of a shortnose sturgeon and the documented presence of shortnose sturgeon from NCDMF research surveys (Proclamation M-5-2016).

Starting in 2001, large-mesh gill nets operating in Pamlico Sound during fall were confined to specific subunits (Shallow Water Gill-Net Restricted Areas 1–4, and Mainland Gill-Net

Restricted Area) and in corridors near Ocracoke, Hatteras, and Oregon inlets (Gearhart 2002, 2003). In October 2001, NMFS closed the rest of Pamlico Sound to gill nets with ≥4.25 ISM (≥10.8 CSM) from September 28 through December 15, 2001, in an interim Final Rule (66 FR 50350). In September 2002, NMFS published the Final Rule closing the deep waters of Pamlico Sound (PSGNRA) annually from September 1 through December 15 (67 FR 56931; 50 CFR 223.206 (d)(7)). NCDMF reflected this deep-water closure in their own proclamations for the fall flounder fishery. In May 2010, Proclamation M-8-2010 was issued by NCDMF that included regulations implemented primarily for gill nets targeting Southern flounder with ≥4 ISM (≥10.2 CSM).

Although Southern flounder cannot be harvested from gill nets with a mesh size of <6 ISM[4] (<15.2 CSM) fishing effort targeting other species from gill nets with a mesh size of ≥4 and <6 ISM (≥10.2 and <15.2 CSM) have also been subject to these regulations. These restrictions are implemented through proclamation (*e.g.*, Proclamation M-31-2013). They include mitigation measures such as restricting soak time and days of the week, limiting net lengths, requiring separations between net shots in a single string, requiring low-profile net configurations, and implementing time/area closures (see below).

1. Soak times:
    a. MU A north of the U.S. Highway 64 bypass bridge (beginning at a point 35° 53.1720' N, 75° 45.6160' W, east to a point at 35° 54.3820' N, 75° 35.9240' W): Fishers must be present at the nets at least once during a 24-hour period no later than noon each day
    b. MU A south of the U.S. Highway 64 bypass bridge: Nets may be set no sooner than one hour before sunset and must be retrieved one hour after sunrise
    c. MU B: Nets may be set no sooner than one hour before sunset and must be retrieved one hour after sunrise
    d. MU C: Fishers must be present at the nets at least once during a 24-hour period no later than noon each day
    e. MU D1: Nets may be set no sooner than one hour before sunset and must be retrieved one hour after sunrise
    f. MU D2: Nets may be set no sooner than one hour before sunset and must be retrieved one hour after sunrise
    g. MU E: Nets may be set no sooner than one hour before sunset and must be retrieved one hour after sunrise
2. Fishing days
    a. MU A north of the U.S. Highway 64 bypass bridge: No restriction on fishing days
    b. MU A south of the U.S. Highway 64 bypass bridge: Nets may be set Monday night through Friday morning
    c. MU B: Nets may be set Monday night through Friday morning
    d. MU C: No restriction on fishing days
    e. MU D1: Nets may be set Monday night through Friday morning
    f. MU D2: Nets may be set Sunday night through Friday morning

[4] The 6 ISM (16.5 CSM) minimum mesh size has been in place since January 2016. Prior to that, 5.5 ISM (14 CSM) was the minimum mesh size (NCDMF 2019).

    g. MU E: Nets may be set Sunday night through Friday morning
3. Net length
    a. MUs A, B, C, and D1: Maximum net length per fishing operation is 2,000 yd (1.83 km)
    b. MUs D2 and E: Maximum net length per fishing operation is 1,000 yd (0.91 km)
4. Gear configurations
    a. MU A, north of the U.S. Highway 64 bypass bridge: No requirements per the ITPs
    b. MU A (south of the U.S. Highway 64 bypass bridge), B, D1, D2, and E:
        i. Nets must not exceed 15 meshes in height and must have a lead core or leaded bottom line.
        ii. Nets must not have cork, floats, or other buoys except those required for identification.
        iii. Nets must have a space of at least 25 yd (22.9 meters (m)) between separate lengths of net, where each length of net cannot exceed 100 yd (91.4 m).
    c. MU C: No requirements per the ITPs
5. Time/area closures
    a. MU A: Western Albemarle Sound in the vicinity of the mouth of the Roanoke River (Black Walnut Point 35° 59.33833' N, -76° 41.0060' W; running southeasterly to a point 35° 56.3333' N, -76° 36.0333' W at the mouth of Mackey’s Creek) including the entire Roanoke River up to the dam in Weldon is closed to all gill nets[5].
    b. MU B: Prohibition of large mesh gill nets in the deep-water portions of the Pamlico Sound and in Oregon, Hatteras, and Ocracoke inlets September 1 through December 15.
    c. MU D1: Entire MU closed annually May 8 through October 14.

During the fall of 2019 for the Southern flounder fisheries the MFC approved Amendment 2 of the Southern flounder Fishery Management Plan (FMP) (NCDMF 2019). This action was taken by the MFC because the most recent Southern flounder stock assessment indicated that the stock was overfished and overfishing was occurring as of the terminal year (2017) of the stock assessment. In order for NCDMF to meet their statutory requirements of ending overfishing and rebuilding an overfished stock, NCDMF determined a 62 percent reduction in harvest was necessary for 2019 and a 72 percent reduction was needed in 2020. These regulations included significant reductions in the season length, a 25 percent reduction in allowed yardage of large-mesh anchored gill nets, and establishment of overnight soak requirements (approximately 12 hours) for large-mesh anchored gill nets state-wide where before this was not required in MU A north of the U.S. Highway 64 bypass bridge and MU C. Starting in the fall of 2019, the season was shortened to approximately four to seven weeks (Proclamation FF-34-2019) and 2 to 4 weeks in 2020 (Proclamation FF-25-2020) and 2021 (Proclamation FF-40-2021) the season length varied across the northern, central, and southern areas of the state. The 25 percent

[5] See N.C. Marine Fisheries Commission Rule 15 NCAC 03R.0201(b).

reduction in gear length meant that the maximum yards per fishing operation was 1,500 yd (1.37 km) in MUs A, B, and C and 750 yd (0.69 km) in MUs D1, D2, and E.

The MFC approved Amendment 3 of the Southern Flounder FMP (NCDMF 2022a) in May 2022. The following management strategies for commercial fisheries were included in Amendment 3:

- Annual harvest quotas for the commercial fisheries divided by gear categories and by harvest areas
- Optional commercial trip limits
- Prohibited harvest of flounder with a Recreational Commercial Gear License
- An adaptive management framework with accountability measures to implement paybacks if the total allowable landings is exceeded
- Maintaining the current commercial gear requirements, including limitations on the use of large-mesh gill nets outside of the commercial flounder season

NC fishers also use small-mesh gill nets to target striped mullet (*Mugil cephalus*), bluefish (*Pomatomus saltatrix*), Atlantic menhaden (*Brevoortia tyrannus*), spanish mackerel (*Scomberomorus maculatus*), spotted seatrout (*Cynoscion nebulosus*), spot (*Leiostomus xanthurus*), and white perch (*Morone americana*; NCDMF 2018). While mesh sizes vary, the most common mesh sizes are between 3.0-3.75 ISM (7.6-9.5 CSM).

In NC, relatively few inshore anchored gill nets are used with a mesh size ≥4 and <5 ISM (≥10.2 and <12.7 CSM) (NCDMF 2018; Byrd and Pensinger 2022a). Only 1.3 percent (122 out of the 9,425) observed trips during ITP years 2013 through 2021 used gill nets with this mesh size and almost half of them (52 out of 122) also used large-mesh gill nets on the same trip (NCDMF, unpublished data). There have been only limited allowances for inshore anchored gill nets with a mesh size ≥4 and <5 ISM (≥10.2 and <12.7 CSM). Limiting the use of this mesh-size range in NC is primarily related to reducing the potential for undersized striped bass and Southern flounder bycatch consistent with management strategies of those corresponding FMPs.

NCDMF has implemented yardage and attendance requirements for small-mesh gill nets, including anchored nets, to minimize bycatch of undersized finfish, reduce mortality of discards, or to limit total catch per trip for quota-managed species. The NC Estuarine Striped Bass FMP implemented in January 1994 limited unattended anchored small-mesh gill nets in the Albemarle Sound Management Area (ASMA–Albemarle, Currituck, Croatan, Roanoke sounds and associated tributaries) to 800 yd (0.73 km) per operation to reduce undersized discards of Striped Bass (NCDMF 1993). The NCDMF Director issued a proclamation in spring 2020 reducing the yardage limit of inshore anchored gill nets with a mesh size of <4 ISM (<10.2 CSM) to 800 yd (0.73 km) statewide in MUs south of A (*i.e.*, B, C, D1, D2, and E) and required year-round attendance of anchored gill nets with a mesh size of <5 ISM (<12.7 CSM) in portions of Pamlico River, Bay River, Neuse River, and western Pamlico Sound (Proclamations M-4-2020 and M-9-2020).

MFC Rule 15A NCAC 03J .0103(g) and (h) state:

(g) It is unlawful to use unattended gill nets with a mesh length <5 inches (in) (<12.7 centimeters (cm)) in a commercial fishing operation in the gill net attended areas designated in 15A NCAC 03R.0112(a).
(h) It is unlawful to use unattended gill nets with a mesh length <5 in (<12.7 cm) in a commercial fishing operation from May 1 through November 30 in the Internal Coastal Waters and Joint Fishing Waters of the state designated in 15A NCAC 03R.0112(b).

To minimize bycatch of undersized striped bass and red drum, net attendance is required from May 1 through November 30 in the ASMA. Year-round anchored small mesh gill net attendance is required within 200 yd (183 m) of shore below the ferry lines in the Pamlico and Neuse rivers. From May 1 through November 30, small-mesh gill nets must be attended in all primary and permanent secondary nursery areas, modified no-trawl areas, within 200 yd (183 m) of shore in Bay River and western Pamlico Sound, within 50 yd (45.8 m) of shore in Pamlico and Core sounds, and all inshore waters south to the NC/South Carolina state line. An exemption to this rule lifts the attendance requirement for the region from Core Sound to the South Carolina border in October for the spot fishery.

## 2.2 Alternatives

### 2.2.1 Alternative 1 - No Action

Under the No Action Alternative, no ITP would be issued for the take of sturgeon and sea turtles incidental to the otherwise lawful NC commercial inshore large- and small-mesh anchored gill net fisheries.

Under this alternative, the NMFS seasonal closure would remain in effect in Pamlico Sound, prohibiting the use of gill nets >4.25 ISM (10.8 CSM) from September 1 through December 15 each year (67 FR 56931, September 6, 2002).

While NMFS cannot know for certain what measures the state would implement absent the ITP, it will assume for purposes of analysis in the EA that NCDMF would not likely implement the full suite of specific monitoring, minimization, and mitigation measures included in the proposed conservation plan and ITP. It is possible that NCDMF would amend their commercial inshore anchored gill net fishing regulations to be less restrictive than they are under the existing regulatory structure.

### 2.2.2 Alternative 2 - Issue Incidental Take Permit as Requested in Application (Preferred Alternative)

Under Alternative 2, an ITP would be issued to exempt NCDMF from the ESA prohibition on taking sturgeon and sea turtles during operation of the otherwise lawful NC commercial inshore anchored gill net fisheries. The ITP would be valid for 10 years and would require NCDMF to operate these fisheries as described in the ITP application and conservation plan, which are incorporated here by reference. This alternative would include authorizing the take levels proposed in the December 2, 2022 application and conservation plan.

*Summary of Conservation Plan*

The conservation plan prepared by NCDMF describes measures designed to monitor, avoid, minimize, and mitigate, to the maximum extent practicable, the incidental take of ESA-listed sea turtles and sturgeon associated with the otherwise lawful commercial inshore large and small-mesh anchored gill net fisheries.

*Monitoring (Observer Program)*
The NCDMF would monitor incidental takes of protected species in the inshore anchored gill net fisheries through its Observer Program. The NC General Assembly established the NC Commercial Fishing Resource Fund (CFRF; North Carolina General Statute (NCGS) 113-173.1) for the purpose of providing funding for the development of sustainable commercial fishing in the state. The CFRF was and is funded through NCDMF's fishing license fees (G.S. 113-173.1). By law, the CFRF must first fully fund the state's ITP for the state's commercial fishing industry. Currently the fund provides for five permanent observer positions and four biologist positions, including the biologist supervisor. There are sufficient funds to hire temporary observers to increase capacity, especially during peak fishing seasons. Should decreased license sales limit funds available for the state's Observer Program to maintain required observer coverage levels statewide, NCDMF would assess the expected spatiotemporal distribution of remaining fishing effort and the number of observed trips that are possible with reduced funding. Based on that assessment, NCDMF would consult with NMFS on an adaptive management approach to use time-area closures that would allow for required observer coverage levels to be met in all areas open to anchored gill nets.

Monitoring of the inshore anchored gill net fisheries will be done through onboard and alternative platform observers as well as NCDMF Marine Patrol. Observer coverage will be distributed state-wide across the six MUs (A, B, C, D1, D2, and E) and across four seasons of each ITP year: fall (September–November), winter (December–February), spring (March–May), and summer (June–August).

A sea-day schedule of observer trips will be developed by NCDMF to obtain 7–10 percent observer coverage of the estimated inshore anchored large-mesh gill-net fishing trips, and 1–2 percent observer coverage of the estimated inshore anchored small-mesh gill-net fishing trips per season proportional to fishing effort in each MU within each season. Projecting observer trips for the sea-day schedule will be similar to NCDMF's current practices, in which they typically calculate the number of needed observer trips based on the average of reported anchored small-mesh and large-mesh gill-net trips by month and MU from the previous 5 years.

NCDMF developing a monthly sea-day schedule contributes to having representative coverage across months for required observer coverage within each season. Developing a monthly sea-day schedule contributes to having representative coverage across months for required observer coverage within each season. However, the approach for developing this schedule used by NCDMF has had to evolve in recent years in response to changes in fishing regulations. As an example, due to Amendment 2 of the Southern Flounder FMP during fall 2019 (ITP year 2020), the Southern flounder commercial fisheries (*e.g.*, anchored large-mesh gill nets and pound nets) were constrained by setting specific dates when fishing was allowed across three flounder management areas, Northern, Central, and Southern. To estimate the number of fishing trips for the fishery, the number of reported fishing trips per month and MU is divided by the number of days the fishery was open during each of the previous 5 years. Then, the average number of fishing trips per day is calculated across the 5 years and expanded to the number of days the fishery would be open for a given year. The projected number of observer trips for each month and MU was based on that expanded number.

The Observer Program would strive to reach the upper range of the observer coverage for each season and MU within each mesh-size category: 10 percent of large-mesh gill-net trips and 2 percent of small-mesh gill-net trips. This approach helps account for differences between estimated fishing trips and reported fishing trips. Observer coverage goals will be based on estimated fishing effort. NCDMF will meet with NMFS-OPR prior to the start of each new ITP year, but after finalized TTP data are provided in the annual reports to assess whether adjustments to estimating observer coverage need to be made (*e.g.*, calculate the 5-year average number of reported trips and add 5 percent). Increases in fishing effort are anticipated between Time Period (TP) 2 and TP 3 of the ITP (outlined below in *Requested number of incidental takes*). NCDMF will meet with NMFS at least 1 year prior to the start of TP 3 of the ITP (ITP year 2029) to determine the best approach for predicting fishing effort in the large-mesh gill-net fishery for Southern flounder. Anticipated increases in fishing effort during TP 3 will be dependent on the results of the updated Southern flounder stock assessment and approval of an FMP amendment based on that assessment. The NCDMF will update NMFS throughout this process to determine if there is a suspected change in the timing or scale of "rebounding" fishing effort for Southern flounder defined as TP 3 that would result in a concomitant continuation of anticipated takes that are reflected in TP 2.

Observers are trained to identify, measure, tag, evaluate condition of, and resuscitate sturgeon and sea turtles by experienced NCDMF, North Carolina Wildlife Resources Commission (NCWRC), and NMFS Southeast Fisheries Science Center (SEFSC, Beaufort, NC) staff. Sturgeon handling instructions are based on best practices identified in NOAA Technical Memorandum documents (Moser et al. 2000, Damon-Randall et al 2010). Sea turtle handling instructions are based on best practices identified by NCWRC sea turtle biologists and NMFS (SEFSC sea turtle research permit 21233-03, Application Appendix 2). Data collected on observed interactions include: date, time, location (latitude and longitude, when possible), condition (*e.g.*, no apparent harm, injury including a description of the nature of the injury, or mortality), species, sex (if determinable), tag numbers, and morphometrics (sea turtles: curved carapace length [CCL, millimeters (mm)], and curved carapace width [CCW, mm]; sturgeon: total length [TL, mm], and fork length [FL, mm]). Trained observers will apply Passive Integrated Transponders (PIT) and t-bar tags to live sturgeon and animal-safe paint pens would be used for short-term marking and identification of live hard-shell sea turtles. Photographs of the protected species and environmental parameters (*e.g.*, salinity, water temperature) would be collected when feasible. Photographs would be used by the NCDMF in training and education materials, including on the Observer Program website. Starting in the fall of 2023, observers would take video of sea turtles while on board and during release and record additional information on behavior to inform post-interaction mortality assessments (NMFS 2022a). Dead and live, debilitated sea turtles would be retained by the observer when possible and delivered to the NCWRC sea turtle biologist for necropsy or examination and treatment. Observers would be instructed to retain any dead sturgeon when possible. Dead sturgeon would be sampled and retained by NCDMF to be used in training sessions for identification and tagging techniques.

Currently, obtaining observer trips is facilitated by the requirement that fishers participating in inshore anchored gill-net fisheries must obtain an Estuarine Gill-Net Permit (EGNP; Proclamation M-24-2014). To obtain an EGNP, fishers must fill out an application, sign that they agree to the conditions of the permit, and provide their contact information so that observers can call to schedule an observed trip. There is no cost associated with the permit. The permit condition form is reviewed annually and updated as needed by NCDMF. Comparisons of EGNP holders and TTP data indicate that many permit holders do not report fishing effort with inshore anchored gill nets (Byrd et al. 2022a). NCDMF staff have been told by some fishers that they get the permit just in case they decide they want to use it. Additionally, some fishers believe that EGNPs may eventually be restricted to a limited-entry and so they get the permit to show a history of possession should that be a criterion for limited-entry. To streamline the contact attempts by observers until the Observer Trip Scheduling System (OTSS) described below is in place, a call list is generated for EGNP holders that have at least one reported inshore anchored gill-net fishing trip during the last 3 years. The dataset includes numbers of reported trips by mesh-size category and MU along with the name and contact information for each permit holder. The final call list of permit holders is divided among observers. Some observer trips scheduled will use the alternative platform approach. One advantage of alternative platform observations is that they provide NCDMF observers the opportunity to observe fishers that cannot be reached by phone or when a fishing vessel is too small to carry an observer. This contributes to having observer coverage across a more representative sampling of the fishing population. However, when an alternative platform is attempted without a scheduled observation, teams are not always successful at finding fishing effort to observe.

NCDMF has had difficulty scheduling observer trips in advance. NCDMF has developed a five-point plan to address these challenges (outlined in Section 7.C.1 Observer Program of the ITP application). Some fishers do not answer calls, and for some fishers, voicemail for the provided phone number is not even set up to leave a message requiring a return phone call. NCDMF has developed standard procedures for issuing Notice of Violations (NOVs) to fishers that have disconnected phone numbers. The NCDMF Observer Program has started to send certified letters to fishers that observers have been unable to contact by phone (*e.g.*, voicemail not set up, voicemail box is full, fisher has not returned phone calls). The certified letters require fishers to contact the Observer Program within 2 business days to schedule an observed trip or notify the program if they are not actively participating in the anchored gill-net fishery to avoid suspension or revocation of their EGNP.

Additionally, the NCDMF Observer Program is currently in the process of developing an OTSS whereby fishers will be required to contact the Observer Program the week before they plan to fish. A percentage of fishers who call would be selected to carry an observer based on random drawing of their names stratified according to mesh-size category and MU. Staff from the Observer Program have met with staff from the NMFS, Northeast Fisheries Science Center Industry-funded Scallop Program to discuss their Integrated Voice Response (IVR) call-in system and post-processing routines to select fishers that must carry an observer. The North Carolina Department of Environmental Quality (NCDEQ) Information Technology has contracted a state vendor to develop an IVR and an automated outbound communication system (*e.g.*, phone call, text, and/or email) to be used as part of the OTSS. The Observer Program is consulting with division management and Marine Patrol to develop business rules for the OTSS and to establish procedures for enforcing the requirement when fishers do not comply. NCDMF will have a pilot beta version of the OTSS in place for testing by the fall of 2023 flounder season with the expectation of full implementation of the OTSS by the fall of 2024 flounder season.

*Measures to Avoid and Minimize*
The avoidance and minimization of incidental takes by NCDMF would be accomplished primarily through fisher compliance with NCDMFs existing statutes, regulations, proclamations, and permit conditions. The NCDMF proposes additional measures outlined below. The restrictions on inshore anchored gill nets ≥4 ISM (≥10.2 CSM) in the current sea turtle and sturgeon ITPs have been successful at reducing incidental takes. Restrictions include measures to avoid and minimize incidental takes of sturgeon and/or sea turtles in inshore anchored gill nets by establishing certain gear construction (*e.g.*, low-profile, breaks between nets in a string), reducing overall fishing effort (*e.g.*, net length, soak-time restrictions), and establishing time/area closures coincident with hotspots of sea turtle and Atlantic sturgeon distribution (*e.g.*, inlet corridors, MU D1 during periods of increased sea turtle abundance, closing Western Albemarle Sound in the vicinity of the mouth of the Roanoke River to all gill nets), and closing areas where incidental takes of sea turtles would likely result in mortalities (*e.g.*, deep waters of Pamlico Sound).

Additionally, NCDMF's application and conservation plan proposes to extend regulations that were included in the current sea turtle and sturgeon ITPs to minimize interactions with inshore anchored gill nets with a mesh size of ≥4 ISM (≥10.2 CSM) (*i.e.*, including all inshore anchored large-mesh and some small-mesh gill nets) with additional measures for MUs A and C during the Southern flounder gill-net fishery and minor changes described below (see below and **Appendices B and C**).

1. **Soak times**: The NCDMF proposes to maintain current regulations on soak times as outlined in the current sea turtle and Atlantic Sturgeon ITPs and add regulations for MUs A and C.
    a. Soak times shall be limited to approximately 12 hours in MU A south of the U.S. Highway 64 bypass bridge and all of MUs B, D1, D2, and E where nets set may be set no sooner than one hour before sunset and must be retrieved no later than one hour after sunrise. (*current regulations*)
    b. Soak times shall be limited to approximately 12 hours (*i.e.*, where nets set may be set no sooner than one hour before sunset and must be retrieved no later than one hour after sunrise) in MU A north of the U.S. Highway 64 bypass bridge and in MU C except for nets configured for American Shad during winter/spring. (*additional regulation in the ITP application and conservation plan*)
2. **Fishing days**: The NCDMF proposes to maintain the fishable days as outlined in the current sea turtle and Atlantic Sturgeon ITPs.
    a. MU A north of the U.S. Highway 64 bypass bridge: No restriction on fishing days
    b. MU A south of the U.S. Highway 64 bypass bridge: Nets may be set Monday night through Friday morning
    c. MU B: Nets may be set Monday night through Friday morning
    d. MU C: No restriction on fishing days

    e. MU D1: Nets may be set Monday night through Friday morning
    f. MU D2: Nets may be set Sunday night through Friday morning
    g. MU E: Nets may be set Sunday night through Friday morning
3. **Net length**: The NCDMF proposes to, at a minimum, maintain the gill-net yardage restrictions as outlined in the current sea turtle and sturgeon ITPs for a fishing operation, regardless of the number of vessels or persons involved and include yardage restrictions in MUs A north of the U.S. Highway 64 bypass bridge and C.
    a. MUs A, B, C, and D1: Maximum net length per fishing operation is 2,000 yd (1.83 km).
    b. MUs D2 and E: Maximum net length per fishing operation is 1,000 yd (0.91 km)
4. **Gear configurations**: The NCDMF proposes to maintain gear configuration restrictions to maintain low profile nets and include separation between shots of net as outlined in the current sea turtle and Atlantic Sturgeon ITPs.
    a. MUs A (south of the U.S. Highway 64 bypass bridge), B, D1, D2, and E:
        i. Nets must not exceed 15 meshes in height and must have a lead core or leaded bottom line.
        ii. Nets must not have cork, floats, or other buoys except those required for identification.
        iii. Nets must have a space of at least 25 yd (22.9 m) between separate lengths of net, where each length of net cannot exceed 100 yd (91.4 m).
    b. MUs A north of the U.S. Highway 64 bypass bridge and C will be exempt from these restrictions on gear configurations.
5. **Area closure**: The NCDMF proposes to maintain time/area closures outlined in the current sea turtle and Atlantic Sturgeon ITPs and add regulations for the upper Cape Fear River.
    a. The NCDMF proposes to maintain the state closure of the deep waters of MU B from September 1 through December 15 to be consistent with the federal rule (67 FR 56931, September 3, 2002). (*current regulations*)
    b. The NCDMF proposes to maintain the closure of MU D1 during the period when the local abundance of sea turtles is expected to be high: May 8 through October 14 as outlined by the current sea turtle ITP. (*current regulations*)
    MU D1 was closed on November 9, 2017, (ITP year 2018) due to estimated takes of green sea turtles (13.4 live, 6.7 dead) exceeding authorized takes (9 live, 5 dead) (Proclamation M-19-2017; Table 4.1; McConnaughey et al. 2019). However, estimated takes decreased after finalized TTP data were used where estimated live turtles still exceeded authorized sea turtle takes by one (estimated ten, authorized nine) for D1 but estimated dead turtles did not exceed authorized takes (estimated three, authorized five; McConnaughey 2019). After conversations between NCDMF and NMFS staff, MU D1 was not reopened for ITP year 2019 and NCDMF has kept this area closed to anchored gill nets with a mesh size of ≥4 ISM (10.2 CSM) (Byrd et al. 2020, 2021; Byrd and Pensinger 2022b). The requested number of incidental takes in this application is state-wide, not by MU. Thus, the NCDMF is requesting to maintain the original closure dates for MU D1, extend the dates through adaptive management should water temperatures or sea turtle densities indicate that is needed, and close the area when appropriate based on the internal guideposts for takes mentioned above.

c. The NCDMF proposes to maintain the closure in Western Albemarle Sound (MU A) in the vicinity of the mouth of the Roanoke River (Black Walnut Point 35° 59.'833– N - 76° 41.'060' W; running southeasterly to a point 35° 56.'333– N - 76° 36.'333' W at the mouth of Mackey's Creek) including the entire Roanoke River up to the dam in Weldon is closed to all gill nets. This closure is in proclamation and not rule, so the language is included each time a gill net proclamation is issued for the Albemarle Sound MU (ASMA–Albemarle, Currituck, Croatan, Roanoke sounds and associated tributaries; NCDMF 1993). (*current regulations*)
d. The NCDMF proposes to maintain the closure of upper Cape Fear River to anchored gill nets with a mesh size of 4-6.5 ISM (10.2-16.5 CSM) (Proclamation M-5-2016) to avoid interactions with Atlantic and shortnose sturgeon. This is an additional restriction from what is currently required in NCDMF's sea turtle and Atlantic sturgeon ITPs. (*additional regulation in the ITP application and conservation plan*)

In addition to regulations, fishing activities are also subject to adaptive management measures, which are implemented in real time through proclamations by the NCDMF Director when incidental takes approach thresholds of authorized takes. The Director has statutory authority to issue proclamations that carry the force and effect of law that can become effective in as little as 48 hours from issuance. Adaptive management measures primarily consist of gear restrictions, season closures, and/or area closures. Implementing management measures through proclamation allows for rapid response when take levels are approaching thresholds of authorized takes. The NCDMF has a history of responding to these occurrences in prior ITP years. Historical observer data have been used in a study to detect hotspots of Atlantic sturgeon interactions in Albemarle Sound and sea turtle interactions in Pamlico Sound (Hoos et al. 2019). Depending on how immediate large-scale area closures are needed to maintain estimated takes below authorized levels, smaller area closures can be implemented using information on known hotspots. Alternatively, one observed take can extrapolate to a number so close to authorized levels, a more drastic time/area closure is required. A recent example occurred in April 2022 when a single observed take of a dead Atlantic sturgeon in a small-mesh anchored gill net in MU A extrapolated to 52 animals compared to the authorized number of 55. The NCDMF discussed the best response, contacted NMFS to discuss that response, and then closed MU A to all anchored gill nets for the rest of the ITP year (Proclamation M-10-2022). The NCDMF would continue to consult with NMFS when considering management measures needed to maintain take levels below those authorized. In the unlikely event that authorized take levels are exceeded for a given species, the NCDMF also would consult with NMFS to determine the appropriate scope and duration of a fishery given the spatiotemporal differences between sturgeon and sea turtles. These adaptive management tools will also be used by NCDMF to ensure observer coverage requirements are met when effort cannot be found and calls into the OTSS are less than expected based on historical effort data.

EGNP conditions are an additional method by which NCDMF regulates fishing activities. The EGNP includes a suite of requirements such as the requirement to take an observer and the requirement to report sea turtles or sturgeon that are incidentally captured. Prior to mailing license renewals each spring, the NCDMF reviews and updates the permit conditions and the

Frequently Asked Questions document that is included in the EGNP. This annual review and update allows NCDMF to adapt requirements to address emerging management needs. For example, in ITP year 2022 there were several instances in which sturgeon or sea turtles caught in fishing gear were released rather than provided to the observers on alternative platform vessels as required. While sturgeon and sea turtles may fall out of the gear as it is being hauled in, fishers may forget the requirement, are unaware of it, or intentionally fail to comply. In response to these occurrences and to enhance both awareness of the requirement and NCMDF's ability to enforce it, the NCDMF revised the language on the EGNP special conditions form in March 2022 to be more explicit about this requirement. As revised, NC's Marine Patrol can take enforcement action for failure to provide captured sturgeon or sea turtles to the observers. The Observer Program has begun tracking these instances including comments about the observer response afterward to identify anyone out of compliance with this permit special condition.

Compliance with general statutes, rules, proclamations, and permit conditions is maintained through enforcement by the NC Marine Patrol. The NCDMF uses two primary enforcement tools when a Marine Patrol officer finds that a fisher's gear or fishing practices are out of compliance with a State statute, regulation, or proclamation under the authority of the MFC. The officer can issue a citation and/or NOV. A citation is a criminal enforcement action to be resolved in criminal district court. Either as an alternative or in addition to a citation, a Marine Patrol officer can also issue an NOV. An NOV is the NCDMF administrative enforcement action that results in suspension of the fisher's EGNP when the permit holder is found to be in violation of general or specific permit conditions. While a citation and NOV may both be predicated upon the same violation, they are two separate actions.

*Measures to Mitigate*
To mitigate impacts of incidental takes of sturgeon and sea turtles in the NC inshore anchored gill net fisheries, the NCDMF would continue to collect and share data, facilitate working relationships between industry stakeholders and researchers, support NCDEQ's coastal habitat and climate change and resiliency efforts, and continue outreach. The Observer Program collects data from observed trips including metrics, such as lengths and weights, on catch, bycatch, and protected species encountered. These data are entered into the NCDMF Biological Database and go through a four-stage verification process ensuring the data is accurate and preserved in perpetuity. This allows NCDMF biologists to access the data for analysis and to fulfill data requests from researchers and other agencies. The NCDMF is currently in discussions with NMFS staff in Beaufort, NC about the use of observer data for a project investigating the spatio-temporal distribution of sea turtles in NC inshore waters.

As part of the Observer Program, experienced NCDMF staff would train observers to apply PIT and t-bar tags to live sturgeon. NCDMF currently orders PIT tags from Biomark and t-bar tags are provided by USFWS (Mike Mangold). Fin clips are collected from live and dead sturgeon when feasible and provided to the Atlantic Coast Sturgeon Tissue Research Repository (ACSTRR) at the Leetown Science Center for genetic analyses. As long as marine conditions allow, all sturgeon in fit condition would be tagged with both PIT, as long as the individual is ≥330mm TL, and t-bar tags, for individuals that are ≥250 mm TL.

Sea turtles would be marked with animal-safe paint pens for short-term identification. NMFS will work with the division to provide guidance on use of animal-safe paint pens consistent with NMFS protocols, which include different guidelines on where to apply the paint based on approximate age of the turtles and to establish a marking scheme that ensures that the scheme is distinguishable from NMFS sea turtle research projects in NC. The marking scheme, including any changes to the marking scheme over time, would be communicated to the NCWRC sea turtle biologists. Observers are also trained to take photographs of identifying characteristics that may be used in photo-identification studies (*e.g.*, Dunbar et al. 2021). Under certain circumstances, such as inclement weather or poor condition, some sea turtles may not receive the full work up.

Data collected from incidental takes provide information that is not available elsewhere. For sea turtles, in particular, information on species, size, and location add to current population data in NC. Temporary marking of sea turtles may also provide information on movement patterns and post-interaction mortality of sea turtles that are resighted or recaptured. Additional video and behavior data collection would also provide information on post-interaction mortality in gill nets. The data collected from tagged and recaptured sturgeon (*e.g.*, by observers, academic researchers) provide important information that can be used to understand the movements of sturgeon using NC inshore waters. The USFWS supplies conventional t-bar tags for the tagging of sturgeon. The NCDMF will commit funds of up to $2,000 per year to purchase PIT tags, which equates to approximately 100 tags per year at the current price of $20 per tag. This number exceeds the average number of live Atlantic sturgeon observed during ITP years 2013 through 2021 and should ensure that sturgeon in condition fit for tagging are PIT tagged unless poor maritime conditions make tagging infeasible even with some increases in cost among years for the requested ITP. This information is also stored in the NCDMF Biological Database and would be shared upon request.

