Environmental Assessment Prepared for the Evaluation of the Environmental Effects Associated with Implementing Protective Regulations for the Proposed Listing of the Gulf of Maine Distinct Population Segment of Atlantic Sturgeon as Threatened

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Environmental Assessment
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1.0 INTRODUCTION

In this Environmental Assessment (EA), NOAA's National Marine Fisheries Service (NMFS) has evaluated the potential environmental effects of implementing protective regulations under the Federal Endangered Species Act (ESA) for the conservation of Gulf of Maine Distinct Population Segment (GOM DPS) of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) that has been proposed to be listed as threatened (75 FR 61872, 10/06/2010). Section 4(d) of the ESA requires that the Secretary of Commerce (hereafter referred to as "the Secretary") "issue such regulations as he deems necessary and advisable to provide for the conservation of the species" for any species listed as threatened under the ESA. The protective regulations which can be extended to the species in a 4(d) rule include all or some of the prohibitions listed in Section 9(a)(1) of the ESA. The NMFS analyzed the potential environmental effects of the proposed protective regulations specified in the 4(d) Rule (Alternative 2), and two additional alternatives. This EA was prepared according to the Council on Environmental Quality's (CEQ) regulations for implementation of the National Environmental Policy Act (NEPA).

1.1 SPECIES BACKGROUND

Atlantic sturgeon are anadromous fish that are widely distributed, but not abundant, along the East Coast of North America. Records indicate that Atlantic sturgeon historically occurred from the Hamilton Inlet, Labrador, to the St. Johns River in Florida (Murawski and Pacheko, 1977; Smith and Clugston, 1997; ASSRT, 2007). The GOM DPS includes Atlantic sturgeon native to watersheds from the Maine/Canadian border and extending southward to include all associated watersheds draining into the Gulf of Maine as far south as Chatham, MA (41.68° N latitude and 69.96° W longitude). The range of Atlantic sturgeon belonging to the GOM DPS also includes all marine waters, including coastal bays and estuaries, from the Bay of Fundy, Canada to the St. Johns River, FL (75 FR 61872, October 6, 2010). GOM DPS Atlantic sturgeon face several threats to their survival, such as incidental catch in commercial fisheries, degraded water quality, and dredging activities (ASSRT, 2007).

In 2003, NMFS sponsored a workshop along with the U.S. Fish and Wildlife Service (FWS) and the Atlantic States Marine Fisheries Commission (ASMFC) entitled "Status and Management of Atlantic Sturgeon," to discuss the status of Atlantic sturgeon throughout their range and determine what obstacles, if any, were impeding their recovery (Kahnle et al., 2005). The results of the workshop indicated some river populations (hereafter, referred to as "subpopulations") seemed to be stabilized or possibly recovering while others were declining. Bycatch and habitat degradation were noted as possible causes for continued declines.

Based on the information gathered from the 2003 workshop on Atlantic sturgeon, NMFS decided that a new review of Atlantic sturgeon status was needed to determine if listing

as endangered or threatened under the ESA was warranted. A status review team (SRT) consisting of NMFS, FWS, and U.S. Geological Survey (USGS) scientists with relevant expertise was convened to assist in assessing the status of the species throughout all or a significant portion of its range. After an extensive review of the available information including the genetic diversity, life history strategies and behaviors, and unique habitats occupied by Atlantic sturgeon, the SRT identified five DPSs of Atlantic sturgeon native to the United States. Based on their review of the available information, the SRT concluded that three of the DPSs (New York Bight (NYB), Chesapeake Bay (CB), and Carolina) were likely to become endangered in the foreseeable future. The SRT concluded that there was insufficient data to make a recommendation as to whether listing was warranted for the GOM and South Atlantic DPSs. The Atlantic Sturgeon Status Review Report was completed in March 2007.

Section 4(a)(2) of the ESA directs the Secretary to determine if a marine species should be listed as endangered or threatened. In order to determine whether Atlantic sturgeon warrant listing as threatened or endangered under the ESA, NMFS reviewed the best available scientific and commercial information (including the status review report and additional information compiled after its completion), evaluated threats facing the species, and considered those efforts being made to protect the species. NMFS also considered information received in October 2009 from the Natural Resources Defense Council in their petition to list Atlantic sturgeon under the ESA, and information submitted by the public in response to the positive 90-day finding on the petition (75 FR 838, January 6, 2010). Based upon this analysis, NMFS concluded that the GOM DPS of Atlantic sturgeon is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range and thus, proposed to list the GOM DPS as threatened. NMFS also concluded that four DPSs (NYB, CB, Carolina and South Atlantic) of Atlantic sturgeon were in danger of extinction within the foreseeable future (75 FR 61872 and 75 FR 61904, October 6, 2010) and proposed that each of these be listed as endangered.

1.2 ESA PROTECTIONS

The ESA provides several means for the protection and recovery of threatened and endangered species. Section 9(a)(1)(A) through 9(a)(1)(G) of the ESA prohibits any person subject to the jurisdiction of the United States from the following activities, with respect to endangered species:

A) Import any such species into, or export any such species from the U.S.;

B) Take any such species within the U.S. or the U.S. territorial sea;

C) Take any such species upon the high seas;

D) Possess, sell, deliver, carry, transport, or ship, by any means whatsoever, any such species taken in violation of (2) and (3) above;

E) Deliver, receive, carry, transport, or ship in interstate or foreign commerce, by any means whatsoever and in the course of commercial activity, any such species;

F) Sell or offer for sale in interstate or foreign commerce any such species; or

G) Violate any regulation pertaining to such species or to any threatened species of fish or wildlife.

The ESA defines "take" as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct (16 U.S.C. 1532(19)). The term "harm" is defined in the regulations as any act which kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation that results in death or injury of wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102).

Section 7 of the ESA requires Federal agencies to consult with NMFS to ensure that any action they authorize, fund, or carry out does not jeopardize the continued existence of an endangered or threatened species, or destroy or adversely modify its critical habitat. If a Federal action may adversely affect a listed species or its critical habitat, a Section 7 consultation is required. Following completion of a Section 7 consultation, NMFS may issue an incidental take statement that anticipates a certain level of take incidental to the Federal agency action. Incidental take of an ESA-listed species that results from federally funded, authorized, or implemented activities conducted after completion of a Section 7 consultation, will not violate the Section 9(a)(1)(B) or 9(a)(1)(C) take prohibitions, provided the activities are conducted in accordance with an incidental take statement.

Section 10 of the ESA provides exceptions to the Section 9(a)(1) take prohibitions by permit. Section 10(a)(1)(A) scientific research and enhancement permits may authorize exceptions to any of the Section 9(a)(1) prohibitions and may be issued to Federal and non-Federal entities conducting research or conservation activities that involve a directed (i.e., intentional) take of listed species. Section 10(a)(1)(B) take permits may be issued to non-Federal entities performing activities that may incidentally take listed species in the course of an otherwise legal activity. Take that results from activities conducted in compliance with an ESA Section 10 permit would not be in violation of the ESA Section 9(a)(1) prohibitions.

All of the prohibitions listed under Section 9(a)(1) of the ESA automatically apply when NMFS lists a fish or wildlife species as endangered but not when listed as threatened. In the case of threatened species, Section 4(d) of the ESA leaves it to the Secretary's discretion whether and to what extent to extend the statutory 9(a)(1) take prohibitions and directs the agency to issue regulations it considers necessary and advisable for the conservation of the species. A determination is made regarding what is necessary and advisable based on the biological status, conservation needs, and potential threats to the

threatened species. For any threatened species, the 4(d) protective regulations may prohibit some or all of the acts which Section 9(a)(1) of the ESA prohibits with respect to endangered species.

2.0 PURPOSE OF AND NEED FOR ACTION

2.1 THE PROPOSED ACTION

NMFS is proposing to establish 4(d) protective regulations for the GOM DPS, to implement measures that are necessary and advisable to provide for the conservation of the GOM DPS by regulating the take of the species. No regulatory timeline exists for issuance of the 4(d) protective regulations.

2.2 PURPOSE AND NEED

The need for the proposed action is to protect and reduce the extinction risk of Atlantic sturgeon from the GOM DPS. According the proposed listing rule, the GOM DPS faces several threats including, but not necessarily limited to, incidental take as a result of bycatch from commercial fisheries, water quality conditions, and dredging (75 FR 61872 and 75 FR 61904, October 6, 2010). Past and ongoing Federal, state, and local protective efforts have contributed to the conservation of the GOM DPS, but these efforts alone do not sufficiently reduce the extinction risk faced by the species (75 FR 61872 and 75 FR 61904, October 6, 2010). As described above, because the GOM DPS of Atlantic sturgeon is being proposed to be listed as threatened, the prohibitions under Section 9(a)(1) of the ESA to protect endangered species do not apply unless specified in an ESA 4(d) Rule. Listing the GOM DPS as a threatened species automatically provides some protection from harm under Section 7 of the ESA. However, the measures associated with these protections apply only to Federal agency actions that are determined to jeopardize the existence of the species, and no ESA protective regulations would be in place to ensure that non-Federal actions do not jeopardize or cause negative impacts to GOM DPS Atlantic sturgeon. Take of Atlantic sturgeon belonging to the GOM DPS is not explicitly prohibited without the application of the Section 9(a)(1) prohibitions through an ESA 4(d) Rule. Without such a rule, Federal agency actions that may adversely affect but not jeopardize the GOM DPS of Atlantic sturgeon would not be required to comply with measures provided in an incidental take statement to minimize the effects of the action to the species. Finally, without the establishment of protective regulations, NMFS cannot effectively address the threats faced by the GOM DPS and the species may continue to decline toward extinction. Thus, NMFS determined that restrictions on take as implemented through 4(d) protective regulations are necessary and advisable to protect and conserve the GOM DPS. Because of the proposed endangered listing of the remaining four Atlantic sturgeon DPSs, and the extent to which Atlantic sturgeon mix throughout their marine and estuarine range, GOM DPS Atlantic sturgeon will be protected as if listed as endangered in all areas where their range overlaps with another DPS. Because of this extensive mixing, as well as the overlap in range with

species already listed under the ESA (e.g., Atlantic salmon and shortnose sturgeon), the environmental impacts of the proposed 4(d) regulation would be limited in scope, and would be constrained to areas of the GOM DPS where Atlantic sturgeon from other DPSs would not be found. In the absence of ESA protective regulations, however, the GOM DPS would not receive explicit ESA protections in riverine portions of the DPS, where important aspects of the Atlantic sturgeon life cycle are completed. Additionally, if the listed species that overlap with the GOM DPS of Atlantic sturgeon were to be removed from the threatened and endangered species list, the GOM DPS of Atlantic sturgeon would no longer receive any protections under the ESA in the absence of this proposed regulation. The purpose of the proposed action is to apply the ESA Section 9(a)(1)(A) through 9(a)(1)(G) prohibitions to activities impacting the GOM DPS with the exemption of take activities within the riverine range of the GOM DPS for 1) certain scientific research activities, and 2) salvage of dead sturgeon, and aid/resuscitation of live injured sturgeon that will contribute to the overall conservation of Atlantic sturgeon.

3.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

3.1 INTRODUCTION

This section describes two alternative 4(d) protective regulations under consideration by NMFS, as well as the status quo (i.e., no extension of protective regulations). NMFS considered the conservation benefits and environmental consequences of two alternatives which would apply, in part or in whole, the prohibitions detailed in Section 9(a)(1) of the ESA to the GOM DPS, and the conservation benefits and environmental consequences of extending no protective regulations. The Section 9(a)(1) prohibitions are designed to protect the species by: (1) prohibiting the take of GOM DPS Atlantic sturgeon within the U.S., the U.S. territorial sea, or upon the high seas ["take prohibitions," ESA Section 9(a)(1)(B) and 9(a)(1)(C)]; and (2) prohibiting the import, export, possession, sale, delivery, carrying, transport, or shipping of GOM DPS Atlantic sturgeon in interstate or foreign commerce or for commercial activity, and the violation of any regulation pertaining to the species [ESA Section 9(a)(1)(A) and (a)(1)(D) through (a)(1)(G)]. The features of each option are described below.

3.2 NO ACTION/STATUS QUO

No Action/Status Quo represents the, biological, physical and economic status quo and is the environmental baseline against which the alternatives are compared to determine their environmental effects. Under No Action/Status Quo, NMFS would not establish 4(d) protective regulations (i.e., no change from current management policies). None of the Section 9(a)(1) prohibitions would apply to the GOM DPS of Atlantic sturgeon. Federal agency actions would still be required to consult under Section 7 of the ESA to insure that any action authorized, funded, or carried out by such agency was not likely to jeopardize the continued existence of the GOM DPS. Actions without a Federal nexus, however, would not be subject to additional ESA regulations with respect to Atlantic

sturgeon belonging to the GOM DPS (i.e., the same as if the GOM DPS were not listed under the ESA). As stated previously, in the estuarine and marine environment, GOM DPS Atlantic sturgeon overlap with the other four Atlantic sturgeon DPSs that are proposed to be listed as endangered. Protections for these DPSs are included in the No Action/Status Quo (i.e. in absence of a 4(d) rule, GOM DPS Atlantic sturgeon may still receive some protection which is afforded to other protected species). However, no ESA protection would be afforded the GOM DPS fish in their riverine range, where they do not overlap with the four DPSs proposed to be listed as endangered.

3.3 ALTERNATIVE 1

Alternative 1 would apply all prohibitions under Section 9(a)(1) of the ESA to the GOM DPS. Alternative 1 would essentially provide the GOM DPS the same protections as an endangered species. As opposed to the No Action/Status Quo alternative, Alternative 1 would protect Atlantic sturgeon in the critical riverine nursery habitat.

Activities that affect GOM DPS Atlantic sturgeon or their habitat, either directly or indirectly, would need to be altered to avoid take. Otherwise, any take must be authorized by an ESA Section 7 incidental take statement or permitted under an ESA Section 10 permit. Activities that may cause take of GOM DPS sturgeon include, but are not limited to:

- Incidental catch resulting from commercial and recreational fisheries;
- Collection and handling for any purpose (e.g., scientific research, emergency fish rescue, commercial sale, consumption, recreational fisheries);
- Construction, maintenance, or operation of barriers in spawning or rearing habitats or migratory corridors;
- Construction, maintenance, or operation of hydrokinetic or other alternative energy projects within the range of the DPS which result in take;
- Destruction or modification of spawning, rearing, foraging habitats and migratory corridors;
- Activities which negatively affect water quality within the range of the DPS, such as, but not limited to, discharges of pollutants, changes in water temperature and dissolved oxygen concentrations, or addition of nutrients.
- Activities that may entrain or impinge fish from the DPS (e.g., operation of water diversions in spawning or rearing habitats, dredging, and power plant operations);
- Artificial propagation and stocking of Atlantic sturgeon within the range of the DPS;
- Operation of vessels in Atlantic sturgeon habitat which results in take through vessel strikes; and
- The release or introduction of non-native species.

If this alternative were selected, all individuals performing scientific research, emergency fish rescue or salvage of Atlantic sturgeon carcasses would be required to obtain a Section 10 (a)(1)(A) permit before continuing to perform these activities.

3.4 ALTERNATIVE 2 (PREFERRED)

Alternative 2 is similar to Alternative 1 in that it would apply all prohibitions under Section 9(a)(1) of the ESA, but different in that the take prohibitions would not be applied within the riverine range of the GOM DPS (Table 1) for 1) certain scientific research activities, and 2) salvaging carcasses or aiding/resuscitating live Atlantic sturgeon. Alternative 2 recognizes that not applying the take prohibitions to these activities provides a greater conservation benefit to the GOM DPS of Atlantic sturgeon than if the take prohibitions were applied to all activities throughout its range. Like Alternative 1, Alternative 2 would protect GOM DPS Atlantic sturgeon in the critical riverine nursery habitat from other activities that have potential to result in take.

As stated previously, NMFS believes it is necessary and advisable to conserve the GOM DPS of Atlantic sturgeon. The proposed 4(d) regulations would apply the ESA Section 9(a)(1)(A) through 9(a)(1)(G) prohibitions (see section 1.2) to activities impacting the GOM DPS throughout its range with two exemptions applicable only within the riverine range of the GOM DPS. The GOM DPS includes the following: all anadromous Atlantic sturgeon whose range occurs in watersheds from the Maine/Canadian border and extending southward to include all associated watersheds draining into the Gulf of Maine as far south as 41.68° N latitude and 69.96° W longitude (Chatham, MA), as well as wherever these fish occur in coastal bays and estuaries and the marine environment.

The two exemptions to the Section 9(a)(1) prohibitions would apply to watersheds within the defined range of the DPS down to the point at which the waterway in which the sturgeon occurs enters a coastal bay, estuary, or other part of the marine environment (Table 1). Available data indicate that from the egg stage and through their first year of life, Atlantic sturgeon are intolerant of high salinity environments (Van Eenennaam et al. 1996; Niklitschek 2001). After the first year, Atlantic sturgeon juveniles become fully tolerant to seawater (Niklitschek 2001). Because subadults greater than age-1 are known to move into saltwater portions of their natal estuary, as well as make long migrations from their natal rivers to forage in the saltwater portions of other estuaries (ASSRT 2007), scientific research activities and salvage and aid/resuscitation activities that occur in marine portions of estuaries in the GOM DPS have the potential to take fish from an endangered DPS. Brackish and freshwater (hereafter termed riverine) portions of estuaries and rivers in the GOM DPS are likely to contain only fish natal to that river. For the purposes of these analyses, riverine portions are defined as those portions of a river where the maximum salinity of any portion of the water column (where stratified data are available) throughout the year does not exceed 20 ppt (Table 1), and areas having salinities above 20 ppt are considered to be part of a coastal bay, estuary, or the marine environment. For instance, for the Kennebec River (and Androscoggin, which flows into the Kennebec above the salinity-based cutoff point), the point where salinity is unlikely to exceed 20 ppt was determined using Mayer et al. (1996), which reported a maximum salinity of 19.38 at 15 m depth in September 1994 at a sampling station approximately 5 km downstream of the US Route 1 bridge crossing in Bath, ME. In order to clearly demarcate the location of the cutoff point, the US Route 1 bridge in Bath, ME will be

used as the exemption cutoff point. Exemptions to the Section 9(a)(1) prohibitions would apply upstream of this point, whereas downstream, the exemptions would not apply due to the potential presence of fish from an endangered DPS. Proposed exemption cutoff points for other river systems in the GOM DPS were determined using similar methodology, with actual exemption cutoff points being selected based on available salinity data and easily recognizable and enforceable boundaries, such as bridge crossings (Table1).

Table 1. List of rivers where Atlantic sturgeon are known to occur in the GOM DPS. Upstream of the proposed exemption cutoff (distance upstream from the listed reference location), the exemptions to the Section 9(a)(1) take prohibitions would apply. Downstream of these cutoff points, no exemptions to the Section 9(a)(1) prohibitions would apply. The proposed exemption cutoff points were chosen based on reported salinities less than 20 ppt at the given location (highest reported value for bottom salinity was used, when available), as well as identifying easily recognizable landmarks, such as a nearby road crossing. Salinity units are reports as parts per thousand (ppt). Latitude and longitude, where given, are in decimal degrees.

