UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
PROGRAM PLANNING AND INTEGRATION
Silver Spring, Maryland 20910

MAY 20 2011

To All Interested Government Agencies and Public Groups:

Under the National Environmental Policy Act (NEPA), an environmental review has been performed on the following action.

TITLE: Environmental Assessment on the Effects of the Issuance of Scientific Research Permit File No. 15614 to Conduct Research on Shortnose Sturgeon in Connecticut Waters

LOCATION: Connecticut waters, including the Connecticut, Thames, and Housatonic Rivers

SUMMARY: The National Marine Fisheries Service (NMFS) proposes to issue a scientific research permit for takes of listed shortnose sturgeon under the authority of the Endangered Species Act. The purpose of File No. 15614 is to monitor shortnose sturgeon populations in Connecticut waters by examining habitat utilization patterns, dietary preferences, and ageing. The preferred alternative is not expected to have more than short-term effects on shortnose sturgeon and will not significantly impact the quality of the human environment.

RESPONSIBLE OFFICIAL:
James H. Lecky
Director, Office of Protected Resources
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
1315 East-West Highway, Room 13821
Silver Spring, MD 20910
(301) 713-2332

The environmental review process led us to conclude that this action will not have a significant effect on the human environment. Therefore, an environmental impact statement will not be prepared. A copy of the finding of no significant impact (FONSI) including the supporting environmental assessment (EA) is enclosed for your information.

Although NOAA is not soliciting comments on this completed EA/FONSI we will consider any comments submitted that would assist us in preparing future NEPA documents. Please submit any written comments to the responsible official named above.

Sincerely,

Paul N. Doremus, Ph.D.
NOAA NEPA Coordinator

Enclosure

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

Environmental Assessment
ON THE EFFECTS OF THE ISSUANCE OF SCIENTIFIC RESEARCH PERMIT FILE NO. 15614 TO CONDUCT RESEARCH ON SHORTNOSE STURGEON IN CONNECTICUT WATERS

{May 2011}

Lead Agency: USDC National Oceanic and Atmospheric Administration
National Marine Fisheries Service, Office of Protected Resources

Responsible Official: James H. Lecky, Director, Office of Protected Resources

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Location: Connecticut, Thames and Housatonic Rivers, CT

Abstract: The National Marine Fisheries Service (NMFS) proposes to issue a scientific research permit for scientific research on shortnose sturgeon. The permit would be valid for five years from the date of issuance and would authorize the permit holder to monitor the status of shortnose sturgeon in Connecticut waters. Annually, 450 fish would be captured via gill net and trawl, measured; weighed; PIT tagged; have a pectoral fin ray removed; and released in the Connecticut River between river kilometers 0 and 140. A subset of 100 would also be gastric lavaged, and a subset of 25 would also have a sonic/radio tag attached. Additionally, 50 fish annually would be captured via gill net and trawl; measured; weighed; PIT tagged; fin ray clipped; and released in either the Thames or Housatonic Rivers. Under NOAA Administrative Order 216-6, NMFS issuance of scientific research permits is generally categorically excluded from the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 et seq.) requirements to prepare an environmental assessment (EA) or environmental impact statement (EIS). However, for this permit NMFS prepared an EA to facilitate a more thorough assessment of potential impacts on endangered shortnose sturgeon. This EA evaluates the potential impacts to the human environment from issuance of the proposed permit.

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CHAPTER 1 PURPOSE OF AND NEED FOR ACTION

1.1 DESCRIPTION OF ACTION

In response to receipt of a request from Tom Savoy, Connecticut Department of Environmental Protection, Marine Fisheries (File No. 15614), NMFS proposes to issue a scientific research permit that authorizes "takes"[1] pursuant to the Endangered Species Act of 1973 (ESA; 16 U.S.C. 1531 *et seq.*).

1.1.1 Purpose and Need

The primary purpose of the permit is to provide an exemption from the take prohibitions under the ESA to allow "takes" for bona fide scientific research. The need for issuance of the permit is related to NMFS's mandates under the ESA. Specifically, NMFS has a responsibility to implement the ESA to protect, conserve, and recover marine mammals and threatened and endangered species under its jurisdiction. The ESA prohibit takes of threatened and endangered species, with only a few very specific exceptions, including for scientific research and enhancement purposes. Permit issuance criteria require that a research activity are consistent with the purposes and polices of federal law and will not have a significant adverse impact on the species or stock.

1.1.2 Research Objectives

The objectives of the aforementioned scientific research would be to gather information to help inform conservation management decisions to recover shortnose sturgeon in Connecticut waters and to continue to monitor the status of the stock. In this effort, researchers would collect biological and life history information on shortnose sturgeon (*Acipenser brevirostrum*) in Connecticut waters.

1.2 OTHER EA/EIS THAT INFLUENCE SCOPE OF THIS EA

The most relevant EA for File No. 15614 was prepared by NMFS in May 2006 entitled *"Environmental Assessment of the Issuance of Scientific Research Permit to Dr. James P. Kirk, U.S. Army Engineer Research and Development Center (File 1489), Mr. Douglas W. Cooke, South Carolina Department of Natural Resources (File 1505), and Mr. Thomas Savoy, Connecticut Department of Environmental Protection (File 1516)"* issued to analyze effects on the environment for a similar research permit conducted on shortnose sturgeon in Connecticut waters. This EA evaluated the effects of research capturing up to 500 adult or juvenile shortnose sturgeon, plus 300 early life stage fish, in the Connecticut, Thames, and Housatonic Rivers, focusing on providing critical data on stock status and movement of shortnose sturgeon in three major Connecticut rivers. A Finding of No Significant Impact (FONSI) was signed May 15, 2006, concluding the research activities analyzed and the issuance of the permit would not significantly impact the quality of the human environment, including the target species, shortnose sturgeon, or any of the non-target species.

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1 Under the MMPA, "take" is defined as to "harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect." [16 U.S.C. 1362(18)(A)] The ESA defines "take" as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." The term "harm" is further defined by regulations (50 CFR §222.102) as "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns including breeding, spawning, rearing, migrating, feeding, or sheltering."

1.3 SCOPING SUMMARY

The purpose of scoping is to identify the issues to be addressed and the significant issues related to the proposed action, as well as identify and eliminate from detailed study the issues that are not significant or that have been covered by prior environmental review. An additional purpose of the scoping process is to identify the concerns of the affected public and Federal agencies, states, and Indian tribes. CEQ regulations implementing the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 et seq.) do not require that a draft EA be made available for public comment as part of the scoping process. A Notice of Receipt of the application was published in the *Federal Register*, announcing the availability for public comment (75 FR 78974, December 17, 2010). No public comments were received. All agency comments were addressed and responses were included in the decision memos for the permit.

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

This section summarizes federal, state, and local permits, licenses, approvals, and consultation requirements necessary to implement the proposed action, as well as who is responsible for obtaining them. Even when it is the applicant's responsibility to obtain such permissions, NMFS is obligated under NEPA to ascertain whether the applicant is seeking other federal, state, or local approvals for their action.

1.4.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA) was enacted in 1969 and is applicable to all "major" federal actions significantly affecting the quality of the human environment. A major federal action is an activity that is fully or partially funded, regulated, conducted, or approved by a federal agency. NMFS issuance of permits for research represents approval and regulation of activities. While NEPA does not dictate substantive requirements for permits, licenses, etc., it requires consideration of environmental issues in federal agency planning and decision making. The procedural provisions outlining federal agency responsibilities under NEPA are provided in the Council on Environmental Quality's implementing regulations (40 CFR Parts 1500-1508).

NMFS has, through NOAA Administrative Order (NAO) 216-6, established agency procedures for complying with NEPA and the implementing regulations issued by the Council on Environmental Quality. NAO 216-6 specifies that issuance of scientific research permits under the MMPA and ESA is among a category of actions that are generally exempted (categorically excluded) from further environmental review, except under extraordinary circumstances. When a proposed action that would otherwise be categorically excluded is the subject of public controversy based on potential environmental consequences, has uncertain environmental impacts or unknown risks, establishes a precedent or decision in principle about future proposals, may result in cumulatively significant impacts, or may have an adverse effect upon endangered or threatened species or their habitats, preparation of an EA or EIS is required.

While issuance of scientific research permits is typically subject to a categorical exclusion, as described in NAO 216-6, NMFS is preparing an EA for this action to provide a more detailed analysis of effects to ESA-listed species. This draft Environmental Assessment is prepared in accordance with NEPA, its implementing regulations, and NOAA 216-6.

1.4.2 Endangered Species Act

Section 9 of the ESA, as amended, and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption such as by a permit. Permits to take ESA-listed species for scientific purposes, or for the purpose of enhancing the propagation or survival of the species, may be granted pursuant to Section 10(a)(1)(A) of the ESA.

NMFS has promulgated regulations to implement the permit provisions of the ESA (50 CFR Part 222) and has produced OMB-approved application instructions that prescribe the procedures necessary to apply for permits. All applicants must comply with these regulations and application instructions in addition to the provisions of the ESA.

Section 10(d) of the ESA stipulates that, for NMFS to issue permits under section 10(a)(1)(A) of the ESA, the Agency must find that the permit: was applied for in good faith; if granted and exercised will not operate to the disadvantage of the species; and will be consistent with the purposes and policy set forth in Section 2 of the ESA.

Section 2 of the ESA sets forth the purposes and policy of the Act. The purposes of the ESA are to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in section 2(a) of the ESA. It is the policy of the ESA that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of the ESA. In consideration of the ESA's definition of conserve, which indicates an ultimate goal of bringing a species to the point where listing under the ESA is no longer necessary for its continued existence (i.e., the species is recovered), exemption permits issued pursuant to section 10 of the ESA are for activities that are likely to further the conservation of the affected species.

Section 7 of the ESA requires consultation with the appropriate federal agency (either NMFS or the U.S. Fish and Wildlife Service) for federal actions that "may affect" a listed species or adversely modify critical habitat. NMFS issuance of a permit affecting ESA-listed species or designated critical habitat, directly or indirectly, is a federal action subject to these Section 7 consultation requirements. Section 7 requires federal agencies to use their authorities in furtherance of the purposes of the ESA by carrying out programs for the conservation of endangered and threatened species. NMFS is further required to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any threatened or endangered species or result in destruction or adverse modification of habitat for such species. Regulations specify the procedural requirements for these consultations (50 Part CFR 402)

1.4.3 Magnuson-Stevens Fishery Conservation and Management Act

Under the MSFCMA Congress defined Essential Fish Habitat (EFH) as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802(10)). The EFH provisions of the MSFCMA offer resource managers means to accomplish the goal of giving heightened consideration to fish habitat in resource management. NMFS Office of Protected Resources is required to consult with NMFS Office of Habitat Conservation for any action it

authorizes (e.g., research permits), funds, or undertakes, or proposes to authorize, fund, or undertake that may adversely affect EFH. This includes renewals, reviews or substantial revisions of actions.