In addition to conventional t-bar and PIT tags, NCDMF also actively maintains a telemetry array throughout the inshore waters of NC for the detection of animals that have had acoustic tags applied by NCDMF staff or other researchers. The Manteo office maintains an array of four receivers in Roanoke Sound, Oregon Inlet, and Hatteras Inlet. The Elizabeth City office maintains an array of approximately 41 receivers in Albemarle Sound and Roanoke River. The Washington Regional office maintains an array of approximately 64 receivers located throughout the Tar-Pamlico, Pungo, Bay and Neuse river systems. The Wilmington office partners with researchers at the University of NC at Wilmington to maintain an array of approximately 35 receivers in the Cape Fear River basin. The array extends from the mouth of the Cape Fear River at Bald Head Island to Elwell Ferry on the main stem, from the confluence in Wilmington to Kenansville on the Northeast Cape Fear, and to Ivanhoe on the Black River. These arrays are serviced and downloaded by the respective offices on a quarterly basis or as needed. Once the detections have been downloaded, the data are entered into the NCDMF Biological Database, in addition to being submitted to the Mid-Atlantic Acoustics Telemetry Observation System, ensuring sturgeon researchers and other agencies have access to the data and the ability to track detections of acoustically tagged sturgeon through NC inshore waters.

While tagging provides important information that can be used to understand sturgeon movements, genetic analysis provides valuable information about the mixing of Atlantic sturgeon DPSs using NC inshore waters. As part of the Observer Program sampling protocol, fin clips are taken from live and dead sturgeon. These samples are stored until they can be submitted for genetic analysis and included in the sturgeon genetics repository currently housed at the ACSTRR at the Leetown Science Center. The NCDMF would commit up to $3,000 per year to fund genetic analysis; at approximately $100 per sample, this funding provides for the analysis of approximately 30 fin clips per year. The NCDMF would consult with NMFS to ensure samples collected during the current ITP and future samples collected under the requested ITP are appropriately selected based on criteria such as sturgeon length, location, and season. Should fewer than 30 fin clips be collected for a given year, any funds not expended from this allocation could be used for analysis of historical samples provided by NCDMF.

Along with the data collected through the Observer Program, there are other ways NCDMF plans to support mitigation efforts. Research is also a valuable tool to address data gaps and inform research needs. The assistance and cooperation of commercial fishery stakeholders in the research can greatly benefit these projects. The NCDMF would continue to support and assist research efforts and facilitate the establishment of relationships with the commercial fishing industry. Also, the NCDMF also would help, to the extent possible, respond to sea turtle cold-stun events that occur in NC with some regularity (Niemuth et al. 2020). During future events, NCDMF would help provide transportation of staff, supplies, and turtles using Observer Program staff, vehicles, and vessels. The NCDMF would communicate with the NCWRC about this commitment to ensure they reach out for assistance when needed.

In addition, NCDMF is committed to mitigating impacts from fishing activities by increasing awareness through education and outreach. Communicating management concerns and actions, including issues related to incidental takes of protected species, has always been an integral part of effective and adaptive fisheries management in NC. Outreach efforts for the Observer Program have included development of a website, distribution of informational pamphlets and business cards, direct engagement during fish house visits and public meetings, and open, ongoing communication between observers and fishers. In addition to these regular and ongoing engagement activities, the division, in partnership with NC Sea Grant, developed two educational videos and an informational report to broadcast information about the Observer Program and the ITPs to a wider audience[6]. COVID-19 limited some of NCDMF's engagement efforts in years past. However NCDMF is working on a revised outreach strategy. The NCDMF plans to highlight the OTSS as it becomes more fully developed by holding regional meetings, which will train fishers on the use of the IVR, emphasize the requirement that use of the system is mandatory, and highlight the potential for enforcement actions for non-compliance.

NCDMF staff have provided two presentations at NCMFC meetings reviewing NCDMF's section 10 ITPs in comparison to section 7 Biological Opinions (August 2022) and providing updates on NCDMF's application for a new Section 10 ITP and development of a call-in system (February 2023). Five regional public meetings were held in May 2023 to review the development status of the OTSS and request public input on some of the details on how they will use the system. Informational materials about the Observer Program and proper reporting of endangered species interactions will be available at future meetings of the MFC. These materials

[6] https://ncseagrant.ncsu.edu/observer_program/

would also be available and incorporated into other division meetings and outreach events like the NCDMF 200- year Jamboree and the NC State Fair.

In addition to the outreach efforts outlined above, the NCDMF will continue to inform fishers on their obligations under the ITP(s), the guidelines for possible boat encounters with manatees, and proper resuscitation actions for incidental takes of sturgeon and sea turtles. This outreach communication will be included with the documents that fishers receive annually when they renew their EGNP. The NCDMF will work with NMFS to ensure that the outreach documents are consistent with federal guidelines.

Finally, coastal habitat protection and restoration are also an important mitigating factor that NCDMF support. The NC Coastal Habitat Protection Plan (CHPP) has an overarching goal of long-term enhancement of coastal fisheries through habitat protection and enhancement efforts. The priority issues in the 2021 CHPP Amendment include elements of improving water quality. The recommended actions from these issues would benefit all the habitats of NC’s coastal ecosystem making it more resilient to potential anthropomorphic impacts (NCDEQ 2021). The NCDMF would continue to play a large role in the implementation of the 2021 CHPP Amendment and be an integral part of the 2026 and 2031 reviews to further support coastal habitat protection and restoration.

*Requested number of incidental takes*
NCDMF used data collected from the Observer Program during ITP years 2013 through 2021 and data collected on fishing effort to estimate incidental takes of protected species in inshore anchored gill nets (see Section 7.A.2 Estimation of Incidental Takes) of the ITP application and conservation plan). NCDMF requested statewide thresholds of authorized takes in two year rolling intervals **(Table 2)** (e.g., any two consecutive years during Time Period 2 (TP2) and Time Period 3 (TP3)) to help account for the interannual variability in takes. This will allow NCDMF the flexibility to respond to changes in the distribution of fishing effort or interannual variability in the distribution of sea turtles and sturgeon. TP 2 includes ITP years September 2023–August 2029 when Amendments 2 and 3 regulations for the Southern flounder FMP will be in place; TP 3 includes ITP years September 2029–August 2033 after the Southern flounder stock is predicted to be rebuilt corresponding with increased fishing effort. Whenever the data allow, estimates of takes across the fishery rather than counts of observed takes have been requested. In either case, annual estimates of overall takes or annual counts of observed takes were used to calculate the requested takes for the 2-year rolling intervals. Annual predicted takes by MU and mesh-size category would be used by NCDMF as guideposts to maintain take levels below numbers of authorized takes by the use of adaptive management.

**Table 2:** Requested incidental takes by species in rolling 2-year (Incidental Take Permit (ITP) year) intervals per Time Period (TP 2 and TP 3) were based on annual take values from model predictions or observed count data for the duration of the requested ITP (September 2023–August 2033). Requested takes include predicted overall takes across the fishery whenever possible; otherwise requested takes are based counts of observed takes. Requested takes are either combined or separate for mesh-size category and disposition. Mesh-size categories are large (≥5 ISM, ≥12.7 CSMD) and small (<5 ISM, <12.7 CSM).

| Species | Mesh-size Category | Disposition | Predicted or Observed Takes | Requested 2-year rolling take TP 2 | Requested 2-year rolling take TP 3 |
|---|---|---|---|---|---|
| **Atlantic Sturgeon** | Large & Small | Live | Predicted | 436 | 1,740 |
| | Large & Small | Dead | Predicted | - | 112 |
| | Large & Small | Dead | Observed | 6 | - |
| **Green sea turtle (North and South Atlantic DPSs)** | Large & Small | Live | Predicted | 542 | 588 |
| | Large & Small | Dead | Predicted | 170 | 182 |
| **Kemp's ridley sea turtle** | Large | Live | Predicted | - | 114 |
| | Large | Live | Observed | 10 | - |
| | Large | Dead | Observed | 4 | 4 |
| | Small | Live or Dead | Observed | 4 | 4 |
| **Shortnose sturgeon** | Large & Small | Live or Dead | Observed | 4 | 4 |
| **Hawksbill sea turtle** | Large & Small | Live or Dead | Observed | 4 | 4 |
| **Leatherback sea turtle** | Large & Small | Live or Dead | Observed | 4 | 4 |
| **Loggerhead sea turtle (Northwest Atlantic Ocean DPS)** | Large & Small | Live or Dead | Observed | 24 | 24 |

Table 3 describes the anticipated assignment of DPS from the predicted number (live in TP 2 and TP 3, dead in TP 3) and observed count (dead in TP 2) of Atlantic sturgeon take by live or dead status across the 10 years of the requested ITP. The Carolina DPS was assigned for 12 percent of the predicted numbers based on the proportion of observed Atlantic sturgeon <500 mm TL used in the analysis. For the remaining 88 percent of the predicted numbers, DPS assignment was based on proportions provided in Kazyk et al. (2021) for the geographic area "Mid Riverine/Estuarine".

**Table 3.** Anticipated assignment of DPS from the predicted number (live in TP 2 and TP 3, dead in TP 3) and observed count (dead in TP 2) of Atlantic sturgeon takes by live or dead status across the 10 years of the requested ITP.

| Atlantic Sturgeon Disposition | Predicted or Observed Counts | Takes Across 10 years | New York Bight DPS | Chesapeake DPS | Carolina DPS | South Atlantic DPS |
|---|---|---|---|---|---|---|
| Live | Predicted | 4,788 | 739 | 106 | 3,464 | 479 |
| Dead | Predicted | 224 | 35 | 5 | 162 | 22 |
| Dead | Observed Counts | 16 | 3 | 0 | 13 | 2 |

Occasionally, takes cannot be identified to species by the observers (*e.g.*, animal falls out of net, animal is released by the fisher and not provided to the observer). Because shortnose sturgeon are so rare in NC, any unidentified sturgeon will be treated as an Atlantic sturgeon for take estimation but reported separately. Unidentified sea turtles would be apportioned based on historical interaction rate. Of the identified sea turtle takes from observer data during ITP years 2013–2021 (n = 297), 83 percent were green sea turtles, 14 percent were Kemp's ridley sea turtles, 3 percent were loggerhead sea turtles. Based on those proportions, each unidentified sea turtle will be apportioned accordingly for real-time estimate of takes where, for example, a single take will be assigned as 0.83 green sea turtle, 0.14 Kemp's ridley sea turtle, and 0.03 loggerhead sea turtle. The NCDMF would consult with NMFS and NCWRC to help with identification if a sea turtle was suspected of being a hybrid. Based on the identification, NMFS would provide guidance on how to count the incidental take against authorized takes.

*Tracking and Reporting of Incidental Take*

For each observed take, the cumulative estimate or observed count would be compared to authorized numbers of takes in real time to prevent authorized takes from being exceeded. For authorized takes based on model output predictors, the more conservative proportion-based method described in the NCDMF ITP application would be used to estimate takes across the gill net fisheries to compare to authorized takes based on estimates of commercial fishing effort. The comparison of cumulative estimated or total count of observed takes will occur within 24 hours of each observed take. Estimated takes also would be compared to the internal guideposts across MU and mesh-size category. Within 24 to 48 hours, a summary will be provided to the NCDMF management team (*i.e.*, Fisheries Management Section Chief, Division Deputy Director, and Division Director). Adaptive management options such as area and/or gear closure, would be considered based on a series of factors such as how close the estimate/observed count is approaching internal guideposts and/or total authorized number, season, proximity of takes to each other, water temperature, and fishing activity occurring at the time. At the end of each ITP year, the model-based method would be updated with observer data and TTP data on reported fishing effort to finalize estimated takes for the annual report.

The NCDMF would provide reports on incidental takes and observer coverage according to several time frames as follows:

- For each observed take, an incidental take form and available photographs and video will be provided in email to the NMFS within 24 hours of the interaction. The email notification would also be provided to the NCWRC.
- Additionally, the NCDMF would provide a brief monthly report that will be compiled for each month in a given season such that the last month of that season would serve as a seasonal report. These reports would be provided by the end of the first month following a given month. They would include details of any takes that occurred during the month and across months in a season, an estimate of observer coverage (by MU and mesh-size category), and a comparison of estimates and/or counts of incidental takes to authorized takes in the ITP.
- Finally, an annual report would be provided by March 15th of the year following an ITP year. Observer data go through a four-stage data verification process that is time consuming and data may not be fully verified before this due date. Nevertheless, observer coverage and takes estimates in the annual reports may need to be updated because TTP data for a given calendar year are not finalized until June of the following calendar year. NCDMF would submit an addendum to the annual report by June 30th using the finalized TTP data.

# CHAPTER 3 AFFECTED ENVIRONMENT

This section presents baseline information necessary for consideration of the alternatives, and describes the resources that would be affected by the alternatives, as well as environmental components that would affect the alternatives if they were to be implemented. The effects of the alternatives on the environment are discussed in chapter 4.

## 3.1 Physical Environment

The affected environment is described as all portions of the NC internal coastal (inshore) waters that are open to commercial anchored small-mesh and large-mesh gill net fishing. The NC inshore waters are separated from offshore waters by a chain of barrier islands that run along nearly the entire coast. The inshore anchored gill net fisheries occur throughout internal coastal and joint fishing waters (NCGS § 113-132) of NC. For management purposes, these inshore waters are divided into six Management Units (MUs; A, B, C, D1, D2, E) presented in **Figure 1** and defined as follows:

**MU A** encompasses all inshore waters north of 35° 46.30' N to the NC/Virginia state line. This includes all of Albemarle, Currituck, Croatan, and Roanoke sounds, as well as the contributing river systems in this area. Most of this area is currently defined as the ASMA.

**MU B** encompasses all inshore waters south of 35° 46.30' N, east of 76° 30.00' W, and north of 34° 48.27'N. This Management Unit includes all of Pamlico Sound and the Northern portion of Core Sound and consists of Gillnet Restricted Areas and Inlet Corridors as listed below.

1. Shallow Water Gillnet Restricted Area (SGNRA) 1

   The area from Wainwright Island to Ocracoke Inlet bound by the following points: Beginning at a point on Core Banks at 34° 58.7963' N, 76° 10.0013' W, running northwesterly to Marker # 2CS at the mouth of Wainwright Channel at 35° 00.2780' N, 76° 12.1682' W, then running northeasterly to Marker "HL" at 35° 01.5665' N, 76° 11.4277' W, then running northeasterly to Marker #1 at 35° 09.7058' N, 76° 04.7528' W, then running southeasterly to a point at Beacon Island at 35° 05.9352' N, 76° 02.7408' W, then running south to a point on the northeast corner of Portsmouth Island at 35° 03.7014' N, 76° 02.2595' W, then running southwesterly along the shore of Core Banks to the point of beginning.

2. SGNRA 2

   The area from Ocracoke Inlet to Hatteras Inlet bound by the following points: Beginning at a point near Marker #7 at the mouth of Silver Lake at 35° 06.9091' N, 75° 59.3882' W, running north to Marker # 11 near Big Foot Slough Entrance at 35° 08.7890' N, 76° 00.3606' W, then running northeasterly to a point at 35° 13.4489' N, 75° 47.5531' W, then running south to a point northwest of the Ocracoke/Hatteras Ferry terminal on the Ocracoke side at 35° 11.5985' N, 75° 47.0768' W, then southwesterly along the shore to a point of beginning.

3. SGNRA 3

   The area from Hatteras to Avon Channel bound by the following points: The area from Hatteras to Avon Channel bound by the following points: Beginning at a point near Marker "HR" at 35° 13.3152' N, 75° 41.6694' W running northwest near Marker "42 RC" at Hatteras Channel at 35° 16.7617' N, 75° 44.2341' W, then running easterly to a point off Marker #2 at Cape Channel at 35°19.0380' N, 75° 36.2993' W, then running northeasterly near Marker #1 at the Avon Channel Entrance at 35° 22.8212' N, 75° 33.5984' W, then running southeasterly near Marker #6 on Avon Channel at 35° 20.8224' N, 75° 31.5708' W, then running easterly near Marker #8 at 35° 20.9412' N, 75° 30.9058' W, then running to a point on shore at 35° 20.9562' N, 75° 30.8472' W, then following the shoreline in a southerly and westerly direction to the point of beginning.

4. SGNRA 4

   The area from Avon Channel to Rodanthe bound by the following points: Beginning at a point near Marker #1 at the Avon Channel Entrance at 35° 22.8212' N, 75° 33.5984' W, then running northerly to a Point on Gull Island at 35° 28.4495' N, 75° 31.3247' W, then running north near Marker "ICC" at 35° 35.9891' N, 75° 31.2419' W, then running northwesterly to a point at 35° 41.0000' N, 75° 33.8397' W, then running easterly to a point on shore at 35° 41.0000' N, 75° 29.3271' W, then following the shoreline in a southerly direction to a point on shore near Avon Harbor at 35° 20.9562' N, 75° 30.8472' W, then running westerly near Marker #8 at 35° 20.9412' N, 75° 30.9058' W, then running westerly near Marker #6 on Avon Channel at 35° 20.8224' N, 75° 31.5708' W, then running northwesterly to the point of beginning.

5. Ocracoke Corridor

The area in Ocracoke Inlet bound by the following points: Beginning at a point at 35° 07.9390' N, 76° 03.8080' W, then running northeasterly to Marker #9 at Nine Foot Shoal Entrance at 35° 08.4411' N, 76° 02.6848' W, then running northeasterly to Marker "1" BF" at 35° 09.3627' N, 76° 00.6259' W, then running southeast to Marker #7 at the mouth of Silver Lake at 35° 06.9091' N, 75° 59.3882" W, then following the shoreline southwesterly to a point at the north side of Ocracoke Inlet at 35° 04.4200' N, 75° 59.9245' W, then crossing the inlet to a point on Portsmouth Island at 35° 03.7014' N, 76° 02.2595' W, then in a northerly direction to a point on Beacon Island at 35° 05.9352' N, 76° 02.7408' W, then running in a northwesterly direction to the point of beginning.

6. Hatteras Corridor

The area in Hatteras Inlet bound by the following points: Beginning at a point at 35° 13.4489' N, 75° 47.5531' W, running east to the site of an old platform at 35° 14.0100' N, 75° 45.8097' W, then running northeast to Marker "42 RC" at the mouth of Hatteras Channel at 35° 16.7617' N, 75° 44.2341' W, then following the channel to Marker "HR" at 35° 13.3152' N, 75° 41.6694' W, then following the shoreline to a point on the north side of Hatteras Inlet at 35° 11.3408' N, 75° 44.9907' W, then crossing the inlet to the south side to a point on Ocracoke Island at 35° 11.0793' N, 75° 45.9645' W, then following the shoreline northwest to a point northwest of the Ocracoke/Hatteras ferry terminal at 35° 11.5985' N, 75° 47.0768' W, then running in a northerly direction to the point of beginning.

7. Oregon Inlet Corridor

The area in Oregon Inlet bound by the following points: Beginning at a point at Marker #12 at Old House Channel at 35° 45.0883' N, 75° 35.9600' W, then following the channel in a northeasterly direction to Marker #53 at 35° 47.2157' N, 75° 34.4264' W, then running easterly to Marker #13 near Oregon Inlet Fishing Center harbor entrance at 35° 47.7076' N, 75° 32.9762' W, then running southerly to a point on the south side of Oregon Inlet at 35° 46.0500' N, 75° 31.6166' W, then running in a southerly direction along the shoreline to a point at 35° 41.0000' N, 75° 29.3271' W, then running west to a point at 35° 41.000' N, 75° 33.8397' W, then in a northerly direction to the point of beginning.

8. Mainland Gillnet Restricted Area

The area on the mainland side of Pamlico Sound, from the shoreline of Hyde and Pamlico Counties out to 200 yd (183 m) between 76° 30.00' W and 75° 42.00' W.

**MU C** includes the Pamlico, Pungo, and Neuse river drainages west of 76° 30.00' W.

**MU D1** encompasses all inshore waters south of 34° 48.27' N and east of a line running from 34° 40.70' N, 76° 22.50' W to 34° 42.48' N, 76° 36.70' W. Management Unit D1 includes Southern Core Sound, Back Sound, and North River.

**MU D2** encompasses all inshore waters west of a line running from 34° 40.70' N, 76°22.50' W to 34° 42.48' N, 76° 36.70' W to the Highway 58 bridge. Management Unit D2 includes Newport River and Bogue Sound.

**MU E** encompasses all inshore waters south and west of the Highway 58 bridge to the NC/South Carolina state line. This includes the Atlantic Intracoastal Waterway (ICW) and adjacent sounds and the New, Cape Fear, Lockwood Folly, White Oak, and Shallotte rivers.

## 3.2 Biological Environment - Status of Affected Species

Endangered

Atlantic sturgeon — *Acipenser oxyrinchus oxyrinchus*

- Carolina DPS
- Chesapeake Bay DPS
- New York Bight DPS
- South Atlantic DPS

Shortnose sturgeon — *Acipenser brevirostrum*

Kemp's ridley sea turtle — *Lepidochelys kempii*

Hawksbill sea turtle — *Eretmochelys imbricata*

Leatherback sea turtle — *Dermochelys coriacea*

Threatened

Green sea turtle — *Chelonia mydas*

- North Atlantic DPS
- South Atlantic DPS

Loggerhead sea turtle — *Caretta caretta*

- Northwest Atlantic Ocean DPS

Atlantic sturgeon — *Acipenser oxyrinchus oxyrinchus*

- Gulf of Maine DPS

The following subsections are synopses of the best available information on the status of the species that are likely to be affected by one or more components of the action. The biology and ecology of these species as well as their status and trends inform the impacts analysis for this document.

### 3.2.1 Atlantic Sturgeon

*Species Description and Distribution*

Five separate DPSs of Atlantic sturgeon were listed under the ESA by NMFS effective April 6, 2012 (77 FR 5880 and 5914, February 6, 2012). The New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs were listed as endangered and the Gulf of Maine DPS was listed as threatened. Atlantic sturgeon are long-lived, late-maturing, estuarine-dependent, anadromous fish distributed along the eastern coast of North America (Waldman and Wirgin 1998). Historically, sightings have been reported from Hamilton Inlet, Labrador, Canada, south to the St. Johns River, Florida (Murawski and Pacheco 1977; Smith and Clugston 1997). While adult Atlantic sturgeon from all DPSs mix extensively in marine waters, the majority of Atlantic sturgeon return to their natal rivers to spawn. Genetic studies show that fewer than two adults per generation spawn in rivers other than their natal river (Wirgin et al. 2000; King et al. 2001; Waldman et al. 2002). Young sturgeon spend the first few years of life in their natal river estuary before moving out to sea (Wirgin et al. 2002). The Atlantic sturgeon were once present in 38 river systems and, of these, spawned in 35 of them. Individuals are currently present in 36 rivers, and spawning occurs in at least 20 of these (ASSRT 2007).

Detailed information on the status of Atlantic sturgeon, including information on population structuring, taxonomy and life history, distribution and abundance, and threats throughout their range, can be found in the most recent five-year reviews for the New York Bight, Chesapeake Bay, and Gulf of Maine DPSs of Atlantic Sturgeon (https://www.fisheries.noaa.gov/action/5-year-review-new-york-bight-chesapeake-bay-and-gulf-maine-distinct-population-segments, NMFS 2022b, 2022c, 2022d), the Final Rules for the Carolina and South Atlantic DPSs (77 FR 5913), Gulf of Maine, New York Bight, Chesapeake Bay DPSs (77 FR 5879) and the Final Rule for designation of Critical Habitat (82 FR 39160).

*Status within the Action Area*

Atlantic sturgeon are considered in danger of extinction in NC and the NCDMF implemented a statewide moratorium on the possession of sturgeon in 1991 (MFC Rule 15A NCAC 03M.0508). The Carolina DPS habitats include rivers from the Albemarle Sound drainage that originate in southern Virginia, south to rivers of the Charleston Harbor area north of the Edisto River. There is evidence of spawning in the Roanoke, Tar-Pamlico, Cape Fear, Waccamaw, and Great Pee Dee Rivers (ASSRT 2007).

The Pamlico Sound (Tar and Neuse Rivers) Atlantic sturgeon population is speculated to be small compared to other populations (Albemarle Sound, Cape Fear Estuary) in NC (Oakley 2003, ASSRT 2007). There is no documented spawning activity of Atlantic sturgeon in Wake or Johnston counties, with all recorded spawning from the basin occurring further downriver.

Additionally, there is no documentation of spawning activity in the Neuse River, however, juveniles are well documented in the middle and lower sections of the Neuse River (Hassler and Hill 1974, Hoff 1980, Oakley 2003, ASSRT 2007). Oakley (2003), Hassler and Hill (1974) captured juveniles as far upriver as river kilometer (RKM) 80. Given that juveniles remain in their natal rivers, it is a logical assumption that the individuals captured in the river were spawned upstream. NMFS used this life history attribute, along with the presence of suitable spawning habitat features and lack of physical barriers, to justify designating critical habitat up to RKM 328 (Milburnie Dam). Most of the recent information for Atlantic sturgeon in NC inshore waters is from the Cape Fear River and the Albemarle Sound and its tributaries.

Acoustically tagged subadult fish captured in the Cape Fear River made seasonal movements between freshwater habitats in the upper estuary to the river mouth at the ocean (Post et al. 2014). Emigration out of the river and into the ocean starts in September and continues through January, with a peak in October when temperatures fall below 15 degrees (º) Celsius (C). Subadult fish return to the river system between February and May with peak immigration occurring in April when temperatures were >10ºC.

Acoustically tagged adults were shown to enter the Cape Fear River system beginning in February and make upriver migrations to freshwater staging and spawning areas. Adults remained in these areas until migrating downriver and returning to the ocean in April and May (Post et al. 2014). In the Albemarle Sound system, acoustic telemetry data indicated that Atlantic sturgeon were present in the system throughout the year (Loeffler 2018). Smaller juvenile fish occurred in western Albemarle Sound where salinities were low. Tagged subadult Atlantic sturgeon from Albemarle Sound demonstrated seasonal migration patterns, with fish moving from low salinity waters in the western sound during warm water temperatures to higher salinity waters in the eastern sound during cooler water temperatures. Adult Atlantic sturgeon entered the Albemarle Sound in late spring, moved into western Albemarle Sound in the summer months and resided there until October and early November when temperatures fell to 20ºC (Post et al. 2014, Smith et al. 2015, Loeffler 2018). Smith et al. (2015) confirmed fall spawning in the Roanoke River through the collection of eggs in the vicinity of Weldon, NC. After spawning the adults exited the river and immediately moved to the ocean, many traveling through Oregon Inlet (Loeffler 2018).

*Critical Habitat*

NMFS designated critical habitat for each ESA-listed DPS of Atlantic sturgeon in September of 2017 (82 FR 39160). Based on the best scientific information available for the life history needs of the Gulf of Maine, New York Bight, and Chesapeake Bay DPSs, the physical features essential to the conservation of the species and that may require special management considerations or protection are: (1) Hard bottom substrate (*e.g.*, rock, cobble, gravel, limestone, boulder, etc.) in low salinity waters (*i.e.*, 0.0-0.5 parts per thousand (ppt) range) for settlement of fertilized eggs, refuge, growth, and development of early life stages; (2) Aquatic habitat with a gradual downstream salinity gradient of 0.5 up to as high as 30 ppt and soft substrate (*e.g.*, sand, mud) between the river mouth and spawning sites for juvenile foraging and physiological development; (3) Water of appropriate depth and absent physical barriers to passage (*e.g.*, locks, dams, thermal plumes, turbidity, sound, reservoirs, gear, etc.) between the river mouth and spawning sites necessary to support: (i) Unimpeded movement of adults to and from spawning sites; (ii) Seasonal and physiologically dependent movement of juvenile Atlantic sturgeon to appropriate salinity zones within the river estuary; and (iii) Staging, resting, or holding of subadults or spawning condition adults. Water depths in main river channels must also be deep enough (*e.g.*, at least 1.2 meters (m)) to ensure continuous flow in the main channel at all times when any sturgeon life stage would be in the river; (4) Water, between the river mouth and spawning sites, especially in the bottom meter of the water column, with the temperature, salinity, and oxygen values that, combined, support: (i) Spawning; (ii) Annual and interannual adult, subadult, larval, and juvenile survival; and (iii) Larval, juvenile, and subadult growth, development, and recruitment (*e.g.*, 13 °C to 26 °C for spawning habitat and no more than 30 °C for juvenile rearing habitat, and 6 milligrams per liter (mg/L) dissolved oxygen (DO) or greater for juvenile rearing habitat).

NMFS determined, based on the best scientific information available, the physical features essential to the conservation of the Carolina and South Atlantic DPSs of Atlantic sturgeon that may require special management considerations or protection, which support the identified conservation objectives, are: (1) Hard bottom substrate (*e.g.*, rock, cobble, gravel, limestone, boulder, etc.) in low salinity waters (*i.e.*, 0.0-0.5 ppt range) for settlement of fertilized eggs and refuge, growth, and development of early life stages; (2) Transitional salinity zones inclusive of waters with a gradual downstream gradient of 0.5- up to 30 ppt and soft substrate (*e.g.*, sand, mud) between the river mouths and spawning sites for juvenile foraging and physiological development; (3) Water of appropriate depth and absent physical barriers to passage (*e.g.*, locks, dams, thermal plumes, turbidity, sound, reservoirs, gear, etc.) between the river mouths and spawning sites necessary to support: (i) Unimpeded movement of adults to and from spawning sites; (ii) Seasonal and physiologically-dependent movement of juvenile Atlantic sturgeon to appropriate salinity zones within the river estuary; and (iii) Staging, resting, or holding of subadults or spawning condition adults. Water depths in main river channels must also be deep enough (at least 1.2 m) to ensure continuous flow in the main channel at all times when any sturgeon life stage would be in the river; (4) Water quality conditions, especially in the bottom meter of the water column, between the river mouths and spawning sites with temperature and oxygen values that support: (i) Spawning; (ii) Annual and inter-annual adult, subadult, larval, and juvenile survival; and (iii) Larval, juvenile, and subadult growth, development, and recruitment. Appropriate temperature and oxygen values will vary interdependently, and depending on salinity in a particular habitat. For example, 6.0 mg/L DO or greater likely supports juvenile rearing habitat, whereas DO <5.0 mg/L for longer than 30 days is less likely to support rearing when water temperature is >25 °C. In temperatures >26 °C, DO >4.3 mg/L is needed to protect survival and growth. Temperatures of 13 to 26 °C are likely to support spawning habitat.

Designated critical habitat for Atlantic sturgeon does occur within the action area (see **Figure 2**).

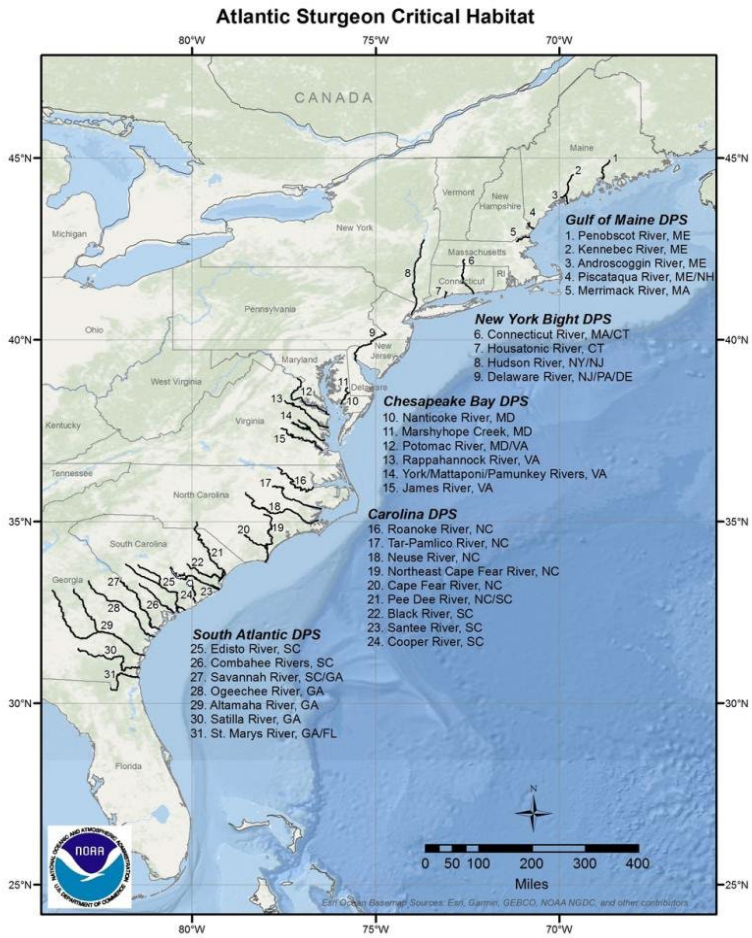


**Figure 2.** Map representing critical habitat for the conservation of endangered and threatened Atlantic sturgeon from Maine to Florida.

### 3.2.2 Shortnose sturgeon

*Species Description and Distribution*

Shortnose sturgeon was first listed under the Endangered Species Preservation Act on October 15, 1966 (32 FR 4001). When the ESA was signed into law in 1973, shortnose sturgeon remained listed as endangered. Shortnose sturgeon occur along the Atlantic coast of North America from the Saint John River in Canada to the Saint Johns River in Florida. While shortnose sturgeon spawning has been documented in several rivers across its range, status for many other rivers remain unknown. Shortnose sturgeon can be found in 41 bays and rivers along the U.S. East coast, but their distribution across this range is broken up, with a large gap of about 250 miles separating the northern and mid-Atlantic metapopulations from the southern metapopulation (SSSRT 2010). In the southern metapopulation, shortnose sturgeon are currently found in the Great Pee Dee, Waccamaw, Edisto, Cooper, Altamaha, Ogeechee, and Savannah rivers. They may also be found in the Black, Sampit, Ashley, Santee, Roanoke, and Cape Fear rivers, as well as Albemarle Sound and Pamlico Sound. Among these waters, Albemarle Sound, Pamlico Sound, the Waccamaw River, Roanoke River, the Cape Fear River and its tributary the

Black River, and the headwaters of the Pee Dee River, are within the state of NC. Archaeological records indicate that prior to the construction of dams in the 1950s and 60s, sturgeon swam further upriver to spawn than is possible today, leading experts to believe that dams severely impacted the natural breeding habits of the Atlantic and shortnose sturgeon (SSSRT 2010).