River	Exemption cutoff	Sample Location	Salinity	Source
Merrimack	US Rt. 1 bridge, Newburyport, MA	42.815N, 70.862W	20.74	EPA's NCA[1]
Piscataqua	Leigh's Mill Pond, South Berwick, ME	43.217N, 70.814W	17.9	EPA's NCA[1]
Saco	Main St. bridge, Biddeford, ME	RKM 6	20	Gupta et al. 1994
Kennebec	US Rt. 1 bridge, Bath, ME	43.877N, 69.7965W	19.38	Mayer et al. 1996
Androscoggin	US Rt. 1 bridge, Bath, ME	43.877N, 69.7965W	19.38	Mayer et al. 1996
Sheepscot	Sheepscot Rd bridge, Newcastle, ME	Reversing falls at Alna, ME	19.68	Mayer et al. 1996
Penobscot	Cove Brook, Winterport, ME	Bald Hill Cove, Winterport, ME	0-26.7[2]	Goulette 2004, NMFS unpub. data

[1]The Environmental Protection Agency's National Coastal Assessment data is available at http://www.epa.gov/emap/nca/html/data/mapuse.html

[2]Goulette (2004, unpub. data) reported a maximum bottom salinity of 26.7 ppt during low flows at Bald Hill Cove in Winterport, ME. However, because this value was significantly higher than the next highest reported bottom salinity (17 ppt) and was measured during very low flow conditions, NMFS considered it to be an outlier.

Based on the best available information, Atlantic sturgeon belonging to the GOM DPS overlap in distribution with all other Atlantic sturgeon within the marine range from the Bay of Fundy, Canada to the St. Johns River, FL (75 FR 61872 and 75 FR 61904, October 6, 2010), including coastal bays and estuaries (Holland and Yelverton, 1973; Doevel and Berggen, 1983; Waldman et al., 1996a; Dadswell, 2006; ASSRT, 2007). Atlantic sturgeon are visually indistinguishable from each other regardless of the river or DPS of origin. Therefore, to ensure that individuals carrying out activities proposed to be exempted from the Section 9(a)(1) prohibitions only take Atlantic sturgeon originating

from the GOM DPS (i.e., threatened Atlantic sturgeon), NMFS is proposing that all of the Section 9(a)(1) take prohibitions apply throughout the range of the GOM DPS Atlantic sturgeon except for those certain activities as specified when they occur within the riverine portions of the GOM DPS.

The collection of needed scientific information is recognized as providing a benefit to ESA-listed species. The permits process described in regulation (50 CFR 222, 223 and 224) is intended to ensure that research is conducted in a manner that minimizes harm (including injury and death) to the species or individuals. Guidelines developed by sturgeon researchers for handling and sampling shortnose and Atlantic sturgeon (Moser et al., 2000) have historically helped NMFS in its review and issuance of permits for research on shortnose sturgeon (ESA-listed as endangered) under Section 10(a)(1)(A) to ensure that researchers are acting in a manner that minimizes harm to that species. The ASSRT (2007) reviewed recent research studies for Atlantic sturgeon in NMFS' Northeast Region. Overall, hundreds of fish have been captured and released and less than 10 mortalities have occurred (ASSRT, 2007), and almost all mortality events were associated with harsh environmental conditions (e.g., high temperatures and/or low dissolved oxygen concentrations), indicating that scientific research of Atlantic sturgeon can provide vital information with minimal risk to the species when conducted in accordance with accepted protocols by researchers with appropriate experience.

Moser et al. (2000) was recently updated to incorporate new information and changing technologies. Similar to Moser et al., the resulting NOAA Technical Memo (Damon-Randall et al. 2010) is intended as a guide that describes the purpose and application of common Atlantic sturgeon research techniques which, when properly applied, have been shown to provide necessary information on Atlantic sturgeon with minimal risk to sturgeon populations and individuals.

Requiring properly trained researchers to obtain a Section 10(a)(1)(A) permit before conducting research using methods and technologies that NMFS has determined to be safe and effective for GOM DPS Atlantic sturgeon will not provide any additional conservation benefit to the GOM DPS of Atlantic sturgeon. In addition, research on the GOM DPS that is already in progress may be impeded if all researchers are required to first obtain a Section 10(a)(1)(A) permit given that permit applications are recommended to be submitted at least one year prior to the proposed activity start date, and NMFS cannot begin to process a permit request until publication of a final rule listing the GOM DPS under the ESA. Such delays could negatively affect the ability to maintain time series of data and delay the acquisition of information necessary for the survival and recovery of the species. Thus, NMFS has concluded that it is not necessary or advisable to impose the ESA-take prohibitions on research that results in take, but not harm, of Atlantic sturgeon belonging to the GOM DPS under certain specified conditions. Specifically, this includes scientific research that: (a) is conducted in those portions of the DPS's range where only sturgeon belonging to the GOM DPS will occur (Table 1); (b) is intended to be non-lethal; (c) is conducted by experienced researchers using a NMFS-approved method for sampling Atlantic sturgeon or technologies that do not require

capture or handling of Atlantic sturgeon; and, (d) complies with all other laws, including state permits, if applicable.

Additionally, NMFS has concluded that it is not necessary or advisable to impose the ESA take prohibitions on activities to salvage Atlantic sturgeon carcasses or to aid/resuscitate live, injured Atlantic sturgeon belonging to the GOM DPS. Atlantic sturgeon carcasses and live injured sturgeon can provide pertinent life history data and information on activities affecting the GOM DPS. In order to obtain the most information or to aid/resuscitate a live sturgeon, the carcass or live animal must be collected and transported as quickly as possible to an appropriate facility or to its natural environment. Requiring NMFS personnel or other individuals to first obtain a Section 10 permit for such activities will potentially result in the loss of opportunities for salvaging a carcass or aiding/resuscitating live sturgeon.

NMFS works cooperatively with the U.S. Fish and Wildlife Service (FWS), and state wildlife agencies for salvage and recovery of other protected species including shortnose sturgeon, sea turtles and marine mammals. Some exceptions to the ESA take prohibitions for salvage or to aid a sick or injured animal already exist for these species. We similarly propose not to apply the Section 9(a)(1)(B) take prohibitions for salvage of Atlantic sturgeon carcasses found within the riverine range of the GOM DPS or for aiding/resuscitating live, injured Atlantic sturgeon within the same riverine range provided retrieval of the carcass or aid to the live sturgeon is provided by any agent or employee of NMFS, the FWS, or any other Federal land or water management agency, or any agent or employee of a state agency responsible for fish and wildlife who is designated by his or her agency for such purposes, when acting in the course of his or her official duties.

Summarizing from above, not applying the Section 9(a)(1) take prohibitions to these specified activities would provide four major benefits:

1) Continued data collection for some scientific research time series data and the ability to initiate new research without delays or an increased risk of harm to the GOM DPS or any other ESA-listed species;

2) An economic benefit associated with time and resource saving for NMFS staff and Atlantic sturgeon researchers involved in Section 10 permitting process;

3) The ability to expeditiously gather information from dead Atlantic sturgeon that would benefit the conservation of the species; and

4) An increased potential to resuscitate or rehabilitate injured Atlantic sturgeon that would benefit the conservation of the species through reducing mortality.

The Preferred Alternative was chosen because the proposed 4(d) protective regulations exempt Section 9(a)(1) take prohibitions for scientific research and salvage or aid/resuscitation operations that can be carried out by NMFS personnel or designated

agents. Therefore, while take will occur as a result of scientific research and salvage or aid/resuscitation activities, the overwhelming importance of collecting important data for the recovery of the species outweighs the risk to the DPS (i.e., provides a conservation benefit to the species that would not be realized or realized to the same extent if take were allowed only through issuance of a Section 10 permit) and thus, makes this Alternative preferred to the other choices.

The prohibitions of Section 9(a)(1)(B) apply to all other activities that do not meet the specific exemptions for scientific research, salvage and aiding/resuscitating Atlantic sturgeon of the GOM DPS as described. All other prohibitions of Sections 9(a)(1)(A) and 9(a)(1)(C) through 9(a)(1)(G) apply to the GOM DPS without exception other than through issuance of a Section 10 permit or through consultation under Section 7 as previously described.

4.0 AFFECTED ENVIRONMENT

The GOM DPS includes the following: all anadromous Atlantic sturgeon whose range occurs in watersheds from the Maine/Canadian border and extending southward to include all associated watersheds draining into the Gulf of Maine as far south as 41.68° N latitude and 69.96° W longitude (Chatham, MA), as well as wherever these fish occur in coastal bays and estuaries and the marine environment (Figure 1). Under the Preferred Alternative, the ESA Section 9(a)(1)(B) prohibitions would not apply to the described scientific research and salvage, aid/resuscitation activities for sturgeon found within the watersheds within the defined range of the DPS up to the point at which the waterway enters a coastal bay, estuary, or other part of the marine environment.

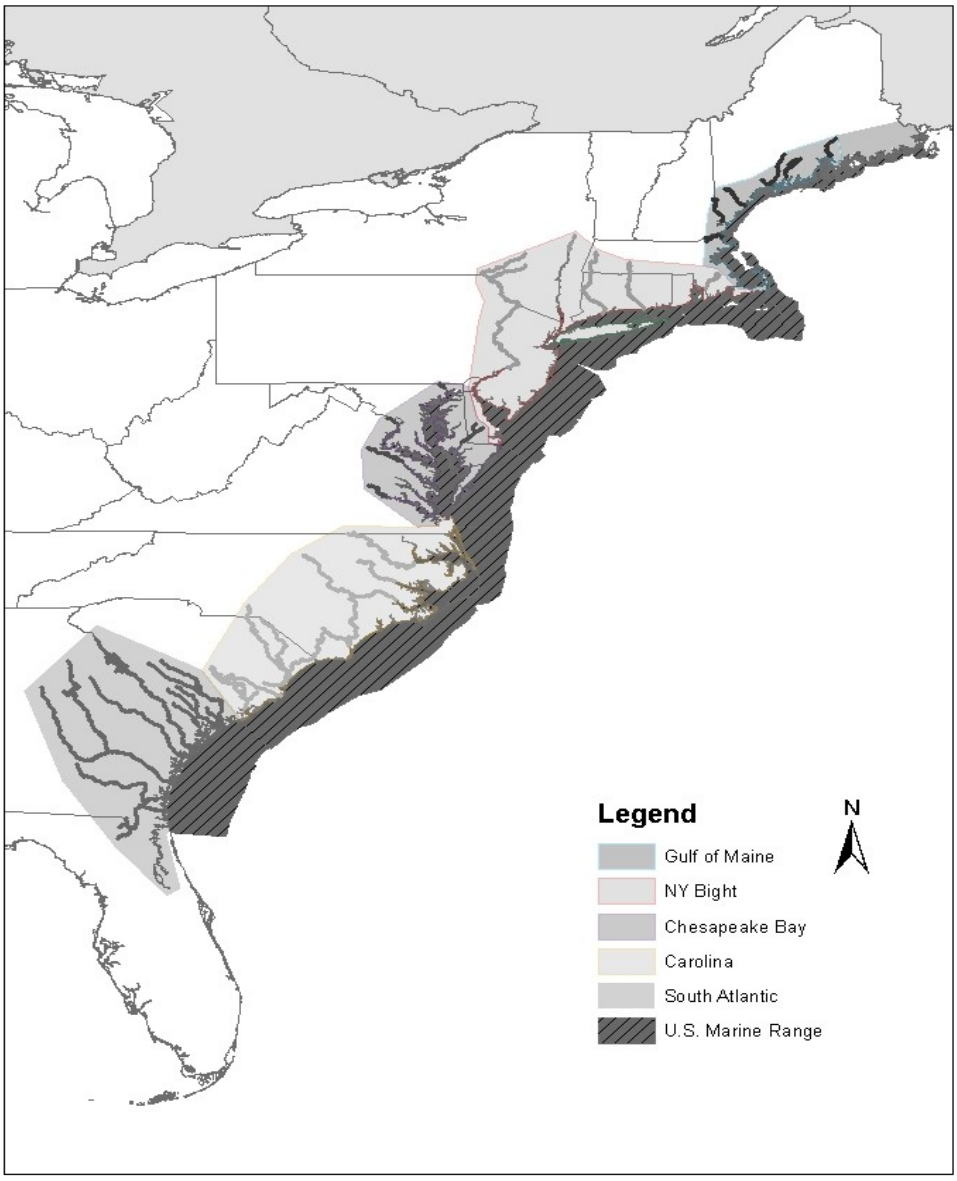

Figure 1. U.S. Atlantic sturgeon DPSs showing rivers (up to the first dam where known) in which the species are known to occur.

4.1 INTRODUCTION

There are three broad categories that NMFS uses to evaluate environmental impacts of proposed actions: biological, physical, and socioeconomic. The biological environment includes information on the GOM DPS of Atlantic sturgeon as a resource as well as

information on other potentially affected species present within the range of the GOM DPS. The physical environment includes a discussion of habitat resources available to the GOM DPS as well as information relating to Essential Fish Habitat (EFH). The analysis of the socioeconomic environment includes impacts to affected economic sectors of the community from regulatory actions and any interrelated or additional social impacts. This description of the affected environment provides a view on current conditions and serves as a baseline against which to compare impacts of implementing the alternatives.

4.2 BIOLOGICAL ENVIRONMENT

The biological resources of the affected area can be categorized into four basic groups: protected resources; non-protected diadromous fish species; other fish species; and invertebrates. Protected resources include whales, seals, and dolphins afforded protection under the Marine Mammal Protection Act (MMPA), as well as sea turtles, fish, and large whale species afforded protection under the ESA. Non-protected diadromous fish species, other fish species, and invertebrates are those species that occur within the riverine and/or marine portions of the affected area, some of which may be managed for recreational or commercial purposes, but none of which are afforded protection under the ESA or MMPA.

Only some of the species that occur within the affected area are likely to be affected by the proposed action given identical protections already in place throughout the marine range of the GOM DPS as a result of the proposed ESA listing as endangered of the other four U.S. Atlantic sturgeon DPSs. Therefore, the following information focuses on the species most likely to be affected by the proposed action (i.e., those species that occur within the riverine range of the GOM DPS of Atlantic sturgeon; see Table 1).

4.2.1 SPECIES CURRENTLY PROTECTED OR PROPOSED FOR PROTECTION

GOM DPS of Atlantic Sturgeon

The GOM DPS of Atlantic sturgeon is the primary resource of concern for the Proposed Action and alternatives. Atlantic sturgeon are long-lived, anadromous fish that are widely distributed along the U.S. East Coast and inhabit a range of habitats from freshwater to estuarine and marine waters. A spawning subpopulation of GOM DPS Atlantic sturgeon is known to occur in the Penobscot River, and spawning potentially occurs in the Kennebec River (ASSRT, 2007). Atlantic sturgeon have also been documented in the Saco River, but it is not clear whether a spawning population is present. Fish are found seasonally in the Merrimack River and estuary as well.

Spawning is believed to occur in flowing water between the salt front of estuaries and the fall line of large rivers, where optimal flows are 46-76 cm/s and depths are 11-27 meters (Borodin, 1925; Leland, 1968; Scott and Crossman, 1973; Crance, 1987; Bain et al., 2000). Sturgeon eggs are highly adhesive and are deposited on the bottom substrate,

usually on hard surfaces such as cobble (Gilbert, 1989; Smith and Clugston, 1997). Hatching occurs approximately 94 and 140 hours after egg deposition at temperatures of 20° and 18° C, respectively, and, once hatched, larvae assume a demersal existence (Smith et al., 1980). The yolksac larval stage is completed in about 8-12 days, during which time the larvae move downstream to the rearing grounds (Kynard and Horgan, 2002). During the first half of this migration, larvae move only at night and use benthic structure (e.g., gravel matrix) as refuge during the day (Kynard and Horgan, 2002). During the latter half of migration to the rearing grounds, when larvae are more fully developed, movement occurs during both day and night. Larvae transition into the juvenile phase as they continue to move even further downstream into brackish waters, developing a tolerance to salinity as they go, and eventually become residents in estuarine waters for months or years. Juveniles then transition to the subadult phase while commencing oceanic migrations. Subadults travel widely once they emigrate from rivers (Holland and Yelverton, 1973; Doevel and Berggen, 1983; Waldman et al., 1996a; Dadswell, 2006; ASSRT, 2007). Atlantic sturgeon spend most of their adult life in the marine environment distributed along the eastern coast of North America (ASSRT, 2007). However, adult Atlantic sturgeon return to their natal rivers to spawn (Collins et al., 2000a; K. Hattala, NYDEC, pers. comm. in ASSRT, 2007).

Atlantic sturgeon age at maturation varies with latitude, potentially from as young as 5 years old in South Carolina to up to 34 years old in the St. Lawrence River (ASSRT 2007). Atlantic sturgeon likely do not spawn every year, where multiple studies have shown that spawning intervals range from 1-5 years for males (Smith 1985, Collins et al. 2000a, Caron et al. 2002) and 2-5 for females (Vladykov and Greeley 1963, Van Eenennaam et al. 1996, Stevenson and Secor 1999).

The GOM DPS of Atlantic sturgeon was proposed to be listed as a threatened species under the Federal ESA in October, 2010 (75 FR 61872, October 6, 2010), based on data indicating that the DPS has declined in numbers and faces several threats to its survival, including incidental catch in commercial fisheries, degraded water quality, and dredging activities. As stated previously, as a threatened species, the GOM DPS would automatically receive protection under the jeopardy provision of Section 7 of the ESA, which states that Federal agencies must ensure that activities they fund, permit, or carry out do not jeopardize the continued existence of the GOM DPS. However, as described in Chapter 2 of this EA, the protections extended under the ESA Section 7 jeopardy provision are not sufficient to address the threats faced by the GOM DPS and to protect and conserve this species from further decline. It is likely that the GOM DPS of Atlantic sturgeon potentially receives additional protections given the overlapping range with federally endangered Atlantic salmon and shortnose sturgeon. In addition, in the estuarine and marine environment, GOM DPS Atlantic sturgeon overlap with the other four Atlantic sturgeon DPSs that are proposed to be listed as endangered. Due to the inability to visually discern the DPS membership of individuals in the estuarine and marine environments, individuals from all DPSs will receive protections granted to species listed as endangered while present in these environments.

NYB, CB, Carolina and South Atlantic DPSs of Atlantic Sturgeon

As mentioned previously, there are 4 other DPSs, which have been proposed for listing as endangered (NYB, CB, Carolina and South Atlantic) (75 FR 61872 and 75 FR 61904, October 6, 2010). Adult and subadult Atlantic sturgeon make extensive marine migrations, and there is a significant amount of mixing of the five DPSs in the marine and estuarine environment. If the proposed ESA listing rules are finalized, all of the Section 9(a)(1) take prohibitions would apply to Atlantic sturgeon from the four DPSs currently proposed to be listed as endangered wherever they are found, including the marine and estuarine range of GOM DPS Atlantic sturgeon. For this reason, this rule will not impact these four DPSs; thus, the impacts of the three alternatives to the four DPSs proposed to be listed as endangered will not be analyzed.

Shortnose sturgeon

Shortnose sturgeon (*Acipenser breviostrum)* are listed as endangered under the ESA and do inhabit the affected area occupied by GOM DPS Atlantic sturgeon, specifically the Penobscot, Kennebec, Androscoggin and Merrimack Rivers. The particulars of population dynamics and habitat use of the Penobscot River population are currently being studied. A Schnabel estimate of 9,488 adult shortnose sturgeon from 2000-2001 (Squiers 2003) is the most recent population estimate for the Kennebec River population; however, this estimate includes fish from the Androscoggin and Sheepscot Rivers as well and does not include an estimate of the size of the juvenile population. A comparison of the population estimate for the estuarine complex from 1982 (Squiers et al. 1982) to 2000 (Squiers 2003) suggests that the adult population has grown by approximately 30% in the last twenty years. The Merrimack River population was estimated to be 32 adults (20-79; 95% confidence interval; B. Kynard and M. Kieffer, unpublished data). Shortnose sturgeon are known to have been taken incidentally during Atlantic sturgeon research in the GOM DPS rivers.