CHAPTER 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

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

2.1 ALTERNATIVE 1 – NO ACTION

Under this alternative, the No Action alternative, scientific research permit (File No. 15614) to capture, sample, lavage, fin ray clip, tag, and release shortnose sturgeon would not be issued at this time.

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

Under the Proposed Action alternative, a permit would be issued for activities as proposed by the applicant, with the permit terms and conditions standard to such permits as issued by NMFS. No other mortality, unintentional or otherwise, for any river would be authorized (Table 1).

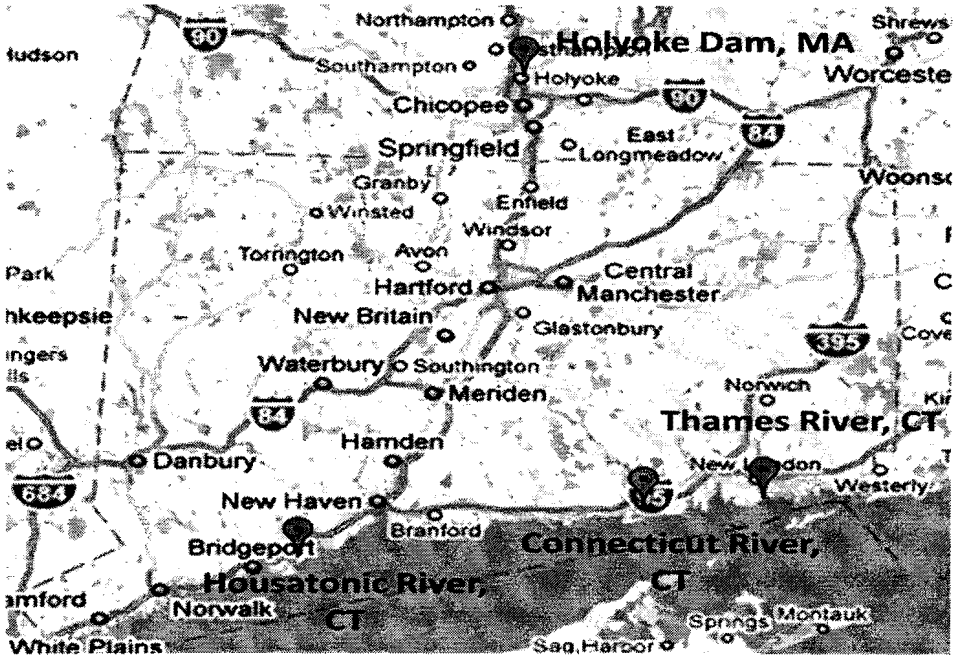
Table 1: Activities proposed to be annually authorized for endangered shortnose sturgeon (*Acipenser brevirostrum*) research in the Connecticut, Thames, and Housatonic Rivers under Permit No. 15614

Sturgeon, shortnose	Adult/ Juvenile	Male and Female	275	Capture*; Handle; Measure; Weigh; PIT tag; Sample, fin clip	Connecticut River, CT
Sturgeon, shortnose	Adult/ Juvenile	Male and Female	100	Capture*; Handle; Measure; Weigh; PIT tag; Lavage; Sample, fin ray clip	Connecticut River, CT
Sturgeon, shortnose	Adult/ Juvenile	Male and Female	50	Capture*; Handle; Measure; Weigh; PIT tag; Sample, fin clip; Sample, fin ray clip	Connecticut River, CT
Sturgeon, shortnose	Adult/ Juvenile	Male and Female	25	Capture*; Handle; Measure; Weigh; Instrument, internal (e.g., VHF, sonic); PIT tag; Sample, fin ray clip	Connecticut River, CT
Sturgeon, shortnose	Adult/ Juvenile	Male and Female	50	Capture*; Handle; PIT tag; Sample, fin ray clip	Thames and Housatonic Rivers, CT

* Capture methods include gill nets and trawls

2.2.1 *Map of Action Area*

Figure 1: Map of Action Area[2]



2.2.2 *Description of the Proposed Action Area*

The proposed action area includes all Connecticut waters and the portion of the Connecticut River between the Connecticut/Massachusetts state line and the Holyoke Dam (river kilometer 140) in Holyoke, Massachusetts. The proposed action area would also include the Thames and Housatonic Rivers. Sampling in the Housatonic River would take place from the mouth of the river (river kilometer 0) to the base of the dam in Derby, Connecticut. Sampling in the Thames River would take place from the mouth of the river (river kilometer 0) to the base of the Greenville Dam in Norwich, Connecticut.

2.2.3 *Research Activities*

The following sections provide a description of the proposed research activities. The same methodologies would be employed and the same mitigation measures would be in place across all study areas (the Connecticut, Thames, and Housatonic Rivers).

2.2.3.1 Capture of Adults or Juveniles

Up to a total of 500 juvenile and/or adult shortnose sturgeon would be captured annually using a standardized netting protocol with anchored gill nets set to fish from the bottom 1.8m of the water column in depths from 10-60 feet. Drift gill nets would also be used, set on the bottom

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2 http://maps.google.com/maps/ms?ie=UTF8&hl=en&msa=0&msid=117448234896363590256.000495bb65177f6668042&ll=41.557922,-72.537231&spn=2.112748,3.532104&z=8

perpendicular to the prevailing flow and allowed to move with the prevailing flow for 15-60 minutes. Gill net mesh size would range from 10-18cm (stretch measure) and be 30.5m long by 1.8m deep. Gill nets would be set in the main body of the rivers from March through December. Sampling with gill nets would not take place in the tributaries in the cold winter months as previous studies have indicated that shortnose sturgeon do not utilize these areas. All sampling and handling of sturgeon would be conducted following the guidelines established in "A Protocol for the Use of Shortnose and Atlantic Sturgeon" (Moser et al. 2000), and as further amended by NMFS in "A Protocol for Use of Shortnose, Atlantic, Gulf, and Green Sturgeons" (Kahn and Mohead 2010).

The following net-set protocol summarized below in Table 2 would be adhered to by researchers. All gill nets would be attended during daylight hours to avoid marine mammal and sea turtle interactions, and in waters having minimum dissolved oxygen (D.O.) concentrations no less than 4.5 mg/L. Netting would cease above 28°C water temperature until consulting with NMFS PR.

Table 2: Summary of Gill Netting Conditions

Water Temperature (^{o}C)	Minimum D.O. Level (mg/L)	Maximum Net Set Duration (hr)
$\leq$15	4.5	14
15 $\leq$ 20	4.5	4
20 $\leq$ 25	4.5	2
25 $\leq$ 28	4.5	1
>28		Cease netting until consulting with NMFS

In addition to gill nets, small skiff trawls (5.1 or 8cm mesh, 10m headrope) would also be employed in sampling the mainstem of the Connecticut, Thames, and Housatonic Rivers. Trawls would be towed along the bottom at speeds between approximately 1-2.5 knots for 5-15 minutes using a boat equipped with a small (5.2 or 6.4hp) outboard engine. Trawls would be set and hauled by hand. The applicant would use trawls year round; the applicant reports good success capturing sturgeon using trawls in the late spring and early summer months. Trawls would also be used from December through March (water temperatures < 10°C) when gill nets are not generally used.

2.2.3.3 General Handling (e.g., holding, measuring, weighing)

Upon hauling gear, all sturgeon would be individually removed from the gear and placed into a floating net pen attached to the boat or placed in a live well in the boar equipped with a flow-through water system. Shortnose sturgeon would then be processed one at a time in a water-filled measuring box (140x30x25cm); "Stress Coat" would be added to the water to replace the natural slime coat (also known as a slime coat restorant). Fish would be held in the box for examination, measuring, tissue sampling, and tagging. To weigh, captured shortnose sturgeon would be placed in a capture sling and suspended from a digital scale. In normal processing of most fish (i.e., those not undergoing additional procedures such as gastric lavage, acoustic tagging, or fin ray sampling), the sling would be lowered over the side of the boat into the water, opened, and the sturgeon allowed to swim away. The total time required to complete routine handling and tagging (*i.e.*, PIT tagging, measuring, weighing) would be approximately one minute. Shortnose sturgeon undergoing other

procedures would be returned to the net pen until all other sturgeon are processed. No specimen would be held in captivity (i.e., the net pen) for longer than 30 minutes.

2.2.3.4 PIT Tags

All captured shortnose sturgeon would be scanned with a PIT tag reader. All untagged fish (≥300mm TL) would be tagged with a PIT tag (BioMark TX1411SST 134.2 kHz, 12.5x2.07mm) injected under the skin on the left side of the body, immediately anterior to the dorsal fin and posterior to the dorsal scutes with a 12 gauge hypodermic needle and syringe. No juvenile fish captured less than 300 mm (TL) would be PIT tagged.

2.2.3.5 Anesthetizing

Each sturgeon prepared for surgery for procedures requiring anesthetization — laparoscopy, transmitter implantation, or fin-ray sectioning — would be placed in a water bath solution containing buffered tricaine methane sulfonate (MS-222) for anesthetization (Summerfelt and Smith 1990) (for a annual total of 175 fish receiving anesthetic). Concentrations of MS-222 of up to 100 mg/L would be used to sedate sturgeon to a state of surgical anesthesia (total loss of equilibrium, no reaction to touch stimuli, cessation of movement, except for opercula movement). The resulting time required for anesthetization and recovery would vary depending on the existing water temperature and water quality (Small 2003, Coyle et al. 2004); however, once anesthesia is administered, sturgeon would be continuously monitored and checked for signs of proper sedation by squeezing the tail and gauging the fish's movement and equilibrium, while also checking for steady opercula movement. Just prior to procedures requiring anesthetizing, sturgeon would be removed from the anesthetic to a moist surgery rack where respiration would be maintained by directing fresh ambient water pumped across the gills with tube inserted in the animals' mouth. After surgery, sturgeon would be allowed to recover to normal swimming behavior in boat-side net pens prior to release.