Detailed information on the status of shortnose sturgeon, including information on population structuring, taxonomy and life history, distribution and abundance, and threats throughout their range, can be found in the most recent Biological Assessment (https://repository.library.noaa.gov/view/noaa/17811; SSSRT 2010), the Final Rule (32 FR 4001) and the Recovery Plan (NMFS 1998).

*Status within the Action Area*
Few surveys have been conducted in the rivers and bays along the NC coast so the presence of a reproducing population of shortnose sturgeon is uncertain (SSSRT 2010). Shortnose sturgeon were historically present in the Roanoke, Chowan, and Cape Fear Rivers and the Winyah Bay System/Pee Dee River (SSSRT 2010). Most historical commercial sturgeon landings records were from Albemarle sound, however records did not differentiate between Atlantic and shortnose sturgeon (SSSRT 2010). Historical use of the New River, Neuse River, and Tar-Pamlico System are unknown, but there are relatively recent anecdotal reports from commercial fishers.

The Cape Fear estuary likely serves as a migration or staging corridor for spawning, perhaps in Brunswick River. Evidence of a reproducing population in the Cape Fear River was provided by a gill net survey conducted in the early 1990s. Three gravid female shortnose were captured in the Brunswick River reach of the Cape Fear estuary during the months of January and February in 1989, 1990, 1991 and 1992 (Moser and Ross 1995). The survey used sonic tracking to document the distribution and movements of adult shortnose sturgeons and juvenile Atlantic sturgeons in the lower Cape Fear River. While only eight fish were captured during the study, the presence of gravid females and observations of rapid upstream migrations provided evidence of shortnose sturgeon spawning in this system (NMFS 2004).

A majority of rivers in NC do not support shortnose sturgeon populations, despite historical records indicating their presence (VanDerwarker 2001). The most recent population estimate of shortnose sturgeon in the Cape Fear River is 50, based on a study that concluded in 1995 (NMFS 1998). Within NC, shortnose sturgeon only inhabit the Cape Fear River, the Waccamaw/Pee Dee/Black Rivers, and the Albemarle Sound. Within NC, shortnose sturgeon are listed as a priority species and are listed on the NC State Endangered Species Act (G.S. 113-331 to 113-337) as NC Endangered.

*Critical Habitat*
Under the ESA, critical habitat designation, or a determination that such designation is not prudent, is only required for species listed since the ESA was enacted. Critical habitat has not been designated for shortnose sturgeon.

### 3.2.3 Sea turtles

All sea turtle species occurring in the Atlantic Ocean are listed as either endangered or threatened under the ESA. The alternatives discussed in this EA may affect five sea turtle species: leatherback, hawksbill, and Kemp's ridley sea turtles, which are listed as endangered, and the North and South Atlantic DPSs of green sea turtles and Northwest Atlantic Ocean DPS of loggerhead sea turtles, which are listed as threatened. The species summaries in this section will focus primarily on the Atlantic Ocean populations of these species, as these are the populations that may be affected by the proposed action. The following subsections are synopses of the best available information on the life history, distribution, population trends, current status, and threats of the five species of sea turtles that are likely to be affected by one or more components of the action. Thorough descriptions and assessments of the status of the species and DPSs of sea turtles found in U.S. Atlantic waters can be found in the most recent sea turtle recovery plans (NMFS and USFWS 1991, 1992, 1993, 1998a, 1998b, 2008; NMFS et al. 2011), 5-year reviews (NMFS and USFWS 2007a, 2007b, 2013a, 2013b, 2015, 2023), and the loggerhead (Conant et al. 2009), green (Seminoff et al. 2015), and leatherback (NMFS and USFWS 2020) status reviews, which are incorporated herein by reference. A brief summary of the status of the species within U.S. Atlantic waters and in the action area is given below.

*General threats to sea turtles*
Sea turtles face numerous natural and man-made threats that shape their status and affect their ability to recover. Many of the threats are either the same or similar in nature for all listed sea turtle species including interactions with fisheries, construction and maintenance of navigation channels (dredging), coastal development, environmental contamination, climate change, and variety of other national and anthropogenic threats including predation, diseases, toxic blooms from algae and other microorganisms, and cold stunning. Additional detail about these threats is described in **Section 4.4 Cumulative Impacts** and information specific to a particular species or DPS is discussed in the corresponding status sections where appropriate

3.2.3.1 Green sea turtle (North Atlantic and South Atlantic DPSs)

The green sea turtle was listed as threatened under the ESA on July 28, 1978, except for the Florida and Pacific coast of Mexico breeding populations, which were listed as endangered. On September 2, 1998, critical habitat for green sea turtles was designated in coastal waters surrounding Culebra Island, Puerto Rico (63 FR 46693). On April 6, 2016, NMFS and USFWS issued a final rule to list 11 DPSs of the green sea turtle. Three DPSs were listed as endangered and eight DPSs were listed as threatened (81 FR 20057). That rule superseded the 1978 final listing rule for green sea turtles and applied the existing protective regulations to the DPSs. For the purposes of this analysis, only the North Atlantic DPS (NA DPS) and South Atlantic DPS (SA DPS) will be considered, as they are the only two DPSs with individuals occurring in the mid-Atlantic waters of the U.S. (Figure 3).

Detailed information on the status of green sea turtles, including information on population structure, taxonomy and life history, distribution and abundance, and threats throughout their range, can be found in the Status Review (Seminoff et al. 2015) and the final rule listing DPSs (81 FR 20057).

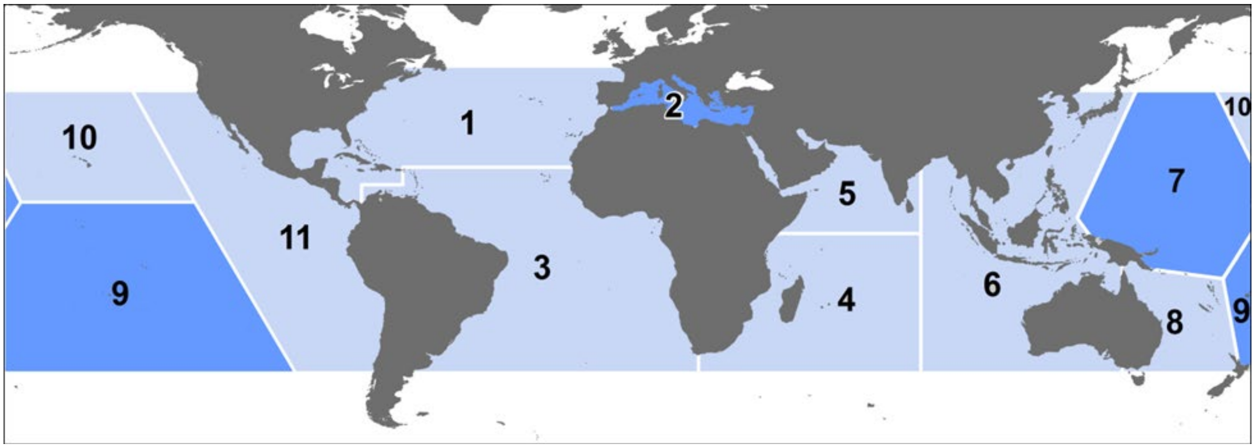

**Figure 3.** Threatened (light) and endangered (dark) green turtle DPSs: 1. North Atlantic, 2. Mediterranean, 3. South Atlantic, 4. Southwest Indian, 5. North Indian, 6. East Indian-West Pacific, 7. Central West Pacific, 8. Southwest Pacific, 9. Central South Pacific, 10. Central North Pacific, and 11. East Pacific.

*Species Description and Distribution*
The green sea turtle is the largest of the hardshell marine turtles growing up to 1 m in shell length. They have dark brown, gray, or olive colored shells (carapace) and a much lighter, yellow-to-white underside (plastron). The green sea turtle has a circumglobal distribution, occurring throughout nearshore tropical, subtropical and, to a lesser extent, temperate waters. Adult turtles exhibit site fidelity and migrate hundreds to thousands of kilometers from nesting beaches to foraging areas. With the exception of post-hatchlings, green turtles live in coastal foraging grounds including open coastline and protected bays and lagoons. Oceanic habitats are used by oceanic-stage juveniles (post-hatchlings), migrating adults, and in some cases foraging juveniles and adults. Post-hatchlings feed close to the surface on a variety of marine algae and other life associated with drift lines and debris. Juvenile and adult green turtles feed primarily on seagrasses and algae, although they also consume jellyfish, sponges, and other invertebrate prey. Green sea turtles nest on sandy beaches of mainland shores, barrier islands, coral islands, and volcanic islands in more than 80 countries worldwide (Hirth 1997).

<u>North Atlantic DPS Distribution:</u> Green sea turtles from the NA DPS range from the boundary of South and Central America (7.5° N, 77° W) in the south, throughout the Caribbean, the Gulf of Mexico, and the U.S. Atlantic coast to New Brunswick, Canada (48° N, 77° W) in the north. The range of the DPS then extends due east along latitudes 48° N and 19° N to the western coasts of Europe and Africa (Figure 2). In U.S. Atlantic and Gulf of Mexico waters, green sea turtles are distributed in inshore and nearshore waters from Texas to Massachusetts.

<u>South Atlantic DPS Distribution:</u> The range of the green sea turtle SA DPS begins at the border of Panama and Colombia at 7.5° N, 77° W, heads due north to 14° N, 77° W, then east to 14° N, 65.1° W, then north to 19° N, 65.1° W, and along 19° N latitude to Mauritania in Africa. The range extends along the coast of Africa to South Africa, with the southern border being 40° S latitude (Figure 2). The in-water range of the SA DPS is widespread and extends from the south Atlantic to north Atlantic Ocean.

*Genetic Diversity*

North Atlantic DPS: The NA DPS has a globally unique haplotype[7], which was a factor in defining the discreteness of the population for the DPS. Evidence from mitochondrial DNA studies indicates that there are at least four independent nesting subpopulations in Florida, Cuba, Mexico, and Costa Rica (Seminoff et al. 2015). More recent genetic analysis indicates that designating a new western Gulf of Mexico management unit might be appropriate (Shamblin et al. 2015).

South Atlantic DPS: Individuals from nesting sites in Brazil, Ascension Island, and western Africa have a shared haplotype found in high frequencies. Green turtles from rookeries in the eastern Caribbean however, are dominated by a different haplotype.

Within U.S. waters, individuals from both the NA and SA DPSs can be found on foraging grounds. Genetic analyses of juvenile green sea turtles captured in inshore pound nets in NC indicated that they are primarily from rookeries in the United States, Mexico, and Costa Rica, with 7 percent of individuals from rookeries in the southern Atlantic Ocean (SA DPS) (Bass et al. 2006). These models suggest that 93 percent of juveniles in NC inshore waters are from the NA DPS and 7 percent are from the SA DPS (Bass et al. 2006).

*Life History Information*

Estimates of age at first reproduction for female green sea turtles range widely depending on population from 15-50 years (Avens and Snover 2013, Seminoff et al. 2015). Females lay an average of three nests per season with an average of 100 eggs per nest and have a remigration interval of 2 to 5 years (Hirth 1997). Nesting occurs primarily on beaches with intact dune structure, native vegetation and appropriate incubation temperatures during summer months. After emerging from the nest, post-hatchlings begin an oceanic juvenile phase. Oceanic-stage juvenile green turtles originating from nesting beaches in the Northwest Atlantic appear to use oceanic developmental habitats and move with the predominant ocean gyres for several years before returning to their neritic foraging and nesting habitats (Musick and Limpus 1997, Bolten 2003). Most green turtles exhibit particularly slow growth rates, which has been described as a consequence of their largely herbivorous (*i.e.*, low net energy) diet (Bjorndal 1982). Growth rates of juveniles vary substantially among populations, ranging from less than 1 cm/year (Green 1993) to >5 cm/year (Eguchi et al. 2012).

*Status and Population Dynamics*

North Atlantic DPS: Compared to other DPSs, the NA DPS exhibits the highest nester abundance, with approximately 167,424 females at 73 nesting sites, and available data indicate an increasing trend in nesting (NMFS 2022e, Seminoff et al. 2015). The largest nesting site in the NA DPS is in Tortuguero, Costa Rica, which hosts 79 percent of nesting females for the DPS (Seminoff et al. 2015). There are no reliable estimates of population growth rate for the DPS as a whole, but estimates have been developed at a localized level. In the continental US, green sea turtle nesting occurs along the Atlantic coast, primarily along the central and southeast coast of Florida. Modeling by Chaloupka et al. (2008) using data sets of 25 years or more show the Florida nesting stock at the Archie Carr National Wildlife Refuge growing at an annual rate of

[7] A set of closely linked genetic markers or DNA variations on a chromosome that tend to be inherited together.

13.9 percent, and the Tortuguero, Costa Rica, population growing at 4.9 percent. According to data collected from Florida's index nesting beach survey from 1989-2021, green sea turtle nest counts across Florida have increased dramatically, from a low of 267 in the early 1990s to a high of 40,911 in 2019. Green sea turtle nesting is also documented annually on beaches of NC, South Carolina, and Georgia, though nesting is found in low quantities (up to tens of nests) (nesting databases maintained on www.seaturtle.org).

South Atlantic DPS: The South Atlantic DPS has 51 nesting sites, with an estimated nester abundance of 63,332. More than half of the 51 identified nesting sites (37) did not have sufficient data to estimate the number of nesters or trends (Seminoff et al. 2015). The largest nesting site is at Poilão, Guinea-Bissau, which hosts 46 percent of nesting females for the DPS (Seminoff et al. 2015). Of the nesting sites where data are available, such as Ascension Island, Suriname, Brazil, Venezuela, Equatorial Guinea, and Guinea-Bissau, there is some evidence that population abundance is stable or increasing. NMFS reported the population trend for the NA DPS to be mixed in the most recent report to Congress (NMFS 2022e).

*Status within the Action Area*

Estuarine waters in NC provide important developmental and foraging habitats for juvenile green sea turtles, and nearshore coastal waters provide a required migratory pathway to and from these habitats (Epperly et al. 2007, Snoddy and Williard 2010, Williard et al. 2017, Braun-McNeill et al. 2018). Green sea turtles are listed on the NC State Endangered Species Act as NC Threatened. Green sea turtles also nest on NC beaches (Schwartz et al. 1981, Woodson and Webster 1999, Shamblin et al. 2018), and recent genetic analyses indicated these green sea turtles may represent an incipient subpopulation (Shamblin et al. 2018). Green sea turtles are the second most common sea turtle species nesting in NC, however, they only account for approximately 2.5 percent of nests in NC (NCWRC unpublished data, http://seaturtle.org/nestdb/). In contrast, sea turtle strandings from estuarine waters are dominated by green sea turtles. Between 2010 and 2020, more than 75 percent of strandings recovered from internal waters and shorelines were green sea turtles with strandings recovered every month across those years. The lengths for measured stranded greens indicate that they were predominantly juvenile turtles (mean Straight Carapace Lengths [SCL]: 28.3 cm, range: 20.5-75.7 cm) indicate that they were predominantly juvenile turtles (NCWRC unpublished data, Avens and Snover 2013).

Green sea turtles are the most commonly observed sea turtles in the inshore gill net fisheries. The density of this species combined with their association with submerged aquatic vegetation (SAV) likely increase their co-occurrence with some anchored gill-net fisheries, especially the fall flounder fishery (McClellan and Read 2009). However, data from fisheries bycatch studies and strandings indicate the relative abundance of green sea turtles in NC estuarine and inshore waters has increased over the last 20-30 years (Epperly et al. 2007, Byrd et al. 2011, Braun-McNeill et al. 2018, Shamblin et al. 2018, NCWRC unpublished data).

*Threats*

The principal cause of past declines and extirpations of green sea turtles has been the overexploitation of the species for food and other products. Although intentional take of green sea turtles and their eggs is not extensive within the southeastern U.S., green sea turtles that nest and forage in the region may spend large portions of their life cycle outside the region and outside U.S. jurisdiction, where exploitation is still a threat in some areas. In addition to general threats to all sea turtles, green sea turtles are particularly susceptible to mortality from Fibropapillomatosis (FP) disease. FP results in the growth of tumors on soft external tissues (flippers, neck, tail, etc.), the carapace, the eyes, the mouth, and internal organs (gastrointestinal tract, heart, lungs, etc.) of turtles (Jacobson et al. 1989, Herbst 1994, Aguirre et al. 2002). Presently, FP is cosmopolitan, but has been found to affect large numbers of animals in specific areas, including Hawaii and Florida. Green sea turtles are also susceptible to cold-stunning. As temperatures fall below 8-10° C, turtles may lose their ability to swim and dive, often floating to the surface. The rate of cooling that precipitates cold-stunning appears to be the primary threat, rather than the water temperature itself (Milton and Lutz 2003). Sea turtles that overwinter in inshore waters, or are unable to leave these waters prior to temperature decreases, are most susceptible to cold-stunning because temperature changes are most rapid in shallow water (Witherington and Ehrhart 1989).

*Critical Habitat*
Critical habitat has not been designated for the North or South Atlantic DPSs, however in the interim, the existing critical habitat designation (*i.e.*, waters surrounding Culebra Island, Puerto Rico) remains in effect for the North Atlantic DPS. Designated critical habitat for green sea turtles is outside the action area. Additionally, NMFS has proposed critical habitat for six DPSs segments of green sea turtles (88 FR 46527; July 19, 2023). The proposed marine critical habitat includes nearshore waters (from the mean high water line to 20 m depth) off the coasts of Florida, North Carolina, Texas, Puerto Rico, U.S. Virgin Islands, California (which also includes nearshore areas from the mean high water line to 10 km offshore), Hawai‘i, American Samoa, Guam, and the Commonwealth of Northern Mariana Islands. Proposed marine critical habitat also includes *Sargassum* habitat (from 10 m depth to the outer boundary of the U.S. Exclusive Economic Zone) in the Gulf of Mexico and Atlantic Ocean. The proposed critical habitat for green sea turtles does occur within the action area.

#### 3.2.3.2 Kemp’s ridley sea turtle

The Kemp’s ridley sea turtle was listed as endangered on December 2, 1970 (35 FR 8491), under the Endangered Species Conservation Act of 1969, a precursor to the ESA. When the ESA was signed into law in 1973, the Kemp’s ridley remained listed as endangered.

Additional detailed information on the status of Kemp’s ridley turtles, including information on population structuring, taxonomy and life history, distribution and abundance, and threats throughout their range, can be found in the Kemp’s ridley 5-year review (NMFS and USFWS 2015), the Bi-National Recovery Plan for the Kemp’s Ridley Sea Turtle (NMFS et al. 2011).

*Species Description and Distribution*
The Kemp’s ridley sea turtle is the smallest of all sea turtles with adults generally weighing <45 kilogram (kg). Kemp’s ridleys have a nearly circular, grey-olive colored carapace and a pale yellowish plastron. Kemp’s ridleys range from the Gulf of Mexico to the northwest Atlantic Ocean, as far north as the Grand Banks (Márquez 2001, Watson et al. 2004) and Nova Scotia (Bleakney 1955). Kemp’s ridley habitat includes sandy and muddy areas in shallow, nearshore

waters, although they can also be found in deeper offshore waters during early life stages and migration. These areas support their primary prey species, which consist of swimming crabs, but may also include fish, jellyfish, and an array of mollusks. Pelagic stage turtles rely on the array of prey items associated with floating *Sargassum* habitat. Kemp's ridleys use relatively shallow corridors to migrate between these foraging areas to nesting beaches. Most nesting occurs in Tamaulipas, Mexico, however in the United States, Kemp's ridleys are known to nest from Texas to NC.

*Life History*
Estimates of age to sexual maturity for Kemp's ridley sea turtles ranges greatly from 5-18 years. NMFS et al. (2011) determined the best available point estimate of age to maturity for Kemp's ridley sea turtles was 12 years. While some sea turtles nest annually, the weighted mean remigration rate for Kemp's ridley sea turtles is approximately 2 years. Nesting generally occurs from April to July. Females lay approximately 2.5 nests per season with each nest containing 95-112 eggs. After hatching, pelagic post-hatchling and juveniles spend approximately 2 years in the ocean prior to recruiting to nearshore waters.

*Status and Population Dynamics*
Of all the sea turtle species in the world, the Kemp's ridley has declined to the lowest population level. 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 mid-1980s, however, nesting numbers from Rancho Nuevo and adjacent Mexican beaches were below 1,000, with a low of 702 nests in 1985. Nesting steadily increased through the 1990s, and then accelerated during the first decade of the twenty-first century. Following a significant, unexplained 1-year decline in 2010, Kemp's ridley nests in Mexico reached 21,797 in 2012 (Gladys Porter Zoo 2013). From 2013 through 2014, there was a second significant decline in Mexico. More recent data in Mexico indicate similar fluctuations in the number of nests with periods of low and high nesting. Nesting in Texas has paralleled the trends observed in Mexico, however over the long term, nesting has increased in Texas from one reported nest in 1985 to over 200 in 2020. At this time, it is unclear whether the increases and decreases in nesting seen over the past decade represents a population oscillating around an equilibrium point or if nesting will increase or decrease in the future. Given these uncertainties, NMFS reported the population trend for Kemp's ridley sea turtle as unknown in the most recent report to Congress (NMFS 2022e).

*Status within the Action Area*
Kemp's ridley sea turtles are listed on the NC State Endangered Species Act as NC Endangered. Kemp's ridleys nest in NC at low levels compared to green and loggerhead sea turtles, laying less than 10 nests per year (NCWRC unpublished data http://seaturtle.org/nestdb/). Among strandings recovered from internal waters and shorelines, Kemp's ridleys are the second most common species encountered with 693 documented between 2010 and 2020 (NCWRC unpublished data). Stranding of Kemp's ridleys have been documented during every month of the year. The lengths for measured stranded Kemp's ridleys indicate they were predominantly juveniles (SCL: 31.4 cm, range: 18.6-61.5 cm) (NCWRC unpublished data, Avens et al. 2017). Kemp's ridleys are also the second most common species observed in the gill net fishery. Although they do occur in shallow waters, telemetry data indicated that this species occurred

often in the deep waters of Pamlico Sound and across a wider range of depths than green sea turtles (McClellan et al. 2009). This habitat use may decrease rates of incidental capture in the anchored large-mesh gill-net fishery for flounder, which operates primarily in shallow water, often <1 m deep (McClellan and Read 2009).

*Threats*
The Kemp's ridley sea turtle was listed as endangered in response to a severe population decline, primarily the result of egg collection. Because the Kemp's ridley has one primary nesting beach, this species is particularly susceptible to habitat destruction by natural (e.g., hurricanes) and human caused events (NMFS and USFWS 2015). Human caused threats include the potential for oil spills, especially in the Gulf of Mexico since it is an area of high-density offshore oil exploration and extraction. Kemp's ridley populations were impacted by the Deepwater Horizon oil spill in which pelagic/oceanic juvenile Kemp's ridleys were the most common species encountered (Witherington et al. 2012). Bycatch of Kemp's ridleys in fisheries is a major threat to Kemp's ridleys. Kemp's ridleys are incidentally captured in fisheries using trawls, gill nets, and hook and line occur throughout the northwest Atlantic Ocean and Gulf of Mexico and were reported to have the highest interaction with fisheries operating in these fisheries of any species (Finkbeiner et al. 2011, Wallace et al. 2013).

*Critical Habitat*
No critical habitat has been designated for Kemp's ridley sea turtles.

3.2.3.3 Hawksbill sea turtle

The hawksbill sea turtle was listed as endangered throughout its entire range on June 2, 1970 (35 FR 8491) under the Endangered Species Conservation Act of 1969, a precursor to the ESA. When the ESA was signed into law in 1973, the hawksbill remained listed as endangered.

Additional detailed information on the status of hawksbill sea turtles, including information on population structuring, taxonomy and life history, distribution and abundance, and threats throughout their range, can be found in the hawksbill 5-year review (NMFS and USFWS 2013a) and the recovery plan (NMFS and USFWS 1998b).

*Species Description and Distribution*
Hawksbill sea turtles have a serrated carapace with a "tortoise-shell" coloring, ranging from dark to golden brown, with streaks of orange, red, and/or black. Their head is elongated and tapers to a point, with a beak-like mouth that gives the species its name. The shape of the mouth allows the hawksbill turtle to reach into holes and crevices of coral reefs to find sponges, their primary adult food source, and other invertebrates. They weigh on average 45-68 kg (Pritchard et al. 1983). Hawksbills have a circumglobal distribution throughout tropical and, to a lesser extent, subtropical waters of the Atlantic, Indian, and Pacific Oceans. In their oceanic phase, juvenile hawksbills can be found in *Sargassum* mats; post-oceanic hawksbills may occupy a range of habitats that include coral reefs or other hard bottom habitats, sea grass, algal beds, mangrove bays and creeks (Musick and Limpus 1997, Bjorndal and Bolten 2010). They are highly migratory and use a wide range of habitats during their lifetimes (Musick and Limpus 1997, Plotkin 2003). Hawksbills nest on sandy beaches throughout the tropics and subtropics and are

capable of migrating long distances between nesting beaches and foraging areas (NMFS and USFWS 2013b). Satellite tagged turtles have shown significant variation in movement and migration patterns. Distance traveled between nesting and foraging locations range from a few hundred to a few thousand kilometers (Miller et al. 1998, Horrocks et al. 2001).

*Life History Information*
Age to maturity for the species is also long, taking between 20 and 40 years, depending on the region (Chaloupka and Musick 1997, Limpus and Miller 2000). On average, female hawksbills return to the beaches where they were born (natal beaches) every 2-5 years (NMFS and USFWS 2013a), lay 3-5 nests per season (Mortimer and Bresson 1999, Richardson et al. 1999), and 130 eggs per nest (Witzell 1983). Hatchlings migrate to and remain in pelagic habitats until they reach approximately 22-25 cm in SCL and return to coastal foraging areas as juveniles.

*Status and Population Dynamics*
Very little long-term trend data exists for abundance of hawksbills at foraging sites, primarily because these data are logistically difficult and relatively expensive to obtain. Therefore, the primary information source for evaluating trends in global hawksbill populations is nesting beach data. Surveys at 88 nesting assemblages among 10 ocean regions worldwide indicate that 22,004-29,035 females nest annually (NMFS and USFWS 2013a). Among the 63 sites for which historic trends could be assessed, all 63 (100 percent) showed a decline during the long-term period of greater than 20 to 100 years. Among the 41 sites for which recent trend data are available 10 (24 percent) are increasing, 3 (7 percent) are stable, and 28 (68 percent) are decreasing (NMFS and USFWS 2013a). Although greatly depleted from historic levels, nesting populations in the Atlantic Ocean in general are doing better than in the Indo-Pacific, where despite greater overall abundance, a greater proportion of the nesting sites are declining.

Along the east coast of the U.S., hawksbills are rarely observed north of Florida, however they have been observed as far north as Massachusetts. Nesting sites in the Atlantic Ocean basin occur in Florida, the insular Caribbean, Western Caribbean mainland, Southwestern Atlantic (Brazil), and Eastern Atlantic (NMFS and USFWS 2013a). Surveys at 33 nesting assemblages in the Atlantic Ocean indicate that 3,626-6,108 females nest annually (NMFS and USFWS 2013a). Of these sites, recent (less than 20 years) abundance data indicate 10 have increasing trends, 10 sites showing decreasing trends, and 13 sites lack enough information to assess trends.

*Status within the Action Area*
Reports of observations of hawksbill sea turtles in NC are also historically rare (Epperly et al. 1995a). Hawksbills are listed on the NC State Endangered Species Act as NC Endangered. To date, two hawksbill sea turtle nests have been documented on NC beaches, both in 2015 (Finn et al. 2016). These nests represent the northernmost records for the species and genetic analyses indicated this as a possible trans-Atlantic colonization event (Finn et al. 2016). Only 12 strandings of hawksbills have been recorded in NC since recording began in the mid-1980s. Only one hawksbill was documented as stranded from internal waters and shorelines between 2010–2020, and between 2000 and 2021, only two hawksbill interactions were documented by the NCDMF Observer Program (Daniel 2013, NCDMF unpublished data).

*Threats*

The greatest threats to hawksbill sea turtles are overharvesting of turtles and eggs, degradation of nesting habitat, and fisheries interactions. Adult hawksbills are harvested for their meat and carapace, which is sold as tortoiseshell. Eggs are taken at high levels, especially in southeast Asia where collection approaches 100 percent in some areas. In addition, lights on or adjacent to nesting beaches are often fatal to emerging hatchlings and alters the behavior of nesting adults. Due to their preference to feed on sponges associated with coral reefs, hawksbills are particularly sensitive to losses of coral reef habitat. Coral reefs are vulnerable to destruction and degradation caused by human activities (*e.g.*, nutrient pollution, sedimentation, contaminant spills, vessel groundings and anchoring, recreational uses) and are also highly sensitive to the effects of climate change (*e.g.*, higher incidences of disease and coral bleaching) (Wilkinson 2004, Crabbe 2008). Because continued loss of coral reef communities (especially in the greater Caribbean region) is expected to impact hawksbill foraging, it represents a major threat to the recovery of the species.

*Critical Habitat*
On June 24, 1982, USFWS designated critical habitat for hawksbill sea turtles in the terrestrial environment and nearshore waters of Isla Mona, Culebra Island, Cayo Norte, and Island Culebrita, Puerto Rico (47 FR 27295). On September 2, 1998, NMFS designated critical habitat for hawksbill sea turtles in the coastal waters of Mona and Monito Islands, Puerto Rico (63 FR 46693). Designated critical habitat for hawksbill sea turtles is outside the action area.

3.2.3.4 Leatherback sea turtle

The leatherback sea turtle was listed as endangered throughout its entire range on June 2, 1970 (35 FR 8491) under the Endangered Species Conservation Act of 1969. When the ESA was signed into law in 1973, the leatherback remained listed as endangered. In 2020 NMFS and USFWS published a status review and identified seven discrete populations (separated from each other as a result of physical and behavioral factors). NMFS concluded that the 7 populations would meet the criteria for recognition as DPSs, however did not list them separately as DPSs as all would meet the definition of the endangered (85 FR 48332). For the purposes of this analysis, this document will primarily focus on the Northwest Atlantic Ocean population as only individuals from this population occur in the mid-Atlantic waters of the U.S.

Additional detailed information on the status of leatherback sea turtles, including information on population structuring, taxonomy and life history, distribution and abundance, and threats throughout their range, can be found in the status review (NMFS and USFWS 2020), 5-year review (NMFS and USFWS 2013b), and recovery plan (NMFS and USFWS 1998a).

*Species Description and Distribution*
The leatherback sea turtle is unique due to its large size and wide distribution (due to thermoregulatory adaptations and behavior), and lack of a hard, bony carapace. Leatherbacks are the largest living turtle, reaching lengths of six feet long (~1.83 m), and weighing up to one ton (0.91 metric tons). They have a black carapace with prominent dorsal ridges, long clawless flippers, and a pink spot on the top of their heads. Leatherbacks have pointed tooth-like cusps and sharp-edged jaws that are adapted for a diet of gelatinous prey such as jellyfish, tunicates, and ctenophores. Leatherback turtles spend the majority of their lives at sea, where they develop,

forage, migrate, and mate. The leatherback turtle has the widest distribution of any reptile, with a global range extending from 71° N to 47° S and migrate between highly productive temperate foraging areas and tropical and subtropical sandy nesting beaches. The northwest Atlantic population includes leatherbacks originating from the northwest Atlantic Ocean, south of 71° N, east of the Americas, and west of Europe and northern Africa (the southern boundary is a diagonal line between 5.377° S, 35.321° W and 16.063° N, 16.51° W) (NMFS and USFWS 2020).

*Life History Information*

Based on mean estimates, leatherback turtles mature at approximately 20 years of age and approximately 130 cm CCL in size (Spotila et al. 1996, Avens et al. 2009, NMFS and USFWS 2020). Females lay an average of five to seven clutches per season, with an inter-nesting interval of 7 to 15 days (Eckert et al. 2012, Eckert et al. 2015). Females lay 20 to 100 eggs per nest (Eckert et al. 2012) and nesting occurs on average every 2 to 4 years (remigration interval, Eckert et al. 2015). The number of leatherback turtle hatchlings that make it out of the nest on to the beach (*i.e.*, emergent success) is approximately 50 percent worldwide (Eckert et al. 2012) and approximately 30 percent of the eggs may be infertile. Nesting females exhibit low site-fidelity to their natal beaches, returning to the same region, but not necessarily the same beach, to nest (Dutton et al. 1999, Dutton et al. 2007). This natal homing results in reproductive isolation between distant nesting beaches, which are separated by physical features, such as land masses, oceanographic features, and currents. This separation is supported by data showing significant genetic discontinuity among the seven populations: northwest Atlantic, southwest Atlantic, southeast Atlantic, southwest Indian, northeast Indian, west Pacific, east Pacific (as summarized in NMFS and USFWS 2020).

*Status and Population Dynamics*

The northwest Atlantic population nesting female abundance at 55 sites is estimated to be 20,659, with the largest nesting site, Grand Riviere in Trinidad accounting for 29 percent of this abundance. NMFS and USFWS (2020) estimated the index of nesting female abundance for 24 nesting sites in 10 nations within the northwest Atlantic population. Nesting in the northwest Atlantic population is characterized by many small nesting beaches. Large nesting aggregations are rare; only about 10 leatherback nesting beaches in the wider Caribbean region (about 2 percent of the population's total nesting sites) host more than 1,000 crawls annually (Piniak and Eckert 2011). At beaches with the greatest known nesting female abundance, the northwest Atlantic population is exhibiting a decreasing trend in nesting activity (NMFS and USFWS 2020). The Northwest Atlantic Leatherback Working Group completed a region-wide trend analysis that also showed an overall decline in the population, reporting a 9.32 percent decline in nesting annually from 2008-2017 (Northwest Atlantic Leatherback Working Group 2018). In-water abundance studies of leatherbacks are rare. However, the relative abundance of turtles at a foraging area off Nova Scotia, Canada, from 2002 to 2015 was recently assessed (Archibald and James 2016). This study evaluated opportunistic sightings per unit effort and found a mean density of 9.8 turtles per 100 $km^2$, representing the highest in-water density of leatherback turtles reported to date. Archibald and James (2016) concluded that the relative abundance of foraging leatherback turtles off Canada exhibited high inter-annual variability, but overall showed a stable trend from 2002 to 2015.