Atlantic salmon

The GOM DPS of Atlantic salmon (*Salmo salar*) includes all naturally spawned and conservation hatchery populations of anadromous Atlantic salmon whose freshwater range occurs in the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River and wherever these fish occur in the estuarine and marine environment. The new GOM DPS of Atlantic salmon was listed as endangered in June 2009 (74 FR 29344, June 19, 2009). Atlantic salmon are known to have been taken incidentally during Atlantic sturgeon research in the GOM DPS rivers.

Other Protected Species

The ESA and MMPA protect a variety of species which overlap with portions of the range of the GOM DPS Atlantic sturgeon. Protected resources include whales, seals, and dolphins afforded protection under the MMPA, as well as sea turtles, fish, and large whale species afforded protection under the ESA. As stated previously, in the estuarine and marine environment, GOM DPS Atlantic sturgeon overlap with the other four Atlantic sturgeon DPSs that are proposed to be listed as endangered and thus, Section 9(a)(1) take prohibitions would be applied in this portion of the range even in absence of this 4(d) rule. For this reason, the application of Section 9(a)(1) take prohibitions for GOM DPS Atlantic sturgeon would not have any incremental effect on other protected

species in the marine and estuarine environments, and therefore, they are not considered further in this document.

4.2.2 OTHER DIADROMOUS SPECIES

The freshwater rivers and coastal watersheds throughout the Gulf of Maine include a diverse group of fish species, in addition to those currently protected under the ESA. Other diadromous fishes that are present within the riverine range of the GOM DPS of Atlantic sturgeon include the following: striped bass (*Morone saxatilis*), American shad (*Alosa sapidissima),* alewife (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), rainbow smelt (*Osmerus mordax*), sea lamprey (*Petromyzon marinus*), Atlantic tomcod (*Microgadus tomcod*), and American eel (*Anguilla rostrata).* Other diadromous species occur throughout the marine and estuarine range of the GOM DPS Atlantic sturgeon. Further discussion of these diadromous fish that inhabit the coast wide portion of the range is not included because the rule (and the subsequent application of the Section 9(a)(1) take prohibitions) would not result in additional impacts to them due to overlap with the other four Atlantic sturgeon DPSs that are proposed to be listed as endangered. As a result of this overlap, Section 9(a)(1) take prohibitions would be applied in the marine and estuarine portion of the range, even in absence of this 4(d) rule, and thus, these other diadromous species would not be affected by this regulation. For this reason, diadromous species found outside of the riverine portion of the GOM DPS Atlantic sturgeon are not discussed further in this document.

4.2.3 OTHER FISH SPECIES IN THE GULF OF MAINE DPS RANGE

There is a diverse array of fish species that inhabit estuarine and nearshore waters within the range of the GOM DPS. As stated previously, in the estuarine and marine environment, GOM DPS Atlantic sturgeon overlap with the other four Atlantic sturgeon DPSs that are proposed to be listed as endangered and thus Section 9(a)(1) take prohibitions would be applied in this portion of the range – even in absence of any 4(d) rule. For this reason, the application of Section 9(a)(1) take prohibitions for GOM DPS Atlantic sturgeon would not have any incremental effect on other fish species in the marine and estuarine environments; therefore, only effects to other fish species in the riverine portion of the GOM DPS described in Section 2.1 are considered further in this document.

4.2.4 INVERTEBRATES

Aquatic macroinvertebrates typically present within the riverine portion of the GOM DPS include: mayflies (*Ephemeroptera*), true bugs (*Hemiptera*), caddisflies (*Trichoptera*), dragonflies and damselflies (*Odonata*), stoneflies (*Plecoptera*), and true flies (*Diptera*). Aquatic beetles (*Coleoptera*), worms (*Annelida*), snails (*Gastropoda*), crayfish (*Decapoda*), mussels (*Pelecypoda*), and other invertebrates are also common in the GOM DPS (Maine Aquatic Biodiversity Project, 2008). The diversity and abundance of the

invertebrate community varies throughout the waters of the GOM DPS depending on the biotic community, physical habitat, and water quality. As certain invertebrates are recognized as prey for GOM DPS Atlantic sturgeon, they are noted as an important component of the biological environment. Other aquatic invertebrates are present throughout the marine and estuarine portion of the GOM DPS Atlantic sturgeon range. Further discussion of these species is not included because this rule (and the subsequent application of the Section 9(a)(1) take prohibitions) would not introduce new impacts to them due to overlap with the other four Atlantic sturgeon DPSs that are proposed to be listed as endangered. As a result of this overlap, Section 9(a)(1) take prohibitions would be applied in the marine and estuarine portion of the range, even in absence of any 4(d) rule, and thus these other invertebrates would not be affected by this regulation. For this reason, invertebrates found outside of the riverine portion of the GOM DPS Atlantic sturgeon are not discussed further in this document.

4.3 PHYSICAL ENVIRONMENT

4.3.1 HABITAT RESOURCES

GOM DPS Atlantic sturgeon largely reside in watersheds that are part of the Northern Appalachian/Boreal Forest terrestrial ecoregion, whose characteristically large expanses of forest, variety of swamps, marshes, bogs, ice scoured riverbanks, salt marshes, and rocky coastal cliffs were influenced by a geological history that includes four glaciation events (TNC, 2008). Additionally, GOM DPS Atlantic sturgeon use riverine portions of watersheds in the Lower New England-Northern Piedmont and North Atlantic Coast terrestrial ecoregions, which are characterized by low mountains, abundant lakes, and limestone valleys inland and generally flat, sandy coastal plains dissected by major tidal river systems near the coast (Barbour, 2000; TNC, 2008).

The essential physical and biological habitat features that may be identified for the GOM DPS may include: prey resources (including benthic invertebrates and small fish), water quality, water flow, water depth, substrate types (i.e., appropriate spawning substrates within freshwater rivers), sediment quality, and migratory corridors. Early life stages of Atlantic sturgeon appear to be sensitive to environmental contamination (Dwyer et al. 2000). Atlantic sturgeon spawning is believed to occur in flowing water between the salt front and fall line of large rivers, where optimal flows are 46-76 cm/s and depths of 11-27 meters (Borodin 1925, Leland 1968, Scott and Crossman 1973, Crance 1987, Bain et al. 2000); thus, disruption to flow regimes in these areas could negatively impact sturgeon spawning. Sturgeon eggs are highly adhesive and are deposited on the bottom substrate, usually on hard surfaces (e.g., cobble; Gilbert 1989, Smith and Clugston 1997), and deposition of sediment in these areas could decrease survival of embryos. Physical structures associated with water diversion may have multiple effects on GOM DPS fish by posing impingement or entrainment risks to early life stages and blocking or delaying migration of all life stages of GOM DPS fish. Though most rivers have multiple intake structures which remove millions of gallons of water a day during the spring and summer months, it is believed that the migratory behavior of larval sturgeon allows them to avoid

intake structures, since migration is active and occurs in deep water (Kynard and Horgan 2002). Runoff from land use activities such as agriculture and urban development may introduce contaminants into water ways, or result in increased stream bank erosion and sedimentation. Atlantic sturgeon may be particularly vulnerable to contaminant exposure and bioaccumulation because they are long-lived and benthic, and Atlantic sturgeon early life stages appear to be among the most sensitive of the species tested (Dwyer et al. 2000).

Designated critical habitat for Atlantic salmon currently exists within the affected environment. Critical habitat for Atlantic salmon is subject to the same protections under Section 7 of the ESA as described above. The affected environment also includes essential habitats and wildlife refuges for fish and wildlife species. Many programs and activities have been conducted to improve habitat conditions for species within the affected environment. For example, the Edwards Dam, constructed on the Kennebec River in 1837, was removed in 1999, reopening Atlantic sturgeon habitat to 100% of its former range on the river. In 2008, the Penobscot River Restoration Trust, a non-profit corporation, exercised its option to purchase the Veazie and two other dams on the Penobscot River (ASSRT, 2007). In doing so, the Trust has the right to, in part, decommission or remove the Veazie Dam; thus, reopening miles of habitat for Atlantic sturgeon and other diadromous species (ASSRT, 2007). However, funds for the removal need to be generated and permits need to be secured so at this time it remains uncertain whether all of the goals will be achieved.

4.3.2 ESSENTIAL FISH HABITAT

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (Act) strengthened the ability of NMFS and the Fishery Management Councils to protect and conserve the habitat of marine, estuarine, and anadromous finfish, molluscs, and crustaceans. This habitat is termed "Essential Fish Habitat" (EFH) and is broadly defined to include "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The Act requires the Councils to describe and identify the essential habitat for the managed species, minimize (to the extent practicable) adverse effects on EFH caused by fishing, and identify other actions to encourage the conservation and enhancement of EFH.

The Act also establishes measures to protect EFH. NMFS must coordinate with other Federal agencies to conserve and enhance EFH, and Federal agencies must consult with NMFS on all actions or proposed actions authorized, funded, or undertaken by the agency that may adversely affect EFH. In turn, NMFS must provide recommendations to Federal agencies on such activities to conserve EFH and provide EFH conservation recommendations for any state agency action that would adversely affect EFH. These recommendations may include measures to avoid, minimize, mitigate, or otherwise offset adverse effects on EFH resulting from actions or proposed actions authorized, funded, or undertaken by that agency.

EFH that is judged to be particularly important to the long-term productivity of populations of one or more managed species or to be particularly vulnerable to degradation should be identified as "habitat areas of particular concern" (HAPC) to help provide additional focus for conservation efforts.

Nearshore and offshore waters occupied by GOM DPS Atlantic sturgeon overlap with EFH for numerous fish species. These species include American plaice (*Hippoglossoides platessoides*), Atlantic halibut (*Hippoglossus hippoglossus*), Atlantic herring (*Clupea harengus*), Atlantic salmon (*Salmo salar*), Atlantic sea scallop (*Placopecten magellanicus*), haddock (*Melanogrammus aeglefinus*), monkfish (goose-fish) (*Lophius americanus*), ocean pout (*Macrozoarces americanus*), offshore hake (*Merluccius albidus*), pollock (*Pollachius virens*), red hake (*Urophycis chuss*), redfish (*Sebastes* spp.), white hake (*Urophycis tenuis*), whiting (silver hake) (*Merluccius bilinearis*), window-pane flounder (*Scophthalmus aquosus*), winter flounder (*Pleuronectes americanus*), witch flounder (*Glyptocephalus cynoglossus*), yellowtail flounder (*Pleuronectes ferruginea*), seven skate species (barndoor (*Dipturus laevis*), clearnose (*Raja eglanteria*), little (*Leucoraja erinacea*), rosette *(Leucoraja garmani*), smooth (*Malacoraja senta*), thorny (*Amblyraja radiate*), and winter (*Leucoraja ocellata*) skates), deep-sea red crab (*Chaceon quinquedens*), Atlantic mackerel (*Scomber scombrus*), black sea bass (*Centropristis striata*), bluefish (*Pomatomus saltatrix*), butterfish (*Peprilus triacanthus*), *Illex* squid (*Illex illecebrosus*), *Loligo* squid (*Loligo pealei*), ocean quahog (*Artica islandica*), scup (*Stenotomus chrysops*), spiny dogfish (*Squalus acanthias*), summer flounder (*Paralichthys dentatus*), surf clam (*Spisula solidissima*), tilefish (*Lopholatilus chamaeleonticeps*), albacore tuna (*Thunnus alalunga*), Atlantic angel shark (*Squantina dumerili*), Atlantic bigeye tuna (*Thunnus obesus*), Atlantic bluefin tuna (*Thunnus thynnus*), Atlantic sailfish (*Istiophorus platypterus*) Atlantic sharpnose (*Rhizoprionodon terraenovae*), Atlantic skipjack (*Katsuwonus pelamis*), Atlantic swordfish (*Xiphias gladius*), Atlantic yellowfin tuna (*Thunnus albacares*), basking shark (*Cetorhinus maximus*), blacktip shark (*Carcharhinus limbatus*), bonnethead shark (*Sphyrna tiburo*) lemon shark (*Negaprion brevirostris*), blue marlin (*Makaira nigricans*), nurse shark (*Ginglymostoma cirratum*), blacknose (*Carcharhinus acronotus*), blue shark (*Prionace glauca*), bull shark (*Carcharhinus leucas*), dusky shark (*Carcharhinus obscurus*), finetooth (*Carcharhinus isodon*), longfin mako (*Isurus paucus*), porbeagle (*Lamna nasus*), sand tiger shark (*Carcharias taurus*), sandbar shark (*Carcharhinus plumbeus*), scalloped hammerhead (*Sphyrna lewini*), shortfin mako (*Isurus oxyrinchus*), silky shark (*Carcharhinus falciformis*), spinner shark (*Carcharhinus brevipinna*), thresher shark (*Alopias vulpinus*), tiger shark (*Galeocerdo cuvieri*), white marlin (*Tetrapturus albidus*), white shark (*Carcharodon carcharias*), red drum (*Sciaenops ocellatus*), Spanish mackerel (*Scomberomorus maculatus*), cobia (*Rachycentron canadum*), king mackerel (*Scomberomorus cavalla*), and golden crab (*Chaceon fenneri*). The Southeast Atlantic Fishery Management Council has adopted EFH in the following Fishery Management Plans which also overlap with the GOM DPS of Atlantic sturgeon: coral and coral reef, coastal migratory pelagic, snapper/grouper, shrimp, spiny lobster, golden crab, and dolphin/wahoo. EFH ranges were obtained from the NMFS Habitat Conservation Division's Web site at http://www.nmfs.noaa.gov/habitat/habitatprotection/efh/, the Final Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks

(http://www.nmfs.noaa.gov/sfa/hms/FMP/TunSwoShk_FMP.htm), and GIS layers were obtained for SAFMC FMP species from the Florida Fish and Wildlife Conservation Commission (http://ocean.floridamarine.org/efh_coral/ims/Description_Layers.htm#efh). Habitat Area of Particular Concern (HAPC) has also been designated in areas that overlap with the GOM DPS for the following species: Atlantic salmon, sandbar shark, snapper/grouper species, coastal migratory pelagic species, coral species, shrimp species, and dolphin/wahoo species.

4.4 SOCIOECONOMIC ENVIRONMENT

The relevant socioeconomic (human) environment is composed of entities potentially affected by the proposed rule. The "Proposed Rulemaking to Establish Take Prohibitions for the Proposed to be listed as Threatened Gulf of Maine Distinct Population Segment of Atlantic sturgeon – Draft Report – Regulatory Impact Review October 7, 2010," (RIR) explored the following industries and related activities (which occur through part or all of the GOM DPS range) for potential economic impacts: fisheries (commercial, recreational and tribal), dams, scientific research, in-water construction and dredging activities, energy and mineral resources, commercial and recreational vessel activity, industry activities impacting water quality, and activities related to climate change. The RIR concluded that while there may be some economic impacts (resulting from the proposed rule) to these industry activities, the economic impacts of the Alternatives 1 and 2 are not considered significant as set forth by the criteria outlined in Executive Order 12866. This conclusion has been reached based on the following facts: first, in the marine environment, the GOM DPS of Atlantic sturgeon, proposed to be listed as threatened, will overlap completely with the other four U.S. Atlantic sturgeon DPSs that are proposed to be listed as endangered. Industry projects in the marine environment may require modification to avoid take of endangered Atlantic sturgeon, but this will not represent an impact associated with this proposed 4(d) rule. Second, in the freshwater range, the GOM DPS of Atlantic sturgeon overlaps to a significant degree with endangered shortnose sturgeon and endangered Atlantic salmon. Industry projects in the freshwater environment may require modification to avoid take of endangered shortnose sturgeon and/or endangered Atlantic salmon, but this will not represent an impact associated with this proposed 4(d) rule.

Beyond potentially affected industry activities, social wellbeing may be affected (increased or decreased) by the proposed rule. Conservation and recovery of a species has a noted social value, captured by the following definitions of value: 1) use value, also known as consumption value, this would represent the ability to use the Atlantic sturgeon resource once it is fully recovered; and 2) existence value, the willingness to pay to maintain the existence of a [natural] resource even though no future utilization is likely (Field 2008). Use and existence values could be impacted by the alternatives outlined in this environmental assessment. Such impacts would result in consequences to the socioeconomic environment as discussed in section 5.0.

5.0 ENVIRONMENTAL CONSEQUENCES

5.1 INTRODUCTION

This chapter describes the potential environmental consequences of the Proposed Action and Alternatives on the environment. The Proposed Action and Alternatives would not impose specific requirements on activities, but establish a framework for the evaluation of activities and invite entities to work with NMFS through the ESA Section 10 or Section 7 processes or under the exemptions in the 4(d) protective regulations (if applicable). Each Alternative would provide for some degree of protection and conservation of the GOM DPS.

5.2 NO ACTION/STATUS QUO

No Protective Regulations Are Extended
The No Action Alternative represents the status quo (after a final listing rule for the threatened GOM DPS Atlantic sturgeon is issued). Under this Alternative, GOM DPS Atlantic sturgeon would receive protection only if a Federal action is determined, pursuant to Section 7, to jeopardize the existence of the GOM DPS of Atlantic sturgeon. Under this Alternative, take of GOM DPS Atlantic sturgeon would not be explicitly prohibited, and Section 7 consultations not resulting in jeopardy would not provide protection for GOM DPS Atlantic sturgeon. GOM DPS Atlantic sturgeon may benefit from protections afforded to other ESA-listed species where they overlap in range, but would be vulnerable if those species were to be removed from the threatened and endangered species list, as the No Action Alternative would not extend any of the Section 9(a)(1) prohibitions for GOM DPS Atlantic sturgeon. Ultimately, this Alternative would mean that activities which may take GOM DPS Atlantic sturgeon (e.g., dredging, in-water construction activities) would be allowed to continue (as long as they were conducted in accordance with other existing laws and regulations) as long as they would not jeopardize the continued existence of the species (assuming they had a Federal nexus—Federal funding, authorization, or implementation). For actions without a Federal nexus, there would be no protective regulations in place under the No Action alternative. As stated previously, in the estuarine and marine environment, GOM DPS Atlantic sturgeon overlap with the other four Atlantic sturgeon DPSs that are proposed to be listed as endangered. Protections for these species are included in the No Action/Status Quo (i.e. in absence of a 4(d) rule, Atlantic sturgeon may still receive some protection which is afforded to other protected species).

5.2.1 BIOLOGICAL ENVIRONMENT

<u>Affected Species: GOM DPS of Atlantic Sturgeon</u>
This Alternative does not extend any of the Section 9(a)(1) protective regulations for Atlantic sturgeon. Activities with a Federal nexus, which may cause take of GOM DPS Atlantic sturgeon, would still be subject to biological analysis pursuant to Section 7 of the ESA. However, this analysis would only consider whether activities may jeopardize the

continued existence of the GOM DPS Atlantic sturgeon. Because take is not prohibited, Reasonable and Prudent Measures (RPMs) would not be available to minimize the impact of Federal actions where take does not jeopardize the species' existence. Additionally, activities occurring in the riverine range of the GOM DPS (e.g., dredging) would not be subject to the ESA regulatory protections of Section 9(a)(1) which would be automatically extended to the four Atlantic sturgeon DPSs proposed to be listed as endangered. As a result, most activities would not have to limit impacts to listed Atlantic sturgeon subpopulations. For this reason, the No Action Alternative would be the least protective alternative for the GOM DPS Atlantic sturgeon.