2.2.3.6 Acoustic Tags

Annually, a maximum of 25 adult or juvenile shortnose sturgeons would be fitted for internal implantation of sonic transmitters tags. There are three types of internal VEMCO tags which would be used. The first type of internal tag (Vemco V13 1H) measures 36mm in length and 13mm in diameter and weighs 6g in water (11g air weight). The other two types of tags would be coded tags with sensor options (e.g., depth or temperature sensing), VEMCO models V13P and V13T 1H are longer than the V13 1H, (13x45mm) and weigh 6g and 12g in water and air, respectively. Fish would be tracked passively with a Vemco array of remote VR2W receivers positioned in the river to document movement within the river. All transmitters would be limited in size to less than 2% of the fish's total weight.

- Internal transmitters would be implanted in adult shortnose using the following 3-5 minute surgical procedure:
    i. Adult or large sub-adult shortnose sturgeon would be captured using gill nets or trawls for implanting telemetry tags;
    ii. Captured fish would be anesthetized using MS-222;

iii. Anesthetized fish would be held on their backs (i.e., ventral side up) in the holding box while held motionless under narcosis. Water levels would be adjusted to maintain water over the gills. The incision site, approximately 10cm posterior to the pectoral girdle and just lateral of the midline, would be disinfected with Iodine and a surgical opening of 4 cm would then be made in the belly of the fish. A separate sterile surgical packet, containing all surgical instruments and supplies, would be used for each individual fish;

iv. Once the incision has been completed, a sterilized sonic transmitter coated with bee's wax or Silastic to reduce foreign body rejection (Summerfelt and Mosier 1984) would be inserted and pushed posterior into the surgical opening;

v. The incision would then be closed with non-absorbable suture in a cruciate pattern (Matsche and Bakal 2008) and swabbed with iodine; and

vi. The fish would then be allowed to recover (to equilibrium) upright in a flow-through water system and released once active.

2.2.3.7 Genetic Fin Clip

Immediately prior to release, a small sample (1 cm^2) of soft fin tissue would be collected from the trailing margin of the caudal or dorsal fin using a pair of sharp sterilized scissors from all fish captured (up to 500 shortnose sturgeon annually). This procedure does not harm shortnose sturgeon and is common practice in fisheries science to characterize the genetic "uniqueness" and quantify the level of genetic diversity within a population. Tissue samples would be preserved in individually labeled vials containing 95% ethanol. The Permit Holder would agree to coordinate genetic tissue samples collected from shortnose sturgeon for archival with Julie Carter of the NOAA/NOS Laboratory, Charleston, South Carolina, or with other genetic specialists authorized to do genetic typing of tissue samples. Proper certification, identity, and chain of custody for the tissue samples would be maintained as samples are transferred.

2.2.3.8 Fin Ray Sample

A total of 225 shortnose sturgeon annually (no more than 1,125 total for the five year permit) would be collected for age and population analyses. A small section (~1 cm^2 notch), of the leading pectoral fin ray would be collected on sampled fish, and no other invasive procedure would be performed on fish undergoing fin ray sectioning. The recommended method requires researchers, using a hacksaw or bonesaw, to make two parallel cuts across the leading pectoral fin-ray approximately 1cm deep and 1cm wide. The blade of the first cut is positioned no closer than 0.5cm from the point of articulation of the flexible pectoral base to avoid an artery at this location (Rien and Beamesderfer 1994, Rossiter et al. 1995, Collins 1995, Collins and Smith 1996). The second cut is made approximately 1cm distally (Everett et al. 2003, Fleming et al. 2003, Hurley et al. 2004, Hughes et al. 2005), where a pair of pliers is then used to remove the fin-ray section. The ray section is placed in an envelope and allowed to air-dry for several days or weeks and later it is cut into thin slices (usually about 0.5 to 2mm thickness) typically using a jeweler's saw or a double bladed saw (Stevenson and Secor 1999, Everett et al. 2003, Fleming et al. 2003, Hurley et al. 2004, Hughes et al. 2005, Johnson et al. 2005, Collins et al. 2008). The sections are then mounted using any number of materials including clear glue, fingernail polish, cytosel, or thermoplastic cement. The annuli are then read using stereoscopic readers.

2.2.3.9 Gastric Lavage

The Recovery Plan for shortnose sturgeon (NMFS 1998) places high priority on understanding the range-wide foraging habits and ecology of shortnose sturgeon. Gastric lavage on up to 100 shortnose sturgeon taken annually from the Connecticut River (not exceeding a total of 500 during the life of the permit) is requested in the application. Researchers would be using methods described by Haley (1998), Murie and Parkyn (2000), Savoy and Benway (2004), and Collins et al. (2008). The applicant has been previously authorized to conduct gastric lavage on shortnose sturgeon (File No. 1247) and has performed the procedure on 246 shortnose sturgeon from 2000-2002 (Savoy and Benway 2004) with no mortalities or apparent ill effects.

The method of lavage would include a sedation dose of anesthetic (100 mg/L of MS-222) to relax the fish and alimentary canal prior to the procedure. Variable sized flexible polyethylene tubes, depending on the size of the sturgeon, would be passed carefully through the sturgeon's alimentary canal and verified to be properly positioned in the stomach by feeling the tubing from fish's ventral surface. Gastric lavage would be then be carried out by gently flooding the stomach cavity with water delivered from a low pressure hand pump. To minimize stress, sturgeon between 250 mm and 350 mm (FL) would be lavaged using 1.90 mm outside diameter (O.D.) tubing; sturgeon between 350 mm to 1250 mm, would be lavaged with a 4.06 mm O.D. tube; and sturgeon above 1250 mm would be lavaged with flexible tubing of 10.15 mm O.D. Prey items dislodged from the stomachs of sampled sturgeon would be collected by a 0.5mm sieve, preserved (using 95% ethanol), and identified later in the laboratory. The applicant would then allow fish to recover within a floating net pen alongside the boat prior to release back to the river. The entire procedure, including anesthetizing, would take from seven to eleven minutes (Collins et al. 2008). No other invasive procedure would be performed on fish undergoing gastric lavage.

2.2.4 *Unintentional Mortality*

It is possible that the capture activities (i.e. gillnetting, trawling) may result in unintentional mortality or stress to the target species in this application; however, we do not anticipate mortality or injury based on past research results and many years of netting they accomplished under similar mitigating measures. Therefore, researchers would not be authorized unintentional mortality of shortnose sturgeon during their studies. If mortality or a serious injury occurs, NMFS must be contacted immediately and researchers suspend all permitted activities. The Permits Division may grant authorization to resume permitted activities based on review of the incident depending on the circumstances.

Additionally, it is possible that capture activities (gill netting, trawling) could result in unintentional capture and/or mortality of non-target species; however, from past experience of the researchers and their practice of monitoring nets on short soak-time schedules, NMFS anticipates that virtually all by-catch would be released alive.

CHAPTER 3 AFFECTED ENVIRONMENT

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

The affected environment is biological and physical resources occurring year-round within the watersheds of the Connecticut, Thames and Housatonic Rivers in the states of Connecticut and Massachusetts (please refer to Figure 1 in Section 2.2.1, "Map of Action Area"). More specifically, since the proposed research activities would primarily involve work in the river, the affected environment for purposes of this analysis focuses primarily on the biological and physical resources occurring within the river reaches that would be accessed by the researchers.

3.1 SOCIAL AND ECONOMIC ENVIRONMENT

Economic and social factors are listed in the definition of effects in the NEPA regulations. However, the definition of human environment states that "economic and social effects are not intended by themselves to require preparation of an EIS." An EA must include a discussion of a proposed action's economic and social effects when these effects are related to effects on the natural or physical environment.

The socioeconomic environment in the action area includes human activities such as industrial, commercial and recreational fishing, and boating. The research would not be expected to impact, inhibit, or prevent other human activities from occurring. More likely, researchers would have to adjust or modify their plans around such activities. No economic losses to other human activities would be expected as a result of the research. The research could result in some minor economic benefits to industries that support the research. The socioeconomic environment would not be significantly impacted and is not considered further in this analysis.

3.2 PHYSICAL ENVIRONMENT

The following section provides a description of the unique or ecologically critical resources within the action area. There are no National Marine Sanctuaries, nor designated critical habitats located within the area for the proposed activities. Also, there are no protected areas (e.g., National Estuarine Research Reserves or state protected aquatic areas) affected by the research; nor are there eligible historic resources in the project location. However, designated EFH exists for federally managed species within the action area. Specifically, areas near the mouths of each of the three rivers (Connecticut, Thames, and Housatonic) contain designated EFH for species such as smooth dogfish, pollock, Atlantic herring, red hake, winter flounder, windowpane flounder, and silver hake. More detailed information on designated EFH in the proposed action area can be found at http://sharpfin.nmfs.noaa.gov/website/EFH_Mapper/map.aspx

3.2.1 Sanctuaries, Parks, Historic Sites, etc.

The proposed action area does not encompass any marine sanctuaries, national parks, historic sites, or other protected areas; thus, none will be affected by the proposed research.

3.2.2 Essential Fish Habitat

EFH has been designated for many of the fish species within the action area. In the mouth of the Connecticut River, EFH has been designated for smooth dogfish (*Mustelus canis*), pollock (*Pollachius virens*), Atlantic herring (*Clupea harengus*), red hake (*Urophycis chuss*), winter flounder (*Plueronectes americanus*), and windowpane flounder (*Scophthalmus aquosus*). EFH for Atlantic salmon (*Salmo salar*) also exists in the Connecticut River. EFH for smooth dogfish and Atlantic herring has been designated in the mouth of the Thames River. At the mouth of the Housatonic River, EFH has been designated for silver hake, pollock, Atlantic herring, red hake, winter flounder, and windowpane flounder. Activities that have been shown to affect EFH include disturbance or destruction of habitat from stationary fishing gear, dredging and filling, agricultural and urban runoff, direct discharge, and the introduction of exotic species. None of the activities in the Proposed Action are directed at or likely to have any impact on any designated EFH. See section 4.3.2 for the results of the consultation with the Office of Habitat Conservation.

3.2.3 Designated Critical Habitat

Critical habitat has not been designated for shortnose sturgeon. If critical habitat is designated, the effects of the proposed action would be evaluated at that time. There are no other critical habitat designations for any other listed species in the action area. Therefore, no further discussion of critical habitat is warranted in this analysis.