*Status within the Action Area*
Leatherback sea turtles have been documented in nearshore ocean waters of NC, particularly near Cape Lookout and Cape Hatteras (Shoop and Kenney 1992, Epperly et al. 1995b, Keinath et al. 1996, Larisa Avens, NMFS Southeast Fisheries Science Center unpublished data). Leatherbacks are listed on the NC State Endangered Species Act as NC Endangered. Nesting by leatherbacks is not common in NC, but nests are documented occasionally (NCWRC unpublished data http://seaturtle.org/nestdb). The occurrence of leatherbacks in inshore waters is thought to be uncommon to rare compared to green, loggerhead, and Kemp's ridley sea turtles based on historical (Epperly et al. 1996) and recent stranding data. Of the 5,456 strandings recovered from NC internal waters and shorelines from 2010–2020, only 12 were leatherbacks (NCWRC unpublished data). Based on carapace length measurements, most, if not all stranded leatherbacks were adults (Avens and Snover 2013). The NCDMF Observer Program has not documented an incidental take of a leatherback in inshore anchored gill net fisheries since the program began in 2000, however there is potential for this species to overlap spatially and temporally with these fisheries.

*Threats*
The primary threats to leatherback sea turtles include fisheries interactions (bycatch), harvest of nesting females, and egg harvesting. Because of these threats, once large rookeries are now functionally extinct, and there have been range-wide reductions in population abundance. Leatherbacks are also susceptible to marine debris ingestion than other sea turtle species due to their predominantly pelagic existence and the tendency of floating debris to concentrate in convergence zones that adults and juveniles use for feeding and migratory purposes (Shoop and Kenney 1992, Lutcavage et al. 1997). Ingestion of marine debris (plastic) is common in leatherback turtles and can block gastrointestinal tracts leading to death. Global climate change can be expected to have various impacts on all sea turtles, including leatherbacks. Climate change is likely to impact leatherbacks by altering nesting habitat, and changing the abundance and distribution of forage species, which will result in changes in leatherback foraging behavior and distribution and fitness and growth (NMFS and USFWS 2020).

*Critical Habitat*
On March 23, 1979, NMFS designated critical habitat for leatherback sea turtles in the waters adjacent to Sandy Point, St. Croix, U.S.V.I. from the 183 m isobath to mean high tide level between 17° 42'12" N and 65° 50'00" W (44 FR 17710). On January 26, 2012, NMFS revised the critical habitat designation for leatherback sea turtles to include coastal and open water areas along the U.S. west coast (77 FR 4170). Designated critical habitat for leatherback sea turtles is outside the action area.

#### 3.2.3.5 Loggerhead sea turtle (Northwest Atlantic Ocean DPS)

The loggerhead sea turtle was listed as a threatened species throughout its global range on July 28, 1978. NMFS and USFWS published a Final Rule designating nine DPSs for loggerhead sea turtles (76 FR 58868, September 22, 2011; effective October 24, 2011): (1) Northwest Atlantic Ocean (NWA) (threatened), (2) Northeast Atlantic Ocean (endangered), (3) South Atlantic Ocean (threatened), (4) Mediterranean Sea (endangered), (5) North Pacific Ocean (endangered), (6) South Pacific Ocean (endangered), (7) North Indian Ocean (endangered), (8) Southeast Indo-

Pacific Ocean (endangered), and (9) Southwest Indian Ocean (threatened). The NWA DPS is the only DPS that occurs within the action area and, therefore, it is the only one considered in this document.

Additional detailed information on the status of loggerhead sea turtles, including information on population structuring, taxonomy and life history, distribution and abundance, and threats throughout their range, can be found in the 5-year review (NMFS and USFWS 2023), and recovery plan (NMFS and USFWS 2008).

*Species Description and Distribution*
Loggerheads sea turtles are large, and adults in the southeast U.S. average 92 cm in carapace length and weigh approximately 116 kg (Ehrhart and Yoder 1978). Adult and subadult loggerhead sea turtles typically have a light yellow plastron and a reddish brown carapace and have large, strong jaws. Loggerhead turtles are circumglobal, and are found in continental shelf and estuarine environments throughout the temperate and tropical regions of the Atlantic, Indian, and Pacific Oceans. NWA DPS of loggerheads are found along eastern North America, Central America, and northern South America (Dodd Jr. 1988). Habitat use within these areas vary by life stage. Juveniles are omnivorous and forage on crabs, mollusks, jellyfish, and vegetation at or near the surface (Dodd Jr. 1988). Subadult and adult loggerheads are primarily found in coastal waters and eat benthic invertebrates such as mollusks and decapod crustaceans in hard bottom habitats. Nesting occurs on beaches within the southeast U.S. and the wider Caribbean region.

Within the NWA DPS, most loggerheads nest from NC to Florida and along the Gulf of Mexico coast of Florida. The recovery plan identified five recovery units. The Northern Recovery Unit (NRU) includes nesting areas from the Florida/Georgia border north through southern Virginia. The recovery plan concluded that all recovery units are essential to the recovery of the species.

*Life History Information*
Estimates of mean age of sexual maturity for female loggerheads sea turtles is 36 to 38 years (mean age predictions for minimum age are 22.5 to 25 years; Avens et al. 2015) with a 95 percent predictive interval of 29 to 49 years (Chasco et al. 2020). Mean age at sexual maturity for males is 37 to 42 years (mean age predictions for minimum age are 26 to 28 years; Avens et al. 2015). Females nest one to seven times in a season, and clutch sizes range from 95 to 130 eggs. Females nest every 1 to 7 years and exhibit relatively strong nest-site fidelity (Shamblin et al. 2017), with a mean remigration interval of 2.7 years (Shamblin et al. 2021). Young juvenile loggerheads inhabit oceanic waters spanning the width of the north Atlantic Ocean and Mediterranean Sea after which juveniles typically return to the neritic waters of the northwest Atlantic Ocean. Older juveniles undergo an ontogenetic, oceanic-to-neritic habitat shift, however, this transition is not obligate, permanent (*i.e.*, some return to oceanic habitats; Mansfield and Putman 2013), nor fixed to a certain body size or age class (Winton et al. 2018).

*Status and Population Dynamics*
An overall estimate of nesting females for the NWA DPS is not available because of reproductive parameter uncertainty: remigration intervals and clutch frequencies vary spatially and temporally, and data are insufficient for some recovery units. Adequate data are available from the NRU (Florida/Georgia border north through southern Virginia), and the state of Florida,

which represents 89 percent of nesting within the DPS (Ceriani and Meylan 2017). Ceriani et al. (2019) evaluated all known Florida nesting data from 1989 to 2018. Using the average annual number of loggerhead nests between 2014 and 2018, Ceriani et al. (2019) estimated the total number of adult females nesting in Florida to be 51,319 (95 percent confidence interval of 16,639-99,739 individuals). To avoid pitfalls of estimating nesting females based on estimates of emigration interval and clutch frequency, Shamblin et al. (2021) used genetic analyses to estimate female abundance for the NRU, estimating 8,074 total nesting females from 2010 to 2015 (Shamblin et al. 2021). The overall nesting trend of NWA DPS appears to be stable, neither increasing nor decreasing, for over two decades (NMFS and USFWS 2023). The NRU has demonstrated a positive, statistically significant growth rate (1.3 percent; $p = 0.04$) over the previous 37 years (NMFS and USFWS 2023).

In-water estimates of abundance include juvenile and adult life stages of both sexes but are difficult to perform on a wide scale. In the summer of 2010, NMFS' Northeast and Southeast Fisheries Science Centers estimated the abundance of juvenile and adult loggerhead sea turtles along the continental shelf between Cape Canaveral, Florida and the mouth of the Gulf of St. Lawrence, Canada. They provided a preliminary regional abundance estimate of 588,000 individuals (approximate inter-quartile range of 382,000-817,000) based on positively identified loggerhead sightings (NMFS 2011). A separate, smaller aerial survey, conducted in the southern portion of the Mid-Atlantic Bight and Chesapeake Bay in 2011 and 2012, demonstrated uncorrected loggerhead sea turtle abundance ranging from a spring high of 27,508 to a fall low of 3,005 loggerheads (Barco et al. 2018).

*Status within the Action Area*

Areas of NC provide important habitat, such as beaches for nesting females and developing hatchlings, foraging hotspots in neritic waters for adults (Ceriani et al. 2017), and developmental and foraging habitats in estuarine waters for juveniles (Musick and Limpus 1997, Avens et al. 2003, Braun-McNeill et al. 2018). Loggerheads are listed on the NC State Endangered Species Act as NC Threatened. Approximately 97 percent of sea turtle nests in NC are laid by loggerheads (NCWRC unpublished data http://seaturtle.org/nestdb/). From 2010 to 2020, 584 loggerheads strandings total were recovered in every month across the time series (NCWRC unpublished data). The lengths for measured stranded loggerheads indicate that they were predominantly juvenile turtles (mean SCL: 65.6 cm, range: 42.4-96.8 cm) indicate that they were predominantly juvenile turtles (NCWRC unpublished data, Avens et al. 2015).

Loggerhead turtles are occasionally observed in inshore gill net fisheries, with eight interactions observed in ITP years 2013-2021. Although they do occur in shallow waters, telemetry data indicated that this species occurs often in the deep waters of Pamlico Sound and across a wider range of depths than green sea turtles (McClellan et al. 2009). This habitat use may decrease rates of incidental capture in the fall flounder anchored large-mesh gill net fishery, which operates primarily in shallow water, often <1 m deep (McClellan and Read 2009).

*Threats*

Destruction and modification of terrestrial and marine habitats threaten the NWA DPS of loggerhead turtles. On beaches, threats that interfere with successful nesting, egg incubation, hatchling emergence, and transit to the sea include erosion, erosion control, coastal development, artificial lighting, beach use, and beach debris (NMFS and USFWS 2023). In the marine environment, threats that interfere with foraging and movement include marine debris, oil spills and other pollutants, harmful algal blooms, and noise pollution (NMFS and USFWS 2023). Domestic and international fisheries bycatch impacts juvenile and adult loggerheads in pelagic and coastal waters throughout the range of the DPS (Bolten et al. 2011, Finkbeiner et al. 2011). Harmful algal blooms (HABs), also called "red tides," are a significant, nearly-annual threat to the DPS, especially to turtles inhabiting the waters off southwest Florida (Hart et al. 2018).

*Critical Habitat*
In 2014, NMFS and the USFWS designated critical habitat for the NWA DPS of loggerhead sea turtles along the U.S. Atlantic and Gulf of Mexico coasts, from NC to Mississippi (79 FR 39856). The final rule designated five different units of critical habitat, each supporting an essential biological function of loggerhead turtles. These units include nearshore reproductive habitat, winter area, *Sargassum*, breeding areas, and migratory corridors. Designated critical habitat for loggerhead sea turtles is outside the action area.

### 3.2.4 Incidental Take of Other Species

In addition to sturgeon and sea turtles, gill net fisheries also capture other fish and wildlife. Gill nets target specific species of fish, such as flounder, but also incidentally capture non-target fish species, birds and marine mammals, in addition to sturgeon and sea turtles. The West Indian manatee (*Trichechus manatus*), also known as the Florida manatee, is a Federally threatened aquatic mammal protected under the ESA and the Marine Mammal Protection Act. The USFWS is the lead Federal agency responsible for the protection and recovery of the West Indian manatee under the provisions of the ESA. Manatees are rare in NC waters; and, therefore, it is not likely that any alternative would have a significant impact on manatees. Additionally, due to the manatee's ESA classification, a Section 10 ITP is not required for this species.

In November 2017, NCDMF observers documented the incidental take of a common bottlenose dolphin (*Tursiops truncatus*); found dead in an anchored small-mesh (3.15 ISM, 8 CSM) gill net in Core Sound. This event represented the first observed take in the gill-net fishery by either the state or federal observer program. Information about the take was reported immediately to the NMFS Southeast Regional Office (SERO). A previously noted, estuarine anchored gill net fisheries in NC are termed the "NC Inshore Gillnet Fishery" in the NMFS List of Fisheries. This combined category has been listed as a Category II fishery due to "occasional incidental death or serious injury of marine mammals" based on data from bottlenose dolphin strandings. The fishery is managed under the Bottlenose Dolphin Take Reduction Plan for interacting with strategic stocks of bottlenose dolphins (NMFS 2006).

Birds are susceptible to incidental capture in NC inshore anchored gill net fisheries; and, therefore, negative impacts may occur (*e.g.*, mortality from entanglement and drowning) to birds from all of the alternatives. No ESA-listed birds are expected to be incidentally captured or adversely affected by these fisheries, as there have been no observed or reported interactions with ESA-listed bird species in these fisheries.

Birds that interact with NC inshore anchored gill net fisheries are protected by the Migratory Bird Treaty Act (MBTA). The MBTA was enacted in 1918 to ensure protection of shared migratory bird resources. The MBTA prohibits the take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase, or barter, of any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit. The responsibilities of federal agencies to protect migratory birds are set forth in Executive Order 13186. USFWS is the lead agency for migratory birds. The USFWS issues permits for takes of migratory birds for activities such as scientific research, education, and depredation control, but does not currently authorize incidental take of migratory birds. However, NMFS has informed NCDMF of their responsibility to minimize and avoid the incidental take of protected migratory birds.

Currently, bycatch reduction in gill nets is a pressing issue for bird bycatch research. Gill net bycatch of birds has proven to be a much more challenging problem to solve than longline bycatch, and has no immediate and obvious solutions. At present, there are no highly effective, universal bird bycatch reduction methods for gill net fisheries. However there are several characteristics that may affect what birds are bycaught in a gill net and how they are caught. These include: net dimensions, length, and height of the net, mesh size and twine type. General guidelines that have been shared with NCDMF to provide to fishers include: increase visibility to birds, and reduce encounter/entanglement rate. High-visibility panels, surface-sets, and one of the most effective methods of reducing bird bycatch is simply attending the nets (Wiedenfeld 2016).

Additionally, the American alligator (*Alligator mississippiensis*), which is managed by the USFWS, is listed as threatened under the ESA due to its similarity in appearance to other crocodilians that are listed under the ESA, ranges in the southern coastal U.S. from Texas to NC and in the inland states of Oklahoma and Arkansas. In NC, the NCWRC adopted a rule in 2018 that allowed limited take of American alligators according to the NC Alligator Management Plan (NCWRC 2017). Between 2001 and 2022, the NCDMF Observer Program documented four incidental takes in anchored gill-net gear, all large-mesh: one live take in Pamlico River (2012), one live take in New River (2014), two dead takes in Cape Fear River (both in 2018). However, due to the American alligator's ESA classification, a Section 10 ITP is not required for this species.

### 3.3 Essential Fish Habitat

Congress defined Essential Fish Habitat (EFH) as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802 et seq.). The EFH provisions of the MSA offer fishery resource managers a means to conserve fish habitat. NC inshore waters are characterized as estuarine waters, and are designated EFH for multiple federally managed species, including  bluefish, summer flounder, snapper grouper, gray snapper, cobia, king mackerel, Spanish mackerel, black sea bass, spiny dogfish, and multiple shrimp species. The inshore waters of NC include nursery and overwintering areas, non-vegetated flats, tidal wetlands, SAV, unconsolidated bottom, hardbottom, and oyster reef habitat. As these fisheries are ongoing, the proposed action evaluated for potential adverse effects to designated EFH is limited to the conservation measures outlined in Alternative 2 that would be required if incidental take of ESA-listed species is authorized under the ITP.

### 3.4 Social and Economic Environment

A variety of human activities may occur in the action area such as commercial fishing, recreational fishing, recreational boating, ecotourism, and other commercial uses, such as shipping. For the purposes of this EA, inshore anchored gill net fisheries likely are the most affected resource. The socioeconomic characteristics of commercial fishing vary by county and region along the coast of NC. The commercial fishing industry was a significant economic factor for some of the more prominent coastal fishing counties including Dare, Carteret, Pamlico, Hyde counties. In these counties, about 2 percent (>5 percent in Hyde County) of the workforce participated in commercial fishing (McInerny and Hadley 2014).

In Dare and Hyde counties, the average income of commercial fishers was greater than the average annual wage of other employees in those counties. Ex-vessel value is a measure of payment a fisher receives from a fish dealer for landed product and provides an indicator of the value of a fishery. From 1994 to 2021, the average annual ex-vessel value of landings (all finfish and shellfish) from commercial fishing operations in NC was $88.1 million. Inshore landings accounted for 63 percent of the total and were valued at about $55 million annually. In the most recent year available (2021), the top 10 valued species from all inshore gill nets in NC were spotted seatrout, striped mullet, southern flounder, spanish mackerel, red drum, bluefish, spot, catfishes, white perch, and black drum (total value = $6.0 million). These species made up 92 percent of the total ex-vessel value of $6.5 million for inshore gill nets in 2021.

As fishers spend their earnings in community stores, shipyards, offices, and other businesses, additional economic impacts are generated. NCDMF estimates that each dollar spent generates approximately $1.75 in economic impact within NC. Inshore gill net landed species contribute to the businesses of primary dealers and processors and were estimated to have an economic impact of $255 million per year to the state economy based on data from 2009 (Hadley and Crosson 2010). These estimates do not include impacts of locally caught seafood that support ancillary businesses (*e.g.*, restaurants, shipping and refrigeration companies).

### 3.5 Historic Places, Scientific, Cultural, and Historical Resources

Numerous historic scientific, cultural, and historical resources are found throughout the action area (*http://gis.ncdcr.gov/hpoweb/*). Four sites established under the National Estuarine Reserve System occur in the action area: Currituck Banks, Beaufort (Rachel Carson), and Masonboro and Zeke's Islands. Six sites established under the NC Coastal Reserve occur in the action area: Buxton Woods, Kitty Hawk Woods, Permuda Island, Bald Head Island, Bird Island, and Emily and Richardson Preyer Buckridge (*http://www.nccoastalreserve.net/*). These 10 sites were established for long-term research, education, and stewardship of inshore resources. Additionally, the Cape Hatteras and Cape Lookout National Seashores have marine waters in the action area.

## CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

This section presents the scientific and analytic basis for comparison of the direct, indirect, and cumulative effects of the alternatives. These are defined at 40 CFR 1508.7 and 1508.8, and these definitions are presented below. For the purpose of this analysis, NMFS considered the type of impact (direct, indirect, or cumulative), intensity (e.g., severity or magnitude) of the impact, and duration of the impact of the proposed action, as well as the context (significance of the action is analyzed in several contexts, e.g., the affected interests and the affected region). The magnitude or intensity of a known or potential impact is defined on a spectrum ranging from no impacts to major impacts. The potential impacts could be either beneficial or adverse. We will use the terms minor, moderate, and major and these are defined below. The duration of the potential impact takes into account the permanence of an impact; either short or long term impacts, which are also defined below.

Type of impact:

- **Direct Impact:** A known or potential impact caused by the proposed action or project that occurs at the time and place of the action.
- **Indirect Impact:** A known or potential impact caused or induced by the proposed action or project that occurs later than the action or is removed in distance from it, but is still reasonably expected to occur.
- **Cumulative Impact:** A known or potential impact resulting from the incremental effect of the proposed action added to other past, present, or reasonably foreseeable future actions.

Magnitude/Intensity:

- **Minor:** The action would have only a small impact on protected species. That impact, when adverse, may disturb a few individuals and alter their behavior temporarily, however it is not likely to "adversely affect" those individuals (per ESA definition). Population-level impacts (for example to migration, feeding and reproductive behavior) would not occur at a meaningful level. Changes to protected species' habitats (critical habitat) are minimal and do not appreciably differ from previous or natural conditions. Changes to habitat function are small and inconsequential.
- **Moderate:** The action has a more noticeable impact on protected species. That impact, when adverse, may widely and frequently disturb individuals, and the action may have the potential to "adversely affect" those individuals (per ESA definition). Population level impacts (for example to migration, feeding, and reproductive behavior) may occur. Changes to protected species' habitats (critical habitat) would be apparent when compared to previous or natural conditions. Changes to habitat function are measurable.
- **Major:** The action has an obvious impact on protected species. That impact, when adverse, may result in harassment of individuals at sub-lethal or lethal levels, and the action may have the potential to "jeopardize" those populations and "adversely modify" critical habitat (per ESA definitions). Population level impacts (for example to migration, feeding and reproductive behavior) are likely to occur. Changes to protected species' habitats (critical habitat) would be obvious when compared to previous or natural conditions. Changes to habitat function are obvious.

Duration of Potential Impacts:

- **Short-Term Impact:** A known or potential impact of limited duration, relative to the proposed activity and the environmental resource. For the purposes of this analysis, these impacts may be instantaneous or may last minutes, hours, days, or years.

- **Long-Term Impact:** A known or potential impact of extended duration, relative to the proposed activity and the environmental resource. For the purposes of this analysis, these improvements or disruptions to a given resource would last longer than 5 years.

## 4.1 Environmental Consequences Common to All Alternatives

Gill net restrictions implemented by NCDMF proclamation are included in **Section 2.1, Description of Activities.** Because these regulations are already in effect, the resulting beneficial effects to sturgeon and sea turtles by reducing the number of sturgeon and sea turtles that are incidentally captured in inshore anchored gill net fisheries would be the same under all alternatives. Additionally, under both alternatives fishing in Pamlico Sound in the fall of each year would be prohibited.

Short-term, minor and moderate direct impacts would occur when NC inshore anchored gill net fisheries result in incidental takes of any species of sea turtles and/or sturgeon, including live releases and mortalities. Each alternative is expected to result in both live captures and mortalities of sea turtles and sturgeon. Incidental capture of sea turtles and sturgeon in the gill net fishery may have short-term or long-term negative impacts on the individuals captured. It is important to recognize that an adverse effect on a single individual or a small group of animals does not translate into an adverse effect on the population or species unless it results in reduced reproduction or survival of the individual(s) that causes an appreciable reduction in the likelihood of survival or recovery for the species. In order for the proposed action to have an adverse effect on a species, the take of individual animals by the fishery would first have to result in: direct mortality, serious injury that would lead to mortality, or disruption of essential behaviors such as feeding or spawning, to a degree that the individual's likelihood of successful reproduction or survival was substantially reduced.

That mortality or reduction in the individual's likelihood of successful reproduction or survival would then have to result in a net reduction in the number of individuals of the species or DPS. In other words, the loss of the individual or its future offspring would not be offset by the addition, through birth or emigration, of other individuals into the population. In order for the proposed action to have an adverse effect on the species, the adverse impacts to individuals would need to be linked to a net loss to the species that would have to be reasonably expected, directly or indirectly, to appreciably reduce the likelihood of both the survival and recovery of the listed species in the wild.

*Incidental Take of Sturgeon*
The magnitude of this impact on loss of Atlantic sturgeon due to mortality at the level proposed in NCDMF's ITP application would likely reduce a portion of the population as specified, although the population size is unknown so an exact estimate cannot be produced. Therefore, NMFS can only reason a magnitude based on percent mortality commented on by researchers such as Bahn et al. (2012) and keep overall mortality under the stated percentage values. Impacts below the mortality level, such as impacts to reproduction or survival would be anywhere from none at all to injury and mortality, reduced fecundity, and delayed or aborted spawning migrations (Moser and Ross 1995, Collins et al. 2000, Moser et al. 2000).

Mortality is expected to result for 2.3 percent of sturgeon incidentally captured in set nets (Bahn et al. 2012). This 2.3 percent mortality rate takes into account the potential for occasional years with higher sturgeon mortality, such as the 8 percent mortality rate observed in 2007 in the Altamaha River, Georgia, by Bahn et al. (2012). In the 2014 sturgeon ITP application NCDMF estimated an overall mortality rate of 5.8 percent. The NCDMF Observer Program data from ITP years 2013 through 2021 indicated that the majority (94 percent) of incidental Atlantic sturgeon takes in anchored inshore gill nets were released alive and has an approximate mortality rate of 6 percent, which is what was predicted.

This mortality rate is higher than reported mortality rates of shortnose sturgeon in gill nets set in the Altamaha River, Georgia (2 percent; Bahn et al. 2012), but markedly less than mortality rates of Atlantic and shortnose sturgeon in gill nets set in Winyah Bay, South Carolina (16 percent; Collins et al. 1996) and of Atlantic sturgeon in federally regulated sink gill-net fisheries set in ocean waters from Maine to NC (22 percent; Stein et al. 2004). While these mortality rates are higher than has been observed in NC, that is likely because these studies are focused on offshore fisheries with no soak time restrictions. Longer soak times are associated with higher mortality rates (Kahn and Mohead 2010).

The effects of incidental capture of sturgeon in NC's inshore gill net fisheries are expected to be similar to the effects of capture of sturgeon for research purposes using anchored gill nets, meaning we expect most interactions to have direct, minor, short-term impacts. However, entanglement in nets could result in injury and mortality, reduced fecundity, and delayed or aborted spawning migrations of sturgeon; which would fall under direct, moderate to major short-term to long-term impacts (Moser and Ross 1995, Collins et al. 2000, Moser et al. 2000). Also, during periods of warm water or low DO, fish have been lethally stressed resulting in short-term cumulative impacts (Hastings et al. 1987, Secor and Gunderson 1998).

Fisheries operations under different DO, temperature, and salinity regimes will vary the effects of net capture on Atlantic sturgeon resulting in a cumulative effect. Research has revealed that sturgeon survival is affected by a relationship between temperature, DO, and salinity. Jenkins et al. (1993), Secor and Gunderson (1998), Niklitschek (2001), Secor and Niklitschek (2002), and Niklitshek and Secor (2009) demonstrated shortnose and Atlantic sturgeon survival in a laboratory setting was affected by reduced DO, increased temperature, or increased salinity. Likewise, Altinok et al. (1998), Sulak and Clugston (1998), Sulak and Clugston (1999), and Waldman et al. (2002) reported high temperatures, low DO, and high salinities result in lower survival of Gulf sturgeon.

The maximum safe temperature limits for adult shortnose sturgeon range between 28 and 31 °C. Kynard (1997) also notes empirical temperatures of 28 to 30 °C in summer months creates unsuitable shortnose sturgeon habitat. Atlantic sturgeon experience lower survival when water temperatures exceed 28 °C (Niklitshek and Secor 2005). Mayfield and Cech (2004) estimated the lethal water temperature for green sturgeon in the wild at 27 °C. Given inshore anchored gill net fisheries operate year-round, sturgeon caught during warmer months are anticipated to be more affected than those caught during the colder winter months.

Each individual sturgeon will react differently to changes in environmental conditions such as water quality, salinity, and stress associated with incidental capture. Because inshore anchored gill net fisheries take place year round, water temperatures could be warmer than the temperatures described above and higher mortality is to be expected during certain months based on high temperatures and low DO concentration.

Handling and restraining sturgeon may cause short-term stress responses, but those responses are not expected to result in pathologies because commercial fishers release sturgeon immediately after they are removed from their nets. The impacts from handling are anticipated to be short-term, minor, direct impacts. Sturgeon may inflate their swim bladder when held out of water (Moser et al. 2000), and if they are not returned to neutral buoyancy prior to release, they will float and be susceptible to sunburn and predation. Collins et al. (1996) note that as much as 20 percent of the shortnose sturgeon bycatch in the shad fishery are injured during capture. Bahn et al. (2012) discussed post-release mortality without mentioning any injuries; therefore, NMFS assumes there were likely no injuries observed because they would have been important in the post-release mortality discussion. The number of anticipated sturgeon injured as bycatch is between the number observed in South Carolina (20 percent) and the number reported during monitoring of the Altamaha River (0 percent), resulting in no more than 10 percent of the sturgeon bycatch being injured.

In addition to the captures that are expected to result in known mortalities, an unknown proportion of the Atlantic sturgeon that are released alive will succumb to post-release mortality or sub-lethal effects resulting in aborted spawning runs or failed reproductive efforts after being handled (Moser and Ross 1995). However, spawning Atlantic sturgeon are not likely to be intercepted by the fishery because of the size gill nets used, the timing, and the location of the nets. Additionally, research by Fox et al. (2019) has shown that tagging and telemetry is a feasible approach to developing post-release mortality estimates for sturgeon, thus the PIT tagging of incidentally caught sturgeon and the maintenance of the telemetry arrays in the action area will provide data needed.

Atlantic sturgeon critical habitat is located within the action area. However, NMFS does not expect that the issuance of ITP No. 27106 is likely to destroy or adversely modify designated critical habitat for any DPS of Atlantic sturgeon.

*Incidental Take of Sea Turtles*

Sea turtles are particularly prone to entanglement in gill nets because of their body configuration and behavior. Sea turtles can be wedged (*i.e.*, held by a mesh or meshes around the body) or become entangled when their mouth, maxillae, scutes, snout, or other projections become entangled in netting. Entanglement may lead to struggling that subsequently wraps the sea turtle in additional webbing. Observer data from the current sea turtle ITP years 2013 through 2021 indicate that the majority of sea turtles incidentally captured in NC inshore anchored gill nets were released alive: 76 percent, 81 percent, and 100 percent of green, Kemp’s ridley, and loggerhead sea turtles, respectively. The impacts from entanglement, handling, and release of live sea turtles are anticipated to be short-term, minor, direct impacts. However, sea turtles released alive from gill nets may later succumb to injuries sustained at the time of capture or from netting otherwise still attached when they are released (known as post-release or post-interaction mortality), resulting in more long-term and moderate impacts. Post-interaction mortality results from delayed effects of physiological disturbances or traumatic injuries caused by capture (NMFS 2022a). Some may suffer impaired swimming or foraging abilities, altered migratory behavior, and altered breeding or reproductive patterns. These behavioral changes may make sea turtles more susceptible to recapture within a short period of time. Numerous factors affect the survival rate of entangled sea turtles: activity level and condition of the sea turtle (*i.e.*, disease and hormonal status); and how much netting, if any, was attached to the sea turtle at release.

Gill nets can also cause sea turtles to be forcibly submerged. Although sea turtles can stay submerged for 20-180 minutes during voluntary dives, forced submergence due to net entanglement can be lethal (Lutz and Bentely 1985). Generally, when sea turtles are underwater, their bodies create energy for their cells in a process that uses oxygen from their lungs. Sea turtles that are stressed from being forcibly submerged due to capture in a gill net and those struggling to escape or surface for air will rapidly deplete their oxygen stores. Since they must continue to create energy with or without oxygen, when their oxygen stores are used up, they begin to create energy via a process that does not require oxygen (*i.e.*, anaerobic glycolysis). However, this process can significantly increase the level of a certain type of lactic acid in a sea turtle's blood (Lutcavage and Lutz 1997); if the level gets too high, death can occur. Numerous factors affect the survival rate of forcibly submerged sea turtles: the size (larger sea turtles can dive for longer), activity level and condition of the sea turtle (*i.e.*, disease and hormonal status); the ambient water temperature (anaerobic glycolysis may begin sooner during the warmer months); gill net soak time, and the number of times forced submergences have recently occurred to the animal. The physiological damage incurred due to net entanglement may affect the turtle's behavior and reduce its chances of survival post-release, and recovery from lactic acid build up can take over 15 hours, depending on the length of time submerged and level of acidosis (Lutz and Dunbar-Cooper 1987).

In 2015, NMFS convened an expert workshop to gather individual input to inform development of national criteria to assess post-interaction mortality for turtles bycaught in trawl, net, and pot/trap fisheries (Stacy et al. 2016). NMFS issued and has since updated a Policy Directive to define the process for post-interaction mortality determinations of sea turtles bycaught in trawl, net, and pot/trap fisheries (NMFS 2022a). The criteria allow experts to use data collected from observed takes to evaluate the condition of turtles and assign a post-release mortality rate. To apply the criteria, experts review the data and video collected by the observers on the body condition, new and existing injuries, as well as the activity level and behavior of the captured animal prior to release and during release. At this time, NMFS is unable to apply the criteria to previous sea turtle interactions in NC inshore anchored gill nets because insufficient detail is currently collected on the activity level/behavior of the sea turtles by observers; however beginning in the fall of 2023, NCDMF will collect additional data and video to allow for the post-interaction mortality criteria to be applied in the future.

While the NMFS post-interaction mortality criteria are unable to be used to evaluate risk of post-interaction mortality at this time, the results of a study by Snoddy and Williard (2010) is a useful tool for evaluating post-interaction mortality because the study occurred in the specific fishery and area subject to the ITP. To better understand post-interaction mortality in sea turtles captured in NC inshore anchored gill nets, Snoddy and Williard (2010) conducted a study to examine the rate of survival for sea turtles that were captured in shallow-set gill nets and released alive. In this study, the health of 14 live sea turtles captured in NC gill nets was assessed and the turtles were tagged with satellite transmitters prior to release. The primary goal of the study was to investigate the rate of post-interaction mortality of these turtles based on blood biochemistry and satellite telemetry results. The study documented one confirmed mortality and three suspected mortalities among the 14 turtles. Based on the data they collected, Snoddy and Williard estimated the post-release mortality of sea turtles captured in shallow-set gill nets ranges from 7.1 to 28.6 percent, although they caution that these rates are specific to soak times of 4 hours or less (Snoddy and Williard 2010).

*Essential Fish Habitat*

NC inshore anchored gill net fisheries are an ongoing activity and the alternatives considered in this EA are not expected to adversely affect the quality and/or quantity of EFH. The issuance of the ITP would require NCDMF to adaptively manage their inshore anchored gill net fisheries for sturgeon and sea turtle bycatch. Adaptive management includes a suite of alternatives, including season and area closures, which will reduce overall fishing effort. If any shift in effort occurs, the NCDMF Observer Program will also shift effort to continue required levels of coverage for the fisheries.

Further, gill nets using anchored sets have minimal effects on EFH. While adverse effects to EFH may occur from bottom contact of gill net anchors, the effects of these impacts to EFH are expected to be short-term and minor, with short recovery timeframes compared to other gear types (NEFMC 2016). The proposed conservation measures in NCDMF ITP application and conservation plan would result in reduced fishing effort that may confer benefits to designated EFH and includes gear modifications that are not expected to result in more than minimal effects to managed species designated EFH beyond those that may result from the operation of inshore anchored gill net fisheries absent such conservation measures. On May 16, 2023, SERO determined that no EFH conservation measures were necessary under the MSA to protect and conserve managed species designated EFH.