Scientific research, an activity which may cause take of GOM DPS Atlantic sturgeon, would be allowed to continue under the No Action Alternative. In general, such activities will help to conserve the listed species by furthering the understanding of the species' life history and biological requirements. Despite the conservation benefit, these activities do pose a risk to the species and therefore, the importance of properly planned and implemented research and assessment is critical to minimizing these risks. For example, under certain conditions there are some research and assessment methods that pose a significant risk of lethal take of Atlantic sturgeon, including gillnetting, trawling, and electrofishing. Failure to extend the Section 9(a)(1) prohibitions would allow research to continue unregulated, and would not adequately provide for the protection of the species by ensuring that the safest research techniques are utilized.

Protected Species Likely to Be Affected

Activities taking place in the affected area have the potential to directly affect Atlantic salmon and shortnose sturgeon in the GOM DPS where they overlap spatially and temporally with the GOM DPS of Atlantic sturgeon. Despite the fact that this Alternative does not extend any protective regulations for GOM DPS Atlantic sturgeon, Atlantic salmon and shortnose sturgeon are both federally endangered species, and any effects on either species would be analyzed separately pursuant to Section 10 and/or Section 7 of the ESA. Therefore, while no protective regulations are extended for Atlantic sturgeon under this Alternative, all of the take prohibitions would still apply for shortnose sturgeon and Atlantic salmon. Shortnose sturgeon and Atlantic salmon are already afforded the full protections of the ESA because they are listed separately from Atlantic sturgeon as federally endangered species. Thus, neither Atlantic salmon nor shortnose sturgeon would be affected by this Alternative.

Diadromous Species

As stated previously, this Alternative does not extend any of the Section 9(a)(1) protective regulations for Atlantic sturgeon. Activities directly affecting Atlantic sturgeon have the potential to cause harm to non-listed diadromous species if those species co-occur with Atlantic sturgeon. Activities with a Federal nexus that may cause take of GOM DPS Atlantic sturgeon would still be subject to biological analysis pursuant to Section 7 of the ESA. However, this analysis would only consider whether activities may jeopardize the GOM DPS of Atlantic sturgeon, and would not consider impacts to any other non-listed species. Thus, this Alternative is not likely (except possibly in a case of jeopardy for the GOM DPS) to afford any indirect protections to other diadromous species in the GOM DPS. Therefore, this Alternative would be less

protective than Alternative 1 or Alternative 2, and would have indirect negative impacts on diadromous species.

Other Fish Species

Because the No Action Alternative would represent the current state of regulation in the GOM DPS, no change in effects would likely be associated with this action for other fish species. However, Alternative 1 and Alternative 2 would provide an additional layer of protection and regulation for GOM DPs Atlantic sturgeon, and to the extent that other fish species overlap in their range and use of habitat with the GOM DPS, they would likely receive some ancillary protection and benefit from these alternatives. Thus, the No Action alternative would have indirect negative effects on other fish species as compared with alternative 1 and Alternative 2.

Invertebrates

This Alternative does not extend any of the Section 9(a)(1) protective regulations for Atlantic sturgeon. Activities with a Federal nexus that may cause take of GOM DPS Atlantic sturgeon would still be subject to biological analysis pursuant to Section 7 of the ESA. However, this analysis would only consider whether activities may jeopardize the GOM DPS of Atlantic sturgeon, and would not consider impacts to invertebrates. Thus, this Alternative is not likely (except possibly in a case of jeopardy for the GOM DPS where invertebrates maybe be afford additional protection) to affect invertebrate species in the GOM DPS. However, as with diadromous species and other fish species, the No Action Alternative would fail to add any additional protections to the GOM DPS, and thus, when compared with Alternative 1 and Alternative 2, the No Action alternative would have an indirect negative impact on invertebrate species in the GOM DPS.

5.2.2 PHYSICAL ENVIRONMENT

Habitat Resources

The No Action Alternative represents the baseline for habitat resources, such as sediment, water flow, water quality, and prey resources in the GOM DPS. Existing laws and regulations (e.g., Clean Water Act, Atlantic salmon Critical Habitat) are currently being implemented in the affected area, and this Alternative would not add to or detract from those existing regulations. Thus, no effects to habitat resources are expected as a result of the No Action Alternative. However, because habitat resources would potentially receive indirect protections resulting from Alternative 1 and Alternative 2 (e.g., in the case of an altered or downscaled in-water construction activity to avoid taking GOM DPS Atlantic sturgeon), the No Action Alternative would have an indirect negative effect on habitat resources in the GOM DPs, as compared with the other alternatives.

Essential Fish Habitat

The No Action Alternative represents the baseline for EFH in the GOM DPS. Existing laws and regulations regulate EFH, and this Alternative would not add or detract from those statutes. Thus, no effects to EFH are expected from the No Action Alternative. However, because EFH would potentially receive indirect protections resulting from Alternative 1 and Alternative 2 (e.g., in the case of an altered or downscaled in-water

construction activity to avoid taking GOM DPS Atlantic sturgeon), the No Action Alternative would have an indirect negative effect on EFH in the GOM DPs (where they overlap with EFH), as compared with the other alternatives.

5.2.3 SOCIOECONOMIC ENVIRONMENT

The No Action Alternative represents the socioeconomic baseline. Industry activities currently affecting GOM Atlantic sturgeon would not be impacted because no additional ESA regulations would be afforded, and thus, none of the activities that occur in the absence of the 4(d) regulation would need to be modified if the No Action Alternative were implemented.

The No Action Alternative would not establish protections sufficient to conserve and recover the GOM DPS of Atlantic sturgeon. Conservation and recovery of a species has a noted social value, captured by the following definitions of value: 1) use value, also known as consumption value, this would represent the ability to use the Atlantic sturgeon resource once it is fully recovered; and 2) existence value, the willingness to pay to maintain the existence of a [natural] resource even though no future utilization is likely (Field 2008). Because of the ASMFC and NMFS moratoria on targeted harvest of Atlantic sturgeon, any Alternative that reduces the likelihood that the species will be recovered sufficiently to warrant the lifting of the moratoria will represent a negative use value. Likewise, because the No Action alternative minimizes the likelihood of recovery of the species (as compared with Alternative 1 and Alternative 2), the existence value is also minimized under the No Action Alternative. Thus, use and existence values are lowest under the No Action Alternative for the socioeconomic environment.

5.3 ALTERNATIVE 1

All of the Section 9(a)(1) prohibitions are extended
Alternative 1 would apply all of the ESA Section 9(a)(1) prohibitions for the protection of the GOM DPS. Alternative 1 would prohibit take of GOM DPS fish within the U.S. and the U.S. territorial sea and upon the high seas, as well as prohibit the import, export, possession, sale, delivery, carrying, transport, or shipping of GOM DPS fish in interstate or foreign commerce or for commercial activity. Specifically, GOM DPS Atlantic sturgeon would be protected from Section 9(a)(1) take resulting from activities in the riverine environment, as they would have already received protection from the endangered listings of the other four Atlantic sturgeon DPSs in the estuarine and marine portion of their range. Activities that affect the GOM DPS or its habitat, either directly or indirectly, would need to be altered to avoid take. Otherwise, any take must be authorized by an ESA Section 7 incidental take statement or permitted under an ESA Section 10 permit. Take resulting from Federal actions must be covered under an ESA Section 7 incidental take statement. In addition to any reasonable and prudent alternatives, an incidental take statement would provide reasonable and prudent measures to minimize the effects of the take on the GOM DPS, which may result in extra time and costs to entities and agencies. However, these reasonable and prudent measures and their

terms and conditions may only make minor changes to an action. Those involved in scientific research as well as other enhancement activities that directly or incidentally take GOM DPS fish must apply for an ESA Section 10(a)(1)(A) permit. Other activities conducted by non-Federal entities and involving incidental take of GOM DPS fish must be covered by an ESA Section 10(a)(1)(B) permit.

5.3.1 BIOLOGICAL ENVIRONMENT

Affected Species: GOM DPS of Atlantic Sturgeon

This Alternative extends all of the Section 9(a)(1) take prohibitions for GOM DPS Atlantic sturgeon. Thus, under Alternative 1, GOM DPS Atlantic sturgeon would benefit from greater levels of protection compared to the No Action Alternative. NMFS has determined that the application of Section 9(a)(1) take prohibitions is essential for the conservation and recovery of GOM DPS Atlantic sturgeon. For this reason, Alternative 1 is preferred to the No Action Alternative.

Under Alternative 1, take prohibitions would be extended to all types of activities which may take GOM DPS Atlantic sturgeon, and would include scientific research activities. Thus, researchers would be required to obtain a Section 10(a)(1)(A) permit to authorize take under Alternative 1. The Section 10 permitting process can be quite lengthy due to the volume of requests for permits and rigorous analysis required. This process will require a significant amount of time and resources for both NMFS and researchers. In this regard, Alternative 1 does not maximize the likelihood that critical research will be able to continue uninterrupted. Because of the potential for the loss of critical information that will be directly used to help recover the species, Alternative 1 would have a negative impact on GOM DPS Atlantic sturgeon as compared with Alternative 2. For this reason, Alternative 1 is not deemed to be the most beneficial (of all alternatives considered) for the conservation and recovery of the species.

Protected Species Likely to Be Affected

Atlantic salmon and shortnose sturgeon are both federally endangered species, and any effects on either species would be analyzed separately pursuant to Section 10 and/or Section 7 of the ESA. Therefore, the application of Section 9(a)(1) prohibitions for GOM DPS Atlantic sturgeon under this Alternative would most likely not impact Atlantic salmon and shortnose sturgeon. Shortnose sturgeon and Atlantic salmon are afforded the full protections of the ESA because they are listed separately from Atlantic sturgeon as federally endangered species. Therefore, relative to the No Action Alternative, no incremental environmental consequences to other protected species (such as Atlantic salmon and shortnose sturgeon) are expected as a result of Alternative 1.

Diadromous Species

The application of Section 9(a)(1) prohibitions for GOM DPS Atlantic sturgeon could provide an indirect benefit for other diadromous species as Atlantic sturgeon and other diadromous fish share some similar life history characteristics and overlap in habitat use. Because of these similarities, the incremental (relative to the No Action Alternative) environmental consequences of Alternative 1 may be positive for other diadromous

species as they may receive some indirect protection from this Alternative. Examples of benefits under Alternative 1 (and Alternative 2) could include improved fish passage at dams, water quality improvements at permitted outflows, and habitat protection from in-water construction activities. It is unlikely that there would be any difference in impacts to diadromous species between Alternative 1 and Alternative 2.

Modifications to activities as a result of extending the Section 9(a)(1) take prohibitions to GOM DPS Atlantic sturgeon may result in overall benefits to other species in the GOM ecosystem.

Other Fish Species

The application of Section 9(a)(1) prohibitions for GOM DPS Atlantic sturgeon could provide an indirect benefit for other fish species as Atlantic sturgeon and other riverine fishes share some similar life history characteristics and overlap in habitat use. Because of these similarities, the incremental (relative to the No Action Alternative) environmental consequences of Alternative 1 may be positive for other fish species as they may receive some indirect protection from this Alternative. Similarly to diadromous species discussed above, there would not likely be any difference between Alternative 1 and Alternative 2 with respect to impacts on other fish species.

Modifications to activities as a result of extending the Section 9(a)(1) take prohibitions to GOM DPS Atlantic sturgeon may result in overall benefits to other species in the GOM ecosystem.

Invertebrates

The application of Section 9(a)(1) prohibitions for GOM DPS Atlantic sturgeon could provide an indirect benefit for other species of wildlife where Atlantic sturgeon and those species share the same ecosystem. Invertebrate communities are particularly sensitive to changes in water quality. Activities that are not conducted in a way that is sufficiently protective of water quality may negatively affect invertebrate communities. The application of Section 9(a)(1) prohibitions may lead to more stringent water quality standards that provide ancillary benefits to invertebrates. While there are separate state and Federal laws aimed at ensuring that water quality standards are protective of aquatic organisms and ecosystems as a whole (e.g. Clean Water Act), applying ESA protections to Atlantic sturgeon, which ware highly dependent on aquatic invertebrates as a prey source, could provide some indirect benefits to invertebrates. Because of potential protections to habitat (e.g., modifications to dredging projects that might take GOM DPS Atlantic sturgeon) resulting from the ESA protections under Alternative 1, there may be some ancillary benefits to invertebrates under Alternative 1. These benefits would also exist under Alternative 2. No negative benefits to invertebrates are likely to result from Alternative 1.

5.3.2 PHYSICAL ENVIRONMENT

Habitat Resources

Alternative 1 applies ESA Section 9(a)(1) prohibitions to GOM DPS Atlantic sturgeon. Existing laws and regulations (e.g., Clean Water Act, Atlantic salmon Critical Habitat) are currently being implemented in the affected area to protect certain habitat characteristics (e.g., water quality and sediment). Any habitat restoration projects aimed at restoring riverine habitat in the GOM DPS that could result in incidental take would require a Section 10(a)(1)(B) permit to cover incidental take resulting from these activities. Thus, Alternative 1 would offer some additional review of these projects by NMFS, which could have a benefit to physical habitat in the GOM DPS. However, it is not expected that Alternative 1 would meaningfully add or detract from existing regulations governing habitat resources in the GOM DPS. Therefore, relative to the No Action Alternative, no incremental environmental consequences to habitat resources are expected as a result of Alternative 1.

Essential Fish Habitat

Alternative 1 applies ESA Section 9(a)(1) prohibitions to GOM DPS Atlantic sturgeon. Existing laws and regulations address EFH, and this Alternative would not add or detract from those statutes. Therefore, relative to the No Action Alternative, no incremental environmental consequences to EFH are expected as a result of Alternative 1.

5.3.3 SOCIOECONOMIC ENVIRONMENT

The impacts to the industry component of the socioeconomic environment relating from Alternative 1 are negative, but not expected to be extensive. The following is the rationale for this conclusion: first, in the marine environment, the GOM DPS of Atlantic sturgeon, proposed to be listed as threatened, will overlap completely with the other four U.S. Atlantic sturgeon DPSs that are proposed to be listed as endangered. Industry projects in the marine environment may require modification to avoid take of endangered Atlantic sturgeon, but this will not represent an impact associated with this proposed 4(d) rule because those projects would likely require modification as a result of the four DPSs proposed to be listed as endangered, for which ESA protections are automatically applied. Second, in the freshwater range, the GOM DPS of Atlantic sturgeon overlaps to such a significant degree with endangered shortnose sturgeon and endangered Atlantic salmon that any modifications to projects specifically for GOM DPS Atlantic sturgeon are likely to be minimal, but negative if those modifications cause economic loss (e.g., altering or limiting the time periods when an action could take place).

Conservation and recovery of a species has a noted social value, captured by the following definitions of value: 1) use value, also known as consumption value, this would represent the ability to use the Atlantic sturgeon resource once it is fully recovered; and 2) existence value, the willingness to pay to maintain the existence of a [natural] resource even though no future utilization is likely (Field 2008). Alternative 1 helps to preserve and contribute to use and existence values for the GOM DPS Atlantic sturgeon by establishing additional protections over the No Action Alternative.

Under this Alternative, researchers conducting studies on Atlantic sturgeon in the GOM DPS are required to obtain a Section 10(a)(1)(A) permit to authorize take. The Section

10 permitting process can be quite lengthy due to the volume of requests for permits and rigorous analysis required. This process will require a significant amount time and resources for both NMFS and researchers. This additional requirement of resources imposes a socioeconomic cost on NMFS and the research community.

Ultimately then, the incremental (relative to the No Action Alternative) environmental consequences of Alternative 1 on the socioeconomic (human) environment are mixed, with some possible negative impacts to industry activities, some positive social impacts (contribution to the conservation and recovery of a species) and a potential loss associated with delaying valuable research activities.

5.4 ALTERNATIVE 2 (PREFERRED ALTERNATIVE)

Preferred Alternative

Alternative 2 would apply the ESA Section 9(a)(1) prohibitions as described in Alternative 1, but would include an exemption from the take prohibitions for a category of activities for which the conservation benefits to the GOM DPS outweigh the potential impacts. Under this alternative, scientific research activities, which are conducted consistent with the research techniques for Atlantic sturgeon that NMFS considers to be safe and effective, as well as salvage and aid/resuscitation activities carried out by NMFS designees, represent the activities for which the Section 9(a)(1) prohibitions would not be applied (i.e. these activities would be exempted from the take prohibitions). In addition to the processes under Section 7 or 10 of the ESA, the exemption would provide an additional, and potentially more stream-lined, option for entities to continue research (deemed to be beneficial for the conservation of the species) on GOM DPS fish. Alternative 2 would reinforce existing state and Federal environmental regulations, facilitate coordination with NMFS, and promote actions that would benefit the GOM DPS as well as potentially benefit other fish and wildlife species. Over the long-term, the development and implementation of conservation measures under Alternative 2 would potentially improve resource management within the affected environment.

5.4.1 BIOLOGICAL ENVIRONMENT

<u>Affected Species: GOM DPS of Atlantic Sturgeon</u>
This Alternative extends all of the prohibitions in Section 9(a)(1) of the ESA to GOM DPS Atlantic sturgeon, as in Alternative 1, except that take resulting from NMFS approved scientific research and salvage and aid/resuscitation activities would not be prohibited within the riverine range of the GOM DPS. Application of the take prohibitions (as in Alternative 1 and the Preferred Alternative) and the exemptions to the take prohibitions (unique to the Preferred Alternative) would provide conservation benefits to GOM DPS Atlantic sturgeon over protections received under the No Action Alternative or Alternative 1.

In carrying out their responsibilities to conserve, protect, and recover listed Atlantic sturgeon subpopulations in the GOM, scientists from the Federal and state agencies, academia, and other institutions conduct a wide range of scientific research activities, including monitoring and other studies on the GOM DPS. These activities are vital for improving the understanding of the status and risks facing Atlantic sturgeon and providing critical information for assessing the effectiveness of current and future management practices. In general, such activities will help to conserve the listed species by furthering the understanding of the species' life history and biological requirements. Despite the conservation benefit, these activities do pose a risk to the species and therefore, the importance of properly planned and implemented research and assessment is critical to minimizing these risks. The proposed action of the Preferred Alternative would provide a mechanism whereby scientific research would be exempt from the Section 9(a)(1) take prohibitions if such research is conducted in a manner that is consistent with the techniques and methodologies that NMFS has determined to be safe and effective for Atlantic sturgeon.

The Preferred Alternative outlines a mechanism whereby researchers or NMFS designees carrying out salvage and aid/resuscitation activities would not have to seek a Section 10(a)(1)(A) permit to receive authorization for take. Due to the volume of requests for Section 10 permits and rigorous analysis required, the Section 10 authorization process can be quite a lengthy process and resource intensive for the applicant. The mechanism provided by the proposed regulations would allow NMFS or our designees to bypass the Section 10 permitting process; thereby, allowing time and resources to be devoted to other recovery issues that pose a greater threat to the DPS. Without any protective regulations such as in the No Action Alternative, NMFS would not have a mechanism for ensuring that scientific research or any other activities that do not require Section 7 consultation do not affect the survival and recovery of the species (broadly speaking, this would include all activities which take GOM DPS Atlantic sturgeon, but do not result in jeopardy under Section 7). In comparison to the No Action Alternative, the Preferred Alternative would have a positive effect on Atlantic sturgeon. Under the Preferred Alternative, NMFS would have increased oversight (as compared with the No Action Alternative) of research activities to ensure that they are sufficiently protective of Atlantic sturgeon and contributing to the conservation and recovery of the GOM DPS, and would be able to appoint designees who could carry out salvage and aid/resuscitation activities that would aid in the conservation of the species.