3.3 BIOLOGICAL ENVIRONMENT

3.3.1 ESA Target Species Under NMFS Jurisdiction

Endangered shortnose sturgeon *Acipenser brevirostrum*

The following is a brief summary of the status and occurrence of targeted shortnose sturgeon range-wide and in the proposed study area. Further descriptions of the status of these species can be found in the Biological Opinion that accompanies this document as well as NMFS Recovery Plans and other documents at http://www.nmfs.noaa.gov/pr/publications/.

3.3.1.1 Occurrence of Shortnose Sturgeon Range-wide

Shortnose sturgeon occur along the Atlantic Coast of North America, from the Saint John River in Canada to the Saint Johns River in Florida. The Shortnose Sturgeon Recovery Plan (NMFS 1998) describes 19 shortnose sturgeon populations that are managed separately in the wild. Two additional, geographically separated populations occur behind dams in the Connecticut River (above the Holyoke Dam) and in Lake Marion on the Santee-Cooper River system in South Carolina (above the Wilson and Pinopolis Dams). Although these populations are isolated, genetic analyses suggest that the shortnose sturgeon living downstream of the dams are not significantly different than those living upstream (Quattro et al. 2002, Wirgin et al. 2005).

At the northern end of the species' distribution, the highest rate of gene flow (suggesting migration) occurs between the Kennebec and Androscoggin Rivers. At the southern end of the species' distribution, populations appear to exchange between 1 and 10 individuals per generation, with the highest rates of exchange between the Ogeechee and Altamaha Rivers (Wirgin et al. 2005). Wirgin (2005) concluded that rivers separated by more than 400 kilometers were connected by very little

migration while rivers separated by no more than 20 kilometers (such as the rivers flowing into coastal South Carolina) would experience high migration rates.

At the geographic center of the shortnose sturgeon range, there is a 400 kilometer area with no known populations occurring from the Delaware River, New Jersey to Cape Fear River, North Carolina (Kynard 1997). However, shortnose sturgeon are known to occur in the Chesapeake Bay, but they may be transients from the Delaware River via the Chesapeake and Delaware Canal (Skjeveland et al. 2000, Welsh et al. 2002) or remnants of a population in the Potomac River.

The USGS and National Park Service (NPS) conducted a telemetry study of shortnose sturgeon in the Potomac River from 2004–2007 using authority of NMFS Permit No. 1444. Although a total of 5,400 gillnetting hours were conducted during this project, in addition to the continuation of the USFWS reward program, only three individual shortnose sturgeon have been captured in the Potomac River. The limited capture of shortnose sturgeon as well as the fact that one of the tagged fish was recaptured three times, indicates a very small number of shortnose sturgeon are present in the Potomac River.

Rogers and Weber (1995), Kahnle et al. (1998), and Collins et al. (2000) concluded that shortnose sturgeon are extirpated in the Saint Johns River in Florida and also possibly in the Saint Marys River bordering Georgia and Florida. In 2002, a shortnose sturgeon was captured in the Saint Johns River, in Florida (FFWCC 2007), suggesting either immigration of transient fish or a small remnant population. Appendix A summarizes the current population densities estimated range-wide for shortnose sturgeon. Data is summarized for 27 east coast Atlantic rivers where information is available on population density.

3.3.1.2 Natural History and Habitat Information of Shortnose Sturgeon in Connecticut Waters

Spawning: The spawning of shortnose sturgeon in the Connecticut River has been documented. Taubert (1980) captured reproductively mature shortnose sturgeon in the Holyoke Pool, above the Holyoke Dam of the Connecticut River, and also collected 13 shortnose sturgeon larvae. Spawning habitat was characterized as dominated by gravel, rubble and large boulders (rkm 179 and above). Below Holyoke Dam, an adult female shortnose sturgeon was captured, and had its eggs extracted, fertilized and brought to a lab where fry were reared (Buckley and Kynard 1985b). Radio telemetry studies of shortnose sturgeon below Holyoke Dam have shown reproductively mature sturgeon leaving the spawning area in May when water temperatures were between 11.5-14°C (Buckley and Kynard 1985a).

Foraging: To document foraging habits of sturgeon, Savoy and Benway (2004) examined stomach contents of fish collected in the upper river and estuarine regions of the Connecticut River. Shortnose sturgeon in the estuary preyed upon gammarid amphipods, chironomids, and polycheates, whereas in the upriver area, sturgeon fed on clams, chironomids, and insects. Since shortnose sturgeon in the estuary foraged on a broader variety and greater amount of taxa than sturgeon in the upper river (Savoy and Benway 2004), the authors placed a high importance on unrestricted access to the estuary so that fish could maintain the high condition factors observed by Savoy (2004).

Over-wintering/Migration: Researchers have observed shortnose sturgeon use of the Connecticut River estuary in spring during times of high freshwater outflow, particularly in the form of rapid (up to 40km/day) and directed movement to this area post-spawning (Savoy and Shake 1993, Savoy 2004). In another study, most (21 out of 23) shortnose sturgeon fitted with ultra-sonic transmitters in the Connecticut River moved into the estuary each spring (Savoy 2004). Buckley and Kynard (1985a) also documented downstream movement in the spring from Holyoke Dam to the lower river in post-spawning shortnose sturgeon. Extensive use of the estuary over winter was not observed, rather, adult shortnose sturgeon remained in the upriver, freshwater sites (Savoy 2004). During sampling efforts from October to March, researchers were successful in collecting only a single shortnose sturgeon in the estuary (Savoy and Benway 2004).

3.3.2 Non Target Species

In addition to the species that are the subject of the permit (target species), a wide variety of non-target species could be found within the action area, including other marine mammals, sea turtles, invertebrates, teleost and elasmobranch fish, and sea birds. Since merely being present within the action area does not necessarily mean a marine organism will be affected by the proposed action, the following discussion focuses not only on the distribution and abundance of various species with respect to the timing of the action, but also on whether and by what means the proposed research activities may affect the non-target species.

3.3.2.1 Invertebrates

From previous catch records of the applicant, NMFS would expect that netting could capture some other non-target invertebrate species such as blue crab (*Callinectes sapidus*) in the estuarine reaches of the action area during summer months. The applicant has stated that virtually all by-catch will be released alive.

3.3.2.2 Fish

From previous catch records of the applicant, NMFS would expect that netting could capture some non-target fish species such as white catfish (*Ictalurus catus*), channel catfish (*Ictalurus punctatus*), white sucker (*Catostomus commersoni*), striped bass (*Morone saxatilis*), carp (*Cyprinus carpio*), and white perch (*Morone americanus*). However, nets would typically be checked at short intervals with respect to temperature and dissolved oxygen levels, and it is believed that virtually all by-catch would be released alive.

Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*): The Atlantic sturgeon is currently considered a "candidate species" under NMFS jurisdiction, co-occurring in Connecticut waters of the study area with shortnose sturgeon (Savoy and Pacileo 2003). Thus, there is potential for Atlantic sturgeon to be caught during research activities. Reviewed in 1998, NMFS and USFWS received a petition to list Atlantic sturgeon as endangered. Although a protective ESA status was denied at that time, the species remained a 'species of concern' under NMFS's jurisdiction. In 2007, NMFS completed a second status review for this species and has since accepted a petition evaluating whether the species warrants listing under the ESA. Recently, Atlantic sturgeon have been proposed for listing under the ESA and five distinct population segments (DPS) have been projected. The Atlantic sturgeon New York Bight DPS has been proposed for listing as endangered (75 FR 61872 & 75 FR 61904).

Currently, however, a proposed rule has not been published, and thus this species does not receive protections under the ESA. Consequently, NMFS considers should a subsequent listing of Atlantic sturgeon occur coinciding with the proposed research activities, the effects of researcher's actions on Atlantic sturgeon would be analyzed at that time. Appropriately, the researcher would monitor gill nets closely, and if an Atlantic sturgeon were captured prior to its listing, NMFS would request the same netting protocols and standard research conditions protective for shortnose sturgeon be used to ensure Atlantic sturgeon survival. For measures conditioned in the proposed permit to protect any captured Atlantic sturgeon, see Section 4.2.9 of this EA.

3.3.2.3 Sea Turtles

Kemp's ridley (*Lepidochelys kempii*), loggerhead (*Caretta caretta*), and green (*Chelonia mydas*) sea turtles have been observed in Long Island Sound (Morreale et al. 1992). New England waters (defined as marine waters north of the Nantucket Lightship, out to the 200 mile limit of the Exclusive Economic Zone, and north to Canadian territory) have been identified as important habitat for sea turtles, particularly for leatherbacks (*Dermochelys coriacea*) and Kemp's ridley (Lazell 1980). The state of Connecticut lists leatherback and Kemp's ridley sea turtles as endangered, and loggerhead and green sea turtles as threatened (www.ct.gov/dep). According to stranding data from Connecticut and Rhode Island from 1987-2001, leatherback sea turtles made up the majority (82.2%) of strandings, followed by loggerheads (15.8%), green (1.4%), and Kemp's ridley (0.7%) (Nawojchik and St. Aubin 2003). However, the "topographical constriction to the entrance of Long Island Sound" has probably led to relatively fewer sea turtle strandings in Connecticut than Rhode Island (Nawojchik and St. Aubin 2003). According to the applicant, within the action area of Connecticut waters, no sea turtles have been observed in more than 20 years of sampling for shortnose sturgeon. In light of these reports, there is the potential for interactions between sea turtles and the proposed actions, although the probability is remote due to the applicant's personal observations and the above published accounts. In the unlikely event of a sea turtle interaction during sampling, the applicant will be instructed to adhere to the measures conditioned in the proposed permit to avoid adverse effects to sea turtles; see Section 4.2.9 of this EA.

3.3.2.4 Marine Mammals

Sightings and strandings of marine mammals in Connecticut waters are generally uncommon and infrequent. Since 1976, there have been very few reported sightings or strandings of whales and dolphins in Connecticut waters. Two fin whales (*Balaenoptera physalus*) were found stranded (1976 and 1983) in Connecticut waters; two Atlantic white-sided dolphins (*Lagenorhynchus acutus*) and one common dolphin (*Delphinus delphis*) were stranded during this time period (Kenney and Vigness-Raposa 2010). White beaked dolphins (*Lagenorhynchus albirostris*) and a Beluga whale (*Delphinapterus leucas*) have been sighted in Connecticut waters in 1986 and 1985, respectively (Kenney and Vigness-Raposa 2010). In Connecticut, there exist known haul-out sites for harbor seals (*Phoca vitulina*), and there have been occasional strandings of gray seals (*Halichoerus grypus*) and hooded seals (*Cystophora cristata*) in the spring (Kenney and Vigness-Raposa 2010). According to the applicant, within the action area of the Connecticut, Thames, and Housatonic rivers, no marine mammals have been observed in more than 20 years of sampling for shortnose sturgeon. Due to these records and the experience of the applicant, the possibility of marine mammal interaction due to the proposed actions is considered unlikely. The reported sightings and strandings occurred in Connecticut waters of Long Island Sound and various harbors, not within the proposed action areas. In the unlikely event of a marine mammal sighting during sampling, the

applicant will be instructed to adhere to the measures conditioned in the proposed permit to avoid adverse effects to marine mammals; see Section 4.2.9 of this EA.