*Historic Places, Scientific, Cultural, and Historical Resources*

Numerous scientific, cultural, and historical resources are found throughout the action area. The inshore anchored gill net fisheries do not preclude availability for other scientific, cultural, or historic uses. All of the alternatives considered, the action would not occur in or indirectly affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or cause loss or destruction of significant scientific, cultural, or historical resources or preclude their availability for other scientific, cultural, or historic uses. Thus, effects on such resources are not anticipated under any alternative.

*Public Health and Safety*

The proposed action is not expected to have substantial adverse impacts on public health or safety because the action, issuing an ITP, would only provide an exemption to the ESA take prohibitions for capturing sturgeon and sea turtles in NC inshore anchored gill net fisheries.

*Non-Indigenous Species*

The issuance of this ITP would not introduce any species to the environment; therefore, it would not result in the introduction or spread of a non-indigenous species.

## 4.2 Effects of the Take Under the No Action Alternative (Alternative 1)

An alternative to the proposed action is no action, or denial of the ITP request. In this EA, NMFS will assume for the No Action Alternative that the status quo would largely be maintained for the inshore anchored gill net fisheries. While NMFS cannot know for certain what measures the state would implement absent the ITP, NMFS will assume that NCDMF will maintain the regulations it put in place by proclamation. While the proclamations provide significant management measures for these fisheries, they do not include the full suite of measures to monitor, minimize, and mitigate the impact of incidental take of ESA-listed species under the proposed conservation plan. Thus, the reduction in adverse impacts that are expected for the species from implementing that full suite of measures would not be achieved. In addition, it is possible that NCDMF would amend its commercial inshore anchored gill net fishing regulations to be less restrictive than they are under the existing regulatory structure.

*Social and Economic Effects*
Under the No Action Alternative, all large-mesh gill net fishing in Pamlico Sound in the fall of each year would continue to be closed per NMFS regulations (67 FR 56931, September 6, 2002). Interactions and subsequent mortality of ESA species in large-mesh gill net gear would be prevented in that area. Due to the seasonal nature of the flounder fishery, no fisher is exclusively dependent on the flounder fishery, rather the participants are diversified into other fisheries, such as blue crab trap and gill nets in the ocean and other inshore areas for various target species. The fall Pamlico Sound large-mesh gill net closure would not result in a total loss of revenue from the flounder fishery and for the participating fishers.

Under this alternative, the small-mesh gill net fishing in Pamlico Sound would remain open, and all waters outside of Pamlico Sound would remain open to large-mesh gill nets. While NMFS cannot know for sure how fishing practices may shift due to the closure, or if most effort would shift to small-mesh gill nets and other areas open to large mesh, it is likely that the fishers will identify alternate locations and gear to use and the overall fishing effort may not be significantly impacted.

Additionally, if no ITP is issued, NCDMF would not receive an exemption from the ESA prohibitions against take; therefore, any incidental takes of sturgeon and sea turtles resulting from NC commercial inshore anchored gill net fisheries would not be exempted. If NCDMF continues to operate these fisheries without an ITP, and protected species takes continue to occur, both NCDMF and the individual fishers could be liable to third party lawsuits and enforcement action by NMFS for violating the ESA and illegally taking endangered or threatened species. Any incidental takes of ESA species would result in the effects described in the *Environmental Consequences Common to All Alternatives* section.

To the extent that this alternative would limit additional burden on licensed commercial inshore gill net fishers (*e.g.*, avoiding additional reporting requirements, education etc.), the no action alternative would have less of a socio-economic impact than Alternative 2.

### 4.3 Effects of Take under Alternative 2 - Issue Incidental Take Permit as Requested in Application (Preferred Alternative)

Implementation of Alternative 2 has the potential to result in both positive and negative effects on sturgeon and sea turtle species. The issue most relevant to this analysis is the potential for impacts on the incidentally captured sturgeon and sea turtles, in addition to the effects described in the *Environmental Consequences Common to All Alternative*s section. Additional effects of Alternative 2 are described below.

*Incidental Take of Sturgeon*
In addition to the effects described in the *Environmental Consequences Common to All Alternatives* section, there are multiple positive effects (described below) to sturgeon that would occur upon implementation of the conservation plan and compliance with the terms and conditions of the ITP.

Implementation of adaptive management to close or restrict fishing effort in areas of high sturgeon abundance or encounter rates with gill nets will result in beneficial effects on sturgeon over the No Action Alternative (Alternative 1). Avoiding areas where high numbers of sturgeon bycatch occurs or may occur in gill net fisheries operating in inshore waters would result in fewer individual sturgeon being injured or killed, which potentially has a positive effect on the populations those individuals represent.

Implementation of the proposed mitigation and monitoring measures would provide education to recreational and commercial gill net fishers on identification of sturgeon species; proper handling techniques to minimize impacts to incidentally captured sturgeon, including the importance of frequently checking nets and immediately releasing sturgeon that were incidentally captured; the biological and legal importance of reporting incidental capture of sturgeon; and the importance of accurately recording sturgeon encounters and returning the trip tickets in a timely manner.

The combination of onboard observers, alternative platform observers, Marine Patrol officer reports, the TTP, and the OTSS would result in NCDMF better tracking of incidental captures of sturgeon in these gill net fisheries, compared to the No Action Alternative.

As mentioned in the *Environmental Consequences Common to All Alternatives* section the post-release mortality of live released sturgeon is an additional factor that must be considered when evaluating the effects of the authorized take on sturgeon populations.

Training and requiring observers to collect fin samples and tagging sturgeon caught incidentally in gill net fisheries operating in inshore waters would result in a better understanding of the number and composition of Atlantic sturgeon DPSs being taken. Captured individuals will be PIT tagged and a 1 $cm^2$ portion of their pelvic fin removed for genetic analysis using the methods described in Kahn and Mohead (2010). Total handling time is expected to be approximately 5- 10 minutes. The sturgeon would then be released alive. PIT tags ensure unique identification upon capture or recapture for population and growth estimates. To avoid duplicate tagging, all sturgeon will be scanned with a PIT tag reader prior to the insertion of a PIT tag.

Tagging procedures could result in stress during restraint and minor wounds from insertion. PIT tag use is not known to have any other direct or indirect effects on sturgeon when tags are appropriately sized and inserted correctly. There has been reported shortnose sturgeon mortality as a result of PIT tags being too large for the fish or inserted too deeply. Henne et al. (2008) found that 14 mm tags inserted into smaller shortnose sturgeon (150 to 220 mm TL) caused 40 percent mortality after 48 hours; however, no mortality occurred in a larger group of juvenile sturgeon measuring 250 to 330 mm TL using smaller 11.5 mm PIT tags. Therefore, to address these concerns, ITP conditions would restrict NCDMF from PIT tagging sturgeon <250 mm TL, the same size animals that have been authorized to be tagged for over 20 years in prior permits resulting in no mortality. As such, the tagging of Atlantic sturgeon with PIT tags is unlikely to have significant adverse impacts on sturgeon. Collection of a small (1 $cm^2$) genetic tissue sample, clipped with surgical scissors from a section of soft fin rays of incidentally captured sturgeon, does not appear to impair the sturgeon's ability to swim and is not thought to have any long-term adverse impact (Kahn and Mohead 2010). Many researchers have removed tissue samples according to this same protocol reporting no adverse effects; therefore NMFS does not anticipate any long-term adverse effects to the sturgeon from this activity. However, NMFS expects a benefit from the knowledge that would be gained from processing these samples. NCDMF has committed to having their genetic samples analyzed.

*Incidental Take of Sea Turtles*
In addition to the effects described in the *Environmental Consequences Common to All Alternatives* section, there are multiple positive effects (described below) on sea turtles that would occur upon implementation of the conservation plan and compliance with the terms and conditions of the ITP.

Implementation of adaptive management to close or restrict fishing effort in areas of high sea turtle abundance or encounter rates with gill nets will result in beneficial effects on sea turtles over the No Action Alternative (Alternative 1). Avoiding areas where high numbers of sea turtle bycatch occurs or may occur in gill net fisheries operating in inshore waters would result in fewer individual sea turtles being injured or killed, which potentially has a positive effect on the populations those individuals represent. By including an adaptive management provision, this alternative will allow NCDMF to respond to new information about populations of protected resources, changes in knowledge about sea turtle life history characteristics, and enhancements to targeted fishery gear types in a way that protects sea turtles and other endangered or threatened species as well as preserving a fishing industry that relies on access to NC's estuarine and inshore waters. This process will ensure that the incidental take of sea turtles does not exceed the authorized level and will therefore ensure continued protection for endangered or threatened sea turtle populations and other protected species.

Implementation of the proposed monitoring and mitigation measures would provide education to recreational and commercial gill net fishers on identification of sea turtle species; proper handling techniques to minimize impacts to incidentally captured sea turtles, including the importance of frequently checking nets and immediately releasing sea turtles that were incidentally captured; the biological and legal importance of reporting incidental capture of a sea turtle; and the importance of accurately recording sea turtle encounters and returning the trip tickets in a timely manner. Data collected by the Observer Program will provide information on species, size, and location and add to current population data in NC. Temporary marking of sea turtles may also provide information on movement patterns and post-interaction mortality of sea turtles that are resighted or recaptured. NCDMF will continue to assist researchers conducting studies to increase the knowledge and improve the conservation of sea turtles in NC waters. NCDMF will also assist NCWRC with response to sea turtle cold-stun events which would assist in ensuring cold-stunned sea turtles are found and transported to rehabilitation facilities as quickly as possible.

The combination of onboard observers, alternative platform observers, Marine Patrol officer reports, and the TTP would result in NCDMF better tracking incidental captures of sea turtles in inshore anchored gill net fisheries, compared to the No Action Alternative.

As discussed in the *Environmental Consequences Common to All Alternatives* section, the post-interaction mortality of live released turtles is an additional factor that must be considered when evaluating the effects of the authorized take on sea turtle populations. Despite the small sample size, the results of this study provide insight into the potential post-interaction mortality rates for shallow-set gill nets in NC. Given that the study was conducted in NC waters within the action area and within the fisheries that would be covered under the ITP, it is the best available data to assess post-interaction mortality for sea turtles in NC inshore anchored gill net fisheries. Snoddy and Williard (2010) estimated the post-release mortality of live sea turtles released from shallow-set gill nets in NC ranged from 7.1 to 28.6 percent, indicating that 7.1 to 28.6 percent of the sea turtles estimated to interact with gill nets in these fisheries (see Table 2) may succumb to post-release mortality.

The expected mortalities and any post-release mortalities resulting from this alternative may result in some level of impacts to the recovery of sea turtle species in the wild. It is difficult to identify the impact of NC inshore anchored gill net fisheries on sea turtles populations due to the uncertainty of population estimates for each species/DPS in NC waters and the fact that there are a number of other stressors on these populations that must be considered as cumulative effects. However NMFS has some information to indicate species/DPS trends, described below. Generally, under Alternative 2, the impact from inshore anchored gill net fisheries on these species can be expected to be less than they would be under Alternative 1 where the ITP would not be issued.

Green sea turtles from the North Atlantic DPS (93 percent of the green sea turtles in the action area) have an increasing population trend and green sea turtles from the South Atlantic DPS (7 percent of greens in the action area) have a mixed population trend (driven by differences in trends on nesting beaches). As previously noted the density of greens and their habitat use likely increases their co-occurrence with some anchored gill-net fisheries, especially the fall flounder fishery (McClellan and Read 2009). Nevertheless, this fishery operates in shallow water, often <1 m deep, where sea turtles that do get entangled would have a greater opportunity to access the water's surface to breathe, which may contribute to lower rates of observed post-interaction mortality (McClellan and Read 2009, Snoddy et al. 2009). Additionally data from strandings and fisheries incidental capture data (pound nets and gill nets) indicate an increase in the relative abundance of green sea turtles in NC inshore estuarine waters (Epperly et al. 2007, Byrd et al. 2011, Braun-McNeill et al. 2018, Shamblin et al. 2018, NCWRC unpublished data). NCDMF has also requested a lower level of takes than authorized in the current ITP. A direct comparison to the numbers of requested takes in NCDMF's ITP application to the current authorized number of takes is not possible because the current authorized number of takes includes both estimated totals extrapolated across the fishery (from model predictions) and counts of observed takes by MU and mesh-size category. Nevertheless, comparisons can show relative differences between the annual estimates used to develop final requested takes and the current authorized number of takes for MUs B, D1, and E for anchored inshore large-mesh gill nets. The mean annual requested take for the first 6 years (TP 2) in MUs B, D1, and E for anchored inshore large-mesh gill nets is 129 live takes compared to the current number of authorized takes of 330 (61 percent decrease) and 41 dead takes compared to the current number of authorized takes of 165 (75 percent decrease). During the remaining 4 years (TP 3) MUs B, D1, and E for anchored inshore large-mesh gill nets, the mean annual requested take would be 212 live takes compared to the current authorized number of 330 (36 percent decrease) and 66 dead takes compared to the current authorized number of 165 (60 percent decrease). Although similar comparisons are not possible for anchored inshore large-mesh gill nets in other MUs and anchored inshore small-mesh gill nets in all MUs, the general trend of decreased takes is expected during the first 6 years of the requested ITP due to the increase in regulations limiting effort in the large-mesh gill-net fishery for flounder and also during the remaining 4 years of the requested ITP due to realized benefits from regulations put into place for the current ITP to minimize incidental takes of protected species.

Overall Kemp's ridley sea turtles have an unknown population trend, however nesting in the U.S. has been increasing since the 1980s. As previously noted, although Kemp's ridleys do occur in shallow waters, telemetry data indicate that this species occurs often in the deep waters of Pamlico Sound which may decrease rates of incidental capture in the anchored large-mesh gill-net fishery for flounder, which operates primarily in shallow water, often less than 1 m deep (McClellan and Read 2009). NCDMF has also requested a lower level of takes than authorized in the current ITP. Similar to green sea turtles, a direct comparison to the numbers of requested takes in NCDMF's ITP application to the current authorized number of takes is not possible. Nevertheless, comparisons can show relative differences between the annual estimates used to develop final requested takes in TP 3 and current authorized number of takes for MU B and large-mesh gill nets. The mean annual requested take for the last 4 years of the new ITP (TP 3) in MU B for anchored inshore large-mesh gill nets would be 27 live takes compared to current authorized takes of 53 (49 percent decrease). Although similar comparisons are not possible for other MUs and for small-mesh gill nets, the general trend of decreased takes is expected during the first 6 years of the requested ITP due to the increase in regulations limiting effort in the large-mesh gill-net fishery for flounder and also during the remaining 4 years of the requested ITP due to realized benefits from regulations put into place for the current ITP to minimize incidental takes of protected species.

Data from hawksbill sea turtles nesting assemblage in the Atlantic Ocean indicate a mix of population trends. The NCDMF Observer Program has only documented two observed incidental takes (both released alive) of hawksbill sea turtles since the program began in 2000. NCDMF has requested an annual take of two individuals (live or dead) due to the rare occurrence of hawksbill sea turtles in areas overlapping with inshore anchored gill net fisheries. This requested take is lower than what is approved in the current ITP (eight from MU B, D1, D2, and E; eight [any species] from MU A and C).

The northwest Atlantic population of leatherback sea turtles has a declining population trend, however the NCDMF Observer Program has never documented an incidental take of a leatherback since the program began in 2000. NCDMF has requested an annual take of two individuals (live or dead) due to the rare occurrence of leatherback sea turtles in areas overlapping with inshore anchored gill net fisheries. This requested take is lower than what is approved in the current ITP (eight from MU B, D1, D2, and E; eight [any species] from MU A and C).

The overall nesting trend of NWA DPS of loggerhead sea turtles appears to be stable, neither increasing nor decreasing, for over two decades and the Northern Recovery Unit has demonstrated an increasing growth rate. NCDMF has requested an annual take of 12 individuals (live or dead) due to the occasional occurrence of loggerhead sea turtles in areas overlapping with inshore anchored gill-net fisheries. This requested take is lower than what is approved in the current ITP (24 from MU B, D1, D2, and E; eight [any species] from MU A and C).

*Effects on Biodiversity and Habitat*

Because the ITP is concerned only with the effects of the fishery on ESA-listed species, and is not a fishery management action, issuance of the proposed ITP would not interfere with benthic productivity, predator-prey interactions, or other biodiversity or ecosystem functions. Issuance of the proposed ITP would not involve alteration of substrate, movement of water or air masses, or other interactions with physical features of ocean and coastal habitat. Thus, effects on biodiversity and habitat due to the issuance of the ITP are not anticipated.

*Social and Economic Impacts*

To the extent that this alternative would result in additional requirements (in terms of fishing time) to commercial gill net fishers deploying anchored sets and operating in inshore waters, NCDMF could potentially close areas or further restrict fisheries practices and effort in areas and times identified as a high potential for sturgeon or sea turtle bycatch. This would result in adverse socio-economic impacts to the fishing community and ancillary businesses that are greater than the No Action Alternative (Alternative 1). Under this alternative, other management areas would still remain open to large and small-mesh gill nets. While NMFS cannot know for sure how fishing practices may shift due to a hotspot or other closure, or if most of the fishing effort would shift to other management areas, it is unlikely that overall fishing effort would be significantly impacted. Furthermore, the ITP and conservation plan are based in large part on the existing regulations under the currently authorized ITPs, however there are additional regulations that would be put in place and are noted in **Appendix C**. NMFS does not anticipate any additional incremental impact resulting from issuance of the ITP.

## 4.4 Cumulative Impacts

A cumulative impact is the impact on the environment resulting from the incremental impact of the action, when added to other past, present, and reasonably foreseeable future actions, regardless of the agency (federal or non-federal) or person undertaking such other actions.

Significance from the proposed action cannot be avoided if it is reasonable to anticipate a significant cumulative impact on the environment. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over time. Sturgeon and sea turtles face numerous natural and anthropogenic direct and indirect threats that shape their status and affect their ability to recover. As many of the threats are similar in nature for listed sturgeon and sea turtle species, those identified in this section below are discussed in a general sense for Atlantic and shortnose sturgeon species and all listed sea turtles, unless otherwise specified.

### 4.4.1 Fisheries

*Sturgeon*

Current and future recreational and commercial fishing activities in state and federal waters may capture, injure, or kill sturgeon. However, it is not clear to what extent these future activities would affect listed species differently than the current fishery activities. Atlantic sturgeon populations occur within and outside of the zone of influence of the ITP to be issued to NCDMF. Historically, one of the major contributors to declines in Atlantic sturgeon populations was direct commercial harvest of this fish. A coast-wide moratorium on harvesting Atlantic sturgeon was implemented in 1998 pursuant to Amendment 1 of the Atlantic States Marine Fisheries Commission's (ASMFC) Interstate Fishery Management Plan for Atlantic sturgeon (ASMFC 1998). Retention of Atlantic sturgeon from the U.S. Exclusive Economic Zone (EEZ) was prohibited by NMFS in 1999 (64 FR 9449; February 26, 1999). While the intentional harvest of Atlantic sturgeon in federal waters has been prohibited since 1999, unintended bycatch in state and federally managed fisheries still occurs. Atlantic sturgeon belonging to the Carolina DPS are also incidentally caught in U.S. fisheries that operate in federal waters (Wirgin et al. 2015). However, there is limited observer coverage of federal fisheries that interact with Atlantic sturgeon. As a result, the total number of Atlantic sturgeon interactions with fishing gear in federal waters is unknown. Even when a fish is observed, captured, and released alive, the rate of post-release mortality is unknown. Similarly, shortnose sturgeon are also taken incidentally in other fisheries occurring within state fisheries that deploy nets, and these species are likely targeted by poachers throughout their range (Dadswell 1979, Dovel et al. 1992, Collins et al. 1996). Impacts from poaching are unknown. Specific information on interactions with sturgeon within all NC state fisheries operating in the action area is not available. However, the issuance of the proposed ITP would provide conservation measures to minimize and mitigate sturgeon interactions in the inshore anchored gill net fishery. Without the conservation measures proposed in NCDMF's conservation plan or additional measures employed in other state and federal fisheries, fisheries effects on listed species in the future are expected to be similar or greater than current conditions.

*Sea turtles*

Incidental bycatch in commercial fisheries is identified as a major contributor to past declines, and a threat to future recovery, for all of the sea turtle species (Lewison et al. 2013, NMFS and USFWS 2013a, 2013b, 2015, 2020, 2023). Alteration of prey abundance and alteration of bottom habitats from bottom tending fishing gear (e.g., bottom trawlers) have also been identified as a threat to sea turtles.

Domestic fisheries often capture, injure, and kill sea turtles at various life stages. Sea turtles in the pelagic environment are exposed to U.S. Atlantic pelagic longline fisheries and similar fisheries in international waters and foreign nation waters. Sea turtles in the benthic environment in waters off the coastal United States are exposed to a suite of other fisheries in federal and state waters and similarly across their range in the waters of other countries. These fishing methods include trawls, gill nets, purse seines, hook-and-line gear [including bottom longlines and vertical lines (e.g., bandit gear, handlines, and rod-reel)], pound nets, and trap fisheries.

In addition to domestic fisheries, sea turtles are subject to direct as well as incidental capture in numerous foreign fisheries, further impeding the ability of sea turtles to survive and recover on a global scale. For example, pelagic stage sea turtles, especially loggerheads and leatherbacks, circumnavigating the Atlantic are susceptible to international longline fisheries (Lewison et al. 2013). Bottom longlines and gill net fishing is known to occur in many foreign waters, including (but not limited to) the northwest Atlantic, western Mediterranean, South America, west Africa, central America, and the Caribbean. Shrimp trawl fisheries are also occurring off the shores of numerous foreign countries and pose a significant threat to sea turtles similar to the impacts seen in U.S. waters. Many unreported takes or incomplete records by foreign fleets make it difficult to characterize the total impact that international fishing pressure is having on listed sea turtles. Nevertheless, international fisheries represent a continuing threat to sea turtle survival and recovery throughout their respective ranges.

The proposed ITP would reduce or remove the likelihood of sea turtle bycatch and/or the likelihood of serious injury or mortality in NC inshore anchored gill net fisheries. However, other state and federal managed commercial and recreational fisheries are reasonably certain to occur within and outside the zone of influence of the proposed ITP in the foreseeable future, therefore interactions of sea turtles with these fisheries are anticipated. The issuance of the proposed ITP would provide conservation measures to minimize and mitigate species interactions. Without the conservation measures proposed in NCDMF's conservation plan or additional measures employed in other state and federal fisheries, fisheries effects on listed species in the future are expected to be similar or greater than current conditions.

### 4.4.2 Non-Fishery In-Water Activities

Dredging and disposal

*Sturgeon*

Navigation channel construction and maintenance may both alter sturgeon spawning habitat resulting in a loss of spawning grounds and directly cause injury or mortality by entrainment during dredge operations. Dredging operations may impact sturgeon by destroying benthic feeding areas, disrupting spawning migrations, altering local hydrology, and resuspending fine sediments in habitat that covers required substrate. Because sturgeon are benthic omnivores, the modification of the benthos from dredging activities in the action area has likely affected the quality, quantity, and availability of sturgeon prey species. Periods of low DO concentrations and high water temperature can result in physiological stress (Campbell and Goodman 2004, Jenkins et al. 1993, Secor and Gunderson 1998, Secor et al. 2000) and poor body condition (Flournoy et al. 1992) for sturgeon. Stress symptoms may include immobility or reduced movement (Jenkins et al. 1993, Crocker and Cech Jr. 1997, Wilkens et al. 2015), increased ventilation rates, and decreased metabolism (Secor and Niklitschek 2001). Low DO levels can reduce growth, feeding, and metabolic rates. Fish may swim to the surface in low oxygen conditions to receive more oxygen-rich water at the air-water interface (Secor and Niklitschek 2001, NMFS 2010). Hence, even a minor decrease in DO from dredging or dredge-related activities during these times can be harmful or fatal to sturgeon in rivers. This is particularly relevant when the dredged sediment contains high concentrations of organic material, these sediments often have high oxygen demands, and will actively absorb DO from the water column, lowering the oxygen available for other aquatic life. Dredging these sediments can expose them to the water column where they can further degrade water quality beyond the changes in DO from dredging other types of sediments. During times when DO is low, sturgeon may seek refuge from stressful environmental conditions by "hunkering" down and aggregating in deep, cool holes; for shortnose sturgeon in the Delaware River, these areas usually occurred in deeper waters (Hastings et al. 1987, Collins et al. 2002). Additionally, sturgeon seek refuge from unsuitable water quality conditions (*e.g.*, extreme temperatures and salinities) and during these times can tightly aggregate in relatively small areas within a river (*e.g.*, a section that was <1 km in length) (Collins et al. 2002). Juvenile shortnose sturgeon that were tracked in the Savannah River traveled upriver when temperatures became too warm and downriver when the river temperatures were cooler (Collins et al. 2002). When sturgeon aggregate in a particular location, there is an increased risk of take via direct interaction with dredge equipment. In addition, if they are aggregating in an area to seek refuge from stressful water quality conditions, dredging or dredge-related effects that force sturgeon to move from the area of refuge to a location that cannot support their physiological needs can also be harmful or fatal.

*Sea turtles*

The construction and maintenance of federal navigation channels have caused sea turtle mortalities. Hopper dredges can entrain and kill sea turtles. Dredging may also alter foraging habitat and relocation trawling associated with the project may injure or kill sea turtles and displace the turtles out of their preferred habitat. Whole sea turtles and sea turtle parts have been taken in hopper dredging operations from New York through Florida. Between 1980 and 2003, the last time a comprehensive report was prepared by the U.S. Army Corps of Engineers, 508 sea turtles were incidentally taken during dredging activities at 38 locations throughout the southeastern U.S. (Dickerson et al. 2004). Most sea turtle encounters with hopper dredges result in serious injuries or mortalities.

Due to beach erosion in some winters, dredged materials are commonly borrowed from offshore shoals to deposit onto beaches, generally for recreational purposes. Harbor and channel dredging can indirectly affect sea turtles by degrading habitat, such as altering benthic foraging areas, decreasing the number and abundance of prey species, and reducing water quality by increasing turbidity and releasing potential contaminants into the water column (Ramirez et al. 2017). Trailing suction hopper dredges and other support vessels may strike slow-moving sea turtles or entrain sea turtles in the draghead, as it moves across the seabed. Such direct impacts often result in severe injury and/or mortality. Nesting success can be reduced by inappropriate quality sand deposited onto nesting beaches, or nests can be directly injured by sand deposited over nests. Dredging and beach nourishment impacts to sea turtles are likely to continue into the foreseeable future.

Water cooling systems

Sturgeon and sea turtles entering coastal or inshore areas have also been affected by entrainment and/or impingement in the cooling-water intake systems (CWIS) of electrical generating plants. Impingement means physical contact with the intake screens during withdrawal of cooling water by sea turtles or sturgeon large enough to be retained by traveling screens. To keep condensers from clogging with solid materials and biota, many power plant CWIS use a combination of large-and finer-mesh screens. Typically, the large-mesh screens or bar racks are fixed in place while the finer-mesh screens can move to facilitate cleaning. These movable screens are called traveling screens. As the water passes through these screens, organisms larger than the mesh openings can be impinged against the screens. Because of their more limited swimming abilities, most fish impinged are less than 1 year old and sea turtles with an underlying condition leaving them susceptible to impingement. The survival rate for impinged species is species specific and varies with size, season, and depends on several other power plant-related factors, such as intake velocity, plant design, and operating conditions.

Entrainment means the transport through the CWIS of sturgeon that pass through the mesh openings of the intake screens, as they are too small to be retained by the traveling screens. Planktonic organisms are susceptible to entrainment because their small size and limited swimming ability reduce the potential for escape from the entrained water mass and allow passage through the mesh of the traveling screens. Entrained fish are typically limited to the younger life stages of fish and this is the case for sturgeon. Any entrained larvae pass through the circulating pumps and condenser tubes along with the cooling water. The cooling water and any entrained fish larvae then enter the discharge canal or conduit for return to the estuary. During their passage through the plant, entrained individuals experience a variety of stresses, some of which may cause death. Survival rates for fish larvae entrained by power plants depend on the species' hardiness as well as their responses to thermal stresses.

Vessel interactions

*Sturgeon*

Sturgeon (Atlantic and shortnose) are susceptible to vessel strike if a deep draft vessel encounters the animals at the sea floor or if the sturgeon moves up into the water column or is sucked into the propeller, however very little is known about the effects of vessel strikes on individuals from the Carolina DPS. Large vessels have typically been implicated because of their deep draft relative to smaller vessels, which increases the probability of vessel collision with demersal fishes like sturgeon, even in deep water (Brown and Murphy 2010). Also, Miranda and Kilgore (2013) estimated that the large towboats on the Mississippi River, which have a propeller diameter of 2.5 m, a draft of up to 9 ft (2.74 m), and travel at approximately the same speed as tugboats (<10 knots or 5.14 m per second), kill a large number of fish by drawing them into the propellers. They indicated that shovelnose sturgeon (*Scaphirhynchus platorynchus*), a small sturgeon (~50-85 cm in length) with a similar life history to shortnose sturgeon, were being killed at a rate of 0.02 individuals per kilometer traveled by the towboats. Historically, vessel strike strandings in the action area have been rare. However, NMFS Southeast Region began dispersing "Report Sturgeon" signage in NC in July 2018, with a particular focus on the Cape Fear River. Since those signs were deployed, five sturgeon strandings, showing evidence of a vessel strike, were reported from Cape Fear River. The increase in reporting may be due to the placement of signs asking citizens to report that were posted June 2018 and the designation of

Atlantic sturgeon critical habitat (82 FR 39160, August 17, 2017). Additional reports of sturgeon strandings showing signs of vessel strikes have been reported in sturgeon rivers. There is no directed survey for sturgeon strandings and all records are opportunistically reported by the public or resource managers that happen to find an animal, usually on a beach or river bank. A number of the rivers in the southeast where sturgeon are present are bounded by areas not easily accessible to the public. Thus, a number of sturgeon strandings/carcasses may go unreported simply because they are not detected. In addition, the continued maintenance of navigation channels may allow these areas to maintain clearance between the river bottom where sturgeon are likely to occur and vessels traveling these channels thereby reducing the risk of vessel strikes from all vessels.

*Sea turtles*
Vessel strikes represent a recognized threat to air breathing marine species including sea turtles and these injuries are commonly observed in stranded animals. Vessel strikes can lead to the injury, debilitation, harassment, and/or mortality of sea turtles (Dwyer et al. 2003). Vessel strikes are a poorly-studied threat, but have the potential to be an important source of mortality to sea turtle populations (Work et al. 2010). The magnitude of these interactions is not currently known. The Sea Turtle Stranding and Salvage Network's reports include evidence of vessel interactions (*e.g.*, carapace damage from propeller and skeg impact injuries) with sea turtles. It is not known how many of these injuries occur pre- or post-mortem. It is likely that the interactions with commercial and recreational vessels result in a higher level of sea turtle mortality than what is documented, since some carcasses would not reach the beach. Minor vessel collisions may cause injuries that weaken or otherwise affect sea turtles that can then become vulnerable to predation, disease, and other natural or anthropogenic hazards.

Vessels in the action area include federal, private, and commercial vessels. Federal vessels include those maintained by the U.S. Navy, U.S. Coast Guard, NOAA, and U.S. Army Corps of Engineers. Private and commercial vessels also have the potential to interact with sea turtles. Vessel activities may result in the lethal (*e.g.*, boat strike) and non-lethal (*e.g.*, harassment) impacts to ESA-listed species that could prevent or slow a species' recovery. However, fishing vessels represent only a portion of marine vessel activity. Due to reduction in vessel speed during fishing operations, collisions are more likely when vessels are in transit. As fishing vessels are smaller than large commercial tankers and container ships, and slower and less agile than recreational speed boats, collisions are less likely to result in mortality. Commercial fishing vessel activity is not likely to increase in the foreseeable future along the Atlantic coast. While allowable catch levels may increase as fish stocks are rebuilt, associated increases in catch rates may preclude the need to increase effort to obtain allowable catch. Conversely, recreational vessel activity may increase as human populations on the coast continue to grow and access to the ocean increases. Vessels (federal and private, commercial and recreational) will continue to operate in the area for the foreseeable future, and the impacts described above will likely persist.

<u>Stream alteration</u>
Dams and their operations are the cause of major instream flow alteration in the southeast (USFWS et al. 2001). Hill (1996) identified the following impacts of altered flow to anadromous fishes by dams: (1) altered DO concentrations and temperature; (2) artificial destratification; (3) water withdrawal; (4) changed sediment load and channel morphology; (5) accelerated

eutrophication and change in nutrient cycling; and (6) contamination of water and sediment. Activities associated with dam maintenance, such as dredging and minor excavations along the shore, can release silt and other fine river sediments which can be deposited in nearby spawning habitat. Dams may reduce the viability of sturgeon populations by removing free-flowing river habitat. Seasonal deterioration of water quality can be severe enough to kill fish in deep storage reservoirs that receive high nutrient loadings from the surrounding watershed (Cochnauer 1986). Important secondary effects of altered flow and temperature regimes include decreases in water quality, particularly in the reservoir part of river segments, and changes in physical habitat suitability, particularly in the free-flowing part of river segments or areas downstream. The most commonly reported factor influencing year-class strength of sturgeon species is flow during the spawning and incubation period (Jager et al. 2002).

### 4.4.3 Coastal Development and Erosion Control

Coastal development can result in the loss or degradation of sturgeon habitat and deter or interfere with sea turtle nesting, affect nesting success, and degrade nesting habitats for sea turtles. The structural modification of shorelines or waterways may result in a loss of connectivity to spawning habitat or significantly altered depths, rates of sedimentation, substrate and/or water flow that degrades sturgeon habitat. Structural impacts to sea turtle nesting habitat include the construction of buildings and pilings, beach armoring and renourishment, and sand extraction (Lutcavage et al. 1997, Bouchard et al. 1998). These factors may decrease the amount of nesting area available to females and change the natural behaviors of both adults and hatchlings, directly or indirectly, through loss of beach habitat or changing thermal profiles and increasing erosion, respectively (Ackerman 1997, Witherington et al. 2003, Witherington et al. 2007). In-water erosion control structures such as breakwaters, groins, and jetties can impact nesting females and hatchlings as they approach and leave the surf zone or head out to sea by creating physical blockage, concentrating predators, creating longshore currents, and disrupting wave patterns. Nocturnal human activities along nesting beaches may also discourage sea turtles from nesting sites. In addition, coastal development is usually accompanied by artificial lighting which can alter the behavior of nesting adults (Witherington 1992) and is often fatal to emerging hatchlings that are drawn away from the water (Witherington and Bjorndal 1991). Coastal counties are presently adopting stringent protective measures to protect hatchling sea turtles from the disorienting effects of beach lighting. The negative effects of coastal development and erosion control activities to listed species are not expected to dissipate in the future.