Protected Species Likely to Be Affected

This Alternative would extend all of the prohibitions in Section 9(a)(1) of the ESA to GOM DPS Atlantic sturgeon, as in Alternative 1. Additionally, exemptions to the take prohibitions would be extended to cover take of GOM DPS Atlantic sturgeon resulting from scientific research and salvage and aid/resuscitation activities. Because of the similarities between shortnose sturgeon and Atlantic sturgeon, exemptions allowing the collection of information for the conservation of Atlantic sturgeon would be expected to mutually benefit shortnose sturgeon by yielding valuable scientific information; however, the normal permitting process would still need to be followed for research on shortnose

sturgeon. Thus, the Preferred Alternative, relative to the No Action Alternative, will provide conservation benefits for protected species likely to be affected.

Scientific research activities may have a direct effect on shortnose sturgeon and Atlantic salmon in the GOM DPS. Both shortnose sturgeon and Atlantic salmon are federally endangered species and any effects on these species would be analyzed separately pursuant to Section 10 and/or Section 7 of the ESA. Scientific research on federally listed species, under Alternative 1, would require ESA Section 10 permits to authorize take of a listed species. A Section 10(a)(1)(A) permit is required for scientific research activities or activities to enhance the propagation or survival of an ESA-listed species when those activities will likely result in take of the species. Therefore, any research directed at shortnose sturgeon or Atlantic salmon would have to be authorized and analyzed pursuant to Section 10 of the ESA. Under Alternative 1, analysis pursuant to Section 7 of the ESA would also be conducted for Atlantic sturgeon research that may also adversely affect shortnose sturgeon or Atlantic salmon.

There is some risk that researchers targeting Atlantic sturgeon could incidentally take shortnose sturgeon, currently listed as endangered under the ESA. However, even if gillnets with 6-inch stretched mesh, which are known to capture shortnose sturgeon, were to be used, it would have to be in accordance with NMFS approved protocols (e.g., Damon-Randall *et al*., 2010). A review of past sturgeon capture studies has shown that the occurrence of sturgeon mortality is very low (<1%) when these protocols are followed. Thus the effects of the scientific research exemption on shortnose sturgeon are likely to be minor.

Without any protective regulations such as in the No Action Alternative, NMFS would not have a mechanism for ensuring that scientific research or any other activities that do not require Section 7 consultation do not affect the survival and recovery of the species. Under the Preferred Alternative, NMFS would have oversight with respect to Atlantic sturgeon scientific research activities to ensure that they are sufficiently protective of Atlantic sturgeon and contribute to the conservation and recovery of the GOM DPS. Scientific research that contributes to the conservation and recovery of the GOM DPS of Atlantic sturgeon may indirectly result in new information that is likely to benefit shortnose sturgeon and Atlantic salmon conservation. In comparison to the No Action Alternative, the Preferred Alternative may have a positive effect on shortnose sturgeon and Atlantic salmon.

The exemption for salvage and aid/resuscitation is not likely to affect other protected species as it would only address collection of GOM Atlantic sturgeon. Information gleaned from salvaged GOM DPS Atlantic sturgeon specimens could lead to indirect benefits to shortnose sturgeon and Atlantic salmon in the same manner as the scientific research exemption described above.

<u>Diadromous Species</u>

As Alternative 2 would only address exemptions for research, salvage and aid/resuscitation with respect to Atlantic sturgeon in riverine portions of the GOM DPS, there is not a difference in the environmental consequences of Alternative 1 and

Alternative 2 as they pertain to diadromous species. For this reason, the incremental (relative to the No Action Alternative) environmental consequences of Alternative 2 may be positive for other diadromous species as they may receive some indirect protection from this Alternative.

Other Fish Species

As Alternative 2 would only address exemptions for research, salvage and aid/resuscitation with respect to Atlantic sturgeon in riverine portions of the GOM DPS, there is not a difference in the environmental consequences of Alternative 1 and Alternative 2 as they pertain to other fish species. For this reason, the incremental (relative to the No Action Alternative) environmental consequences of Alternative 2 may be positive for other diadromous species as they may receive some indirect protection from this Alternative.

Invertebrates

As Alternative 2 would only address exemptions for research, salvage and aid/resuscitation with respect to Atlantic sturgeon in riverine portions of the GOM DPS, there is not a difference in the environmental consequences of Alternative 1 and Alternative 2 as they pertain to invertebrate species. For this reason, the incremental (relative to the No Action Alternative) environmental consequences of Alternative 2 would be positive for invertebrate species as they may receive some indirect protection from this Alternative, in that the application of Section 9(a)(1) prohibitions may lead to more stringent water quality standards that provide ancillary benefits to invertebrates

5.4.2 PHYSICAL ENVIRONMENT

Habitat Resources

As Alternative 2 would only address exemptions for research, salvage and aid/resuscitation, there would not be a difference in the environmental consequences of Alternative 1 and Alternative 2 as they pertain to habitat resources. Therefore, relative to the No Action Alternative, no incremental environmental consequences to habitat resources are expected as a result of Alternative 2.

The Preferred Alternative would extend protective regulations pursuant to 4(d) of the ESA for all activities which would violate the prohibitions detailed in Section 9(a)(1) of the ESA throughout the range of the GOM DPS, but would provide an exemption for scientific research activities, salvage, and aid/resuscitation for Atlantic sturgeon. Any habitat study that requires manipulation of the habitat is not considered purely scientific research. Under this Alternative, individuals engaging in habitat restoration activities that result in take of GOM DPS Atlantic sturgeon would have to obtain a Section 10(a)(1)(B) permit. The effects of physical manipulations of the habitat are considered during that process. NMFS does not expect either impacts from direct research on Atlantic sturgeon, monitoring associated with restoration, or salvage and aid/resuscitation activities to affect habitat resources.

Essential Fish Habitat

As Alternative 2 would only address exemptions for research, salvage and aid/resuscitation, there is not a difference in the environmental consequences of Alternative 1 and Alternative 2 as they pertain to EFH. Therefore, relative to the No Action Alternative, no incremental environmental consequences to EFH would be expected as a result of Alternative 2.

5.4.3 SOCIOECONOMIC ENVIRONMENT

Alternative 2 (the Preferred Alternative) differs from Alternative 1 in its environmental consequences on the socioeconomic (human) environment because of the exempted activities. The Preferred Alternative outlines a mechanism whereby researchers would not have to seek a Section 10(a)(1)(A) permit to obtain authorization for take. The proposed regulations presented in the Preferred Alternative would exempt a certain level of take. This take has been analyzed by NMFS in a biological opinion in conjunction with other anticipated levels of take, and NMFS has determined that it would not result in jeopardy. Due to the volume of requests for Section 10 permits and rigorous analysis required, the Section 10 authorization process can be quite a lengthy process and resource intensive for the applicant. The mechanism provided by the proposed regulations would allow researchers to bypass the Section 10 permitting process, thus allowing time and resources to be devoted to other recovery issues that pose a greater threat to the DPS. This process would allow research to be conducted that is sufficiently protective of Atlantic sturgeon and that is critical to understanding the status and risks facing the GOM DPS, without spending valuable time fulfilling permitting requirements. As a result, researchers as well as NMFS staff would be able to devote extra time and resources to additional studies or addressing more pressing threats.

There could be a potentially positive effect on the social environment given that society generally benefits from species conservation and preservation. Whether that social benefit translates into the ability to use a resource once it is fully recovered or something more intangible such as simply knowing that a species still exists, both are still considered extensions of social benefits. The No Action Alternative (as well as Alternative 1) will not ensure that research contributes to the conservation of the GOM DPS. Therefore, greater conservation benefits will result from the Preferred Alternative.

Negative effects to the industrial component of the socioeconomic environment could result from the Preferred Alternative as compared with the No Action Alternative, but would be identical to those under Alternative 1 (Section 5.3.3). For example, negative economic impacts could results because of project modifications to dam operations, dredging, and in-water construction activities. However, because of the presence of other protected species (e.g., endangered Atlantic sturgeon, shortnose sturgeon, and Atlantic salmon) throughout the range of the GOM DPS, additional impacts from the Preferred Alternative on the socioeconomic environment are expected to be minimal.

Ultimately then, the incremental (relative to the No Action Alternative) environmental consequences of Alternative 2 on the socioeconomic (human) environment are mixed, with some possible negative impacts to industry activities, and increased (relative to

Alternative 1) positive social impacts by contributing to the conservation and recovery of the species, through the two exemptions for research, salvage and aid/resuscitation.

6.0 CUMULATIVE EFFECTS

Cumulative impacts are those combined effects on the quality of the human environment that result from the incremental impact of the Preferred Alternative when added to other past, present, and reasonably foreseeable future actions, regardless of what Federal or non-Federal agency or person undertakes such actions. The purpose of the cumulative impacts analysis is to ensure that Federal decisions consider the full range of an action's consequences, incorporating this information into the planning process. Direct and indirect impacts to most components of the environment were either non-existent or minor. Therefore, the analysis of cumulative effects will focus on Atlantic sturgeon listed as threatened with the proposed protective regulations.

The analysis of cumulative effects for the Preferred Alternative for Atlantic sturgeon includes an analysis of the past, present, and reasonably foreseeable future effects, followed by a summary of those effects on Atlantic sturgeon in the GOM DPS, and lastly, an analysis of the impact of the Preferred Alternative when combined with the past, present, and reasonably foreseeable future effects.

6.1 TEMPORAL AND GEOGRAPHIC SCOPE OF CUMULATIVE IMPACTS ANALYSIS

The geographic scope of this analysis is the range of Atlantic sturgeon belonging to the GOM DPS is described as: all watersheds from the Maine/Canadian border and extending southward to include all associated watersheds draining into the Gulf of Maine as far south as 41.68° N latitude and 69.96° W longitude (Chatham, MA), as well as wherever these fish occur in coastal bays and estuaries and the marine environment. NMFS is proposing that, while the Section 9(a)(1) take prohibitions will apply throughout the range of GOM DPS Atlantic sturgeon, the exemptions to the Section 9(a)(1)(B) take prohibitions apply only to Atlantic sturgeon found within specific riverine portions of the GOM DPS to ensure that only Atlantic sturgeon listed as threatened will be taken. Because of the overlap of GOM DPS Atlantic sturgeon with the other four DPSs proposed to be listed as endangered, GOM DPS Atlantic sturgeon would receive Section 9(a)(1) protection in the baseline. This fact is considered in this analysis.

Regarding temporal scope, in all instances, the analysis attempts to take into account both present and reasonably foreseeable future actions that are occurring or may occur within the next five years. The discussion of past actions and events reflects underlying differences in the availability of historical information as well as differences in the period of time that must be considered to provide adequate context for understanding the current circumstances. In all cases, the information presented and analysis conducted is commensurate with the overall impacts associated with this action.

6.2 PAST AND PRESENT ACTIONS IN THE GOM DPS

6.2.1 MIGRATORY IMPEDIMENT TO ATLANTIC STURGEON HABITAT

6.2.1.1 DAMS AND TIDAL TURBINES

Historically, the upstream migration of Atlantic sturgeon in the Kennebec River was limited to Waterville, ME, which is the location of Ticonic Falls (river kilometer (rkm) 98) (NMFS and USFWS, 1998). The construction of Edwards Dam in 1837, downstream of the Ticonic Falls, denied Atlantic sturgeon access to historical habitat in the Kennebec River until 1999 when the dam was removed. Since its removal, access to 100% of historic habitat has been restored. In the Androscoggin River, the Brunswick Hydroelectric Dam is located at the head-of-tide near the site of a natural falls. The location of historical spawning grounds on the Androscoggin is unknown, but it is unlikely that Atlantic sturgeon could navigate the natural falls located near the Brunswick Dam (NMFS and USFWS, 1998). Therefore, the dam is unlikely to have limited access of Atlantic sturgeon to their spawning habitat (although spawning could be affected by altered flow regimes from the dam). Similarly, Atlantic sturgeon upstream migration within the Sheepscot River is thought to have been historically limited to the lower river (rkm 32) just below the first dam on the river (rkm 35); therefore, 100% of the historical habitat (based on river kilometers) is believed to be available to Atlantic sturgeon in the Sheepscot.

In contrast to the aforementioned rivers, access to Atlantic sturgeon spawning habitat is impeded on the Penobscot River. Historically, the falls at Milford, rkm 71, were likely the first natural obstacle to Atlantic sturgeon migration on the Penobscot River (L. Flagg, MEDMR, pers. comm., 1998). If Atlantic sturgeon were able to ascend the falls at Milford, they could have migrated without obstruction to Mattaseunk (rkm 171) (ASSRT, 2007). However, in 1833, the Veazie Dam was constructed on the Penobscot River at rkm 56, blocking 29 km (21%) of Atlantic sturgeon habitat. Five kilometers downstream of the Veazie, the Treats Falls Bangor Dam also impeded migration upstream during the summer months (ASSRT, 2007). However, this dam was breached in 1977 (ASSRT, 2007). Currently, 79% of Atlantic sturgeon habitat is accessible on the Penobscot (ASSRT, 2007). In 2008, the Penobscot River Restoration Trust, a non-profit corporation, exercised its option to purchase the Veazie and two other dams on the Penobscot (ASSRT, 2007). In doing so, the Trust has the right to, in part, decommission or remove the Veazie Dam, thus reopening miles of habitat for Atlantic sturgeon and other diadromous species (ASSRT, 2007). However, funds for the removal need to be generated and permits need to be secured, and it remains uncertain at this time whether all of the goals will be achieved.

Information on Atlantic sturgeon use of the Saco River in Maine became available after completion of the status review report. The last focused study of the Saco River was almost 30 years ago, and continued use of the river by Atlantic sturgeon was uncertain at the time of the status review. However, Atlantic sturgeon were captured during routine

trawl sampling in the river during 2008 and 2009 as part of a two-year monitoring project of the Saco River/Estuary. In conjunction with researchers at the University of New England, NMFS initiated a directed study on Atlantic sturgeon use of the Saco River. Tagging and tracking of the captured fish has shown that Atlantic sturgeon are making use of the river up to the first dam (J. Sulikowski, UNE, pers. comm., 2009). Data from the acoustic receivers indicates that all of the Atlantic sturgeon that have been detected to date were tagged in the Saco River with the exception of three fish that were tagged in the Penobscot (J. Sulikowski, UNE, pers. comm., 2010). Preliminary genetic analyses for all of the samples that have been analyzed from the Saco River (n=27) indicate that these fish are genetically similar to other fish from the GOM DPS (T. King, USGS, pers. comm., 2010). There are several dams on the Saco River known to have blocked fish passage for species such as Atlantic salmon, shad, and alewives (ME DMR, 1994). The effect of such dams on the Atlantic sturgeon that currently use the river is unknown. Likewise, there are several dams on the Piscataqua River and the effect of such dams on the Atlantic sturgeon that currently use the river is unknown.

Within the GOM DPS, access to historical spawning habitat is most severely impacted in the Merrimack River (ASSRT, 2007). Hoover (1938) identified Amoskeag Falls (rkm 116) as the historical limit for Atlantic sturgeon in the Merrimack River. In the 1800's, construction of the Essex Dam in Lawrence, MA (rkm 49) blocked the migration of Atlantic sturgeon to 58% of its historically available habitat (Oakley, 2003; ASSRT, 2007). Tidal influence extends to rkm 35; however, in the summer months when river discharge is lowest, the salt wedge extends upriver, resulting in approximately 19 km of tidal freshwater and 9 km of freshwater habitat (Kieffer and Kynard, 1993). Based on a detailed description by Kieffer and Kynard (1993), the accessible portions of the Merrimack seem to be suitable for Atlantic sturgeon spawning and nursery habitat. Nevertheless, the presence of the dam means that only 42% of historical Atlantic sturgeon habitat is currently available (ASSRT, 2007).

Other types of hydropower generation also have the potential to affect GOM DPS Atlantic sturgeon. Eight hydrokinetic projects proposed within the range of the GOM DPS have received preliminary permits from FERC, with other projects being proposed. There are two tidal power projects currently in operation along the range of Atlantic sturgeon. The placement of turbine structures for alternative energy projects to generate power in rivers used by Atlantic sturgeon could, potentially, damage or destroy bottom habitat. However, the more likely effect of turbines is injury and death of Atlantic sturgeon as a result of being struck by the turbine blades. The Annapolis River (Nova Scotia, Canada) tidal power plant, built in 1982, was constructed as a demonstration site for marine STRAFLO turbines and consists of a rock-filled dam housing the turbine and sluice gates (M. Dadswell, Arcadia University, pers. comm., 2006). The negative impacts of the Annapolis tidal turbine on Atlantic sturgeon (150-200 cm TL) appear to be significant, as the probability of lethal strike from the turbine to sturgeon that pass through ranges between 40-80% (M. Dadswell, Arcadia University, pers. comm., 2006; ASSRT, 2007), and at least three severed, gravid females have been observed below the power plant (Dadswell and Rulifson, 1994).

6.2.1.2 DREDGING AND BLASTING

Dredging and filling operations can impact important features of Atlantic sturgeon habitat because they disturb benthic fauna, eliminate deep holes, and alter rock substrates necessary for spawning (Smith and Clugston, 1997). Deposition of dredge sediment has been shown to affect the distribution of Atlantic sturgeon (Hatin et al., 2007). Dredging can also result in direct takes (killing and injuring) of Atlantic sturgeon.

Dickerson (2006) summarized observed takes of Gulf, shortnose and Atlantic sturgeon from dredging activities conducted by the Army Corps of Engineers (ACOE) in the United States; overall 24 sturgeon (2 Gulf, 11 shortnose, and 11 Atlantic sturgeon) were observed during the years of 1990-2005. Of the 24 sturgeon captured, 15 (62.5%) were reported as dead. The Atlantic sturgeon SRT calculated a minimum take of 0.6 Atlantic sturgeon per year based on hopper dredge takes since 1995, and that dredging efforts were relatively similar among years (USACOE, 2006). This is considered a minimum estimate since observed takes of Atlantic sturgeon are documented incidental to observer coverage of dredging activities for other, already listed, ESA-species (e.g. shortnose sturgeon and sea turtles). Given that Atlantic sturgeon do not always have the same temporal and spatial distribution as these ESA-listed species, it is likely that Atlantic sturgeon takes occur during unobserved dredging operations.

Dredging projects on the Kennebec River in the GOM DPS are known to have captured Atlantic sturgeon. Dredging has also been proposed for the Penobscot Harbor of the Penobscot River (ASSRT, 2007). Take of Atlantic sturgeon is likely to occur if dredging occurs at times when Atlantic sturgeon are present in the area. NMFS can currently request, but cannot require, dredge operations to be modified to minimize capture and injury of Atlantic sturgeon.

6.2.2 COMMERCIAL, RECREATIONAL, SCIENTIFIC, OR EDUCATIONAL PURPOSES

6.2.2.1 COMMERCIAL AND RECREATIONAL HARVEST

Harvest records indicate that fisheries for sturgeon were conducted in every major coastal river along the Atlantic coast at one time and were concentrated during the spawning migration (Smith, 1985). By 1860, commercial fisheries were established in Delaware, Georgia, Maryland, New Jersey, New York, North Carolina, Pennsylvania, South Carolina, and Virginia (Smith, 1990). Records of landings were first kept in 1880 when the U.S. Fisheries Commission started compiling statistical information on commercial fishery landings (ASMFC 1990). Harvest in these early years was heavy, and approximately 3350 mt (7.4 million lbs) were landed in 1890 (Smith and Clugston, 1997). The majority of the fishery for a 50-year time period (from 1870-1920) was conducted on the Delaware River and the Chesapeake Bay System with New Jersey and Delaware reporting the greatest landings. Landings reported until 1967 likely included both Atlantic and shortnose sturgeon. Shortnose sturgeon were granted Federal

protection in 1967; therefore, harvest of shortnose sturgeon has been prohibited since that time. During the 1970s and 1980s, the focus of fishing effort shifted to South Carolina, North Carolina, and Georgia, which accounted for nearly 80% of the total U.S. landings (64 mt). Catch between 1990 and 1996 (average 49 mt) was centered in the Hudson River and coastal areas of New York and New Jersey (Smith and Clugston, 1997).