3.3.2.5 Aquatic Nuisance Species

The U.S.Geological Survey (USGS) has documented several aquatic nuisance species (USGS 2010) in Connecticut waters including: Asian shore crab (*Hemigrapsus sanguineus*), green crab (*Carcinus maenus*), Oriental shrimp (*Palaemon macrodactylus*), common periwinkle (*Littorina littorea*), hydrilla (*Hydrilla verticillata*), variable leaf water-milfoil (*Myriophyllum heterophyllum*), and ide (*Leuciscus idus*). Because the proposed research activities have the potential to spread these aquatic nuisance species to other watersheds, mitigations measures proposed by NMFS, outlined in Section 4.2.9 of this EA, were agreed to by the researcher to be implemented as standard practices.

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

This chapter represents the scientific and analytic basis for comparison of the direct, indirect, and cumulative effects of the alternatives. Regulations for implementing the provisions of NEPA require consideration of both the context and intensity of a proposed action (40 CFR Parts 1500-1508).

4.1 EFFECTS OF ALTERNATIVE 1: No Action

An alternative to the proposed action is no action, i.e., denial of the permit request. This alternative would eliminate any potential risk to all aspects of the environment from the proposed research activities. However, it also would prohibit researchers from gathering information that could help endangered and protected shortnose sturgeon.

4.2 EFFECTS OF ALTERNATIVE 2: Issue permit with standard conditions

Any impacts of the proposed action would be limited primarily to the biological environment, specifically the animals that would be studied or affected by the research. The type of action proposed in the permit request would minimally affect the physical environment and would be unlikely to affect the socioeconomic environment or pose a risk to public health and safety.

4.2.1 *Effects of Capture*

The applicant proposes to use gill nets and trawl nets to capture sturgeon. Entanglement in nets can result in injury and mortality, reduced fecundity, and delayed or aborted spawning migrations of sturgeon (Moser and Ross 1995, Collins et al. 2000, Moser et al. 2000). However, historically, the majority of shortnose sturgeon mortality during scientific investigations has been directly related to netting mortality and as a function of numerous factors including water temperature, low dissolved oxygen concentration, soak time, mesh size, net composition, and netting experience.

To illustrate, shortnose sturgeon mortality resulting from six similar scientific research permits utilizing gillnetting is summarized in Table 6 below. Mortality rates due to the netting activities ranged from 0 to 1.22%. Of the total 5,911 shortnose sturgeon captured by gill nets or trammel nets, only 23 died, yielding an average incidental mortality rate of 0.39%. However, all of the mortalities associated with these permits were due to high water temperature and low dissolved oxygen (DO) concentrations. Moser and Ross (1995) reported gill net mortalities approached 25% when water temperatures exceeded 28°C even though soak times were often less than 4 hours.

Table 6: Number and percentage of shortnose sturgeon killed by gill or trammel nets associated with existing scientific research permits.

	Permit Number						
	1051	1174	1189	1226	1239	1247	TOTALS
Time Interval	1997, 1999 – 2004	1999 – 2004	1999, 2001 – 2004	2003 – 2004	2000 – 2004	1988 – 2004	1988-2004
No. sturgeon captured	126	3262	113	134	1206	1068	5909
No. sturgeon died in gill nets	1	7	0	0	5	13	26
Percentage	0.79	0.22	0	0	0.41	1.22	0.44

Under Permit Number 1247, between 4 and 7% of the shortnose sturgeon captured died in gill nets prior to 1999, whereas between 1999 and 2005, none of the more than 600 shortnose sturgeon gill netted died as a result of their capture. Also, in five years, under Permit Number 1189, none of the sturgeon captured died. Under Permit Number 1174, all seven of the reported shortnose sturgeon mortalities occurred during one sampling event.

The low mortality rates of more recent research are due to mitigation measures implemented by researchers (Moser et al. 2000), such as reduced soak times at warmer temperatures or lower DO concentrations, minimal holding or handling time, handling sturgeon with smooth rubber gloves, and treating with an electrolyte bath prior to release. Based on the mitigation measures implemented by researchers since 1999, the effects of capture on sturgeon have been reduced.

To limit stress and mortality of sturgeon due to capture by gill nets, the applicant will adhere to the net set protocols as stated by NMFS PR. Specifically, during lower water temperatures (<15°C), soak times of nets would not exceed 14 hours; at water temperatures between 15°C and 20°C, net sets would not exceed 4 hours; at water temperatures between 20°C and 25°C, net sets would not exceed two hours; and at water between 25°C and 28°C, net sets would not exceed one hour. Netting activities would cease at 28°C or higher. Gear would be deployed only in waters where dissolved oxygen concentrations are at least 4.5 mg/l at the deepest depth sampled by the gear for the entire duration of deployment.

Trawl nets will be utilized in such a manner as to limit potential impacts to shortnose sturgeon. According to the applicant and in accordance with NMFS recommendations, the gear will be set and hauled by hand (Kahn and Mohead 2010). The trawl will be towed along the bottom at about 2.5 knots for 5-15 minutes. The applicant has utilized trawl nets in the past, and has had no mortality or injuries (File No. 1516).

Based on the applicant's experience and past history, as well as the conditions contained in the permit, NMFS does not anticipate any long-term adverse effects to shortnose sturgeon as a result of the proposed capture methods.

4.2.2 *Effects of General Handling (e.g., short-term holding, measuring, and weighing)*
Sturgeon are a hardy species, but sensitive to handling stress when water temperatures are high or dissolved oxygen is low. Additionally, sturgeon tend to inflate their swim bladder when stressed and when handled in air (Moser et al. 2000). If they are not returned to neutral buoyancy prior to release, they tend to float and would be susceptible to sunburn and bird attacks. In some cases, if pre-

spawning adults are captured and handled, it is possible that they would interrupt or abandon their spawning migrations after being handled (Moser and Ross 1995).

To minimize capture and handling stress, researchers plan to hold shortnose sturgeon in net pens until they are processed, at which time they would be transferred to a processing station on board the research vessel. During processing, each fish would be immersed in a continuous stream of water supplied by a pump/hose assembly mounted to over the side of the research vessel. For most procedures planned, the total time required to complete routine handling and tagging would be no more than 15 minutes. Moreover, following processing, sturgeon would be returned to the net pen for observation to ensure full recovery prior to release. As mentioned, they would be checked for buoyancy problems and treated with a slimecoat restorant prior to release. Total holding time would be no longer than 60 minutes from the time of capture until release.

Although sturgeon are sensitive to handling stress, the proposed methods of handling fish described in the application are consistent with the best management practices endorsed by NMFS and, as such, should minimize the potential handling stress and therefore minimize indirect effects resulting from handling. The applicant has also reported zero mortality in the field for the past ten years of research on shortnose sturgeon (File Nos. 1516 and 1247).

4.2.3 *Effects of PIT Tags*

The applicant proposes to use PIT tags on all fish (over a certain size, described below) captured to insure unique identification upon capture or recapture for population and growth estimates. To avoid duplicate tagging, all sturgeon would be scanned with a PIT tag reader prior to the insertion of a PIT tag. Tagging procedures would mainly cause stress during restraint and minor wounds from attachment. The attachment and retention of PIT tags is not known to have any other direct or indirect effects on shortnose sturgeon. As such, the tagging of shortnose sturgeon with PIT tags is unlikely to have significant impact on the reproduction, numbers, or distribution of shortnose sturgeon in proposed action areas. However, there is reported yearling fish mortality within the first 24-48 hours of PIT tag insertion as a result of larger PIT tags being inserted too deeply. Henne et al. (2003) found that 14mm tags inserted into shortnose sturgeon less than a size of 330 mm total length (TL) caused 40% mortality after 48 hours; however, no additional mortalities occurred after 28 days. Henne et al. (2003) also showed that no mortality to sturgeon between 250 and 330 mm occurred after 28 days when 11.5mm PIT tags were used. Therefore, to address these concerns, the applicant would not PIT tag sturgeon less than 300mm TL.

4.2.4 *Effects of Anesthetizing*

The proposed anesthetic concentration of up to 150 mg/L MS-222 is commonly used by sturgeon biologists to induce light to deep planes of anesthesia for internal acoustic tagging (D. Peterson, D. Fox, M. Collins, T. Savoy, *pers. comm.* Nov. 2009) and is the only chemical anesthetic recommended by NMFS (Kahn and Mohead 2010). The induction varies with dosage, water temperature and water chemistry; however, typical induction times are from five to eight minutes. Because telemetry tags can be inserted into the coelom in less than a minute with little reaction to the external stimuli (muscle spasm, contraction) when incised, there is little risk to the sturgeon in this regard (M. Matsche; pers. comm.; December 2009). Complete recovery time from the anesthetic averages four to six minutes (Brown 1988).

Risks associated with anesthetizing with MS-222 at this level would include hypoxia from

overexposure (possibly caused by inexperience at recognizing the proper level of narcosis) (Coyle et al. 2004), anesthetizing fish in poor health or stressed conditions, and injury from thrashing during the excited phase of anesthetic induction. To reduce such risks, the applicant is personally experienced and accomplished in transmitter implantation using the anesthetic MS-222. Only non-stressed animals in good health would be anesthetized for internal tagging. Fish would be monitored closely during induction to reach the proper level of anesthesia prior to surgery, and would be watched to ensure proper recovery from anesthetic narcosis prior to release. To avoid injury while being anesthetized, sturgeon would be restrained with netting to prevent animals from jumping or falling out the anesthetic bath. Also, because MS-222 is an acidifying solution, potentially extending the induction time for narcosis, bath solutions would be buffered to a neutral pH with sodium bicarbonate and oxygenated prior to use.