### 4.4.4 Environmental Contamination

Environmental contaminants include atmospheric loading of pollutants, stormwater runoff from coastal development, groundwater discharges, and industrial development. Non-point sources from terrestrial activities have caused reductions in water quality leading to degradation of habitat for sturgeon and sea turtles. Chemical contamination may have effects on listed species' reproduction and survival. Multiple municipal, industrial, and household sources, as well as atmospheric transport, introduce various pollutants such as pesticides, hydrocarbons, organochlorides (*e.g.*, DDT, PCBs, and PFCs), and others that may cause adverse health effects to sea turtles (Iwata et al. 1993, Grant and Ross 2002, Garrett 2004, Hartwell 2004). Acute exposure to hydrocarbons from petroleum products released into the environment via oil spills and other discharges may directly injure individuals through skin contact with oils (Geraci 1990), inhalation at the water's surface and ingesting compounds while feeding (Matkin and Saulitis 1997). Hydrocarbons also have the potential to impact prey populations, and therefore may affect listed species indirectly by reducing food availability in the action area. Excessive turbidity due to coastal development and/or construction sites may also influence sea turtle or sturgeon foraging ability.

*Sturgeon*
The effects of changes in water quality (temperature, salinity, DO, contaminants, etc.) in rivers and coastal waters inhabited by sturgeon are expected to be more severe for those populations that occur at the southern extreme of the sturgeon's range (*e.g.*, the action area), and in areas that are already subject to poor water quality as a result of eutrophication. Heavy metals and organochlorine compounds accumulate in sturgeon tissue, but their long-term effects are not known (Ruelle and Henry 1992, Ruelle and Keenlyne 1993). Elevated levels of contaminants, including chlorinated hydrocarbons, in several other fish species are associated with reproductive impairment (Cameron et al. 1992, Longwell et al. 1992, Drevnick and Sandheinrich 2003, Hammerschmidt et al. 2002), reduced egg viability (von Westernhagen et al. 1981, Giesy et al. 1986, Billsson et al. 1998, Mac and Edsall 1991, Matta et al. 1997), reduced survival of larval fish (Berlin et al. 1981, Giesy et al. 1986), delayed maturity (Jørgensen et al. 2004) and posterior malformations (Billsson et al. 1998). Pesticide exposure in fish may affect antipredator and homing behavior, reproductive function, physiological development, and swimming speed and distance (Beauvais et al. 2000, Scholz et al. 2000, Moore and Waring 2001, Waring and Moore 2004). It should be noted that the effect of multiple contaminants or mixtures of compounds at sublethal levels on fish has not been adequately studied. Atlantic sturgeon use marine, estuarine, and freshwater habitats and are in direct contact through water, diet, or dermal exposure with multiple contaminants throughout their range (Atlantic Sturgeon Status Review Team 2007). Trace metals, trace elements, or inorganic contaminants (mercury, cadmium, selenium, lead, etc.) are another suite of contaminants occurring in fish. Post (1987) states that toxic metals may cause death or sublethal effects to fish in a variety of ways and that chronic toxicity of some metals may lead to the loss of reproductive capabilities, body malformation, inability to avoid predation, and susceptibility to infectious organisms.

Waterborne contaminants may affect the aquatic environment. Issues such as raised fecal coliform and estradiol concentrations affect all wildlife that utilize riverine habitat. The impact of many of these waterborne contaminants on sturgeon is unknown, but they are known to affect other species of fish in rivers and streams. These compounds may enter the aquatic environment via wastewater treatment plants, agricultural facilities, as well as runoff from farms (Folmar et al. 1996, Culp et al. 2000, Wildhaber et al. 2000, Wallin et al. 2002) and settle to the bottom, therefore affecting benthic foragers to a greater extent than pelagic (Geldreich and Clarke 1966). For example, estrogenic compounds are known to affect the male to female sex ratio of fish in streams and rivers via decreased gonadal development, physical feminization, and sex reversal (Folmar et al. 1996). Although the effects of these contaminants are unknown in shortnose and Atlantic sturgeon, Omoto et al. (2002) found that varying the oral doses of estradiol-17β or 17α methyltestosterone given to captive hybrid "bester" sturgeon (*Huso huso* female × i male) could induce abnormal ovarian development or a lack of masculinization. These 64 compounds, along with high or low DO concentrations, can result in sub-lethal effects that may have negative consequences on small populations.

*Sea turtles*
Sea turtles may also be affected directly or indirectly by fuel oil spills. Fuel spills involving fishing vessels are common events. However, these spills are typically small amounts that are unlikely to affect listed species unless they occur adjacent to nesting beaches or in foraging habitats. Larger spills may result from accidents, although these events are rare and generally involve small areas. Fuel spills may impact nesting beaches, bottom habitat, and benthic resources, but it is unknown to what extent oil releases from recreational and commercial vessels or shoreline activities such as fueling facilities may affect sea turtles in migratory or foraging areas. Immediately after an oil release, direct contact with petroleum compounds or dispersants used to respond to spills may cause skin irritation, chemical burns, and infections (Lutcavage et al. 1995). Inhalation of volatile petroleum vapors can irritate lungs and dispersants have a surfactant effect that may further irritate or injure the respiratory tract, which may lead to inflammation or pneumonia (Shigenaka et al. 2010). Ingestion of petroleum compounds may remain in the turtle's digestive system for days (Van Vleet and Pauly 1987), which may affect the animals' ability to absorb or digest foods. Absorption of petroleum compounds or dispersants may damage liver, kidney, and brain function as well as causing anemia and immune suppression as seen in seabirds that have ingested and absorbed petroleum compounds (Shigenaka et al. 2010). Exposure to an oil release can cause long-term chronic effects such as decreased survival and lowered reproductive success may occur.

Persistent petrochemical products in the marine environment are frequently encountered by sea turtles. Tarballs are frequently observed sealing the mouths and nostrils of small sea turtles. Witherington (1994) found evidence of tar in the gastro-intestinal tracts of over one-third of the post-hatchling sea turtles examined offshore of Florida in 1993 and evidence of tar ingestion was documented in 20 percent of neonate loggerhead sea turtles examined along the Gulf Stream (Witherington 2002). Van Vleet and Pauly (1987) concluded that the source of tar observed on stranded sea turtles in the Gulf of Mexico originated from crude oil tanker discharges and have a significant impact on marine turtles in the eastern Gulf of Mexico.

Threats of oil releases and discharges from vessels are greatest in port areas, shipping lanes, and areas of heavy recreational vessel use. Oil releases caused by oil and gas development and transportation activities, as well as oil releases from vessels or shoreline activities such as fueling facilities adjacent to nesting beaches, may directly affect sea turtles and nesting beaches. During the decade between 1992 and 2001, sea turtles were identified as resources at risk in 73 oil releases. Nine of these releases occurred along Florida's Atlantic coast (Milton et al. 2003). The continued exposure of sea turtles and other living marine resources due to vessel and land based oil releases is likely to continue into the future. There is no basis to conclude that the level of interaction represented by the various vessel activities that would occur under the preferred alternative would be detrimental to the existence of biological resources considered with the action.

The April 20, 2010, explosion of the Deepwater Horizon (DWH) oil rig affected sea turtles in the Gulf of Mexico. An assessment has been completed on the injury to Gulf of Mexico marine life, including sea turtles, resulting from the spill (DWH Trustees 2015). Following the spill, juvenile Kemp's ridley, green, and loggerhead sea turtles were found in *Sargassum* algae mats in the convergence zones, where currents meet and oil is collected. Sea turtles found in these areas were often coated in oil and/or had ingested oil. The spill resulted in the direct mortality of many sea turtles and may have had sub-lethal effects or caused environmental damage that will affect other sea turtles into the future.

Marine debris

Marine debris is a continuing problem for sea turtles. Sea turtles living in the pelagic environment commonly eat or become entangled in marine debris (*e.g.*, tar balls, plastic bags/pellets, balloons, and ghost fishing gear) as they feed along oceanographic fronts where debris and their natural food items converge. This is especially problematic for sea turtles that spend all or significant portions of their life cycle in the pelagic environment (*i.e.*, leatherbacks and oceanic stage juveniles of all species). Ingested debris can block the digestive tract, causing death or serious injury (Lutcavage et al. 1997, Laist et al. 1999). Plastic may be ingested out of curiosity or due to confusion with prey items. Marine debris consumption has been shown to depress growth rates in post-hatchling loggerhead sea turtles, increasing the time required to reach sexual maturity and increasing predation risk (McCauley and Bjorndal 1999). Sea turtles can also become entangled and die in marine debris, such as discarded nets and monofilament line (NRC 1990, Lutcavage et al. 1997, Laist et al. 1999). The effects of environmental contamination to listed species is not expected to change in the future.

### 4.4.5 Climate Change

Climate change in North Carolina

The following is a comprehensive summary of baseline climate change conditions in NC as reported in the 2022 NOAA National Centers for Environmental Information, State Climate Summaries (Frankson et al. 2022). Temperatures in NC have increased steadily with winter average temperatures generally above average since 1990 and summer average temperatures the warmest on record for the last 16 years (2005–2020). Although NC has not experienced an increase in the frequency of very hot days the last 11 years (2010–2020) have seen the largest number of very warm nights. There is no overall trend over time in annual precipitation. Since 1900, global average sea level has risen by about 7–8 in (0.18-0.20 m). This has caused an increase in tidal floods associated with nuisance-level impacts. Nuisance floods are events in which water levels exceed the local threshold (set by NOAA's National Weather Service) for minor impacts. These events can damage infrastructure, cause road closures, and overwhelm storm drains. As sea level has risen along the NC coastline, the number of days exceeding the nuisance-level threshold has also increased, with the greatest number (14) occurring at Wilmington in 2018. A large portion of NC's coastline is extremely vulnerable to sea level rise due to its low elevation and to geological factors that are causing the land to sink in the Northern Coastal Plain.

A storm at hurricane intensity reaches NC about once every 3 years; however, storms at less than hurricane intensity can also have major impacts. The late 1990s through the early 2000s and the late 2010s through 2020 were notably active hurricane periods. In 1999, Hurricane Floyd dropped 15 to 20 in (0.38-0.51 m) of rain in the eastern part of the state, which was still recovering from flooding caused by Hurricane Dennis several weeks earlier. Beginning on September 6, 2004, the remnants of Hurricane Frances dropped 6 to 10 in (0.15-0.25 m) of rain across much of western NC over a 3-day period. Less than 2 weeks later, the remnants of Hurricane Ivan struck the same area, dropping 10 in (0.25 m) of rain and causing hundreds of landslides in the mountains. During October 7–9, 2016, Hurricane Matthew dumped torrential rain that caused major flooding in eastern NC, with many locations receiving more than 10 in (~0.25 m) and a few locations more than 18 in (~0.46 m). In September 2018, the most intense rainfall event on record occurred as Hurricane Florence dropped 20 to 36 in (~0.51-0.91 m) in eastern NC, causing widespread destruction and losses exceeding $20 billion, more than the combined losses from Floyd and Matthew. In addition to damage from high winds and flooding, hurricane strikes can produce tornadoes. Rain bands associated with Hurricane Frances spawned multiple tornadoes in the central and eastern portions of the state.

There is a large and growing body of literature on past, present, and future impacts of global climate change, exacerbated and accelerated by human activities. Some of the likely effects commonly mentioned are sea level rise, increased frequency of severe weather events, and change in air and water temperatures. NOAA's climate information portal provides basic background information on these and other measured or anticipated effects (see http://www.climate.gov).

Climate change impacts

*Sturgeon*

Information regarding the vulnerability of Atlantic sturgeon to climate change suggests it poses a greater threat to the Carolina DPS than what was anticipated when the DPS was listed in 2012. Ocean temperature in the U.S. northeast shelf and surrounding northwest Atlantic waters has increased faster than the global average over the last decade (Pershing et al. 2015). New projections for the U.S. northeast shelf and northwest Atlantic Ocean suggest that this region will warm two to three times faster than the global average (Saba et al. 2016). Global climate change affects all components of marine ecosystems, including human communities. Physical changes that are occurring and will continue to occur to these systems include sea-level rise, changes in sediment deposition; changes in ocean circulation; increased frequency, intensity and duration of extreme climate events; changing ocean chemistry; and warming ocean temperatures. A first-of-its-kind climate vulnerability assessment, conducted on 82 fish and invertebrate species in the U.S. northeast shelf, concluded that Atlantic sturgeon from all five DPSs were among the most vulnerable species to global climate change (Hare et al. 2016).

Increased water temperatures as a result of climate change could mean a decrease in the amount of DO in surface waters. Atlantic and shortnose sturgeon rely on a variety of water quality parameters to successfully carry out their life functions. Low DO and the presence of contaminants modify the quality of Atlantic sturgeon habitat and in some cases, restrict the extent of suitable habitat for life functions. Secor (1995) noted a correlation between low abundances of sturgeon during this century and decreasing water quality caused by increased nutrient loading and increased spatial and temporal frequency of hypoxic (low oxygen) conditions. Of particular concern is the high occurrence of low DO coupled with high temperatures in the river systems throughout the range of the Carolina DPS in the southeast. Sturgeon are more highly sensitive to low DO than other fish species (Niklitschek and Secor

2009b) and low DO in combination with high temperature is particularly problematic for Atlantic sturgeon. Studies have shown that juvenile Atlantic sturgeon experience lethal and sublethal (metabolic, growth, feeding) effects as DO drops and temperatures rise (Niklitschek and Secor 2005, Niklitschek and Secor 2009b, Secor and Gunderson 1998). Sturgeon are already susceptible to reduced water quality resulting from various factors: inputs of nutrients; contaminants from industrial activities and non-point sources; and interbasin transfers of water and climate change is likely exacerbating the challenges to sturgeon. Still, more information is needed to better determine the full and entire suite of past and ongoing impacts of climate change on sturgeon in the action area.

*Sea turtles*
The Intergovernmental Panel on Climate Change (IPCC, 2019) reports the following consequences of climate change on sea turtles with high confidence, which is an evaluation of the underlying evidence and agreement in the conclusion. Loss of sandy beaches, due to sea level rise and storm events, reduces available nesting habitat (Fish et al. 2005, Fuentes et al. 2010, Reece et al. 2013, Katselidis et al. 2014, Patino-Martinez et al. 2014, Pike et al. 2015, Marshall et al. 2017). Storms, waves, and sea level rise are likely to increase erosion and sediment loss. Changes in beach morphology, dune scarping, vegetation loss, and reduction in beach area are likely to reduce availability of sea turtle nesting sites, and potential for landward migration of the beach profile is limited due to human development. Temperature directly affects important sea turtle life history traits, including: hatchling size, sex, viability, and performance (Hays et al. 2003, Pike 2014, Dudley et al. 2016, Santos et al. 2017). One of the greatest concerns is the effect of temperature on hatchling emergence rates and sex ratios (Santidrián Tomillo et al. 2014, Patrício et al. 2017). Changes in ocean temperature indirectly impact sea turtles by altering the abundance and distribution of their prey (Polovina 2005, Doney et al. 2012, Sydeman et al. 2015, Briscoe et al. 2017). Additionally, sea turtles require habitat associated with bathymetric and mesoscale features that aggregate their prey, and the persistence and location of these features are linked to variations in climate (Baez et al. 2011, Bjorndal et al. 2017, Santora et al. 2017). The IPCC (2019) states with high confidence that climate change is likely to alter foraging success, juvenile recruitment, breeding phenology, growth rates, and population stability.

Climate change is expected to continue and may impact ESA-listed species and their habitat in the action area. The likely rate of change associated with climate impacts is on a century scale, which makes the ability to discern changes in the abundance, distribution, or behavior of listed species as a result of climate change impacts challenging in the short term.

### 4.4.6 Other Threats

Diseases, toxic blooms from algae and other microorganisms, and cold stunning events are additional sources of mortality that can range from local and limited to wide-scale and impacting hundreds or thousands of animals.

<u>Predation</u>
*Sturgeon*
Very little is known about natural predators of Atlantic sturgeon. However, Gadomski and Parsley (2005) have shown that catfish and other species do prey on juvenile sturgeon, and

concerns have been raised regarding the potential for increased predation on juvenile Atlantic sturgeon by introduced flathead catfish (Brown et al. 2005). Other documented predators of sturgeon species, in general, include sea lampreys, gar, striped bass, common carp, northern pikeminnow, channel catfish, smallmouth bass, walleye, fallfish, grey seal, and sea lion (Scott and Crossman 1973, Kynard and Horgan 2002, Gadomski and Parsley 2005). However the extent is unknown. Seal predation on shortnose sturgeon has also been documented (Fernandes 2006).

*Sea turtles*
Predation by various land predators is a threat to developing nests and emerging hatchlings. The primary natural predators of sea turtle nests are mammals, including raccoons, dogs, pigs, skunks, and badgers. Emergent hatchlings are preyed upon by these mammals as well as ghost crabs, laughing gulls, and the exotic South American fire ant (*Solenopsis invicta*). In addition to natural predation, direct harvest of eggs and adults from beaches in foreign countries continues to be a problem for various sea turtle species in certain parts of their range (NMFS and USFWS 2008).

<u>Offshore wind development</u>
In recent years, plans for offshore wind energy within the ranges of Atlantic sturgeon and sea turtles have emerged. In the Mid-Atlantic region, an offshore wind pilot project off of Virginia installed two turbines in 2020. Multiple call and lease areas throughout the rest of the Mid-Atlantic region are at various stages in the regulatory process, including two areas offshore of NC. Currently, the impact of offshore wind energy on the Carolina DPS and sea turtles is unknown, but likely to range from no impact to moderately adverse, depending on the number and locations of projects that occur, as well as the effects of mitigation efforts.

### 4.4.7 Actions Taken to Reduce Threats
*Sturgeon*
Beginning in the late 1990s federal and state actions have been taken to prohibit the intentional harvest of sturgeon throughout their range. Atlantic sturgeon benefit from the use of devices designed to exclude other species from trawl nets, such as Turtle Excluder Devices (TEDs). TEDs and bycatch reduction device requirements may reduce Atlantic sturgeon bycatch in southeast trawl fisheries (ASSRT 2007). NMFS has required the use of TEDs in southeast U.S. shrimp trawls since 1989 and in summer flounder trawls in the mid-Atlantic area (south of Cape Charles, Virginia) since 1992 to reduce the potential for incidental mortality of sea turtles in commercial trawl fisheries. These regulations have been refined over the years to ensure that TED effectiveness is maximized through more widespread use, and proper placement, installation, floatation, and configuration (*e.g.*, width of bar spacing) with the aim of gaining greater conservation benefits for Atlantic sturgeon. Additionally, through ESA section 6 cooperative agreements, NMFS has supported numerous research projects within the southeastern U.S. to investigate the life history of the shortnose sturgeon.

*Sea turtles*
Actions have been taken to reduce human-caused impacts to sea turtles from various sources, particularly since the early 1990s. Some actions have resulted in significant steps towards reducing the recurring sources of mortality of sea turtles and improving the status of all sea turtle

populations in the Atlantic and Gulf of Mexico. For example, the TED regulations such as those published on February 21, 2003 (68 FR 8456) and September 20, 2020 (85 FR 59198), and pelagic longline regulations implementing the use of specific hook and bait types significantly reduces the impacts of trawl and longline fisheries on sea turtles (NMFS SEFSC 2009). Other actions include lighting ordinances, in situ nest protection and predation control to help increase hatchling survival, as well as measures to reduce the mortality of pelagic immature, benthic immature, and mature age classes from various fisheries and other marine activities. Summaries of these actions to reduce threats to sea turtles can be found in the 5-year reviews and status reviews (NMFS and USFWS 2007a, 2007b, 2013a, 2013b, 2015, 2020, 2023, Conant et al. 2009, Seminoff et al. 2015).

### 4.4.8 Conclusion and Summary of Cumulative Effects

*Sturgeon*
Overall, the preferred alternative would not be expected to have more than short-term adverse effects on Atlantic sturgeon that are captured and released alive. The impacts of incidental capture and release are not expected to have more than short-term adverse effects on individual animals and any increase in stress levels from the capture and handling would dissipate rapidly. Even if an animal was exposed to additional capture (*e.g.*, a week later), no significant cumulative effects would be expected because the increase in stress levels from the previous capture should have already dissipated.

Based on the analysis in this draft EA, NMFS expects that issuance of the proposed ITP (preferred alternative) would not likely appreciably reduce the species likelihood of survival and recovery in the wild, nor would it adversely affect spawning, mortality rates, or recruitment rates. In particular, NMFS expects that issuance of the proposed ITP would not likely affect reproductive sturgeon adults in a way appreciably reducing their reproductive success, survival of their young, or the number of young annually recruiting into the breeding populations. The incremental impact of the proposed authorization of takes of limited numbers of Atlantic sturgeon incidental to the otherwise legal NC inshore anchored gill net fisheries, when added to other past, present, and reasonably foreseeable future actions, would not likely result in population-level effects.

*Sea turtles*
As noted above, sea turtles found in the affected environment for this ITP may travel widely throughout the Atlantic, Gulf of Mexico, and Caribbean Sea. Therefore, individuals found in an area can potentially be affected by activities anywhere within this wide range. A number of human activities have contributed to the current status of listed sea turtle species in the action area. Some of those activities, (*e.g.*, commercial harvesting of individuals as well as eggs) no longer occur in the U.S. yet are still a problem in some countries. Other human activities are ongoing and appear to be directly or indirectly affecting these species. The most significant threats affecting sea turtles in the Atlantic are fisheries, and there are many conservation activities directed at reducing this threat. Other environmental impacts to turtles may result from vessel operations, discharges, dredging, military activities, oil and gas development activities, industrial cooling water intake, aquaculture, recreational fishing, vessel traffic, coastal development, habitat degradation, directed take, and marine debris. Impacts to sea turtles in the

action area also include sources of natural mortality as well as influences from oceanographic and climatic features in the action area. Circulation and productivity patterns influence prey distribution and habitat quality for listed species. The effects of climatic variability on sea turtles in the action areas and the availability of prey remain largely undetermined; however, it is likely that any changes in weather and oceanographic conditions resulting in effects on population dynamics (*i.e.*, sex ratios) as well as prey availability would have dire consequences for sea turtle species.

The proposed ITP would authorize the incidental capture of sea turtles, resulting in both live captures that would be released alive and mortalities. Effects of past and ongoing human threats (*e.g.*, fisheries, vessel traffic, etc.) occurring in the range of the ESA-listed sea turtles species and DPSs considered in this analysis have contributed to their current status. Based on the analysis in this draft EA, NMFS expects that issuance of the proposed ITP would not likely appreciably reduce the species likelihood of survival and recovery in the wild, nor would it be likely to adversely affect reproductive or mortality rates. The incremental impact of the authorization of takes of limited numbers of sea turtles incidental to the otherwise legal NC inshore anchored gill net fisheries, when added to other past, present, and reasonably foreseeable future actions, would not likely result in population-level effects.

# CHAPTER 5 LIST OF PREPARERS AND AGENCIES CONSULTED

This document was prepared by the Marine Mammal and Sea Turtle Conservation Division (F/PR2) and Endangered Species Conservation Division of NMFS' Office of Protected Resources (F/PR3) in Silver Spring, Maryland.

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**Appendix A:** Responses to public comments on NCDMF's Incidental Take Permit Application and Conservation Plan

A *Federal Register* notice was published to inform the public of receipt of the application and allow for comments to be submitted on NCDMF's ITP application and conservation plan (ITP No. 27106). On December 22, 2022 (78 FR 41034), NMFS published the Notice of Receipt of NCDMF's ITP application and conservation plan (submitted December 2, 2022) for the incidental take of ESA-listed sturgeon and sea turtles. After receiving a request to extend the comment period, on January 23, 2023, NMFS published a notice in the *Federal Register* (88 FR 3971) extending the comment period by 30 days. The public comment period ended on February 22, 2023, and 231 comments were received. NMFS thanks all commenters for their comments and input on NCDMF's application and conservation plan.

Comments and responses below have been grouped together by topic, and comments are not associated with the specific commenter.

**General support of application and conservation plan or ITP**

**Comment:** Several commenters stated that they supported the ITP application and its conservation plan designed to minimize and mitigate take of endangered or threatened species in the inshore waters of NC.
**Response:** NMFS thanks the commenters for their input on NCDMF's application and conservation plan.

**General opposition of application and conservation plan or ITP**

**Comment:** Several commenters stated that they do not support NCDMF's ITP application and conservation plan and requested that NMFS deny the application. Commenters provided several reasons why they believe the ITP should not be issued. They felt that the ITP would result in adverse effects to ESA-listed species and their environment and that because the southern flounder is overfished there is no need for the state to apply for an ITP. Several commenters felt that the ITP should be denied because they believe NC has mismanaged state fisheries resources and noted that the Coastal Conservation Association is currently engaged in legal action against the state. Finally, several commenters stated the importance of maintaining recreational fisheries and the resources these fisheries provide to NC.
**Response:** Section 9 of the ESA prohibits the "take", including incidental take, of endangered sea turtles and sturgeon. Pursuant to section 4(d) of the ESA, NMFS has issued regulations extending the prohibition of take, with exceptions, to threatened sea turtles (50 CFR 223.205 and 223.206) and to threatened sturgeon (50 CFR 223.211). NMFS may grant exceptions to the take prohibitions with an incidental take statement or an ITP issued pursuant to ESA sections 7 or 10, respectively. To do so, NMFS must determine the activity that will result in incidental take is not likely to jeopardize the continued existence of the affected listed species.

Section 10(a) of the ESA includes allowable circumstances for permitting, which includes any act otherwise prohibited by section 9 for scientific purposes or to enhance the propagation or survival of the affected species, including, but not limited to, acts necessary for the establishment and maintenance of experimental populations (section 10(a)(1)(A)) or any taking otherwise prohibited by section 9(a)(1)(B) if such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity (section 10(a)(1)(B)). As provided in 50 CFR 222.307, NMFS may issue section 10(a)(1)(B) ITPs to non-Federal entities to take threatened and endangered species when such taking is incidental to an otherwise lawful activity, and when specific issuance criteria have been met (see below). NMFS must base our decision on these issuing criteria.

*Issuance criteria*

(1) In determining whether to issue a permit, the Assistant Administrator will consider the following:

(i) The status of the affected species or stocks;
(ii) The potential severity of direct, indirect, and cumulative impacts on the species or stocks and habitat as a result of the proposed activity;
(iii) The availability of effective monitoring techniques;
(iv) The use of the best available technology for minimizing or mitigating impacts; and
(v) The views of the public, scientists, and other interested parties knowledgeable of the species or stocks or other matters related to the application.

(2) To issue the permit, the Assistant Administrator must find that—

(i) The taking will be incidental;
(ii) The applicant will, to the maximum extent practicable, monitor, minimize, and mitigate the impacts of such taking;
(iii) The taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild;
(iv) The applicant has amended the conservation plan to include any measures (not originally proposed by the applicant) that the Assistant Administrator determines are necessary or appropriate; and
(v) There are adequate assurances that the conservation plan will be funded and implemented, including any measures required by the Assistant Administrator.

If the issuance criteria is met by the applicant, NMFS will issue an ITP in accordance with our regulations.

**Comment:** Several commenters stated that they believe NMFS should ban the use of gill nets for all commercial and recreational fisheries in NC's inshore waters. They stated that gill nets are destructive and have high levels of bycatch.
**Response:** NC commercial inshore anchored gill net fisheries are currently legal fisheries and are managed by the state of NC. The issuance of an ITP authorizes the incidental take of ESA-listed species associated with these fisheries.

**Comment:** One commenter expressed concern that combining the sea turtle and sturgeon ITPs into one ITP would provide even further incentive and ability for commercial fishermen to ignore the rule, and continue the devastation of our dwindling endangered resources.
**Response:** Combining the separate sturgeon and sea turtle ITPs into one ITP would not decrease protection for these ESA-listed species. Combining the sturgeon and sea turtle ITPs provides

efficiencies in tracking minimization, monitoring, mitigation, and reporting requirements under the ITP. NMFS believes that operating under a single ITP will provide NCDMF the ability to implement the provisions of the ITP effectively and comprehensively.

**Comment:** Several commenters stated that NC is the only state applying for this permit and that NC is the only state that allows the use of gill nets.
**Response:** NMFS has worked with and is currently working with several other states on ITP applications (see NMFS' website for additional information on current ITPs and received applications and conservation plans: https://www.fisheries.noaa.gov/national/endangered-species-conservation/incidental-take-permits). NC is not the only state that allows the use of gill nets. Please see 50 C.F.R. § 600.725 and the MMPA List of Fisheries (https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries) for additional information on gill net fisheries in other state and federal waters.

**Comment:** Some commenters stated that NCDMF is not the appropriate entity to apply for the permit, as they believe it goes against statute for a governmental agency to apply for an ITP.
**Response:** Any individual, non-Federal agency, business, or other entity that has the authority to conduct activities on non-Federal property, or any State, municipal or tribal government agency that has the authority to regulate land/water use can apply for an ESA section 10 ITP. A qualified applicant is one who has the legal authority to execute a project on the lands/waters proposed for coverage under a conservation plan, and who has enough legal control over these lands/waters to implement the conservation plan. Thus, NCDMF states in their application and conservation plan that (see section 7.D Alternatives Considered): *"As North Carolina's primary licensing and data collection agency for fishing in coastal waters (inland and ocean), NCDMF is uniquely situated to apply for and comply with the ITP based upon its infrastructure, personnel, and expertise."*

**Proposed action**

**Comment:** One commenter noted that due to joint water management between the NCDMF and NCWRC, the term "inland coastal" water bodies should be removed. They stated that this term is not a familiar term in other state and federal agency terminology and may cause confusion between "inland" and "coastal" water designations. They recommended the term "internal coastal" be used as a substitute.
**Response:** NMFS agrees. NCDMF has removed the term "inland coastal" from their application and conservation plan.

**Comment:** One commenter noted that the definitions of large mesh and small mesh gear were not consistent between the current ITP and TTP and that the proposed definitions in NCDMF's application and conservation plan would align with those definitions. They stated that this is an improvement as far as consistency amongst programs, with no major changes for sturgeon or sea turtles.
**Response:** NMFS agrees that consistency in definitions between the ITP and the TTP is important, and changes in the definition from the current ITP to what is proposed in NCDMF's application and conservation plan are appropriate and will not have effects on sturgeon or sea turtles.

**Comment:** One commenter stated that the application claims that there is no strong evidence of how anchored gill nets affect marine habitat. They stated that the application addresses only the interaction between gill nets and the marine bottom and does not, for example, consider the impacts of the amount of bycatch produced by gill nets, nor the habitat impacts of dead discards from gillnets, both of which NCDMF's biologists concede is high. They stated that the application does not investigate the impact of the gear across species, or the interrelatedness of those species in the ecosystem impacting sea turtles and sturgeon.
**Response:** An application and conservation plan for an ESA section 10 ITP describes the effects and how the proposed action may or may not impact covered species and/or their designated critical habitat. No additional analyses are required in the application and conservation plan. However, NCDMF updated their discussion on these topics in their application and conservation plan in section 7.B Habitat: *"The ecosystem impacts of bycatch, or non-targeted species, is a concern in all fisheries. Set gill nets have been shown to have some of the highest bycatch rates across most industrial fisheries (Shester and Micheli 2011). An article reviewing 130 studies in the primary literature that concurrently quantified unwanted mortalities (bycatch, depredation, habitat damage, and injuries) found that all unwanted mortalities are affected by key biological (e.g., species), technical (e.g., fishing mechanisms) and/or environmental (e.g., temperature) factors (Uhlmann and Broadhurst 2015). The authors propose that these key factors should be considered as part of a strategy to reduce impacts of these gears by first assessing modifications within and then beyond conventional configurations, followed by changes to operational and handling practices. Justification for this three-tiered approach is based not only on the potential for cumulative reduction benefits, but also on the likely ease of adoption, legislation, and compliance.*

*"The NCDMF uses regulations based on these key factors, such as minimum mesh size, attendance requirements, and seasonal or permanent area and set time restrictions, which have the potential to reduce the incidence of fish bycatch and ultimately dead discards (NCDMF 2021). Additionally, these regulatory measures can aid fishery managers in constraining harvest of state and federal quota-managed stocks by focusing effort and harvest in areas or times where the target species is more available and effort is better characterized. Lastly, these regulatory measures can work in concert to more discretely define how and where gill nets can be used to maximize efficiency of the gear and reduce competition and conflicts with other gear types and user groups."*

Additionally, as part of the NEPA process NMFS evaluates issuance of the ITP from the perspective of its potential effects on the human environment. Specifically NMFS analyzes the effects of the action on Essential Fish Habitat (EFH) ("those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802 et seq.)). The proposed conservation measures in NCDMF's application and conservation plan would result in reduced fishing effort that may confer benefits to designated EFH and includes gear modifications that are not expected to result in more than minimal effects to designated EFH beyond those that may result from the operation of inshore estuarine anchored gill net fisheries absent such conservation measures. On May 16, 2023, SERO determined that no EFH conservation measures were necessary under the MSA to protect and conserve managed species designated EFH.