In 1996, a review of the 1990 Atlantic sturgeon FMP concluded that the standard seven foot (2.13 m) minimum size mandated in the FMP protected only about 50% of the spawning females and about 80% of the spawning males in the stock. The review further concluded that the five foot (1.5 m) minimum size permitted in New York and New Jersey probably resulted in recruitment overfishing. The 1996 review document noted that New York had exceeded its set quota for both 1994 and 1995 but stated that both New York and New Jersey had committed to further restrictions that would help restore the Hudson stock.

In reviewing historical records of catch and stock abundances, Smith (1985) pointed out that Atlantic sturgeon was in need of immediate protection throughout much, if not all, of its range and suggested that the best strategy might be a total moratorium on exploitation of the species. The 1996 FMP review stated that the 1990 FMP for Atlantic sturgeon would not lead to the recovery of the East Coast stocks and therefore, should be amended. Recommendations in the plan review included a complete moratorium on harvest until 20 year classes were established (20-40 years), enhanced monitoring programs, specifications on the role of cultured fish in stock enhancement and restoration programs, and monitoring and commitment to reduce bycatch if necessary. The plan was adopted in early June 1998. A Canadian commercial fishery still exists, although it is highly regulated by size restrictions, seasonal closures, limited entry in some portions, and quotas.

Despite the fact that the fishery has been closed coastwide since 1998 and in certain states prior to then (NC, 1991; SC, 1985), poaching of Atlantic sturgeon continues and is a potentially significant threat to the species, but the present extent and magnitude of such activity is largely unknown. Instances of documented poaching have occurred since the previous status review, several of them very recent, indicating that poaching is contributing to Atlantic sturgeon mortality, and should be considered along with bycatch in other legal fisheries as a factor in assessing present threats.

6.2.2.2 SCIENTIFIC AND EDUCATIONAL PURPOSES

The available information supports that the GOM DPSs is not overutilized as a result of educational or scientific purposes. There is no known use of Atlantic sturgeon for educational purposes other than, possibly, limited display in commercial aquaria. Atlantic sturgeon are the subject of scientific research in the wild and in hatcheries and may be incidentally caught during research for other species such as shortnose sturgeon or assessment of commercial fish stocks. The ASSRT (2007) reviewed recent and on-going research studies for Atlantic sturgeon in NMFS' Northeast Region. Overall, hundreds of fish have been captured and released and few mortalities have occurred

(ASSRT, 2007). Scientific research of ESA-listed species such as shortnose sturgeon must comply with the conditions of ESA permits, including measures to minimize the likelihood of injury and death (e.g., short tow times or soak times for collection gear, handling protocols). These measures also minimize the likelihood of harm to Atlantic sturgeon when they are also present. Trawl surveys to assess the status of commercial fish stocks occur throughout the Northeast Region. The surveys typically use short tow times that help to minimize mortality and injuries. Atlantic sturgeon have been caught during such research operations, but there have been no mortalities and all fish were released in good condition (i.e., no apparent injuries) (B. Kramer, NEFSC, pers. comm., 2006).

6.2.3 DISEASE AND PREDATION

6.2.3.1 PREDATION

Very little is known about natural predators of Atlantic sturgeon. The presence of bony scutes is likely an effective adaptation for minimizing predation of sturgeon greater than 25 mm TL (Gadomski and Parsley, 2005; ASSRT, 2007). Documented predators of sturgeon species (Acipenser sp.), 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; Dadswell et al., 1984; Miller and Beckman, 1996; Kynard and Horgan, 2002; Gadomski and Parsley, 2005; Fernandes, 2006; Wurfel and Norman, 2006). Seal predation on shortnose sturgeon in the Penobscot River has been documented (Fernandes, 2008). Seven shortnose sturgeon carcasses found in the Kennebec River in August 2009 also bore wounds consistent with seal predation (A. Lictenwalner, UME, pers. comm., 2009). Although seal predation of Atlantic sturgeon has not been documented, Atlantic sturgeon that are of comparable size to shortnose (e.g., subadult Atlantic sturgeon) may also be susceptible to seal predation.

Disease and predation are not presently significant stressors on the GOM DPSs. While there is new evidence of seal predation on shortnose sturgeon in the Penobscot and Kennebec Rivers of the GOM DPS (Fernandes, 2008; A. Lictenwalner, UME, pers. comm., 2009), the number of mortalities is believed to be low and thus, this is a localized threat affecting a small number of fish. Likewise, we would expect that any seal predation of Atlantic sturgeon, if it is occurring, would also be low given that they spend less time in the rivers/estuaries than shortnose sturgeon.

6.2.3.2 DISEASE

Disease organisms commonly occur among wild fish populations, but under favorable environmental conditions, these organisms are not expected to cause population-threatening epidemics. There are no known diseases currently affecting any of the Atlantic sturgeon DPSs. A die-off of sturgeon, 13 shortnose and two Atlantic sturgeon, was reported for Sagadahoc Bay, ME in July 2009; at the same time as a red tide event

for the region. The dinoflagellate associated with the red tide event, *Alexandrium fundyense*, is known to produce saxitoxin which can cause paralytic shellfish poisoning when consumed in sufficient quantity. Stomach content analysis from the necropsied sturgeon revealed saxitoxin levels of several hundred nanograms per gram (S. Fire, NOAA, pers. comm., 2009). Although tissue samples were collected, saxitoxin cannot be confirmed as the cause of death of the Sagadahoc Bay sturgeon given the lack of historical information on saxitoxin presence in sturgeon tissues.

There is concern that non-indigenous sturgeon pathogens could be introduced to wild Atlantic sturgeon, most likely through aquaculture operations. Fungal infections and various types of bacteria have been noted to have various effects on hatchery Atlantic sturgeon. Due to the threat of impacts to wild populations, the ASMFC recommends requiring any sturgeon aquaculture operation to be certified as disease-free; thereby, reducing the risk of the spread of disease from hatchery origin fish. The aquarium industry is another possible source for transfer of non-indigenous pathogens or non-indigenous species from one geographic area to another, primarily through release of aquaria fish into public waters. With millions of aquaria fish sold to individuals annually, it is unlikely that such activity could ever be effectively regulated. Definitive evidence that aquaria fish could be blamed for transmitting a non-indigenous pathogen to wild fish (sturgeon) populations would be very difficult to collect (J. Coll and J. Thoesen, USFWS, pers. comm., 1998).

6.2.4 INADEQUACY OF EXISTING REGULATORY MECHANISMS

A variety of State and Federal statutes and regulations directly or indirectly address potential threats to Atlantic sturgeon and their habitat. Implementation and enforcement of these laws and regulations could be strengthened to further protect Atlantic sturgeon. There are major threats to the GOM DPS for which current regulatory mechanisms (applicable laws and regulations can be found in Section 8.0) remain insufficient, such as bycatch, dredging and water quality. Thus, it is concluded that the inadequacy of existing regulatory mechanisms is a factor limiting the viability of the GOM DPS into the foreseeable future.

6.2.4.1 BYCATCH

Current regulatory mechanisms have effectively removed threats from legal, directed harvest in the U.S. As previously described, the ASMFC manages Atlantic sturgeon through an interstate fisheries management plan that was developed in 1990 (Taub, 1990). The moratorium prohibiting directed catch of Atlantic sturgeon was developed as Amendment 1 to the FMP. The Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA), authorized under the terms of the ASMFC Compact, as amended (P.L. 103-206), provides the Secretary of Commerce with the authority to implement regulations in the EEZ in the absence of an approved Magnuson-Stevens FMP that are compatible to ASMFC FMPs. It was under this authority that, in 1999, NMFS implemented regulations that prohibit the retention and landing of Atlantic sturgeon bycatch from federally

regulated fisheries. NMFS has discretion over the management of federally regulated fisheries and is required to address bycatch for each federally regulated fishery. Therefore, while there are currently no fishery specific regulations in place that address Atlantic sturgeon bycatch, NMFS has the authority and discretion to implement such measures, and has previously used its authority to implement measures to reduce bycatch of protected species in federally regulated fisheries.

Some fisheries that occur within state waters are also known or suspected of taking Atlantic sturgeon as bycatch. Maine's regulations prohibit the use of purse, drag, and stop seines, and gill nets with greater than 87.5 mm stretched mesh (ASSRT, 2007). Fixed or anchored nets have to be tended continuously and hauled in and emptied every two hours (ASSRT, 2007). As described above, there has been no reported or observed bycatch of Atlantic sturgeon in the limited gill net fisheries for menhaden, alewives, blueback herring, sea herring, and mackerel in the estuarial complex of the Kennebec and Androscoggin Rivers (ASSRT, 2007). However, the level of observer coverage or reporting effort is unknown. There are also offshore fisheries (MA, ME and NH) for dogfish, cod, and striped bass, which are known to take sturgeon as bycatch, although mortality is relatively low (ASSRT, 2007).

6.2.4.2 DREDGING

As described above (in section 6.2.1.2), dredging is a stressor for the GOM DPS of Atlantic sturgeon. Currently, there are no specific regulations requiring action(s) to reduce effects of dredging on Atlantic sturgeon. However, NMFS has the authority and discretion to implement such measures or require modification of dredging activities if Atlantic sturgeon are listed under the ESA.

6.2.4.3 WATER QUALITY

Water quality for the GOM DPSs continues to be an issue likely affecting Atlantic sturgeon despite many positive actions (e.g., implementation of the Clean Water Act). Contaminants, including toxic metals, polychlorinated aromatic hydrocarbons (PAHs), organophosphate and organochlorine pesticides, polychlorinated biphenyls (PCBs), and other chlorinated hydrocarbon compounds can have substantial deleterious effects on aquatic life. Effects from these elements and compounds on fish include production of acute lesions, growth retardation and reproductive impairment (Cooper, 1989; Sinderman, 1994). The coastal environment is also impacted by coastal development and urbanization that result in storm water discharges, non-point source pollution, and erosion. 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 conditions.

Within the GOM DPS, water quality of its rivers and estuaries was severely degraded as a result of many activities including agricultural and forestry practices, industrialization, and land development. As late as 1994, the Androscoggin River was still considered one

of the most polluted rivers in the United States (EWG, 2005; Lichter et al., 2006). However, water quality in the Androscoggin River has been improving (Lichter et al., 2006). Likewise, the Penobscot River went through a period of very poor water quality (Hatch, 1971; Davies and Tsomides, 1999; Courtemanch et al., 2009). Pollutants such as mercury and dioxin persist in the river, but dioxin levels in fish are showing improvement with a drop from 7.6 parts per trillion in 1984 to less than 0.1 parts per trillion in 2004 (MEDEP, 2005). In addition, increasing numbers of shortnose sturgeon are being found in the river (G. Zydlewski, ME DMR, pers. comm., 2009). Shortnose sturgeon and Atlantic sturgeon are believed to have similar sensitivities to pollutants (Dwyer et al., 2000). Given the presence of Atlantic sturgeon in the Penobscot River and increasing numbers of shortnose sturgeon, it appears that water quality in the river is suitable for supporting Atlantic sturgeon spawning.

In 2003, the Merrimack River was the subject of a watershed assessment conducted by the Army Corps of Engineers and municipalities along the river (ASSRT, 2007). The study noted that the lower basin of the river was highly urbanized with high levels of point and non-point source pollution (USACOE, 2003; ASSRT, 2007). The study also noted impaired dissolved oxygen levels and pH levels (ASSRT, 2007). The Merrimack River watershed in New Hampshire was identified as a mercury hot spot within the region (Evers et al., 2007; ASSRT, 2007). However, despite these water quality assessment results, sampling studies indicate that the shortnose sturgeon population in the river has increased over the last decade. Likewise, anecdotal information indicates that more Atlantic sturgeon are using the lower river now than in years past.

Despite the persistence of contaminants in rivers and increasing land development, many rivers and watersheds within the range of the GOM DPS have demonstrated improvement in water quality (EPA, 2008). In general, the most recent EPA Coastal Condition Report identified that water quality was good to fair for waters north of Cape Cod (EPA, 2008).

6.2.5 OTHER NATURAL OR MANMADE FACTORS AFFECTING THE CONTINUED EXISTENCE OF STURGEON

6.2.5.1 IMPINGEMENT AND ENTRAINMENT

Along the range of Atlantic sturgeon, most, if not all, subpopulations encounter water withdrawal intakes for commercial uses, municipal water supply facilities, and agricultural irrigation intakes, and entrainment or impingement in such intakes is possible. Larval sturgeon have been documented in intake structures in several power plants on the Hudson River.

Though some rivers in the GOM DPS have multiple intake structures which remove millions of gallons of water a day during the spring and summer months, it is believed that the migratory behavior of larval sturgeon allows them to avoid many intake structures, since migration is active and occurs primarily in deep water (Kynard and Horgan 2002). Thus, this is considered to be a minor stressor to the GOM DPS.

6.2.5.2 VESSEL STRIKES

Vessel strikes of Atlantic sturgeon have been documented in particular areas. Atlantic sturgeon that occur in locations that support large ports and have relatively narrow waterways seem to be more prone to vessel strikes. Recreational vessels are known to have struck and killed a shortnose sturgeon in the Kennebec River (G. Wippelhauser, ME DMR, pers. comm., 2009). Therefore, it is likely that Atlantic sturgeon can also suffer mortal injuries when struck by recreational vessels. While this is a significant stressor to other DPSs, it is considered to be a minor stressor to the GOM DPS.

6.2.5.3 ARTIFICIAL PROPAGATION OF ATLANTIC STURGEON

Artificial propagation of Atlantic sturgeon for use in restoration of extirpated subpopulations or recovery of severely depleted wild subpopulations has the potential to be both a threat to the species and a potential tool for recovery. If conducted both in accordance with published guidelines and protocols (ASMFC, 2006) and as part of a planned recovery program, artificial propagation may increase population numbers. Artificial propagation for commercial purposes can also be beneficial or detrimental to the species. Providing a cultured product to the market can remove the need to legally and illegally harvest wild stocks. However, aquaculture can make enforcement of a ban on possession of wild stock more difficult by enabling the disguising of poached wild animals as captive-produced. Aquaculture can also introduce the potential for disease or genetic impacts to wild stocks. In order to minimize these potential threats, stock enhancement programs follow culture and stocking protocols approved by the ASMFC. Commercial aquaculture facilities are expected to maintain disease-free facilities and have safe guards in place to prevent escapement of sturgeon into the wild. While in at least one instance cultured Atlantic sturgeon have gone unaccounted from a commercial aquaculture facility in Florida, this is not currently considered to be a significant threat; thus, this is considered to be a minor stressor to the GOM DPS.

6.2.6 CONSERVATION AND RECOVERY ACTIONS REDUCING THREATS TO LISTED SPECIES

The SRT analyzed several conservation efforts potentially affecting Atlantic sturgeon throughout its range. The 1998 Amendment to the ASMFC Atlantic Sturgeon FMP strengthens conservation efforts by formalizing the closure of the directed fishery, and by banning possession of bycatch, eliminating any incentive to retain Atlantic sturgeon. However, bycatch is known to occur in several fisheries (ASMFC, 2007), and it is widely accepted that bycatch is underreported. With respect to its effectiveness, contrary to information available in 1998 when the Amendment was approved, Atlantic sturgeon bycatch mortality is a primary stressor affecting the recovery of Atlantic sturgeon. Therefore, there is considerable uncertainty that the Atlantic Sturgeon FMP will be effective in meeting its conservation goals.

Three states, Maine, New Hampshire, and Massachusetts, have applied for and have received funding under NMFS's Proactive Species Conservation Program grant. The project, entitled "Multi-State Collaborative to Develop and Implement a Conservation Program for Three Anadromous Fish Species of Concern in the Gulf of Maine," includes proposed research on Atlantic sturgeon within the Kennebec River. Specifically, project participants will: (1) use acoustic biotelemetry (i.e., deploy an array of acoustic receivers) to identify essential Atlantic sturgeon habitat in the Kennebec River/Androscoggin River complex; (2) conduct a mark-and-recapture study using PIT tags to estimate subpopulation size and external Carlin tags to investigate movements beyond the estuary; (3) investigate non-traditional population estimation methods because of spawning periodicity of adult sturgeon; and, (4) obtain tissue samples for sturgeon to conduct genetic analysis and determine stock structure. Also, researchers at Maine Department of Marine Resources, the University of Maine, and University of New England received funding under the NMFS Section 6 program to conduct additional research efforts on both Atlantic and shortnose sturgeon in the Gulf of Maine. The Atlantic sturgeon research component of the Multi-State Conservation Program and the Section 6 funded studies are both expected to provide new information on the GOM DPS of Atlantic sturgeon that could inform management decisions for future conservation efforts. However, neither effort specifically describes the threats to the Atlantic sturgeon subpopulations in question, nor do they address how those threats would be reduced or eliminated.

The Penobscot River Restoration Program (PRRP) is the result of many years of negotiations between Pennsylvania Power and Light (PPL), U.S. Department of the Interior (e.g., FWS, Bureau of Indian Affairs, National Park Service), Penobscot Indian Nation, the state of Maine (e.g., Maine State Planning Office, Inland Fisheries and Wildlife, MDMR), and several non-governmental organizations (Atlantic Salmon Federation, American Rivers, Trout Unlimited, Natural Resources Council of Maine, among others). If implemented, the PRRP would lead to the removal of the two lowermost mainstem dams on the Penobscot River (Veazie and Great Works) and would decommission the Howland Dam and construct a nature-like fishway around it. As a result, portions of historical habitat once available to Atlantic sturgeon of the GOM DPS will be reopened. While the necessary funding has been committed by the government and private donors to achieve the purchase of the dams, a significant amount of money still must be acquired in order for the parties to exercise the option to decommission and remove the Veazie and Great Works dams as well as to construct a nature like fishway for the Howland dam. Staffing, funding level, funding source and other resources necessary to fully implement the PRRP are not identified at this time.

6.3 FUTURE REASONABLY FORESEEABLE ACTIONS

Agriculture production, forestry activities, management of inland or marine fisheries, pollution, dam removal projects, development and/or construction (both terrestrial and in-water), and Canadian hydrokinetic operations are all actions that have the potential to result in effects in the action area. However, aside from Canadian hydrokinetic operations, persistent (legacy) pollution, and waterfront development all of these actions

and their associated effects on Atlantic sturgeon in the GOM DPS are addressed by the proposed action. If these programs do not comply with the protective regulations proposed by NMFS pursuant to 4(d) of the ESA, any take associated with these activities will not be authorized. Therefore, Canadian hydrokinetic operations, pollution, and waterfront development are the only actions that will be discussed.

Eight hydrokinetic projects located in the GOM DPS have received preliminary permits from FERC, and many more have been proposed. The Annapolis River (Nova Scotia, Canada) tidal power plant, built in 1982, was constructed as a demonstration site for marine STRAFLO turbines and consists of a rock-filled dam housing the turbine and sluice gates (M. Dadswell, Arcadia University, pers. comm., 2006). The negative impacts of the Annapolis tidal turbine on Atlantic sturgeon (150-200 cm TL) appear to be great, as the probability of lethal strike from the turbine ranges between 40-80% (M. Dadswell, Arcadia University, pers. comm., 2006; ASSRT, 2007), and at least three severed, gravid females have been observed below the power plant (Dadswell and Rulifson, 1994). In summer 2009, nine severed Atlantic sturgeon carcasses were documented on beaches near the Annapolis project (http://annapolisroyalheritage.blogspot.com/2009/09/atlantic-sturgeon.html).