MS-222 has been found to be excreted in fish urine within 24 hours and tissue levels decline to near zero in the same amount of time (Coyle et al. 2004). Consequently, a sturgeon released after treatment with MS-222 would not present a sizable risk to the environment should a predator consume that sturgeon. Therefore, NMFS considers this anesthetizing protocol for internal tagging to be well established with known risks minimized to produce limited effects on the sturgeon and the environment.

4.2.5 *Effects of Internal Sonic Tags*

The issuance of this permit would also authorize the use of internally implanted sonic transmitters. This activity would cause stress during capture and restraint and minor wounds from surgical procedures under anesthesia. The surgical procedures would also cause discomfort to the fish under recovery, as well as a risk of infection. To address these concerns, the researchers propose to use the best management practices as endorsed by Moser et al. (2000). These practices would minimize or eliminate potential short-term adverse effects from sampling and greatly lower the risk of injury and mortality. The fish would also be monitored for infection and treated as needed.

The past experience of other researchers using the same methods suggests that the research would be conducted in a manner to minimize or eliminate mortalities to the fish. Buckley and Kynard (1985a) conventionally tagged 341 shortnose sturgeon and recaptured 64 (18%); 91 additional fish were radio tagged and 1,442 locations from 82 fish were obtained with no observed mortality. Hastings et al. (1987) tagged 1,310 sturgeon and recaptured 70 (5.3%). Studies have also shown that radio-tagged fish appear to recover quickly and show no long-term effects from handling. O'Herron et al. (1993) radio-tagged 28 fish, 26 of which were relocated as many as 35 times. Shortnose sturgeon were tagged and tracked up to 3 months by Moser and Ross (1995). Additional studies working with Atlantic sturgeon have shown a high tolerance to stress associated with capture and handling. Moser and Ross (1995) reported a recapture rate of 22% and noted that commercial fisherman have captured and released the same fish on several occasions. In an Altamaha River mark-recapture study, 97 of 1,534 tagged juvenile Atlantic and 12 of 551 tagged shortnose sturgeons were reported recaptured (Collins et al. 1996). USFWS and MDDNR observed a 14% recapture rate of hatchery raised Atlantic sturgeon, with 2 fish being recaptured 4 times and 22 fish being recaptured 3 times.

Surgical implantation of internal transmitters in fish conducted by the applicant (File No. 1516) has thus far not resulted in a known mortality. Demonstrated tag retention and healing rates using this method have been satisfactory; Kieffer and Kynard (1996) report that internal tag rejection is reduced by coating tags with an inert elastomer. Tags surgically implanted into the body cavity were

usually retained for the tag's operational life, and in most cases, for much longer (mean: 1,370.7 days), and poor incision healing was rare (Kieffer and Kynard *in press*).

To guard against adverse effects associated with completely internal sonic tags, the applicant proposes to use the best management practices as endorsed by NMFS in the sturgeon protocol (Moser et al. 2000, Kahn and Mohead 2010). More specifically, researchers would limit implanting internal transmitters in sturgeon when water temperatures exceed 27°C or less than 7°C. Additionally, they would seal the tags with an inert elastomer polymer to prevent the sturgeon's body from rejecting the tag. In general, by using proper sterilized conditions and surgical techniques, tagging of shortnose sturgeon with internal sonic tags, is not expected to have significant impact on the normal behavior, reproduction, numbers, distribution or survival of shortnose sturgeon.

4.2.6 *Effects of Genetic Tissue Sample*

The applicant proposes to take a small (1 cm^2), non-deleterious tissue sample, clipped with surgical scissors from a section of soft fin rays of captured sturgeon. Tissue sampling does not appear to impair the sturgeon's ability to swim and is not thought to have any long-term adverse impact (Kahn and Mohead 2010). Many researchers, including the applicant, have removed tissue samples according to this same protocol with no adverse effects; therefore, we do not anticipate any long-term adverse effects to the sturgeon from this activity (Wydoski and Emery 1983).

4.2.7 *Effects of Fin Ray Clip*

A small section (~1 cm^2) of the pectoral fin rays would be collected from each shortnose sturgeon captured for subsequent age-determination (Kahn and Mohead 2010). The samples would be collected using sterilized hacksaws and scalpels from a section of the pectoral fin ray while fish are under anesthesia. The procedure is a common and accepted practice in shortnose sturgeon research and has shown not to impair the sturgeon's ability to swim or have long-term impacts (Moser et al. 2000).

4.2.8 *Effects of Gastric Lavage*

Information on diets and how they relate to seasonal foraging and habitat use has recently benefited from the gastric lavage procedure (Foster 1977; Haley 1998; Murie and Parkyn 2000; Moser et al. 2000). Although, due to the morphology of the gut tract and position of the swim bladder in the shortnose sturgeon, care must be taken in the procedure to not injure sturgeon while inserting the tube into the esophagus and positioning it within the gut. Potential injury to sturgeon could include abrasion of the gut wall near the pyloric caecum, trauma associated with not seating the tubing properly in the gut, and potential negative growth responses of sturgeon (going off-feed) after gastric lavage. To mitigate these concerns, the applicant will use the practice of lightly anesthetizing sturgeon with MS-222 prior to gastric lavage which relaxes the gut wall, allowing easy penetration of the tubing to the proper position in the gut (Kahn and Mohead 2010).

Savoy and Benway (2004) reported results from 246 shortnose sturgeon collected on the Connecticut River between 2000 and 2003. All of the fish tolerated the procedure well, recovered rapidly and were released unharmed after the procedure. The lavage technique was successful in evacuating stomach contents effectively of shortnose sturgeon of all sizes without internal injury; in some cases, recently ingested prey items were still alive after retrieval (Savoy and Benway 2004). Based on the reported experience with this procedure, it is believed that sturgeon which undergo gastric lavage as

proposed would experience handling discomfort, but would be exposed to only minimal short-term risk associated with the procedure.

4.2.9 *Effects on Non-Target Species*

4.2.9.1 Listed Species Under USFWS Jurisdiction

There are no non-target ESA-listed species under USFWS jurisdiction located within the action area.

4.2.9.2 Sea Turtles

As per the applicant's experience and the available information of sea turtle strandings and sightings within the action area, combined with the mitigation conditions set forth in the permit, no significant impacts on sea turtles are expected. The following standard condition would be included in the permit.

If a sea turtle were incidentally captured during netting, the Permit Holder, Principal Investigator, Co-investigator(s), or Research Assistant(s) acting on the Permit Holder's behalf must use care when handling a live turtle to minimize any possible injury; and appropriate resuscitation techniques must be used on any comatose turtle prior to returning it to the water. All turtles must be handled according to procedures specified in 50 CFR 223.206(d)(1)(i).

4.2.9.3 Marine Mammals

As precautionary measures, the following mitigation conditions would be applied in permits, namely: netting would not be deployed when marine mammals are observed within the vicinity of the research; and animals would be allowed to either leave or pass through the area safely before net setting is initiated. Should any marine mammal enter the research area after the nets have been deployed, the lead line would be raised and dropped in an attempt to make marine mammals in the vicinity aware of the net. If marine mammals remain within the vicinity of the research area or approach the set, nets would be removed.

Additionally, in all boating activities, researchers would be advised to keep a close watch for marine mammals to avoid harassment or interaction and also to review the NMFS Guidelines for Viewing Marine Mammals (http://www.nmfs.noaa.gov/pr/education/regional.htm).

As per the applicant's experience and the available information of marine mammal strandings and sightings within the action area, combined with the mitigation conditions set forth in the permit, no significant impacts on marine mammals are expected.

4.2.9.4 Non-Listed By-catch Species

All non-listed by-catch species are expected to be released alive (see Section 3.3.2.1 and 3.3.2.2 for lists of potentially encountered by-catch species). For Atlantic sturgeon interactions, the following conditions would apply: if an Atlantic sturgeon is incidentally captured, NMFS requests that it minimally be PIT tagged, genetically sampled, and released. Additionally, NMFS requests Atlantic sturgeon interactions to be reported to Lynn Lankshear, NMFS PR at 978-281-9300 ext. 6535

(Lynn.Lankshear@noaa.gov). This report should contain descriptions of take, including lethal take, location and final disposition of the sturgeon. Specimens or body parts of dead Atlantic sturgeon should be preserved (preferably on ice or refrigeration) until sampling and disposal procedures are discussed with NMFS. If an Atlantic sturgeon is incidentally captured, it will be handled according to NMFS protocol and the conditions listed in the permit; thus, no significant impacts on non-listed by-catch species are expected.

4.2.9.5 Aquatic Nuisance Species

To prevent potential spread of aquatic nuisance species identified in the watershed, all equipment assigned to the research should not be reassigned to other watersheds until the research is completed or suspended. If the research has been completed or suspended, all gear and equipment should be bleached, washed and air dried before being re-deployed to a new location.

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

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

4.3.1 Endangered Species Act

This section summarizes conclusions resulting from consultation as required under section 7 of the ESA. The consultation process was concluded after close of the comment period on the application and draft EA to ensure that no relevant issues or information were overlooked during the initial scoping process summarized in Chapter 1. For the purpose of the consultation, the draft EA represented NMFS' assessment of the potential biological impacts.

To comply with Section 7 of the regulations (50 CFR 402.14(c)), a Section 7 consultation was initiated by the NMFS, OPR under the ESA. In accordance with Section 7 of the ESA of 1973, as amended (16 U.S.C. 1531 *et seq.*), a Biological Opinion was prepared for this proposed action concluding that, after reviewing the current status of shortnose sturgeon, the environmental baseline for the action areas, the effects of the take authorized in the permits, and probable cumulative effects, that it is NMFS' biological opinion that issuance of the proposed permit would not likely jeopardize the continued existence of shortnose sturgeon or any other NMFS ESA-listed species, nor would it likely destroy or adversely modify designated critical habitat.

4.3.2 Compliance with the Magnuson Stevens Fishery Conservation Management Act

NMFS PR contacted the NMFS Northeast Region Office of Habitat Conservation (Gloucester, MA) by email on 12/7/2010. The Office concurred with NMFS PR on 12/14/2010 (by email from Lou Chiarella, (Northeast Region, Essential Fish Habitat Program Coordinator)) that the proposed actions would not adversely affect essential fish habitat and no formal consultation was required.

4.4 COMPARISON OF ALTERNATIVES

While the "no action" alternative would have no environmental effects, the opportunity to conduct this particular research would be lost. Initiation of this research is important to collect data that would contribute to better understanding of shortnose sturgeon habitat use and ecology, which in turn would provide information to NMFS needed to implement NMFS

management activities for shortnose sturgeon in the Connecticut, Thames, and Housatonic Rivers. This is important information that would help conserve and manage shortnose sturgeon as required by the ESA and implementing regulations.