*Alternative methods*

**Comment:** Several commenters stated that large-mesh gill net fishermen almost exclusively harvest Southern flounder, and gill nets are not needed to harvest the flounder quota. They suggested that alternative fishing methods such as gigs or pound nets with proven records of minimal harm to protected species could be used to harvest the commercial Southern flounder quota. They stated that this is easily proven by referring to NCDMF's data, which show that over the last five years, average annual pound net and gig harvest of Southern flounder in NC has substantially exceeded the current commercial quota for that stock.
**Response:** Inshore anchored gill nets are used to catch a variety of fish, including Southern flounder (see section 5.B of NCDMF's application and conservation plan). The application and conservation plan also state that pound nets and gigs are currently used to harvest Southern flounder (with pound nets also targeting other species); however, NCDMF states that the broad scale adoption of these gears is hampered by the significant financial investment for pound net gear and the environmental limitations (*e.g.*, water clarity) for using gigs. To clarify this in the application and conservation plan, NCDMF has added the following language to section 7.D.2 Alternative 2: Full Gear Closure: *"A variety of commercial gears are used in the estuarine waters of North Carolina to harvest many different species of fish. In addition to anchored, runaround nets, and drift gill nets, pound nets are an effective gear for harvesting bait fish, butterfish, and Southern flounder among other species. However, entry into the pound net fishery requires a significant financial investment in gear. Other gear, such as gigs, are effective at harvesting targeted species, like Southern flounder, but are limited to shallow areas with high water clarity. Because of these reasons, many fishers depend on the ability to use a variety of different gears throughout the year to harvest seasonally shifting species and to provide sustained income throughout the year (Steve et al. 2001)."* Furthermore, pound nets are also known to interact with sea turtles (see McNeill et al. 2018).

**Alternatives not adequately addressed**

**Comment:** One commenter stated that the alternatives that the application considers do not address the relative risks of jeopardizing sea turtles, sturgeon, and their habitat. Rather, the reasons for dismissing each alternative center on the difficulty of implementation and on the impacts on the fishing communities. They stated that while those are certainly important considerations, evaluation of alternatives' habitat and species impact are required considerations.
**Response:** Section 10 of the ESA and its regulations require that an application and conservation plan describe actions the applicant considered as alternatives to the take that would result from the proposed action and the reasons why they are not using those alternatives. When describing alternative actions in the conservation plan the applicant focuses on significant differences in project design that would avoid or reduce the take. The regulations do not require that the conservation plan include a specific number of alternatives. In addition to the proposed alternative, conservation plans typically include a no-action alternative, in which the applicant would not proceed with their proposed action or modify it to avoid take altogether. Other types of alternatives will depend on the situation. The conservation plan must demonstrate that the applicant reasonably considered the alternatives to the proposed action and explain why the applicant did not select each alternative. These explanations do not have to justify the

impracticability of any alternative. NMFS needs only to evaluate whether the applicant's explanations appear to be credible and reasonable; therefore, NMFS is not required to analyze the feasibility of the alternatives. NMFS has determined that NCDMF's alternatives meet these requirements.

**Comment:** Several commenters stated that NCDMF should include banning gill nets as a serious potential alternative in the application and conservation plan.
**Response:** NCDMF considered an alternative for full gear closure, in which NCDMF would close state waters to the estuarine anchored gill nets in Alternative 2 (see NCDMF's application and conservation plan section 7.D.2 Alternative 2: Full Gear Closure).

**ITP duration**

**Comment:** Several commenters felt that the ITP duration should be shorter than the requested 10 years, and believe that a shorter duration would provide opportunities for review and adjustment of the monitoring and management program due to the sensitivity of the species potentially impacted. They also felt that shortening the time frame would allow NMFS and NCDMF to reevaluate stock assessments, compliance, and any new strategies (such as NCDMF's 5-point plan, which is in the early stages of implementation) in a more timely fashion.
**Response:** NMFS acknowledges the concern for a 10-year time period for this ITP. The application includes an upper limit on authorized take and NCDMF is required, if the ITP is issued, to limit takes to the authorized level through tools such as minimization and adaptive management measures. The NCDMF would meet with NMFS prior to TP3 to discuss anticipated fishing effort to determine if authorized takes are appropriate (*e.g.*, if the Southern flounder stock does not recover as expected and effort does not increase to the level anticipated). Section 7.A.3 Finalizing Requested Incidental Takes of NCDMF's application and conservation plan states: *"Anticipated fishing effort increases during TP 3 will be dependent on results of the updated Southern Flounder stock assessment and approval of an FMP amendment based on that assessment. The NCDMF will update NMFS throughout this process to determine if there is a suspected change in the timing or scale of "rebounding" fishing effort for Southern Flounder defined as TP 3 that would result in a concomitant continuation of anticipated takes that are reflected in TP 2."* Additionally, changes can be made at any time to the implementation of the conservation plan through amendments to the conservation plan, ITP, or other implementation-related documents. Either party can initiate amendments, but it is up to NMFS to decide the level of review needed to satisfy ESA statutory and regulatory requirements for any such changes.

**Take estimates**

**Comment:** Several commenters stated that the data used for the analysis to estimate takes are flawed because data acquired from the Observer Program are not representative and are not a random sampling of the fishery. One commenter stated that the data on the expected takes for all species is based on data produced through an observer program that has systematically failed to obtain reliable, representative, and reasonable coverage of the NC gill net fisheries. They stated that levels of observer coverage have been chronically low and inconsistent due in part to NCDMF's lack of compliance and reliance on data from a small subset of EGNP holders. They also stated that observer coverage has demonstrably focused on a small group of fishers (roughly

3 percent of permit holders) who respond to NCDMF's requests for observation as observers have been successful in booking trips on less than 1 percent of their recorded attempts in many seasons. They stated this observer data is admittedly flawed and unreliable, rendering the agency's methods incapable of delivering an accurate estimated impact on protected species, and that because these shortcomings are not corrected in the ITP application, they believe estimates will continue to significantly underestimate the number of actual takes. Finally, they stated that NOAA Fisheries should supplement this data with its own information and additional analysis of the NC estuarine fisheries to achieve a more complete picture of the affected environment.
**Response:** Observer data, like other dependent fisheries data, do have challenges. The NCDMF Observer Program makes every effort to distribute observed trips across time and space proportional to estimated effort (see NCDMF's application and conservation plan section 7.C.1 Monitor). For example, the Observer Program develops a sea-day schedule that stratifies the schedule of observed trips in each month of a season to allow for representative effort across each season. The Observer Program also deploys observers across different ports for a single MU to ensure representative sampling, even if fishing effort is not concentrated in that area (*e.g.*, mainland Hyde County). Representative sampling is hampered by fisher avoidance; however, the addition of alternative platform trips assist in distributing observed trips across fishers, not just the ones who schedule trips in advance. NMFS anticipates that the implementation of the call-in program will reduce fisher avoidance.

The dataset used in NCDMF's current application and conservation plan is markedly more robust than the previous applications submitted in 2013 and 2014. The analysis in the current application used 9,305 observed trips state-wide over nine years, four seasons, and two mesh-size categories. These data represent the best data available by which to estimate takes by the NC inshore anchored gill net fisheries. For example, by comparison, the previous sea turtle ITP application submitted in 2013 had a much more limited dataset to use for the analysis: 1,496 observed large-mesh gill net trips over two years with 278 observed small-mesh gill net trips over one year. This larger sample size of observer trips leads to better estimates of incidental take and high confidence in those estimates.

The measure of precision commonly used in reference to estimates of bycatch is the coefficient of variation (CV), which is given by the ratio of the square root of the variance of the bycatch estimate (*i.e.*, the standard error) to the estimate, itself (NMFS 2004). The lower the CV, the greater the level of precision. For protected species, the National Working Group on Bycatch recommended precision goal is a 20-30 percent CV for estimates of bycatch for each species/stock taken in a fishery (NMFS 2004), and no more than 30 percent is the standard used for sea day estimation needs under the 2015 Standard Bycatch Reporting Methodology Omnibus Amendment to the Fishery Management Plans of the Mid-Atlantic and New England Regional Fishery Management Councils. The CVs around the point estimates of incidental takes NCDMF presents in their application and conservation plan are low (often less than or equal to the <30 percent recommendation) indicating relatively precise estimates of take (see NCDMF's application and conservation plan Tables 7.17, 7.20, 7.24).

NMFS believes that the data provided in NCDMF's application and conservation plan are the best available information and does not currently have additional information to include in the analysis. However, the EA should provide the public with a more comprehensive picture of the affected environment.

**Comment:** Several commenters stated that they believe the take estimates are too high and that the applicant has not taken steps to reduce take with their take estimates. These commenters believe the numbers of authorized takes for any species should not exceed the average observed takes from the previous ten years as observations and should not exceed the average observed takes divided by the fraction of observations in the total population applicable to those observations.
**Response:** The ITP application includes a suite of management measures to minimize takes and an adaptive management approach to prevent the exceeding authorized takes levels. The data used in the analysis were collected when most of these measures were in place. The analyses that were performed for the applications for the current ITPs included fewer data. For example, the dataset used in NCDMF's current application and conservation is markedly more robust than the previous applications submitted in 2013 and 2014. The analysis in this application used 9,305 observed trips state-wide over nine years, four seasons, and two mesh-size categories and these data represent the best data available by which to estimate takes by the NC inshore anchored gill net fisheries. By comparison, NCDMF's previous sea turtle ITP application submitted in 2013 had a much more limited dataset to use for the analysis: 1,496 observed large-mesh gill net trips over two years with 278 observed small-mesh gill net trips over one year. This larger sample size of observer trips leads to better estimates of incidental take. This updated analysis indicates that the reduction in takes from these management measures was greater than previously predicted. NCDMF's application and conservation plan highlights these reductions where comparisons can be made (See section 7.A.3 Finalizing Requested Incidental Takes).

NCDMF has included additional language in the application and conservation plan in section 7.A.3 Finalizing Requested Incidental Takes: *"Anticipated fishing effort increases during TP 3 will be dependent on results of the updated Southern Flounder stock assessment and approval of an FMP amendment based on that assessment. The NCDMF will update NMFS throughout this process to determine if there is a suspected change in the timing or scale of "rebounding" fishing effort for Southern Flounder defined as TP 3 that would result in a concomitant continuation of anticipated takes that are reflected in TP 2."* NCDMF will meet with NMFS at least 1 year prior to the start of TP 3 of the ITP (ITP year 2029) to determine the best approach for predicting fishing effort in the large-mesh gill-net fishery for Southern flounder. Anticipated increases in fishing effort during TP 3 will be dependent on the results of the updated Southern flounder stock assessment and approval of an FMP amendment based on that assessment. The NCDMF will update NMFS throughout this process to determine if there is a suspected change in the timing or scale of "rebounding" fishing effort for Southern flounder defined as TP 3 that would result in a concomitant continuation of anticipated takes that are reflected in TP 2.

Additionally, in this application the requested takes are much lower than that of what was approved in the original ITPs. For example, for Atlantic sturgeon the mean annual estimate of live takes for the first six years (TP 2) in MU A for both mesh-size categories would be 181 live takes compared to current authorized number of 2,822; which is a 94 percent decrease in requested take. Please see additional examples in NCDMF's application and conservation plan in section 7.A.3 Finalizing Requested Incidental Takes (*Effects on the Listed Species*).

**Comment:** One commenter stated that they believe for the purposes of analyzing extinction risk and in the absence of better information, NMFS should assume that most if not all individuals released will suffer post-release mortality. For example, post-release survival rates are unknown for Atlantic sturgeon. They stated that because of this, the impact of the fishery will be underestimated if all live interactions are considered to have zero post-release mortality. This commenter believes NMFS should consider assigning the entire take to each DPS—New York Bight DPS, Chesapeake DPS, Carolina DPS and South Atlantic DPS—in its jeopardy analysis in order to sufficiently protect the DPSs.
**Response:** As part of the NEPA processes, NMFS evaluates the potential for post-release mortality in the draft EA (see Chapter 4 *Environmental Consequences*). Additionally, the ESA section 7(a)(2) consultation process determines whether the issuance of an ITP to NCDMF will appreciably reduce the likelihood of an ESA-listed species or DPSs survival and recovery. In addition, ESA section 10(a)(2)(B)(iv) states that the Secretary (of Commerce) shall issue an ITP if, among other things, "the taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild," which is part of the ITP issuance criteria. A formal consultation has been initiated and a formal biological opinion will be completed before a decision to issue the ITP is made. The biological opinion will consist of a description of the proposed action, status of the species/critical habitat, the environmental baseline, effects of the action, cumulative effects, NMFS' conclusion of jeopardy/no jeopardy and/or adverse modification/no adverse modification, and reasonable and prudent alternatives, as appropriate. The take levels proposed will therefore be addressed in the section 7 consultation and an analysis will be available prior to NMFS' determination on issuance of an ITP.

NMFS disagrees with the commenters request to assign the entire take to each DPS in the consultation process, in order to "sufficiently protect the DPSs". This would lead to a drastic overestimate of effects to a single DPS. NMFS will use the best available data including the best available data on Atlantic sturgeon DPSs in its analysis in order to make a determination.

**Comment:** One commenter stated that there is uncertainty in assigning sturgeon take to the DPS level and a lack of baseline data to determine impacts.
**Response:** Similar to other areas along the mid-Atlantic, several Atlantic sturgeon DPSs mix in NC waters. No real-time methods are available to definitely determine DPS of any single Atlantic sturgeon. It can reasonably be assumed that animals <500 mm total length are from their natal DPS (ASMFC 2017), and NCDMF's application and conservation plan includes this assignment (See sections 4.A and 7.A.3 Finalizing Requested Incidental Takes). For sturgeon equal to or greater than 500 mm total length, the NCDMF used a probabilistic method based on the best available approach (Kazyak et al. 2021).

**Comment:** One commenter stated that the use of a two-year rolling average for allowable sea turtle takes is a reasonable approach and does not change overall take total.
**Response:** NMFS agrees that the two-year rolling average requested by NCDMF is reasonable and would not change the overall take total.

**Comment:** One commenter recommended that any unidentified incidental turtle takes should be proportionally distributed across all species and stated that to avoid this practice, all measures

should be taken to accurately identify turtle species. They also stated that the ITP should include a protocol to develop a procedure or established manner on how to account for hybrid turtle takes.
**Response:** NCDMF makes every effort to identify sea turtle species, and starting in the fall of 2023 observers would collect video recordings of incidentally captured sea turtles which may assist in increasing their ability to identify sea turtles in the future. However occasionally, takes cannot be identified to species by the observers (*e.g.*, animal falls out of net, animal is released by the fisher and not provided to the observer; see section 7.A.3 Finalizing Requested Incidental Takes of NCDMF's application and conservation plan). NMFS agrees that unidentified sea turtle takes should be proportionally distributed based on species interaction rate data. NCDMF's conservation plan includes a description of how takes would be apportioned consistent with this approach. NCDMF states that of the identified sea turtle takes from observer data during ITP years 2013–2021 (n = 297), 83 percent were green sea turtles, 14 percent were Kemp's ridley sea turtles, 3 percent were loggerhead sea turtles. Based on these proportions, each unidentified sea turtle would be apportioned accordingly. For example, a single take would be assigned as a take of 0.83 green sea turtles, 0.14 Kemp's ridley sea turtles, 0.03 loggerhead sea turtles. If the predicted overall or count of observed takes incorporating these partial species values approach the species-specific authorized number, adaptive management measures will be implemented (see section 7.C.2 Avoid and Minimize of NCDMF's application and conservation plan). NCDMF states in the conservation plan that they would consult with NMFS and NCWRC to help with identification if a sea turtle was suspected of being a hybrid. Based on the identification, NMFS would provide guidance on how to count the incidental take against authorized takes (see section 7.A.3 Finalizing Requested Incidental Takes of NCDMF's application and conservation plan). Finally, one observed sea turtle interaction that was identified by NCWRC as a Kemp's ridley/loggerhead hybrid was removed from analysis and in responding to this comment NCDMF discovered that it was inadvertently not included in Table 7.1 of the application and conservation plan. NCDMF has revised and included this sea turtle in Table 7.1.

**Impacts of take are not adequately addressed**

**Comment:** One commenter stated that the plan fails to address the adverse impact of take and the use of gill nets on the habitats and thus, the broader ecosystem of NC's coastal waters.
**Response:** Although preferred, the applicant is not required to do so. Federal entities are required to assess the impacts of the federal activity (e.g., issuance of an ITP), and NMFS, as the federal action agency, will analyze these in the National Environmental Policy Act (NEPA) and section 7 documents. However, NCDMF does include a section in their application and conservation plan that discusses habitat; please see section 7.B. Habitat of NCDMF's application and conservation plan.

**Comment:** One commenter stated that the Habitat Conservation Plan (HCP, referred to as the conservation plan elsewhere in this EA) fails to comply with additional regulatory requirements and policy that ensure implementation. They stated that HCPs must include measures to monitor the effects of incidental take and that agencies interpret this rule to mean that HCP monitoring and reporting protocols must provide baseline information, evaluate compliance, and assess impacts and effectiveness to support conservation decisions. They stated that the HCP must also include an adaptive management strategy to address and respond to changed circumstances

identified in the plan. They believe that the proposed HCP application fails both permit requirements and similarly, the proposed plan further specifies that its adaptive management scheme that responds to changes and minimizes adverse impact also depends on information collected through the observer program. They believe that such adaptive measures are hardly sufficient to provide the right response to changed circumstances when the information it uses is misleading to begin with.
**Response:** Please see section 7.C.1. Monitor (*Tracking and Reporting of Incidental Take*) of NCDMF's application and conservation plan for information regarding how NCDMF plans to monitor the effects of the ITP, which would be the authorized taking of ESA listed species. Additionally, please see section 7.C.2 Avoid and Minimize of NCDMF's application and conservation plan for information about how NCDMF would use adaptive management strategies to prevent authorized take levels from being reached. NMFS believes that NCDMF has used the best information available at this time to develop their application and conservation plan. Please see responses to comments on the Observer Program below under *Monitoring*.

**Other species impacted**

**Comment:** Several commenters stated that other species are impacted by gill net fishing gear including diamondback terrapins, marine mammals, American alligators, and numerous species of aquatic birds and sportfish such as striped bass, redfish, and black drum.
**Response:** While gill nets target specific species of fish, such as flounder, they are also known to incidentally capture non-target fish species, seabirds, reptiles, and marine mammals, including ESA-listed species. NCDMF discusses some of the other species that may be impacted by their proposed action in section 4.C (Other Species) of their application and conservation plan. This includes the following information on manatees, which have not been previously observed incidentally captured in NC commercial inshore anchored gill net fisheries: *"The West Indian Manatee (Trichechus manatus), which is managed by the US Fish and Wildlife Service (USFWS), is listed as threatened under the ESA (82 FR 16668). The Florida subspecies (Trichechus manatus latirostris) occurs in the southeastern US, making seasonal movements northward in warm-water months (Lefebvre et al. 2001; Cummings et al. 2014). Manatee sightings and strandings have been documented in NC, with sightings primarily during June to October (Byrd et al. 2014; Cummings et al. 2014). There are no records of manatees incidentally entangled in estuarine anchored gill nets. As such they are not expected to be affected by this fishery."*

NCDMF has revised their application and conservation plan to include information on the American alligator in section 4.C (Other Species): *"The American Alligator, which is managed by the USFWS, is listed as threatened under the ESA due to its similarity in appearance (ESA section 4(e)) to other crocodilians that are threatened with possible extinction (52 FR 21059). The species ranges in the southern coastal United States from Texas to North Carolina and in the inland states of Oklahoma and Arkansas. The 1987 final rule in the Federal Register (FR) reclassified the species from endangered or threatened, to threatened due to similarity of appearance for populations in Alabama, Arkansas, Georgia, Mississippi, North Carolina, Oklahoma, and South Carolina. The reclassification as threatened due to similarity of appearance was already in place for Texas, Florida, and Louisiana. The final rule states that the species is no longer biologically endangered or threatened and that States would have the option* *to expand harvest albeit while still complying with related provisions of the ESA. In NC, the NCWRC adopted a rule in 2018 that allowed limited take of American Alligators according to the North Carolina Alligator Management Plan (NCWRC 2017). Between 2001 and 2022, the NCDMF Observer Program has documented four incidental takes in anchored gill-net gear, all large-mesh: one live take in Pamlico River (2012), one live take in New River (2014), two dead takes in Cape Fear River (both in 2018). Due to its ESA classification, a section 10 ITP is not required for this species."*

Diamondback terrapins are listed as an NC Species of Special Concern on the NC State Endangered Species Act, but are not listed under the U.S. ESA. Similarly, none of the bird or sportfish (striped bass, redfish, and black drum) species that have been observed interacting with NC commercial inshore anchored gill net fisheries are listed under the ESA. Applicants are not required to request authorization for incidental capture, or assess the impacts of those incidental captures of non-ESA-listed species in an ESA section 10 permit application and conservation plan.

**Monitoring**

**Comment:** One commenter stated that small-mesh gill nets are becoming more popular in NC's coastal fisheries, with fishers deploying them when areas are closed to large-mesh nets, thereby posing an increased threat to sturgeon. They expressed concern that sturgeon's fins and snouts can be easily caught in small-mesh gillnets, yet the proposed ITP and conservation plan provide no information on these impacts and maintain the current 2 percent observer coverage goal – a shockingly small target that the agency rarely meets – for these nets.
**Response:** Obtaining sufficient observer coverage levels to reliably estimate takes can be especially difficult for fisheries with relatively low bycatch rates, such as anchored small-mesh gill nets in NC. NCDMF's application and conservation plan includes a description of their sea-day schedule and states that NCDMF's sea-day schedule is developed with the goal of 2 percent observer coverage for small-mesh gill nets. Once the call-in system is in place, reaching the 2 percent observer coverage goal should occur more frequently. Nevertheless, the CVs around the point estimates of incidental takes (incorporating observer coverage for both the small and large-mesh fisheries) which will be used to estimate takes state-wide are low indicating precise estimates, often less than or equal to the 30 percent target for federal fisheries (See Tables 7.17, 7.20, 7.24 of NCDMF's application and conservation plan; NMFS 2004).

**Comment:** One commenter recommended that procedures be implemented to ensure the observer protocols are effective at understanding interactions. They stated that a situation may occur where reports of incidental captures from a fisher within a MU are received during a season, but the observer program does not report any observations during the same period. The request that details on how this information will be reported and actions taken should be presented within the permit or associated Implementing Agreement.
**Response:** Fishers would be required under their EGNP to report any incidental captures of sea turtles and sturgeon to NCDMF and these incidental captures are included in NCDMF's reports to NMFS. However, these unobserved takes would not be included in the take estimates under the ITP as when observed takes are extrapolated across the fishery, those takes that are unobserved are already accounted for in the take estimate. Estimated takes would be calculated

state-wide and take levels would not be set for each MU (as in the current permit), however NCDMF can use information from observed takes to inform adaptive management.

**Comment:** Commenters suggested an assessment be completed to ensure the trips with observers are representative of normal fishing activities within a given fishery. They stated that one initial measure may be a comparison of landings data for targeted species between observed trips and non-observed trips.
**Response:** Matching observed trips to dealer trip tickets is not a straightforward process. For example, some fishers may sell their catch to one or more dealers, they may sell part but not all of their catch, or they may hold their catch for several days before transporting them to a dealer. In addition to this challenge, a comparison of landings data as suggested would not be appropriate to define normal fishing activities as landings data represent the success of a particular trip by a particular fisher or what is most marketable from their catch. NCDMF currently makes an effort to stratify observed trips across ports within each MU and across months within each season using onboard and often unscheduled alternative platform methods which contribute to representative sampling across the inshore anchored gill net fisheries. Additionally, implementation of the call-in system which will further randomize scheduled observer trips using will contribute to even more representative sampling.

**Comment:** One commenter noted that the required observer coverage rates are to be based on estimated versus actual fishing effort. They were not concerned with this change since past observer coverage was coordinated on estimated trips due to actual trip numbers not being known until after the season finished. However, they stated that a report capturing actual percent observer coverage based on actual trips should be provided once TTP data are available.
**Response:** NCDMF currently includes and will continue to include in their annual report and addendum the estimated and actual percent observer coverage based on the finalized TTP data.

**Comment:** One commenter stated that the change to a statewide total of takes rather than gear and area specific takes may put undue pressure on a species within a single area. Adequately dispersed observer coverage and maintaining minimum coverage rates within each MU would be essential.
**Response:** NMFS agrees. NCDMF's application and conservation plan states that observer coverage will be distributed state-wide across the six MUs (A, B, C, D1, D2, and E; Figure 5.1 in NCDMF's application and conservation plan) and across four seasons of each ITP year: fall (September–November), winter (December–February), spring (March–May), and summer (June–August). The conservation plan also states that NCDMF will develop a sea-day schedule of observer trips to obtain 7–10 percent observer coverage of the estimated estuarine anchored large-mesh gill-net fishing trips, and 1–2 percent observer coverage of the estimated inshore anchored small-mesh gill-net fishing trips per season in each MU within each season (see section 7.C.1 Monitor - Observer Program of NCDMF's application and conservation plan).

**Comment:** One commenter noted that the application states a sea-day schedule of observer trips will be developed to obtain 7-10 percent observer coverage on large-mesh and 1-2 percent observer coverage on small-mesh gear. They stated that it was unclear if these percentages were designated for each month or averaged over the entire season or if the observer coverage was

within each MU or a statewide average. They recommended 10 percent observer coverage for large mesh and 2 percent observer coverage for small mesh be set and met as a goal for a season.
**Response:** In their application and conservation plan, NCDMF proposes to monitor at least 7 percent (with a goal of 10 percent) of large-mesh gill net trips and 1 percent (with a goal of 2 percent) of small-mesh gill net trips in each MU during each of 4 seasons (i.e., spring, summer, fall and winter). With respect to setting goals for observer coverage, NCDMF has proposed, as the commenter recommends, to plan for the upper range of this proposed observer coverage section 7.C.1 Monitoring - Observer Program of NCDMF's application and conservation plan states that: *"As is the current practice, the Observer Program will strive to reach the upper range of the observer coverage for each season and MU within each mesh-size category: 10% of large-mesh gill-net trips and 2% of small-mesh gill-net trips. This approach helps account for differences between estimated fishing trips and reported fishing trips."*

**Comment:** One commenter noted that the ITP states PIT tags and flipper tags will no longer be used for captured turtles, but rather the use of temporary marking with paint pens will be used. They did not object to this change as complications may arise in tagging juvenile green and Kemp's ridley sea turtles; however they requested that a consistent marking scheme be determined and communicated with NCWRC.
**Response:** NMFS agrees that a consistent marking scheme is needed and it should be communicated to NCWRC. NCDMF revised their application and conservation plan to include the following addition in section 7.C.1. (Monitor). *"The division will also seek guidance from NMFS on a marking scheme that ensures that the scheme is distinguishable from NMFS sea turtle research projects in NC. The marking scheme, including any changes to the marking scheme over time, will be communicated to the NCWRC sea turtle biologists."*

**Comment:** One commenter requested that the application and conservation plan indicate continued coordination and communication occur between the NCDMF, NMFS, and NCWRC regarding species within our jurisdiction affected by the gill-net fishery.
**Response:** NMFS agrees that this coordination is critical to effective management and conservation of these species. NCDMF's application and conservation plan indicates commitments to this coordination in several ways including: copying NCWRC on submission all report submissions (individual take reports, and monthly, seasonal, and annual reports), obtaining training for observers, consulting on species identification for unidentified or hybrid individuals, and coordinating to provide assistance with cold-stunning events and rehabilitation turtle transportation.

**Comment:** One commenter stated that the application simply proposes to continue an observer program that is functionally the same as the flawed, non-compliant program currently in place. They state that the minor changes to the observer program listed in the application provide no solutions to the inaccuracies, non-responsiveness of fishers, and its own lack of enforcement.
**Response:** NMFS disagrees. While the observer program proposed by NCDMF in the application and conservation plan retains the method of using on-board and alternative platform observation methods and the same observer coverage rates as the current ITPs, NCDMF would implement several new actions to improve the observer program. The NCDMF Observer Program is currently in the process of developing an OTSS whereby fishers will be required to contact the Observer Program the week before they plan to fish. A percentage of fishers who call

would be selected to carry an observer based on random drawing of their names stratified according to mesh-size category and MU. Staff from the Observer Program have met with staff from the NMFS, Northeast Fisheries Science Center Industry-funded Scallop Program to discuss their Integrated Voice Response (IVR) call-in system and post-processing routines to select fishers that must carry an observer. The North Carolina Department of Environmental Quality (NCDEQ) Information Technology has contracted a state vendor to develop an IVR and an automated outbound communication system (e.g., phone call, text, and/or email) to be used as part of the OTSS. The Observer Program is consulting with division management and Marine Patrol to develop business rules for the OTSS and to establish procedures for enforcing the requirement when fishers do not comply. NCDMF will have a pilot beta version of the OTSS in place for testing by the fall of 2023 flounder season with the expectation of full implementation of the OTSS by the fall of 2024 flounder season.

**Minimization/Adaptive management**

**Comment:** One commenter brought up concerns about sturgeon interactions that are centered at the mouth of the Roanoke and suggested closing this as hotspot.
**Response:** NMFS agrees, and this area is identified as a hotspot. **S**ection 5.B.1 Set (Anchored) Gill Nets of NCDMF's application and conservation plan states: *"MU A: Western Albemarle Sound in the vicinity of the mouth of the Roanoke River (Black Walnut Point 35° 59.33833' N, -76° 41.0060' W; running southeasterly to a point 35° 56.3333' N, -76° 36.0333' W at the mouth of Mackey's Creek) including the entire Roanoke River up to the dam in Weldon is closed to all gill nets."* Other hotspots may be ephemeral and are referenced as identification of hotspots in real time.

**Comment:** One commenter stated that information regarding the management response for any unmet observer coverage goals should be presented.
**Response:** NMFS agrees. NCDMF's adaptive management measures are described in section 7.C.2 Avoid and Minimize of their application and conservation plan and include actions such gear restrictions, season closures, and/or area closures. NCDMF revised section 7.C.2 Avoid and Minimize of their application and conservation plan to include the following language: *"These adaptive management tools will also be used to ensure observer coverage requirements are met when effort cannot be found and calls into the OTSS are less than expected based on historical effort data."*

**Comment:** One commenter requested additional information regarding the management response for the exceedance of allowable takes.
**Response:** NMFS agrees that it is important that the management response in the event authorized takes is exceeded is clear in the application and conservation plan. Monitoring and adaptive management measures outlined in NCDMF's application are designed to avoid exceeding allowable takes. The application and conservation outlines several examples where the NCDMF has a history of responding quickly and definitively when the number of allowable takes was approached or, rarely, exceeded by consulting with NMFS on options and following through with time-area closures. To clarify this in the application and conservation plan, NCDMF added the following language in section 7.C.2. Avoid and Minimize: *"In the unlikely event that authorized take levels were exceeded for a given species, the NCDMF also would*

*consult with NMFS to identify the extent a fishery closure would need to be given the spatiotemporal differences between sturgeon and sea turtles*."

**Comment:** One commenter recommended requiring fishers to use illuminated gill nets. They stated that scientific studies have shown that illuminating gillnets with green LED lights is effective at mitigating sea turtle bycatch and that more recent studies have shown that the same technology significantly reduced mean rates of total discarded bycatch biomass, and did so without harming target catch rates. They state that if banning gill nets is not possible, illuminating them may at least protect sea turtles, however, it is worth noting that this solution does not carry the benefits to finfish (including sturgeon) and other species as banning gill nets entirely.
**Response:** The commenter is correct that several studies have found that illuminated gill nets have lower sea turtle bycatch per unit effort than non-illuminated gill nets. However, before a bycatch reduction method, such as lights, can be implemented in a fishery, they must be adequately tested in that fishery. At this point in time there is not enough information about the effect of illuminated nets on the catch of sea turtles, sturgeon, and other target and bycatch species or their operational feasibility in NC inshore anchored gill net fisheries to implement illuminated nets in these fisheries. Should there be interest in further examining these effects of illuminated nets, NCDMF stated in their application and conservation plan (see section 7.C.3 Mitigate) that: *"The NCDMF will continue to support and assist research efforts and facilitate the establishment of relationships with the commercial fishing industry."*

**Enforcement**

**Comment:** Several commenters noted that the limitations on soak time, net length, gear configuration, area closures, and fishing days put forward as avoidance efforts in the application rely entirely on fisher compliance with the regulations and these commenters do not believe this has been or will be effective.
**Response:** NCDMF uses two primary enforcement tools when a Marine Patrol officer finds that a fisher's gear or fishing practices are out of compliance with a State statute, regulation, or proclamation under the authority of the MFC. The officer can issue a Citation and/or Notice of Violations (NOV). A citation is a criminal enforcement action to be resolved in criminal district court. Either as an alternative or in addition to a citation, a Marine Patrol officer can also issue an NOV. An NOV is the NCDMF administrative enforcement action that results in suspension of the fisher's permit (*e.g.*, EGNP) when the permit holder is found to be in violation of general or specific permit conditions. While a citation and NOV may both be predicated upon the same violation, they are two separate actions.

The NCDMF recently updated their NOV procedures, in August 2021, to better align with rules and statutes, adequately notify permittees of their appeal rights, and streamline and automate the internal permit suspension and revocation process. Marine Patrol coordinates the issuance, standardization, suspension, and revocation of all these permits. NMFs believes these updated NOV procedures will be even more beneficial to fisher compliance enforcement when the OTSS is implemented.

**Comment:** One commenter stated that they are concerned about the lack of enforcement capabilities that NCDMF has. They stated that the shear amount of water in the sounds, bays, and creeks of NC inshore waters where these gill net fishermen are operating vastly exceeds the manpower/resources of the Marine Fisheries enforcement division. Additionally this commenter raised concerns about fishers using technology to avoid enforcement officers.
**Response:** NCDMF has revised their application and conservation plan to include additional information about funding for enforcement officers (section 7.C.3. Mitigate): *"Enforcement is critical to a successful Conservation Plan. Funds from the CFRF are currently used to provide salary for one full-time Marine Patrol officer position. The CFRF-funded position officer enforces all Marine Fisheries rules and regulations, not just the requirements of the ITPs; however, fully funding one position is more streamlined than tracking and reimbursing each Marine Patrol officer's ITP-related enforcement activities. With the addition of OTSS and the need to provide adequate enforcement to make the system effective, the NCMDF anticipates that additional enforcement resources will be necessary."*

Additionally, the Marine Patrol currently has 56 officers (https://www.deq.nc.gov/about/divisions/marine-fisheries/rules-proclamations-and-size-and-bag-limits/nc-marine-patrol) that work in three law enforcement districts along the coast. In addition to checking commercial and recreational fishermen, officers patrol waterways, piers, and beaches in coastal areas. They also inspect seafood houses, vehicles transporting seafood, and restaurants all over the state to make sure everyone is complying with fisheries rules. Officers use a variety of different size boats, aircraft and patrol vehicles to accomplish these tasks.