Pollution from point and non-point sources has been a problem for rivers throughout the range of the GOM DPS. Specifically, rivers that have an increased level of urbanization and industrial development, such as the Penobscot and Kennebec, receive discharges from sewer treatment facilities and paper production facilities (metals, dioxin, dissolved solids, phenols, and hydrocarbons). Contaminants introduced into the water column or through the food chain eventually become associated with the benthos where bottom dwelling species are particularly vulnerable. Atlantic sturgeon are likely to continue to be impacted by water quality impairments throughout the action area.

Contaminants that are directly linked to industrial development along the waterfront are known to be present in rivers within the range of the DPS. PCBs, heavy metals, and waste associated with point source discharges and refineries are likely to be present in the future due to continued operation of industrial facilities. In addition, many contaminants such as PCBs remain present in the environment for prolonged periods of time and thus, would not disappear even if contaminant input were to decrease. Therefore, it is likely that Atlantic sturgeon will continue to be affected by contaminants in the action area in the future.

Industrialized waterfront development will continue to impact the water quality throughout the action area. Sewage treatment facilities, manufacturing plants, and other facilities present throughout the GOM DPS are likely to continue to operate. Excessive water turbidity, water temperature variations and increased shipping traffic are likely with continued future operation of these facilities. Activities affecting water quality must comply with the Clean Water Act, and in cases where listed species are present, ESA protections will be afforded as well.

Sources of contamination in the action area include atmospheric loading of pollutants, storm water runoff from development, groundwater discharges, and industrial development. Chemical contamination may have an effect on Atlantic sturgeon reproduction and survival.

Perhaps the most significant future project that will have positive effects is the Penobscot River Restoration Project (PRRP), as has been described previously. The PRRP would improve habitat accessibility for all diadromous species in the Penobscot River.

6.4 SUMMARY OF CUMULATIVE EFFECTS AND IMPACTS ON ATLANTIC STURGEON

Table 2. Impacts/Expected Impacts of Past, Present, and Reasonably Foreseeable Future Actions on the Affected Environment.

	BIOLOGICAL					PHYSICAL		SOCIOECONOMIC	
	GOM DPS Atlantic sturgeon	Other protected species	Diadromous species	Other fish species	Invertebrates	Habitat resources	EFH	Social	Industry
Migratory Impediments to Atlantic Sturgeon	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Positive
Commercial Harvest of Atlantic Sturgeon	Negative	Negative	Negative	Negative	No	No	No	Positive/ Negative	Positive/ Negative
Bycatch of Atlantic Sturgeon	Negative	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect	Negative	Negative
Recreational Harvest of Atlantic Sturgeon	Negative	Negative	Negative	Negative	No Apparent Effect	No Apparent Effect	No Apparent Effect	Negative	No Apparent Effect
Scientific or Educational Use of Atlantic Sturgeon	Positive/ Negative	Positive/ Negative	Positive/ Negative	Positive/ Negative	No Apparent Effect	No Apparent Effect	No Apparent Effect	Positive	No Apparent Effect
Disease and Predation of Atlantic Sturgeon	Negative	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect	Negative	No Apparent Effect
Inadequacy of Existing Regulatory Mechanisms for Atlantic Sturgeon	Negative	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect	Negative	Positive
Other Natural or Manmade Factors Affecting Atlantic Sturgeon	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect

The information below explains Table 2 and how each item in the first column relates to the impacts of past, present, and reasonably foreseeable future actions on the biological, physical and socioeconomic environments.

6.4.1 MIGRATORY IMPEDIMENTS TO ATLANTIC STURGEON

Biological Impacts

Migratory impediments to Atlantic sturgeon have had negative biological impacts on GOM DPS Atlantic sturgeon and the other biological components in the action area, including other protected species and other diadromous species. These negative impacts are associated with considerations, including, but not limited to, loss of spawning or feeding grounds. Invertebrates could be negatively affected due to habitat disturbances associated with dams and hydrokinetic/alternative energy development. For example, placing tidal turbines in habitat occupied by mussels could sufficiently disturb and alter substrate type to detrimentally affect invertebrate communities. Additionally, dams block or inhibit passage to fish species that may be hosts for parasitic larval stages of invertebrates (e.g., mussel glochidia), and dispersal of these invertebrates could be disrupted.

Physical Impacts

Migratory impediments to Atlantic sturgeon have had a negative effect on Habitat Resources and Essential Fish Habitat. Other fish species (e.g., Atlantic salmon) need unimpeded migratory access within rivers, and impoundments in riverine habitats can disrupt this migratory habitat. Additionally, development of hydrokinetic and other alternative energy forms (e.g., wind turbines or tidal turbines) in the marine environment could occur in Essential Fish Habitat for Federally managed species.

Socioeconomic Impacts

Migratory impediments to Atlantic sturgeon have had both positive and negative impacts on the socioeconomic environment. NMFS recognizes the social loss associated with depletion of Atlantic sturgeon stocks as a result of migratory impediments. This social loss is represented by the following definitions of value: 1) use value, also known as consumption value, this would represent the ability to use the Atlantic sturgeon resource once it is fully recovered; and 2) existence value, the willingness to pay to maintain the existence of a [natural] resource even though no future utilization is likely (Field 2008). This is reflected in society's preference to protect and recover endangered species. A depletion in stocks results in a loss of both of these types of value. Net economic positives have resulted for the industries involved with such impediments (dams, tidal turbines, etc) as the construction and operation of these impediments has been economically viable.

6.4.2 COMMERCIAL HARVEST OF ATLANTIC STURGEON

Biological Impacts

Commercial harvest of Atlantic sturgeon has had negative biological impacts on GOM DPS Atlantic sturgeon and the other biological components in the action area, including other protected species, and other diadromous species. There has been no apparent effect on invertebrates resulting from such harvest of Atlantic sturgeon. Historically, bycatch or even targeted take of other species (such as shortnose sturgeon) in commercial Atlantic sturgeon fisheries has resulted in negative impacts to the biological environment relating to these species.

Physical Impacts
Commercial harvest of Atlantic sturgeon has had no apparent effect on Habitat Resources and Essential Fish Habitat as most of these commercial fisheries were gillnet fisheries which do not have an adverse effect on habitat.

Socioeconomic Impacts
Commercial harvest of Atlantic sturgeon has had both positive and negative impacts on the socioeconomic environment. Over harvesting has significantly depleted stocks of Atlantic sturgeon, and NMFS recognizes the associated social loss (related to use and existence values as discussed above). Sturgeon harvest sustained a substantial industry throughout the early 1900s, clearly a positive for this industry (as well as for any related social benefits derived from such harvest). Such harvest ultimately resulted in a moratorium on Atlantic Sturgeon harvesting (ASFMC 1998), a negative impact for the industry.

6.4.3 BYCATH OF ATLANTIC STURGEON

Biological Impacts
Bycatch of Atlantic sturgeon has had negative biological impacts on GOM DPS Atlantic sturgeon. Bycatch of Atlantic sturgeon has had no apparent effect on the other biological components in the action area, including other protected species, other diadromous species and invertebrates.

Physical Impacts
Bycatch of Atlantic sturgeon has had no apparent effect on Habitat Resources and Essential Fish Habitat because Atlantic sturgeon bycatch predominantly occurs in sink gillnet fisheries which do not have an adverse effect on habitat.

Socioeconomic Impacts
Bycatch of Atlantic sturgeon has had a negative impact on the socioeconomic environment. In addition to the loss associated with a depletion in stocks of Atlantic sturgeon, bycatch of Atlantic sturgeon has resulted in a negative impact for fishing industries as they are required (as a result of the moratorium) to release those fish which have been taken as bycatch resulting in additional use of time resources to untangle fish.

6.4.4 RECREATIONAL HARVEST OF ATLANTIC STURGEON

Biological Impacts
While there was not an extensive directed recreational fishery for Atlantic sturgeon, any recreational harvest of this species likely has had negative biological impacts on GOM DPS Atlantic sturgeon because of extraction of the fish. It has also likely affected some of the other biological components in the action area, including other protected species, and other diadromous species, which may have been taken during recreational fishing of Atlantic sturgeon. Recreational harvest of Atlantic sturgeon has had no apparent effect on invertebrates.

Physical Impacts
Recreational harvest of Atlantic sturgeon has had no apparent effect on Habitat Resources and Essential Fish Habitat; because any recreational harvest most likely used hook and line, there has been no significant impact to the associated habitat.

Socioeconomic Impacts
Recreational harvest of Atlantic sturgeon has had both negative impacts and no apparent effects on the socioeconomic environment. Reduced stocks and a moratorium on harvesting Atlantic sturgeon have resulted in a social loss (loss of recreational fishing activity). There are no apparent effects on industry associated with recreational harvest of Atlantic sturgeon.

6.4.5 SCIENTIFIC OR EDUCATIONAL USE OF ATLANTIC STURGEON

Biological Impacts
Where scientific or educational uses of Atlantic sturgeon have contributed to the conservation of the species, there has been a positive impact to the biological environment. Protected species and other diadromous fishes may have also benefited as a result of scientific or educational use of Atlantic sturgeon. However, Atlantic sturgeon and the other biological components may have suffered negative impacts from improper or excessive scientific research or educational uses; however, this is believed to be limited in scope. There are no apparent effects of scientific or educational uses of Atlantic sturgeon on the invertebrate community.

Physical Impacts
Scientific or educational use of Atlantic sturgeon has had no apparent effect on Habitat Resources and Essential Fish Habitat as those methodologies used to collect fish for these purposes are not expected to impact associated habitats.

Socioeconomic Impacts
Where scientific or educational uses of Atlantic sturgeon have contributed to the conservation of the species, there has been a positive impact on the socioeconomic environment. Conservation of the species has a noted social (economic) value, which can be increased, enhanced and preserved by appropriate scientific research. There are no apparent effects on industry associated with scientific or educational uses of Atlantic sturgeon.

6.4.6 DISEASE AND PREDATION OF ATLANTIC STURGEON

Biological Impacts

Disease and predation of Atlantic sturgeon have had and may continue to have a negative impact on GOM DPS Atlantic sturgeon. There has been no apparent effect from disease and predation of Atlantic sturgeon on other biological components in the action area, including other protected species, other diadromous species and invertebrates.

Physical Impacts

Disease and predation of Atlantic sturgeon has had no apparent effect on Habitat Resources and Essential Fish Habitat, as they would not affect habitat.

Socioeconomic Impacts

In cases where disease and predation of Atlantic sturgeon have contributed or are continuing to contribute to the decline of the species, there has been a negative impact on the socioeconomic environment. The decline of the species represents a noted social (economic) loss. There are no apparent effects on industry associated with disease and predation of Atlantic sturgeon.

6.4.7 INADEQUACY OF EXISTING REGULATORY MECHANISMS FOR ATLANTIC STURGEON

Biological Impacts

The inadequacy of existing regulatory mechanisms for Atlantic sturgeon has had a negative impact on GOM DPS Atlantic sturgeon, as evidenced by the continued decline of the species despite current regulatory mechanisms. There has been no apparent effect from the inadequacy of existing regulatory mechanisms for Atlantic sturgeon on other biological components in the action area, including other protected species, other diadromous species and invertebrates.

Physical Impacts

The inadequacy of existing regulatory mechanisms for Atlantic sturgeon has had no apparent continuing effect on Habitat Resources and Essential Fish Habitat given that regulatory mechanisms for Atlantic sturgeon have no impact to habitat features, and that existing mechanisms governing water quality (e.g., Clean Water Act) are contributing to improve water quality in the GOM DPS.

Socioeconomic Impacts

Where the inadequacies of existing regulatory mechanisms for Atlantic sturgeon have contributed to the decline of the species, there has been a negative impact on the socioeconomic environment. The decline of the species represents a noted social (economic) loss. It is, however, possible that industry activities and the related socioeconomic environment have experienced positive impacts resulting from the inadequacy of existing regulatory mechanisms for Atlantic sturgeon. Examples would include situations where lack of regulation relating to Atlantic sturgeon has made such activities more economically viable.

6.4.8 OTHER NATURAL OR MANMADE FACTORS AFFECTING ATLANTIC STURGEON

Biological Impacts

Some natural or manmade factors affecting Atlantic sturgeon (e.g., impingement and entrainment, vessel strikes) are considered to have a negative impact on GOM Atlantic sturgeon, but given the infrequent occurrence of these types of events and activities, NMFS concludes that they are a minor stressor for the GOM DPS. The best available data indicates that other natural or manmade factors affecting Atlantic sturgeon have had no apparent effect on GOM DPS Atlantic sturgeon and the other biological components in the action area, including other protected species, other diadromous species and invertebrates.

Physical Impacts

Given the infrequent occurrence of these types of events and activities in the action area, it is concluded that there are no apparent effects on Habitat Resources and Essential Fish Habitat from other natural or manmade factors affecting Atlantic sturgeon.

Socioeconomic Impacts

Given the infrequent occurrence of these types of events and activities in the action area, it is concluded that there are no apparent affects on the socioeconomic environment from other natural or manmade factors affecting Atlantic sturgeon.

6.5 IMPACT OF THE PREFERRED ALTERNATIVE WHEN COMBINED WITH CUMULATIVE EFFECTS

Table 3. Cumulative Effects Summary of the Preferred Alternative.

	BIOLOGICAL					PHYSICAL		SOCIOECONOMIC	
	GOM DPS Atlantic sturgeon	Other protected species	Diadromous species	Other fish species	Invertebrates	Habitat resources	EFH	Social	Industry
Sum of Impacts from Past/Present/ Reasonably Foreseeable Future Actions	Negative	Negative	Negative	Negative	No Apparent Effect	Negative	Negative	Negative	Positive
Application of all prohibitions under Section 9(a)(1) of the ESA - Alternative 2	Positive	Positive	Positive	Positive	Positive	Positive	Positive	Positive	Negative
Scientific Research Exemption – Alternative 2	Positive	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect	Positive	No Apparent Effect
Salvage and Aid/ Resuscitation Exemption— Alternative 2	Positive	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect	No Apparent Effect	Positive	No Apparent Effect
Sum of Direct/ Indirect Effects of Alternative 2	Positive	Positive	Positive	Positive	Positive	No Apparent Effect	No Apparent Effect	Positive	No Apparent Effect

The information below explains Table 3 and how each item in the first column impacts the individual components of the biological, physical, and socioeconomic environment.

6.5.1 SUM OF IMPACTS FROM PAST/PRESENT/REASONABLY FORESEEABLE FUTURE ACTIONS

Biological Impacts

The sum of impacts from past, present, and reasonably foreseeable future actions relating to GOM Atlantic sturgeon have been negative for GOM Atlantic sturgeon, protected species likely to be affected, other fish species and diadromous species. Many of these impacts would not be exclusive to Atlantic sturgeon in the GOM DPS, but would also impact other biological components of the environment. There has been no apparent effect to invertebrates. Invertebrates would not be impacted by activities that directly capture Atlantic sturgeon or other fishes, nor would they benefit from scientific research conducted on Atlantic sturgeon. While invertebrates could be impacted by dams and other migratory impediments to Atlantic sturgeon and other fishes, impacts from past, present, or reasonably foreseeable future actions, in general, have no effect on invertebrates.

Physical Impacts

The sum of impacts from past, present, and reasonably foreseeable future actions relating to GOM Atlantic sturgeon have negative effects on Habitat Resources and Essential Fish

Habitat, because some activities (e.g., dredging, dam operation) could have impacts to habitat.

Socioeconomic Impacts

The sum of impacts from past, present and reasonably foreseeable future actions relating to GOM Atlantic sturgeon can be considered both negative and positive. Where past, present and reasonably foreseeable future actions relating to Atlantic sturgeon have contributed to the decline of the species, there has been a negative impact on the socioeconomic environment. The decline of the species represents a noted social (economic) loss. Where such actions have benefited industry, there has been a positive economic impact on the socioeconomic environment (e.g., operation of dams or dredging activities to optimize economic conditions, without respect to impacts on Atlantic sturgeon).

6.5.2 CUMULATIVE IMPACTS OF THE PREFERRED ALTERNATIVE ON THE BIOLOGICAL ENVIRONMENT

Affected Species: GOM DPS of Atlantic Sturgeon

The application of all prohibitions under Section 9(a)(1) of the ESA for GOM Atlantic sturgeon would have a positive impact on the target species, as will the exemptions for scientific research and salvage/aid/resuscitation, described in Section 3.4. These prohibitions and exemptions would be put in place specifically for the protection and conservation of GOM DPS Atlantic sturgeon.

Protected Species Likely to Be Affected

The application of all prohibitions under Section 9(a)(1) of the ESA for GOM Atlantic sturgeon would have a positive impact on other protected species that overlap in range with the affected area of the Preferred Alternative (mainly Atlantic salmon and shortnose sturgeon). The exemptions for scientific research and salvage/aid/resuscitation, described in Section 3.4, would not be expected to detrimentally impact other ESA listed species, as conductance of exempted activities targeting Atlantic sturgeon would still need to abide by the take prohibitions in place for Atlantic salmon and shortnose sturgeon.

Diadromous Species

The application of all prohibitions under Section 9(a)(1) of the ESA for GOM Atlantic sturgeon would have a positive impact on diadromous species that overlap in range with the affected area of the Preferred Alternative, since protections aimed at the target species could have ancillary benefits to diadromous species with similar ranges and habitat use. The exemptions for scientific research and salvage/aid/resuscitation, described in Section 3.4, would not be expected to detrimentally impact diadromous species, as conductance of exempted activities targeting Atlantic sturgeon would need to follow NMFS-approved protocols, which would likely be safe for other diadromous species.

Other Fish Species

The application of all prohibitions under Section 9(a)(1) of the ESA for GOM Atlantic sturgeon would have a positive impact on other fish species that overlap in range with the

affected area of the Preferred Alternative, since protections aimed at the target species could have ancillary benefits to other fish species with similar ranges and habitat use. The exemptions for scientific research and salvage/aid/resuscitation, described in Section 3.4, would not be expected to detrimentally impact other fish species, as conductance of exempted activities targeting Atlantic sturgeon would need to follow NMFS-approved protocols, which would likely be safe for other fish species as well.

Invertebrates

The application of all prohibitions under Section 9(a)(1) of the ESA for GOM Atlantic sturgeon would have a positive impact on invertebrate species found in the affected area of the Preferred Alternative, since protections aimed at the target species could have ancillary benefits to invertebrate species, especially for projects that have the potential to both take GOM DPS Atlantic sturgeon and disturb benthic habitats or impair water quality (e.g., dredging, in-water construction). The exemptions for scientific research and salvage/aid/resuscitation, described in Section 3.4, would not be expected to detrimentally impact invertebrate species, as they are not likely to be taken during scientific research activities targeting GOM DPs Atlantic sturgeon.

6.5.3 CUMULATIVE IMPACTS OF THE PREFERRED ALTERNATIVE ON THE PHYSICAL ENVIRONMENT

Habitat Resources

The application of all of the ESA Section 9(a)(1) prohibitions for GOM Atlantic sturgeon would have a positive impact on habitat resources in the affected area of the Preferred Alternative, since ESA protections for the target species could cause the modification of projects that have the potential to negatively impact habitat resources (e.g., dredging, in-water construction). The exemptions for scientific research and salvage/aid/resuscitation, described in Section 3.4, would not be expected to detrimentally impact habitat resources, as scientific research activities targeting GOM DPs Atlantic sturgeon are unlikely to have any effect on habitat.