The preferred alternative would affect the environment, primarily individual shortnose sturgeon and bycaught animals. However, the effects would be minimal and this alternative would allow the collection of valuable information that could help NMFS' efforts to recover shortnose sturgeon. Neither alternative is anticipated to have adverse population nor stock-level effects on any species, including shortnose sturgeon. Given the preferred alternative's minimal impact to the environment and the potential positive benefits of the research, NMFS believes that the information gained would outweigh any potential negative effect to the target species.

4.5 MITIGATION MEASURES

The activities authorized under proposed Permit No. 15614, if approved, would follow certain procedures (as described in Section 2.2) in order to minimize and mitigate effects of the proposed action (as described in Section 4.2). The permit would require specific conditions to ensure compliance with appropriate research protocols. These include conditions that will minimize the potential for injury and stress during procedures.

4.6 UNAVOIDABLE ADVERSE EFFECTS

The research activities would cause disturbance and stress and injury to the captured shortnose sturgeon and non-target species (temporarily interrupting normal activities such as feeding). The mitigation measures imposed by permit conditions are intended to reduce, to the maximum extent practical, the potential effects of the research on the targeted species as well as any other species that may be incidentally harassed. While the research techniques used may have an effect on the individual shortnose sturgeon being targeted for research, the effect on the animals is not expected to have an adverse or long-term effect on target or non-target individuals or populations.

4.7 CUMULATIVE EFFECTS

Cumulative effects are defined those that result from incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency (federal or nonfederal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions that take place over a period of time.

4.7.1 Other research permits and authorizations

Shortnose sturgeon have been the focus of field studies since the 1970s. The primary purpose of this research is for monitoring populations and gathering data for physiological, behavioral and ecological studies. Over time, NMFS has issued dozens of permits for takes of shortnose sturgeon within its range for a variety of activities including capture, handling, lavage, laparoscopy, bloodwork, habitat, spawning verification, genetics, aging, and tracking. Research on shortnose sturgeon in the U.S. is carefully controlled and managed so it does not operate to the disadvantage of the species. As such, all scientific research permits are also conditioned with mitigation measures to ensure that the research impacts target and non-target species as minimally as possible.

Range wide, there are 18 active scientific research permits targeting wild shortnose sturgeon populations with similar objectives as proposed by the applicant (See Appendix 1). Although there

are various other researchers studying the unlisted Atlantic sturgeon populations in Connecticut waters, which could potentially impact shortnose sturgeon and its habitat to some extent, there are no other current permitted activities sampling shortnose sturgeon in Connecticut waters. A Biological Opinion was issued for each of these the permits appearing in Appendix 1, including the requirement for consideration of cumulative effects to the species (as defined for ESA). For each permit, the Biological Opinion concluded that issuance, as conditioned, was not likely to jeopardize the continued existence of the shortnose sturgeon, either individually or cumulatively.

4.7.2 Other activities

Historically, one of the major contributors to declines in shortnose sturgeon populations was commercial harvest. Today, shortnose sturgeon may be adversely affected by human activities including bycatch and poaching, artificial propagation, dams, dredging and blasting, poor water quality, and contaminants. Of the activities, lethal takes of shortnose sturgeon and the disturbance that results in displacement of animals or abandonment of behaviors such as feeding or breeding by groups of animals are more likely to have cumulative effects on the species than the proposed research activities. Cumulative effects are those that result from incremental impacts of a proposed action which when added to other past, present, and reasonably foreseeable future threats or actions, regardless of which agency (federal or nonfederal) or person(s) undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions that take place over a period of time.

4.7.3 Summary of cumulative effects

Effects of past and ongoing human and natural factors and current threats (fisheries, water quality, dredging, dams, existing NMFS research permits, and other actions) are occurring (or have occurred) in or near the action area that have contributed to the current status of the species, are described above, and are also included in the baseline section of the Biological Opinion issued for this proposed research activity. These activities and threats are expected to continue into the future.

Overall, the preferred alternative would not be expected to have more than short-term effects on shortnose sturgeon if sturgeon are present in the research locations. The impacts of the non-lethal research activities are not expected to have more than short-term effects on individual animals and any increase in stress levels from the capture and handling would dissipate rapidly. Even if an animal was exposed to additional capture (e.g., a week later), no significant cumulative effects from the research itself would be expected given the nature of the effects. Based on the analysis in this EA and supported by the Biological Opinion, NMFS expects the proposed authorization of shortnose sturgeon research activities of the preferred alternative would not appreciably reduce the species likelihood of survival and recovery in the wild nor would it adversely affect spawning, mortality rates, or recruitment rates. In particular, NMFS expects the proposed research activities not to affect reproductive adults in a way that appreciably reduces their reproductive success, the survival of young, or the number of young that annually recruit into the breeding populations.

The incremental impact of the proposed research on these animals, when added to other past, present, and reasonably foreseeable future actions discussed here, would not be significant at an individual or a population level. Therefore, no species level events would result from the capture, handling, and release of shortnose sturgeon. The data collected during sampling activities linked with the proposed action would help assess movement and habitat use of juvenile shortnose sturgeon found in the waters of the three mentioned Connecticut rivers. The research would provide

information helpful in managing, conserving, and recovering this species and would outweigh any adverse impacts.

Moreover, the Biological Opinion prepared for File No. 15614 provides an integration and synthesis of the information about the status of the species, past and present activities affecting the species, possible future actions that might affect the species, and effects of the proposed action to provide a basis for determining the additive effects of the take authorized in this permit on ESA listed sturgeon, in light of their present and anticipated future status. The conclusion of the biological opinion for File No. 15614 was the proposed action would not likely jeopardize the continued existence of the species.

The opinion also indicated that NMFS is not aware of any future State, tribal, local, or private actions in the action area that may have a bearing on the risk assessment, and finds that the that the issuance of the proposed permit would have only negligible impacts to shortnose sturgeon. The analysis of past, present and reasonably foreseeable actions indicates that no cumulatively significant impacts would occur associated with the proposed action.

CHAPTER 5 LIST OF PREPARERS AND AGENCIES CONSULTED

Preparers:

Office of Protected Resources
National Marine Fisheries Service
Permits, Conservation and Education Division
Silver Spring, MD 20910

Agencies and Personnel Consulted:

Essential Fish Habitat Program
NMFS Office of Habitat Conservation
Silver Spring, MD 20910

Informal consultations of effects on EFH of federally managed species

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APPENDICES
Appendix 1

Existing shortnose sturgeon research permits similar to the proposed action.			
Permit No.	**Location**	**Authorized Take**	**Research Activity**
10115 Expires: 8/3/2013	Saint Marys & Saltilla Rivers, FL & GA	85 adult/juv 20 ELS	Capture, handle, measure, weigh, PIT tag, tissue sample, collect ELS
14394 Expires: 9/30/14	Altamaha River and Estuary, GA	500 adult/juv. (1 lethal), 100 ELS	Capture, handle, weigh, measure, PIT tag, transmitter tag, tissue sample, anesthetize, laparoscopy, blood collection, fin ray section, collect ELS
10037 Expires: 4/30/2013	Ogeechee River and Estuary, GA	150 adult/juv. (2 lethal), 40 ELS	Capture, handle, measure, weigh, PIT tag, tissue sample, fin-ray section, anesthetize, laparoscopy, blood collection, radio tag, collect ELS
1447 Expires: 2/28/2012	S. Carolina Rivers and Estuaries	100 adult/juv. (2 lethal), 100 ELS	Capture, handle, measure, weigh, PIT and DART tag, transmitter tag, anesthetize, tissue sample, gastric lavage, collect ELS
1505 Expires: 5/15/2011	S. Carolina Rivers and Estuaries	98 adult/juv. (2 lethal), 200 ELS	Capture, handle, measure, weigh, PIT and DART tag, transmitter tag, anesthetize, laparoscopy, blood collection, tissue sample, gastric lavage, collect ELS
1542 Expires: 7/31/2011	Upper Santee River Basin, SC	5 adult/juv.; 100 ELS	Capture, handle, weigh, measure, PIT and dart tag, tissue sample, ELS collection
1543 Expires:11/30/2011	Upper Santee River Basin, SC	3 adult/juv.	Capture, handle, weigh, measure, tissue sample
14396 Expires: 12/31/2014	Delaware River and Estuary NJ & DE	100 adult/juv. (1 lethal),	Capture, handle, measure, weigh, Floy tag, PIT tag, tissue sample, anesthetize, ultrasonic tag,
14604 Expires: 4/19/2015	Delaware River and Estuary NJ & DE	1,000 adult/juv (1 lethal) 500 ELS	Capture, handle, weigh, measure, PIT tag, Floy tag, ultrasonic tag, tissue sample, anesthetize, laparoscopy, blood/biopsy collection, collect ELS
1547-02 Expires:10/31/2011	Hudson River, (Haverstraw & Newburgh), NY	500 adults/juv.	Capture, handle, weigh, measure, PIT & Carlin tag, tissue sample
1575 Expires11/30/2011	Hudson River (Tappan-Zee), NY	250 adult/juv.	Capture, handle, measure
1580 Expires: 3/31/2012	Hudson River and Estuary, NY	82 adult/juv.; 40 ELS	Capture, handle, measure, weigh, PIT tag, Carlin tag, photograph, tissue sample, collect ELS
1549-01 Expires: 1/31/2012	Upper Conn. River, MA	673 adult/juv (5 lethal), 1,430 ELS from East Coast rivers	Capture, handle, measure, weigh, anesthetize, PIT tag, TIRIS tag, radio tag, temperature/depth tag, tissue sample, borescope, laboratory tests, photographs, collect ELS
1516* Expires: 5/15/2011	Lower Conn. River & Estuary., CT	500 adult/juv (2 lethal); 300 ELS	Capture, handle, measure, weigh, PIT tag, sonic/radio tag, gastric lavage, fin ray section, collect ELS
1578-01 Expires: 11/30/2011	Kennebec River and Estuary, ME	500 adult/juv.; 30 ELS	Capture, handle, measure, weigh, tissue sample, PIT tag, acoustic tag, anesthetize, collect ELS
1595-03 Expires: 3/31/2012	Penobscot River and Estuary, ME	200 adult/juv. (2 lethal); 50 ELS	Capture, handle, measure, weigh, borescope, photograph, tissue sample, blood sample, Carlin tag, PIT tag, anesthetize, transmitter tag, collect ELS

14759 Expires: 8/19/2015	North Carolina Rivers, NC	40 adult/juv.	Capture, handle, measure, weigh, photograph, tissue sample, PIT tag, Floy T-bar tag, transmitter tag
14716 Expires: 9/30/2015	Potomac River, VA and MD	30 adult/juv.; 20 ELS	Capture, handle, measure, weigh, photograph, tissue sample, PIT tag, anesthetize, transmitter tag, collect ELS

*Permit currently authorized to applicant

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

Finding of No Significant Impact
Issuance of Scientific Research Permit No. 15614

Background

In October 2010, the National Marine Fisheries Service (NMFS) received an application for a permit (File No. 15614) from Tom Savoy, Connecticut Department of Environmental Protection, to conduct research on shortnose sturgeon in Connecticut waters. In accordance with the National Environmental Policy Act, NMFS has prepared an Environmental Assessment (EA) analyzing the impacts on the human environment associated with permit issuance (Environmental Assessment of the Issuance of Scientific Research Permit File No. 15614 to Conduct Research on Shortnose sturgeon in Connecticut waters, March 2011). In addition, a Biological Opinion was issued under the Endangered Species Act (3/25/2011) summarizing the results of an intra-agency consultation. The analyses in the EA, as informed by the Biological Opinion, support the below findings and determination.