**Mitigation**

**Comment:** One commenter stated that they believe the HCP fails to meet the statutory standard of "maximum extent practicable" and does not provide adequate mitigation measures. They also state that the HCP does not show that its proposed minimization and mitigation measures are sufficient to offset the impact from the taking, nor do the current mitigation measures indicate how they contribute to offsetting take.
**Response:** CFR 222.307 states that: If the Secretary finds, after opportunity for public comment, with respect to a permit application and the related conservation plan that …. (ii) the applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking … the Secretary shall issue the permit [see also 16 U.S.C. § 1539(a)(2)(B)].

The applicant must minimize and mitigate to the maximum extent practicable. However, maximum extent practicable does not necessarily mean most restrictive. Economics and the capabilities of an applicant are factors that are considered when analyzing whether take has been minimized and mitigated to the maximum extent practicable (see the Habitat Conservation Planning and Incidental Take Permit Processing Handbook). Furthermore, NCDMF did discuss and consider several practicable alternatives including (1): No-Action Alternative; (2) Full Gear Closure; and (3) Additional Gear Regulations in the application and conservation plan.

**Comment:** One commenter expressed appreciation that NCDMF proposed to collaborate with NCWRC on responsive efforts for cold stunned turtles. They also suggested that this response

could include collection of turtles as well as a commitment to facilitate the release of rehabilitated cold stunned turtles.
**Response:** NCDMF stated that they do not have appropriate vessel resources to transport sea turtles offshore, however they are able to assist with other transportation and have revised their application and conservation plan to include the following description of their commitment to assisting with cold-stunned and rehabilitated sea turtles in section 7.C.3 Mitigate: *"Also, the NCDMF also will help, to the extent possible, respond to cold-stun events that occur in NC with some regularity (Niemuth et al. 2020). The NCDMF does not have the vessel resources to transport sea turtles for release far from shore (e.g., Gulf Stream); however, the division will help provide transportation of staff, supplies, and sea turtles using Observer Program staff, vehicles, and vessels to the extent possible. These efforts would apply to the release of rehabilitated sea turtles regardless of the reason they were first brought into care. The division will communicate with the NCWRC about this commitment to ensure they reach out for assistance when needed."*

**Inadequate descriptions of costs/funding assurances**

**Comment:** One commenter felt that the conservation plan failed to meet the adequate funding requirements. They state that the permit applicant must ensure adequate funding will be provided for the proposed conservation plan and consistent with the statute, the agencies require the applicant to estimate the costs of conservation plan implementation by detailing all different types of costs incurred. They state that the conservation plan should provide cost estimates for all proposed measures and specific categories of operation from upfront costs like hiring experts to future costs. They state that no cost estimates or detailed funding plan is provided for the observer program or for the proposed steps of the minimizing and mitigating efforts with the exception of the small amount identified for purchasing tags and for genetic analysis of sturgeon fin tips.
**Response:** Before NMFS can issue an ITP, NMFS must find that the applicant will ensure that adequate funding for the plan will be provided (see Issuance Criteria included above). It is the applicant's (NCDMF's) decision how to ensure that level of funding. NCDMF has presented data under section 7.C. Monitor, Minimize, Mitigate Impacts of the application and conservation plan stating: *"The NCDMF will be able to monitor incidental takes of protected species in the estuarine anchored gill net fishery through its Observer Program. The North Carolina General Assembly established the North Carolina Commercial Fishing Resource Fund (CFRF; North Carolina General Statute (NCGS) 113-173.1) for the purpose of providing funding for the development of sustainable commercial fishing in the State. The principal of the Fund consists of fixed costs on standard commercial fishing licenses (SCFL) pursuant to NCGS 113-168.2, retired SCFL's pursuant to NCGS 113-168.3, shellfish licenses pursuant to NCGS 113-169.2, fish dealer licenses pursuant to NCGS 113-169.3, land-or-sell licenses pursuant to NCGS 113-169.5, and recreational commercial gear licenses pursuant to NCGS 133-173.3. By law, this Fund shall first fully fund the State's ITPs for the commercial fishing industry. Currently the fund provides for five permanent observer positions and four biologist positions, including the biologist supervisor. There are sufficient funds to hire temporary observers to increase capacity, especially during peak fishing seasons. Should decreased license sales limit funds available for the Observer Program to maintain required observer coverage levels statewide, NCDMF would assess the expected spatiotemporal distribution of remaining fishing effort and the number of*

*observed trips that are possible with reduced funding. Based on this assessment, NCDMF will consult with NMFS on an adaptive management approach to use time-area closures that would allow for required observer coverage levels in all areas open to anchored gill nets."* Additionally, in the same section NCDMF specifically allocates annual funding for mitigation efforts and states: *"The NCDMF will commit funds of up to $2,000 per year to purchase PIT tags, which equates to approximately 100 per year at the current price of $20 per tag. The NCDMF will commit up to $3,000 per year to fund genetic analysis; at approximately $100 per sample, this funding provides for the analysis of approximately 30 fin clips per year."*

**Implementing agreement**

**Comment:** One commenter noted that previous ITP included a separate Implementing Agreement (IA) between NCDMF and NMFS that provided specific actions regarding allowance of takes and management measures. They said it should not be assumed that many of these details will develop later and basic management details should be provided in the ITP application, at the time of permit issuance or at minimum reference the continuation of a previous IA or development of a new IA where management actions, coordination, minimum observer levels, and reporting methodologies are detailed for all seven species.
**Response:** Implementing agreements are not required under ESA section 10 and are typically reserved for more complex, or multi-party permits. There is no need for an implementing agreement where all of the agreed-upon measures are spelled out in the applicant's conservation plan and ITP. NMFS will ensure that all appropriate and necessary details on adaptive management, coordination between NMFS and NCDMF, observer coverage levels, reporting requirements, etc. are included in the conservation plan and ITP.

**Compliance with current ITP**

**Comment:** Several commenters expressed concern that fishers are not reporting catch through the trip ticket program, stating that only 38 percent of licensed commercial fishermen filing trip tickets reported any actual landings, or that more than 60 percent of commercial license holders fail to report landings, leading to inaccuracies in under reporting of catch.
**Response:** NCDMF provided additional information and context in the application and conservation plan to describe the process for obtaining an EGNP and why not all fishers that obtain an EGNP report landings (section 7.C.1 Monitor): *"To obtain an EGNP, fishers must fill out an application, sign that they agree to the conditions of the permit, and provide their contact information so that observers can call to schedule an observed trip. There is no cost associated with the permit. The permit condition form is reviewed annually and updated as needed (Appendix D). Comparisons of EGNP holders and TTP data indicate that many permit holders do not report fishing effort with estuarine anchored gill nets (Byrd et al. 2021). Division staff have been told by some fishers that they get the permit just in case they decide they want to use it. Additionally, some fishers believe that EGNPs may eventually be restricted to a limited-entry and so they get the permit to show a history of possession should that be a criterion for limited-entry."*

**Comment:** Several commenters stated that the ITP should not be issued because NCDMF has not been in compliance with the current sea turtle and sturgeon permits' observer requirements

which are 7 percent observer coverage in large-mesh gill nets and 1 percent observer coverage in small-mesh gill nets in each MU in each season.
**Response:** It is a challenge for many observer programs to schedule observed trips with fishers, including the NCDMF Observer Program. Challenges arise when using alternative platform methods, as it can be challenging to find fishing effort, especially in MUs with extremely low effort or where net attendance requirements lead to fishers hauling gear before daylight hours. A MU may also be closed "early," due to adaptive management strategies or fish quota limitations, resulting in a loss of scheduled trips within that MU.

The NCDMF has provided information in annual reports and in other communications with NMFS describing the approaches they use to meet the observer coverage requirements of the ITPs. These approaches include making numerous calls to fishers, having observers at boat ramps that fishers may use, and looking for fishing activity on the water through an alternative platform approach. In 2020, NMFS sent NCDMF a letter expressing concerns about instances where observer coverage requirements were not met. The NCDMF responded with a 5-point plan to address shortages (see 7.C.1 Monitor of NCDMF's application and conservation plan). This plan includes specific strategies in which NCDMF will 1) Build Capacity, 2) Improve Tracking, 3) Assess Trip Ticket Data, 4) Improve Outreach, and 5) Obtain Observer Coverage.

The NCDMF's commitment to fulfilling their observer coverage requirements is evident from their efforts during the more than 25 months they had waiver of observer coverage requirements during the COVID-19 pandemic. During the months of the waiver, NCDMF continued to make efforts to deploy observers, often meeting or exceeding waived observer coverage requirements, including the fall seasons of 2020 and 2021 when incidental capture of sea turtles can be highest. The NCDMF has also revised text in section 7.C.2 Avoid and Minimize of their application and conservation plan outlining a commitment to close areas when they do not expect to meet observer coverage requirements: *"These adaptive management tools will also be used to ensure observer coverage requirements are met when effort cannot be found and calls into the OTSS are less than expected based on historical effort data."*

Finally, the NCDMF's application and conservation plan includes commitment to the implementation of a call-in system, the Observer Trip Scheduling System (OTSS) to facilitate the scheduling of observer trips and help alleviate some of the issues with fisher avoidance. NMFS has used "call-in" systems in several fisheries to aid in the scheduling of trips and meeting the coverage goals (*e.g.*, https://www.fisheries.noaa.gov/resource/tool-app/pre-trip-notification-system-northeast, and https://www.fisheries.noaa.gov/new-england-mid-atlantic/commercial-fishing/industry-funded-scallop-observer-program-call-requirements). The NCDMF application and conservation plan states that a "beta version" of the OTSS will be in user testing by fall 2023 and that the OTSS will be fully implemented by fall 2024 (see Section 7.C.1. Monitor).

**Comment:** One commenter stated that NCDMF observers are not performing their duties, and have instructed fishers on how to avoid sea turtles being observed (removing sea turtles from nets prior to observation).
**Response:** The NC Department of Environmental Quality, Division of Marine Fisheries (NCDEQ/DMF) has a Code of Professional Conduct that all employees must read, agree, and

sign (https://ncgov.csod.com/clientimg/ncgov/MaterialSource/fad7d123-c2ce-474c-a7a0-11ffd20ff064_The_Department_of_Environmental_Quality_s_Code_of_Professional_Conduct2142019.pdf). The NCDEQ/DMF investigates any substantiated complaint that is provided in a timely manner. Section 7 of the NC Office of State Human Resources (OSHR) Disciplinary Action Policy outlines three reasons for disciplinary action, including "Unacceptable Personal Conduct", which can include "material falsification of… work-related documents". Unacceptable Personal Conduct can lead to disciplinary action, up to and including dismissal, without any prior written warning. The public should contact the NCDMF Observer Program to report any instances of such actions so that NCDMF can investigate and take appropriate action.

**Comment:** Several commenters stated that the ITP should not be issued because fishers are not in compliance with the current ITP because they refuse to take observers and do not report all incidental captures of ESA-listed species when observers are not on board. Further they state that the ITP should not be issued because NCDMF has not enforced these requirements.
**Response:** Under the specific conditions of the EGNP, it is unlawful for an EGNP holder to refuse or deny NCDMF observers a trip aboard their vessel to collect data or a trip using an alternative platform to collect data. The enforcement of the requirement to take an observer is a challenge shared across state and federal observer programs. NCDMF's application and conservation plan describes the difficulty of enforcing the observer requirement for fishers that avoid being observed, as opposed to outright refusing to carry an observer. NMFS anticipates the implementation of the call-in system (see NCDMF's application and conservation plan section 7.C.1. Monitor) will greatly improve the NCDMF's ability to enforce the requirement to take an observer because fishers will no longer be able to simply not take an observer's call to schedule a trip. While this call-in system becomes fully operable, NCDMF has also included procedures for issuing Notice of Violations to fishers that have disconnected phone numbers (violating a condition of their EGNP) and to issue certified letters to fishers that repeatedly do not take an observer's call to schedule a trip.

The current ITP states that NCDMF must ensure (*i.e.*, issue a proclamation) that all commercial and recreational fishermen report all incidental captures of sea turtles and sturgeon to NCDMF. NCDMF has included the requirement to report incidental captures in the EGNP. One of the specific conditions of the permit is: "It is unlawful to fail to report any sea turtle or sturgeon captured. Reports shall be made within 24 hours of the capture to the Division of Marine Fisheries at (252) 726-7021 or (800) 682-2632."

If a fisher is not in compliance with either of these conditions of the permit the NCDMF uses two primary enforcement tools when a Marine Patrol officer finds that a fisher's gear or fishing practices are out of compliance with a State statute, regulation, or proclamation under the authority of the MFC. The officer can issue a Citation and/or Notice of Violations (NOV). A citation is a criminal enforcement action to be resolved in criminal district court. Either as an alternative or in addition to a citation, a Marine Patrol officer can also issue an NOV. An NOV is the NCDMF administrative enforcement action that results in suspension of the fisher's permit (e.g., EGNP) when the permit holder is found to be in violation of general or specific permit conditions. While a citation and NOV may both be predicated upon the same violation, they are two separate actions.

The NCDMF recently updated their NOV procedures, in August 2021, to better align with rules and statutes, adequately notify permittees of their appeal rights, and streamline and automate the internal permit suspension and revocation process. Marine Patrol coordinates the issuance, standardization, suspension, and revocation of all these permits. The Observer Program has used this enforcement tool to ensure fishers provide working phone numbers where they can be reached to schedule trips by issuing NOVs for disconnected phone numbers. NMFS believes the updated NOV procedures will be even more beneficial to fisher compliance enforcement when the OTSS is implemented.

**Comment:** One commenter requested that incidental captures during non-observed trips be reported and stated that information on how the reports would be treated should be presented within the permit or associated Implementing Agreement.
**Response:** NCDMF will continue to include a requirement in the EGNP for fishers to report to NCDMF incidental capture of sturgeon and sea turtles during unobserved trips. These unobserved takes would not be included in the take estimates under the ITP as when observed takes are extrapolated across the fishery, those takes that are unobserved are already accounted for in the take estimate. NCDMF revised their application and conservation plan to include additional instances where the NCDMF would highlight the importance of self-reporting in their outreach activities:

- Section 7.A.3 Finalizing Requested Incidental Takes: *"Finally, fisher-reported incidental takes of sea turtles and sturgeon will not go toward the number of incidental takes authorized by the requested permit."* and
- Section 7.C.3 Mitigate. *"In addition to the outreach efforts outlined above, the NCDMF will continue to inform fishers of their obligations under the ITP(s) (e.g., to report incidental takes of sea turtles and sturgeon), the guidelines for possible boat encounters with manatees, and proper resuscitation actions for incidental takes of sturgeon and sea turtles."*

**Biological Opinion**

**Comment:** Several commenters stated that NMFS must conduct and publish an ESA section 7 analysis prior to issuing an ITP, and one commenter requested that NMFS re-issue the permit draft along with Biological Opinion and EA/EIS so that the public has full information and can submit more informed comments.
**Response:** NMFS agrees that NMFS must complete a Biological Opinion prior to issuing an ITP. The NMFS OPR Marine Mammal and Sea Turtle Conservation Division and Endangered Species Division initiated formal ESA section 7 consultation with NMFS OPR ESA Interagency Cooperation Division on the proposed issuance of ITP on May 22, 2023. The consultation is in-progress and a biological opinion will be issued by the ESA Interagency Cooperation Division at the conclusion of the consultation process. An ITP cannot be issued until the section 7 consultation is complete and can only be issued if a no jeopardy opinion is reached or a reasonable and prudent alternative is developed and accepted. However, the NOA and NCDMF's application and conservation are not draft permits. They provide an opportunity for the public to review and comment on the application and conservation plan from an applicant. NMFS has not issued a draft permit, nor does the public have an opportunity to review and comment on a

biological opinion before it is finalized. See the *National Environmental Policy Act (NEPA)* section below for comments related to the NEPA analysis.

**Comment:** One commenter asked to see collaboration between NMFS and NC on workshops to develop and implement gear alternatives as part of the biological opinion's terms and conditions.
**Response:** NCDMF's application includes their current and planned future efforts to collaborate with and assist researchers in conducting research to inform bycatch reduction and ESA-listed species conservation and management (see section 7.C.3 Mitigate). Terms and conditions included in the biological opinion will be determined by the NMFS OPR ESA Interagency Cooperation Division.

**National Environmental Policy Act (NEPA)**

**Comment**: One commenter felt that the NEPA process has not been conducted as required and that the NEPA document and analyses should have been shared with the public when the NOA for the permit application was published. The commenter states that the agency must consult other involved Federal agencies and that the statement must be made available for public comment. They also quote the regulations that state the environmental review must begin "as soon as practicable after receiving the application" (40 CFR 1502.5(b)) and that agencies are expected to work with government applicants so they can begin the NEPA process prior to receipt of the application. The commenter alleges that the agency is required to solicit public comments on potential alternatives and impacts and identification of relevant information in the notice of intent to prepare the environmental review. They also quote 1501.2(b)(2) and U.S. Supreme Court case Kleppe v. Sierra Club regarding the timing of the publication of environmental documents and EISs. The commenter states that the NOA and permit application do not comply with NEPA, its implementing regulations, and case law. They state that the NOA does not include a timeline for the EA, that no research was conducted to inform the permit application, and that because NMFS did not work with the applicant to develop the permit application in order to publish the EA at the time of, or soon after, the NOA, that it is not adhering to 40 C.F.R. 1501.2(b)(2) & 1502.5. Additionally, the commenter states that because the permit application functions as a notice of proposal for federal action, case law interpreting NEPA (i.e., Kleppe v. Sierra Club) requires the NEPA analysis be ready at the time of the NOA. The commenter states that not making the EA available with the NOA limited the public comment process, preventing a fully informed document. The commenter also states that the biological assessment (BA) or biological opinion should have also been made available to the public at the time of the NOA, and that as a result NMFS cannot adequately determine if issuance of the permit would jeopardize listed species or critical habitat. Lastly, the commenter requests that NMFS withdraw the permit application and reissue the NOA with the EA and biological opinion.
**Response:** Per the 2020 CEQ NEPA regulations as modified by the Phase I 2022 revisions, and applied to the proposed permit issuance, procedural requirements specific to environmental assessments (EAs) are found at 40 CFR 1501.5. Federal agencies are required to begin the NEPA process "as soon as practicable after receiving the application" when an EA will be prepared (40 CFR 1501.5(d)) and "…at the earliest reasonable time to ensure that agencies consider environmental impacts in their planning and decisions…" (40 CFR 1501.2). On December 22, 2022, NMFS published a Notice of Receipt (NOR) in the *Federal Register* to alert the public that

they had received an application and conservation plan for an ITP and conservation plan. No ITP had been prepared or was available at that time, therefore there was no federal action to initiate an EA. Consistent with NMFS standard practice per the Habitat Conservation Planning and Incidental Take Permit Processing Handbook and the aforementioned CEQ NEPA implementing regulations, NMFS has now published a draft EA, allowing the public to comment on the proposed decision to issue an ITP and confirms that NMFS commenced development of the EA as soon as practicable after receiving an adequate complete application. As is standard practice for similar actions, NMFS notified the public of its intent to prepare an EA through the NOR of NCDMF's ITP application and conservation plan, and considered this the "earliest reasonable time" following receipt of an adequate and complete application.

NMFS does not dispute the requirements laid out in 40 CFR 1500.3(b)(1), but notes that this section is specific to environmental impact statements (EISs) and does not apply in this situation. Similarly, 1502.5(b) reads that the federal agency should work with the applicant et al. prior to receipt of the application, but is specific to EISs and therefore also does not apply in this situation. However, 40 CFR 1501.5(e) states that NMFS must, "involve the public, State, Tribal, and local governments, relevant agencies, and any applicants, to the extent practicable in preparing environmental assessments." As such, NMFS has been and will continue to work with NCDMF, the applicant. NMFS began working with NCDMF after receiving an ITP application and conservation plan on June 22, 2022, through a request for additional information on their proposed mitigation measures and take requests. After several draft submissions and NMFS reviews, NCDMF submitted an adequate complete revised application on December 2, 2022. Additionally, any public comments received on the application and conservation plan will be considered as part of, and inform, the NEPA process.

The case law provided, Kleppe v. Sierra Club, involved an EIS and therefore NMFS does not consider it relevant case law in this situation since associated requirements under NEPA and its implementing regulations are different for EAs. Secondly, NMFS does not consider the applicant's ITP application and conservation plan to be a "proposal for major federal action" as applied in the referenced legal case and purported by the applicant. Instead, NMFS' issuance of a permit would be a "proposal for major federal action" requiring NEPA review. The NEPA process is itself the mechanism by which environmental research is used to inform planning and decision making. Therefore, it is premature to expect that this will occur prior to an applicant submitting an ITP application and conservation plan. Additionally, because publication of the Notice of Availability (NOA) for the draft EA acts as a second opportunity for the public to provide input, this NEPA and regulatory requirement is amply met and the document fully informed through the public comment process. As is statutorily required, NMFS used the best available science during development of the draft EA. Additionally, per the standard consultation process, biological opinions result from a consultation process that begins after the agency determines there is a federal action for which the NEPA process is initiated. As appropriate, the final EA will be informed by the analysis in the final biological opinion.

Lastly, NMFS does not consider a permit application and conservation plan from the applicant to be a NMFS planning document and therefore does not apply the regulations at 40 CFR 1501.2(b)(2) to this situation, which recommend the EA be made available at the same time as "other planning documents."

**Comment:** Commenters stated that NMFS should complete an Environmental Impact Statement (EIS) rather than an Environmental Assessment. They believe that the environmental effects of the action will be significant, which requires the development of an EIS under NEPA.
**Response:** In accordance with the NEPA, NMFS has prepared an EA analyzing the impacts on the human environment associated with NMFS' proposed action, which is the issuance of an ITP to NCDMF. The ITP would authorize the incidental take of green (North Atlantic and South Atlantic DPSs), Kemp's ridley, hawksbill, leatherback, and loggerhead (Northwest Atlantic Ocean DPS) sea turtles, and Atlantic (Gulf of Maine, New York Bight, Chesapeake, Carolina, and South Atlantic DPSs) and shortnose sturgeon and the mitigation and monitoring measures to minimize the effects of that take (*i.e.*, the proposed ITP would only authorize incidental take of ESA-listed sea turtles and sturgeon so NMFS anticipates effects will be limited to these species). It is appropriate for NMFS to develop an EA in order to determine if the effects will be significant. The CEQ NEPA regulations state "An agency shall prepare an environmental assessment for a proposed action … when the significance of the effects is unknown." (40 CFR 1501.5(a)). Our preliminary determination based on the analyses contained in the draft EA is that issuance of ITP No. 27106 would not significantly impact the quality of the human environment. Accordingly, based on this preliminary determination, preparation of an EIS for this action is not required.

## References


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**Appendix B:** Regulations set forth in proclamations by NCDMF

Proclamations can be found at the following site: https://deq.nc.gov/about/divisions/marine-fisheries/rules-proclamations-and-size-and-bag-limits/fisheries-management-proclamations

| Proclamation Number | Effective Date | Description |
|---|---|---|
| M-8-2010 (REVISED) | 6/13/2010 | The intent of this proclamation is to implement gill net restrictions while the Division applies for a statewide incidental take permit from NMFS under Section 10 of the Endangered Species Act. |
| M-31-2013 | 9/30/2013 | The intent of this proclamation is to implement gill net restrictions under Incidental Take Permit No. 16230 from NMFS under Section 10 of the Endangered Species Act. |
| M-24-2014 | 9/1/2014 | It is unlawful for holders of a Standard Commercial Fishing License (SCFL), Retired Standard Commercial Fishing License (RSCFL), or Recreational Commercial Gear License (RCGL) to deploy gill nets in Internal Coastal Waters with an exception for run around, strike, drop or drift gill nets, without possessing a valid Estuarine Gill Net Permit issued by the Division of Marine Fisheries. |
| M-5-2016 | 4/10/2016 | It is unlawful to use gill nets with a stretched mesh length of 4 in through 6 ½ in in Internal Coastal Waters except those described below. Areas not listed below are closed to gill nets (including trammel gill nets) with a stretched mesh length of 4 in through 6 ½ in; except as described in Section III. |
| M-19-2017 | 11/9/2017 | This proclamation supersedes proclamation M-17-2017 dated October 12, 2017. This proclamation closes MU D1 (See map) to the use of gill nets with a stretched mesh length of 4 in through 6 ½ in (except as described in Section III.) in accordance with the Sea Turtle Incidental Take Permit. |

| Proclamation Number | Effective Date | Description |
|---|---|---|
| M-6-2019 | 3/18/2019 | During an emergency meeting on March 13, 2019, the N.C. Marine Fisheries Commission directed the N.C. Division of Marine Fisheries Director to issue this proclamation pursuant to N.C. General Statute 113-221.1 (d). The Director has no legal authority to modify or change a proclamation when the proclamation is specifically directed by the Commission under this statute. This proclamation supersedes proclamation M-5-2019, dated March 7, 2019. This proclamation prohibits the use of ALL gill nets upstream of the ferry lines from the Bayview Ferry to Aurora Ferry on the Pamlico River and the Minnesott Beach Ferry to Cherry Branch Ferry on the Neuse River. It maintains tie-down (vertical net height restrictions) and distance from shore restrictions for gill nets with a stretched mesh length 5 in and greater in the western Pamlico Sound and rivers (excluding the areas described in Section I. B.) in accordance with Supplement A to Amendment 1 to the N.C. Estuarine Striped Bass Fishery Management Plan. |
| FF-34-2019 | 9/15/2020 | This proclamation supersedes Proclamation FF-31-2019, dated August 28, 2019. It establishes commercial flounder season dates for Internal Coastal Waters by Flounder Management Area. It maintains a 15-in total length minimum size limit. It also maintains the regulation making it unlawful to possess flounder taken from anchored large mesh gill nets with a stretched mesh length less than 6 in. It makes it unlawful for a commercial fishing operation to possess flounder from the Atlantic Ocean Waters taken by any method other than trawls. This action is being taken to comply with the requirements of Amendment 2 to the N.C. Southern Flounder Fishery Management Plan. |
| FF-25-2020 | 9/15/2020 | This proclamation supersedes Proclamation FF-34-2019, dated September 12, 2019. It establishes commercial flounder season dates for Internal Coastal Waters by Flounder Management Area. It maintains a 15-in total length minimum size limit. It also maintains the regulation making it unlawful to possess flounder taken from anchored large mesh gill nets with a stretched mesh length less than 6 in. It makes it unlawful for a commercial fishing operation to possess flounder from the Atlantic Ocean Waters taken by any method other than trawls. This action is being taken to comply with the requirements of Amendment 2 to the N.C. Southern Flounder Fishery Management Plan. |
| M-4-2020 | 4/20/2020 | Gill net restrictions for gill nets with a stretched mesh length less than 4 in and attendance requirements for gill nets with a stretched mesh length less than 5 in |

| Proclamation Number | Effective Date | Description |
|---|---|---|
| M-9-2020 | 5/1/2020 | This proclamation supersedes proclamation M-4-2020 dated March 19, 2020. It implements attendance requirements for gill nets with a stretched mesh length less than 4 in in Subunit B.1 |
| M-11-2020 | 5/8/2020 | This proclamation supersedes proclamation M-9-2020 dated April 24, 2020. It increases yardage limits for the commercial Spanish mackerel drift gill-net fishery in MU B. |
| M-16-2021 | 9/14/2021 | This proclamation supersedes proclamation M-12-2021 dated April 30, 2021. It opens MU A to the use of gill nets for the purpose of harvesting flounder in accordance with Amendment 2 to the N.C. Southern Flounder Fishery Management Plan and the Incidental Take Permit for Sea Turtles. It maintains the exempted areas in MU A open to the use of run-around, strike, drop, and trammel gill nets to harvest blue catfish. It also maintains small mesh gill net attendance requirements in the entirety of MU A. |
| FF-40-2021 | 9/15/2021 | This proclamation supersedes Proclamation FF-25-2020, dated June 15, 2020. It establishes commercial flounder season dates for Internal Coastal Waters by Flounder Management Area. It maintains a 15-in total length minimum size limit. It also maintains the regulation making it unlawful to possess flounder taken from anchored large mesh gill nets with a stretched mesh length less than 6 in. It makes it unlawful for a commercial fishing operation to possess flounder from the Atlantic Ocean Waters taken by any method other than trawls. This action is being taken to comply with the requirements of Amendment 2 to the N.C. Southern Flounder Fishery Management Plan. |
| M-17-2021 | 9/30/2021 | This proclamation supersedes proclamation M-11-2021 dated April 9, 2021. This proclamation opens MUs B (subunits only), C, D2 and E to the use of gill nets with a stretched mesh length of 4 in through 6 ½ in (except as described in Section III.) in accordance with Amendment 2 to the N.C. Southern Flounder Fishery Management Plan and the Incidental Take Permit for Sea Turtles. |
| M-4-2022 | 2/15/2022 | This proclamation supersedes proclamation M-23-2021 dated October 14, 2021. This proclamation opens Management Unit C to the use of gill nets with a stretched mesh length of 4 inches through 6 ½ inches and implements gear exemptions for the shad fishery in all areas south of Management Unit A in accordance with Amendment 2 to the N.C. Southern Flounder Fishery Management Plan. |

| Proclamation Number | Effective Date | Description |
|---|---|---|
| M-5-2022 | 3/22/2022 | This proclamation supersedes proclamation M-2-2022 dated December 17, 2021. It opens a portion of Management Unit A to the use of floating gill nets configured for harvesting American shad by removing vertical height and setting restrictions for all gill nets with stretched mesh lengths of 5 ¼ through 6 inches. |
| M-10-2022 | 4/28/2022 | This proclamation supersedes proclamation M-9-2022 dated April 26, 2022. This proclamation makes it unlawful to use fixed or stationary gill nets of any mesh size in Management Unit A due to dead sturgeon takes nearing the authorized amount for Management Unit A. A portion of Management Unit A remains open to the use of run-around, strike and drop gill nets with a stretched mesh length of 5 ½ inches through 6 ½ inches for harvesting blue catfish. Runaround, strike and drop gill nets with a stretched mesh length of 3 inches through 4 inches may also still be used in portions of Management Unit A. This action is being taken to comply with the Division of Marine Fisheries' Federal Incidental Take Permit for endangered Atlantic sturgeon. |

**Appendix C:** Restrictions implemented for estuarine anchored gill nets greater than or equal to 4 inches stretched mesh (10.2 centimeters stretched mesh).

Included in the current NCDMF sea turtle (No. 16230) and Atlantic Sturgeon (No.18102) Incidental Take Permits and additional restrictions (*italicized*) included in the requested ITP.

| Management Unit | Soak time | Days of the week | Net length | Gear configuration | Low-profile requirements | Time/Area Closure |
|---|---|---|---|---|---|---|
| **A** - north of US Hwy 64 bridge | *One hour before sunset to one hour after sunrise except for the shad gill-net fishery* | - | Maximum net length per fishing operation is 2,000 yd (1.83 km). | - | - | Western Albemarle Sound in the vicinity of the mouth of the Roanoke River including the entire Roanoke River up to the dam in Weldon, permanently closed to all gill nets. |
| **A** - south of US Hwy 64 bridge | One hour before sunset to one hour after sunrise | Monday night - Friday morning | Maximum net length per fishing operation is 2,000 yd (1.83 km). | Net-shot lengths ≤ 100 yd (91.4 m) with a 25-yd (22.9-cm) separation between each net-shot | Nets must not exceed 15 meshes in height and must have a lead core or leaded bottom line.<br><br>Nets must not have cork, floats, or other buoys except those required for identification. | - |
| **B** | One hour before sunset to one hour after sunrise | Monday night - Friday morning | Maximum net length per fishing operation is 2,000 yd (1.83 km). | Net-shot lengths ≤ 100 yd (91.4 m) with a 25-yd (22.9-cm) separation between each net-shot | Nets must not exceed 15 meshes in height and must have a lead core or leaded bottom line.<br><br>Nets must not have cork, floats, or other buoys except those required for identification. | Prohibition of large mesh gill nets in the deep-water portions of the Pamlico Sound and in Oregon, Hatteras, and Ocracoke inlets September 1 through December 15. |

| Management Unit | Soak time | Days of the week | Net length | Gear configuration | Low-profile requirements | Time/Area Closure |
|---|---|---|---|---|---|---|
| **C** | *One hour before sunset to one hour after sunrise except for the shad gill-net fishery* | - | Maximum net length per fishing operation is 2,000 yd (1.83 km). | - | - | - |
| **D1** | One hour before sunset to one hour after sunrise | Monday night - Friday morning | Maximum net length per fishing operation is 2,000 yd (1.83 km). | Net-shot lengths ≤ 100 yd (91.4 m) with a 25-yd (22.9-cm) separation between each net-shot | Nets must not exceed 15 meshes in height and must have a lead core or leaded bottom line.<br><br>Nets must not have cork, floats, or other buoys except those required for identification. | Closed May 8 through October 14 |
| **D2** | One hour before sunset to one hour after sunrise | Sunday night - Friday morning | Maximum net length per fishing operation is 1,000 yd (0.91 km). | Net-shot lengths ≤ 100 yd (91.4 m)with a 25-yd (22.9-cm) separation between each net-shot | Nets must not exceed 15 meshes in height and must have a lead core or leaded bottom line.<br><br>Nets must not have cork, floats, or other buoys except those required for identification. | - |
| **E** | One hour before sunset to one hour after sunrise | Sunday night - Friday morning | Maximum net length per fishing operation is 1,000 yd (0.91 km). | Net-shot lengths ≤ 100 yd (91.4 m)with a 25-yd (22.9-cm) separation between each net-shot | Nets must not exceed 15 meshes in height and must have a lead core or leaded bottom line.<br><br>Nets must not have cork, floats, or other buoys except those required for identification. | *Upper Cape Fear River closed to anchored gill nets with a mesh-size of 4-6.5 ISM (10.2-16.5 CSM) (Proclamation M-5–2016)* |