Essential Fish Habitat

The application of all of the ESA Section 9(a)(1) prohibitions for GOM Atlantic sturgeon would have a positive impact on EFH in the affected area of the Preferred Alternative, since ESA protections for the target species could potentially cause the modification of projects that would negatively impact EFH (e.g., dredging, in-water construction). The exemptions for scientific research and salvage/aid/resuscitation, described in Section 3.4, would not be expected to detrimentally impact EFH, as scientific research activities targeting GOM DPS Atlantic sturgeon are unlikely to have any effect on habitat.

6.5.4 CUMULATIVE IMPACTS OF THE PREFERRED ALTERNATIVE ON THE SOCIOECONOMIC ENVIRONMENT

The application of all of the ESA Section 9(a)(1) prohibitions for GOM Atlantic sturgeon would have mixed effects (i.e., some positive, some negative) on the socioeconomic environment in the affected area of the Preferred Alternative. Negative economic impacts could occur if ESA protections for the target species caused the modification of

projects that would increase the costs of conducting the activity (e.g., requiring dredged materials to be transported a greater distance to protect GOM DPS Atlantic sturgeon), or if the scope of a project had to be limited to protect GOM DPS Atlantic sturgeon (i.e., maximum economic gains were not able to be realized). Positive effects to the social environment would result if the ESA protections afforded GOM DPS Atlantic sturgeon resulted in the recovery of the species. This could cause an increase in the use value and the existence value of the species (Section 4.4). The exemptions for scientific research and salvage/aid/resuscitation, described in Section 3.4, would be expected to have a positive socioeconomic impact, as the added cost to NMFS's permitting office would be avoided under this exemption.

6.5.5 SUM OF DIRECT/INDIRECT EFFECTS OF ALTERNATIVE 2

Biological Impacts

The sum of the direct/indirect effects of Alternative 2 will have a positive impact on Atlantic sturgeon in the GOM DPS, other protected species, diadromous species, other fish species, and invertebrates in the affected area. This is because extension of the take prohibitions will provide additional protections to other species and the exemptions will provide a streamlined process to allow important research activities, as well as salvage and aid/resuscitation activities, to continue, which will mutually benefit Atlantic and shortnose sturgeon.

Physical Impacts

The sum of the direct/indirect effects of Alternative 2 will have no apparent effect on Habitat Resources and Essential Fish Habitat, as neither the ESA Section 9(a)(1) prohibitions nor the exemptions will affect habitat features. As discussed above, there are some potential benefits to habitat that could be realized is ESA protections are provided to GOM DPS Atlantic sturgeon under Alternative 2. However, because of overlap in habitat use between GOM DPS Atlantic sturgeon and ESA listed Atlantic salmon and shortnose sturgeon, any additional modifications to projects made specifically due to a 4(d) rule promulgated for GOM DPS Atlantic sturgeon would likely be minimal.

Socioeconomic Impacts

The sum of direct/indirect effects of Alternative 2 will have a positive impact on the socioeconomic environment in that the application of the take prohibitions under Section 9(a)(1) of the ESA will contribute to the conservation of the species. Conservation of the species has a noted social (economic) value. In addition, the included scientific research exemption will insure that research conducted will contribute to the conservation of the species, thus creating an additional positive impact on the socioeconomic environment. Finally, the scientific research exemption will create an economic benefit by resulting in time and resource savings for NMFS staff and Atlantic sturgeon researchers. The salvage and aid/resuscitation exemption has a conservation benefit, as valuable information, which can contribute to the conservation of the species, can be learned from salvaged sturgeon.

The application of take prohibitions under Section 9(a)(1) of the ESA may have a negative impact on industry related activities, but the impact is not thought to be significant given current (and reasonably expected future) take prohibitions for other ESA-listed species (e.g., Atlantic salmon and shortnose sturgeon) that occur in the affected area. Many industry activities needing to be modified to avoid take of GOM Atlantic sturgeon would need to be modified in absence of the application of Section 9(a)(1) take prohibitions because of their occurrence in areas populated by other ESA listed species.

7.0 APPLICABLE LAWS AND REGULATIONS

Endangered Species Act
The ESA imposes on all Federal agencies a duty to ensure their actions do not jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of the critical habitat of such species. To effectuate the ESA's requirement to avoid jeopardy and adverse modification, the ESA requires the "action" agency to consult with an "expert" agency to evaluate the effects a proposed agency action may have on a listed species. If the action agency determines through preparation of a biological assessment or informal consultation that the preferred alternative is "not likely to adversely affect" listed species or critical habitat, formal consultation is not required, as long as the expert agency concurs.

A formal consultation was conducted to evaluate the potential effects of this action on ESA-listed species, as required under Section 7 of the ESA. In the biological opinion NMFS determined that the proposed action does not affect sea turtles and marine mammals, is not likely to adversely affect shortnose sturgeon or Atlantic salmon, and will not jeopardize the continued existence of anadromous Atlantic sturgeon in the GOM DPS.

Marine Mammal Protection Act
Under the MMPA, Federal responsibility for protecting and conserving marine mammals is vested with the Departments of Commerce (NMFS) and Interior (USFWS). The primary management objective of the MMPA is to maintain the health and stability of the marine ecosystem, with a goal of obtaining an optimum sustainable population of marine mammals within the carrying capacity of the habitat. The MMPA is intended to work in cooperation with the applicable provisions of the ESA. The proposed 4(d) protective regulations for Atlantic sturgeon in the GOM DPS will not affect marine mammals.

Paperwork Reduction Act
This proposed rule does not contain collection-of-information requirements subject to the Paperwork Reduction Act (PRA).

Magnuson-Stevens Fishery Conservation and Management Act including Essential Fish Habitat
These nearshore and offshore waters represent Essential Fish Habitat (EFH) for numerous fish species. These species include American plaice (*Hippoglossoides platessoides*), Atlantic halibut (*Hippoglossus hippoglossus*), Atlantic herring (*Clupea harengus*), Atlantic salmon (*Salmo salar*), Atlantic sea scallop (*Placopecten magellanicus*), haddock (*Melanogrammus aeglefinus*), monkfish (goose-fish) (*Lophius americanus*), ocean pout (*Macrozoarces americanus*), offshore hake (*Merluccius albidus*), pollock (*Pollachius virens*), red hake (*Urophycis chuss*), redfish (*Sebastes* spp.), white hake (*Urophycis tenuis*), whiting (silver hake) (*Merluccius bilinearis*), window-pane flounder (*Scophthalmus aquosus*), winter flounder (*Pleuronectes americanus*), witch flounder (*Glyptocephalus cynoglossus*), yellowtail flounder (*Pleuronectes*

ferruginea), seven skate species (barndoor [*Dipturus laevis*], clearnose [*Raja eglanteria*], little [*Leucoraja erinacea*], rosette *[Leucoraja garmani*], smooth [*Malacoraja senta*], thorny [*Amblyraja radiata*], and winter [*Leucoraja ocellata*] skates), deep-sea red crab (*Chaceon quinquedens*), Atlantic mackerel (*Scomber scombrus*), black sea bass (*Centropristis striata*), bluefish (*Pomatomus saltatrix*), butterfish (*Peprilus triacanthus*), *Illex* squid (*Illex illecebrosus*), *Loligo* squid (*Loligo pealei*), ocean quahog (*Artica islandica*), scup (*Stenotomus chrysops*), spiny dogfish (*Squalus acanthias*), summer flounder (*Paralichthys dentatus*), surf clam (*Spisula solidissima*), tilefish (*Lopholatilus chamaeleonticeps*), albacore tuna (*Thunnus alalunga*), Atlantic angel shark (*Squantina dumerili*), Atlantic bigeye tuna (*Thunnus obesus*), Atlantic bluefin tuna (*Thunnus thynnus*), Atlantic sailfish (*Istiophorus platypterus*) Atlantic sharpnose (*Rhizoprionodon terraenovae*), Atlantic skipjack (*Katsuwonus pelamis*), Atlantic swordfish (*Xiphias gladius*), Atlantic yellowfin tuna (*Thunnus albacares*), basking shark (*Cetorhinus maximus*), blacktip shark (*Carcharhinus limbatus*), bonnethead shark (*Sphyrna tiburo*) lemon shark (*Negaprion brevirostris*), blue marlin (*Makaira nigricans*), nurse shark (*Ginglymostoma cirratum*), blacknose (*Carcharhinus acronotus*), blue shark (*Prionace glauca*), bull shark (*Carcharhinus leucas*), dusky shark (*Carcharhinus obscurus*), finetooth (*Carcharhinus isodon*), longfin mako (*Isurus paucus*), porbeagle (*Lamna nasus*), sand tiger shark (*Carcharias taurus*), sandbar shark (*Carcharhinus plumbeus*), scalloped hammerhead (*Sphyrna lewini*), shortfin mako (*Isurus oxyrinchus*), silky shark (*Carcharhinus falciformis*), spinner shark (*Carcharhinus brevipinna*), thresher shark (*Alopias vulpinus*), tiger shark (*Galeocerdo cuvieri*), white marlin (*Tetrapturus albidus*), white shark (*Carcharodon carcharias*), red drum (*Sciaenops ocellatus*), Spanish mackerel (*Scomberomorus maculatus*), cobia (*Rachycentron canadum*), king mackerel (*Scomberomorus cavalla*), golden crab (*Chaceon fenneri*). The Southeast Atlantic Fishery Management Council has adopted EFH in the following Fishery Management Plans which also overlap with the GOM DPS of Atlantic sturgeon: coral and coral reef, coastal migratory pelagic, snapper/grouper, shrimp, spiny lobster, golden crab, dolphin/wahoo. EFH ranges were obtained from the NMFS Habitat Conservation Division's Web site at http://www.nmfs.noaa.gov/habitat/habitatprotection/efh/, the Final Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks (http://www.nmfs.noaa.gov/sfa/hms/FMP/TunSwoShk_FMP.htm), and GIS layers were obtained for SAFMC FMP species from the Florida Fish and Wildlife Conservation Commission (http://ocean.floridamarine.org/efh_coral/ims/Description_Layers.htm#efh). Habitat Area of Particular Concern (HAPC) has also been designated for Atlantic salmon, sandbar shark, snapper/grouper species, coastal migratory pelagic species, coral species, shrimp species, and dolphin/wahoo species.

Pursuant to the determination made in Section 5.4.2 that EFH will not be affected by the Preferred Alternative, no EFH consultation was deemed necessary.

Information Quality Act

The Information Quality Act directed the Office of Management and Budget to issue government wide guidelines that "provide policy and procedural guidance to Federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by Federal agencies." Under

the NOAA guidelines, this action is considered a Natural Resource Plan. It is a composite of several types of information from a variety of sources. Compliance of this document with NOAA guidelines is evaluated below.

- **Utility:** The information disseminated is intended to describe a management action and the impacts of that action. The information is intended to be useful to: 1) state and Federal agencies, non-governmental organizations, industry groups and other interested parties so they can understand the management action, its effects, and its justification; and 2) managers and policy makers so they can choose an alternative for implementation.

- **Integrity:** No confidential data was used in the analysis of the impacts associated with this document. All information considered in this document and used to analyze the proposed action, is considered public information.

- **Objectivity:** The NOAA Information Quality Guidelines standards for Natural Resource Plans state that plans be presented in an accurate, clear, complete, and unbiased manner. NMFS strives to draft and present proposed management measures in a clear and easily understandable manner with detailed descriptions that explain the decision making process and the implications of management measures on natural resources in the Gulf of Maine and the public. Although the alternatives considered in this document rely upon scientific information, analyses, and conclusions, clear distinctions are drawn between policy choices and the supporting science. In addition, the scientific information relied upon in the development, drafting, and publication of this EA was properly cited, and a list of references was provided. Finally, this document was reviewed by a variety of biologists, policy analysts, and attorneys from NMFS' Northeast Regional Office.

Administrative Procedure Act

The Federal Administrative Procedure Act (APA) establishes procedural requirements applicable to informal rulemaking by Federal agencies. The purpose of the APA is to ensure public access to the Federal rulemaking process and to give the public notice and an opportunity to comment before the agency promulgates new regulations. NMFS is not requesting a waiver from the requirements of the APA for notice and comment rulemaking.

Coastal Zone Management Act

Section 307(c)(1) of the Federal Coastal Zone Management Act of 1972 requires that all Federal activities that affect the any land or water use or natural resource of the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. NMFS has determined that this action is consistent to the maximum extent practicable with the enforceable policies of approved Coastal Zone Management Programs of Maine, New Hampshire, and Massachusetts. Letters documenting NMFS' determination, along with the draft environmental assessment and proposed rule, were sent to the

coastal zone management program offices in the affected states. The specific state contacts and a copy of the letters are available upon request.

Executive Order (E.O.) 13132 Federalism
E.O. 13132, otherwise known as the Federalism E.O., was signed by President Clinton on August 4, 1999, and published in the Federal Register on August 10, 1999 (64 FR 43255). This E.O. is intended to guide Federal agencies in the formulation and implementation of "policies that have Federal implications." Such policies are regulations, legislative comments or proposed legislation, and other policy statements or actions that have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government. EO 13132 requires Federal agencies to have a process to ensure meaningful and timely input by state and local officials in the development of regulatory policies that have Federalism implications. A Federal summary impact statement is also required for rules that have Federalism implications.

Pursuant to the Executive Order on Federalism, E.O. 13132, the Assistant Secretary for Legislative and Intergovernmental Affairs will provide notice of the proposed action and request comments from the appropriate official(s) in Maine, New Hampshire, and Massachusetts.

E.O. 13084-Consultation and Coordination with Indian Tribal Governments
E.O. 13084 requires that, if we issue a regulation that significantly or uniquely affects the communities of Indian tribal governments and imposes substantial direct compliance costs on those communities, we consult with those governments or the Federal government must provide the funds necessary to pay the direct compliance costs incurred by the tribal governments. This proposed rule does not impose substantial direct compliance costs on the communities of Indian tribal governments. Accordingly, the requirements of section 3(b) of E.O. 13084 do not apply to this proposed rule. Nonetheless, we intend to inform potentially affected tribal governments and to solicit their input on the proposed rule. We will continue to give careful consideration to all written and oral comments received on the proposed rule and will continue our coordination and discussions with interested tribes as we move forward toward a final rule.

E.O. 12866 Regulatory Planning and Review
The Regulatory Impact Review (RIR) is intended to assist NMFS decision making by selecting the regulatory action that maximizes net benefits to the Nation.

Framework for Analysis

Net National benefit is measured through economic surpluses, consumer and producer surplus.

Regulatory Flexibility Act (RFA)

The regulatory flexibility act (5 U.S.C. 601 et seq.) is designed to assess the impacts various regulatory alternatives would have on small entities, including small businesses, and to determine ways to minimize those impacts. This analysis is conducted to primarily determine whether the proposed action would have a "significant economic impact on a substantial number of small entities." In addition to analyses conducted for the RIR, the regulatory flexibility analysis provides: 1) a description of the reasons why action by the agency is being considered; 2) a succinct statement of the objectives of, and legal basis for, the proposed rule; 3) a description and where feasible, an estimate of the number of small entities to which the proposed rule applies; 4) a description of impacts of the proposed rule and alternatives; 5) a description of the projected reporting, record-keeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirements of the report or record; and 6) an identification, to the extent practical, of all relevant Federal rules that may duplicate, overlap, or conflict with the proposed rule (5 U.S.C. 601 et seq.).

Description of the reasons why action by the agency is being considered: The purpose and need of the action are set forth in section 2.0 of this document and are included herein by reference.

Statement of the objectives of, and legal basis for, the proposed rule: The Endangered Species Act provides the legal basis for this proposed rule. The primary objective of this proposed rule is to establish protective regulations for threatened anadromous Atlantic sturgeon in the GOM DPS. In the case of threatened species, Section 4(d) of the ESA leaves it to the Secretary's discretion whether and to what extent to extend the statutory 9(a) "take" prohibitions (including harass, harm, pursue, hunt, shoot, wound, kill, trap, or collect; or to attempt any of these) and directs the agency to issue regulations it considers necessary and advisable for the conservation of the species. The 4(d) protective regulations may prohibit, with respect to threatened species, some or all of the acts which Section 9(a) of the ESA prohibits with respect to endangered species.

NMFS has identified two programs for which it may not be necessary and advisable to impose take prohibitions for Atlantic sturgeon in the GOM DPS, because they contribute to conserving the GOM DPS or are governed by a program that adequately limits impacts on the GOM DPS. The programs identified by the Secretary for which limits will be applied to the application of the Section 9(a)(1) take prohibitions are scientific research conducted in accordance with a NMFS-approved research techniques document, and salvage and aid/resuscitation activities carried out by NMFS designees.

Description and estimate of the number of small entities to which the proposed rule will apply:
A small entity includes small businesses, small organizations, and small governmental jurisdictions. The SBA considers a small business in the commercial fishing activity as a firm with receipts of up to 3 million dollar annually. For processors, small business is one with 500 or fewer employees; the wholesale industry size standard is 100 or fewer employees. The Regulatory Flexibility Analysis states that a "small organization" is any non-profit enterprise that is independently owned and operated and not dominant in its

field, and a "small governmental jurisdiction" is any government of a district with a population of less than 50,000.

The proposed regulations and the exemptions apply to activities conducted on Atlantic sturgeon in riverine portions of the GOM DPS. Research is typically conducted by Federal and state biologists, scientists from academia, as well as non-governmental organizations. Research activities could include collection, tagging, sampling or other activities as described in the Atlantic Sturgeon Research Techniques document. Because of the overlap in range with Endangered Atlantic sturgeon, the only impact to small businesses would be that research conducted by small businesses could take place without a permit if in the riverine portion of the GOM DPS, and if in accordance with a NMFS-approved research techniques document.

Description of impacts of the proposed rule and alternatives: The impact of the proposed rule and alternatives is analyzed and described in sections 5.1.4 (PA), 5.2 (No Action), 5.3.4 (Alternative 1) and 6.3. These sections are incorporated by reference herein.

Identification of all relevant Federal rules that may duplicate, overlap, or conflict with the proposed rule: No duplicative, overlapping, or conflicting Federal rules have been identified.

Substantial Number of Small Entities Criterion: A "Substantial number of small entities is defined as more than 20 percent of those small entities affected by the regulation, out of the total universe of small entities in the industry or, if appropriate, industry segment. In determining the scope or universe of the entities to be considered in making the significance determination, a general rule is to consider only those entities that can reasonably be expected to be directly or indirectly impacted by the proposed action." (5 U.S.C. 601 et seq.). In looking at the definition of "substantial number," the proposed regulations for scientific research do not affect a substantial number of small entities.

Significant Economic Impact Criterion:
The outcome of "significant economic impact" can be determined by the criteria outlined in the RFA (5 U.S.C. 601 et seq.). The proposed regulations affect small entities. The proposed regulations will not have a significant economic impact on the small entities affected.

Conclusion:
NMFS evaluated the criteria in the Regulatory Flexibility Act (RFA) to determine if the proposed regulations will have a "significant economic impact" on a "substantial number of small entities." NMFS has determined that the proposed regulations will not have a significant economic impact on a substantial number of small entities. Given that the proposed regulations will not have a significant economic impact on a substantial number of small entities, no discussion of how the alternatives will minimize economic impacts is necessary. This analysis is part of the Regulatory Impact Review (RIR), no Initial Regulatory Flexibility Analysis (IRFA) is required.

8.0 LIST OF PREPARERS

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