Analysis

National Oceanic and Atmospheric Administration Administrative Order 216-6 (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality (CEQ) regulations at 40 C.F.R. 1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant to making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ's context and intensity criteria. These include:

1) Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in Fishery Management Plans?

> The project's proposed research activity, including boating and netting (gill net and trawl) activity taking place in Connecticut waters, would not take place in national marine sanctuaries. Also, no coral reef ecosystems occur in the action area and thus none would be affected. However, designated EFH does occur in the proposed area of research. Although the researcher's boats would pass through and over the water column where EFH occurs, NMFS determined this portion of the researcher's activity would not adversely impact the physical environment, including any portion considered EFH. Additionally, with respect to anticipated effects on EFH by gill nets and trawls fished, NMFS concluded this gear would result in minimal disturbance to the physical environment, including the bottom substrate and any portion having EFH.

NMFS PR requested concurrence by email on December 7, 2010, from NMFS Northeast Office of Habitat Conservation whether the proposed action, as conditioned, would have adverse impacts on designated EFH in Connecticut waters. On December 14, 2010, Lou Chiarella, EFH Coordinator, responded by email agreeing the proposed boating and netting activities would have no adverse impact to EFH in the action area for the proposed research; therefore, an EFH consultation was not required.

2) Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?

No substantial impact on biodiversity or ecosystem function within the affected area is expected. The bottom substrate of the proposed area for sampling sturgeon consists of sandy loam sediment, mud flats and some rocky substrate in the upper branches of rivers. Thus, the impacts to bottom substrate would be during capture (gillnetting and trawling); however, the minimal contact by nets in localized areas— in addition to the proposed mitigation measures set forth in the permit— we expect minimal disturbance of the benthic organisms and substrate.

Due to the nature of netting, the researchers would expect some other non-target species would become enmeshed. However, non-target fish would be removed from the net and released at the site of capture at short intervals, and it is believed that virtually all by-catch would be released alive without long-term effects on predator-prey relationships.

It is also possible that small numbers of subadult or adult Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) would be taken during sampling for shortnose sturgeon. The Atlantic sturgeon is a candidate species currently considered for listing under the ESA. Any Atlantic sturgeon captured would be handled using the same procedures as shortnose sturgeon and thus, negative effects would not be significant for the species.

3) Can the proposed action reasonably be expected to have a substantial adverse impact on public health or safety?

Issuance of the permit is not expected to have substantial adverse impacts on public health or safety that could reasonably be expected by the proposed research activities. This action would involve the use of 95% ethanol pre-measured in vials for preservation, storage, and transportation of tissue samples. The researchers would wear gloves during use of the alcohol; therefore, direct contact with the alcohol would be eliminated.

4) Can the proposed action reasonably be expected to adversely affect endangered or threatened species, their critical habitat, marine mammals, or other non-target species?

The proposed research activities could potentially have adverse effects on individual endangered shortnose sturgeon, but the effects are not expected to be significant at the population or species level and further, we do not anticipate any individual sturgeon mortality or serious injuries from research activities.

The permit activities require standard NMFS research and mitigation protocols to minimize stress and harmful effects on the species. In the Biological Opinion produced for this action, NMFS concluded issuance of the permit would not likely jeopardize the continued existence of the endangered shortnose sturgeon. Critical habitat has yet to be designated for shortnose sturgeon; thus, none would be affected.

Likewise, bycatch would be returned immediately to the water with minimal exposure to handling stress. Because nets would typically be checked at short intervals, NMFS believes that virtually all bycatch would be released alive. Atlantic sturgeon is considered a "species of concern" occurring in action area in small numbers; hence, there is potential for Atlantic sturgeon to be captured as bycatch. Accordingly, the researchers would monitor nets closely and if this sturgeon species is captured, appropriate measures would be taken to ensure its survival. Additionally, should there be a subsequent Federal listing established for Atlantic sturgeon, or other species, during the permitted time frame, the effects of the proposed research on the species would be analyzed at that time.

Also, in the unlikely event sea turtles or marine mammals were encountered while netting, researchers would be directed by permit conditions to avoid contact with the animals.

5) Are significant social or economic impacts interrelated with natural or physical environmental effects?

There are no known social or economic impacts associated with the proposed action. Therefore, there would be no significant social or economic impacts interrelated with natural or physical environmental effects.

6) Are the effects on the quality of the human environment likely to be highly controversial?

A *Federal Register* notice (75 FR 78974) was published on December 17, 2010, allowing other agencies and the public to comment on the action. All agency comments were addressed and responses were included in the decision memos for the permit. None of the comments were controversial and none addressed the proposal's potential effects on the quality of the human environment. No comments from the public were received on this application.

7) Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands,

wild and scenic rivers, essential fish habitat, or ecologically critical areas?

The research methods in the proposed permit have been analyzed under the current EA. The activities in this proposed permit would not be expected to result significant impacts to any unique areas mentioned above. Additionally, with respect to anticipated effects on EFH by gill nets, trawls and boating activities, NMFS concluded these would result in minimal disturbance to the physical environment, including the bottom substrate and any portion having EFH.

8) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

Potential risks by proposed research methods are not unique or unknown, nor is there significant uncertainty about impacts. Monitoring reports from other permits of similar nature, and published scientific information on impacts of shortnose sturgeon, indicate the proposed activities would not result in significant adverse impacts to the human environment or the species. There is also considerable scientific information available on the minimal likely impacts.

9) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

Overall, the proposed action would be expected to have no more than short-term effects on individual endangered shortnose sturgeon and no effects on other aspects of the environment. The incremental impact of the action when added to other past, present, and reasonably foreseeable future actions discussed in the environmental assessment would be minimal and not significant.

10) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

The action would not take place in any district, site, highway, structure, or object listed in or eligible for listing in the National Register of Historic Places, thus none would be impacted. The proposed action would also not occur in an area of significant scientific, cultural or historical resources and would not cause their loss or destruction.

11) Can the proposed action reasonably be expected to result in the introduction or spread of a non-indigenous species?

The U.S. Geological Survey has documented several aquatic nuisance species occurring in the proposed research area having potential to be spread by the actions of the proposed research. However, the applicant has agreed to follow certain conditions proposed by NMFS (outlined in the accompanying permit) minimizing potential spread of these aquatic nuisance species. Therefore, the

proposed research activities would not be expected to result in introduction or spread of non-indigenous species to other watersheds. The research activities would also not involve discharging bilge water or other issues of concern relative to nonindigenous species.

12) Is the proposed action likely to establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration?

The decision to issue this permit would not be precedent setting and would not affect any future decisions. NMFS has issued numerous scientific research permits to study shortnose sturgeon pursuant to section 10 of the Endangered Species Act, thus, this is not the first permit NMFS has issued for this type of research activity. Issuance of a permit or permit modification, to a specific individual or organization for a given research activity, does not in any way guarantee or imply NMFS would authorize other individuals or organizations to conduct the same research activity. Any future request received, including those by the applicant, would be evaluated upon its own merits relative to the criteria established in the ESA and NMFS' implementing regulations.

13) Can the proposed action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?

Issuance of the proposed permit is not expected to violate any Federal, State, or local laws for environmental protection. NMFS has sole jurisdiction for issuance of such permits for shortnose sturgeon and has determined the research consistent with applicable provisions of the ESA. The permit contains language stating this permit does not relieve the Permit Holder of the responsibility to obtain other permits, or comply with other Federal, State, local, or international laws or regulations.

14) Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

NMFS concluded the proposed procedures would have potential adverse effects on individual shortnose sturgeon. However, because shortnose sturgeon are a robust species and respond well to the types of handling proposed, the cumulative effects on the population are not likely long-term or significant on the species.

NMFS considered the potential for cumulative effects on Atlantic sturgeon as bycatch. Accordingly, NMFS established provisions for monitoring interactions with Atlantic sturgeon and placed conditions in the permit stating if an Atlantic sturgeon are incidentally captured, it must be handled with similar protocols authorized for shortnose sturgeon and at least PIT tagged and genetically sampled. NMFS concluded that since researchers would be monitoring the nets closely, if Atlantic sturgeon were captured, appropriate measures would be taken to ensure survival. NMFS also concluded should there be a subsequent listing of Atlantic

sturgeon coinciding with the proposed research activities, the effects of the research on Atlantic sturgeon would be analyzed at that time.

Likewise, NMFS considered impacts upon potential marine mammal or sea turtle interactions when sampling for sturgeon. Although interactions with these animals would be considered rare based on historical records and the proposed seasonal sampling methods used to minimize contact, the permit would be conditioned so that nets would not be set if these animals were seen in the vicinity of the research, and also mandate that they must be allowed to leave the area before the nets were set.

DETERMINATION

In view of the information presented in this document, and the analyses contained in the EA and Biological Opinion prepared for issuance of Permit No. 15614, it is hereby determined that permit issuance will not significantly impact the quality of the human environment. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an Environmental Impact Statement for this action is not necessary.

James H. Lecky
Director, Office of Protected Resources

MAY 19 2011
Date