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

SEP 24 2010

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 a Scientific Research Permit File No. 14176 to Conduct Research on Shortnose Sturgeon in the Potomac River, Maryland and Virginia**

LOCATION: **Potomac River, Maryland and Virginia**

SUMMARY: The National Marine Fisheries Service (NMFS) proposes to issue a scientific research permit for takes under the authority of the Endangered Species Act. The purpose of File No. 14176 is to collect biological and life history information on shortnose sturgeon in the Potomac River, Maryland and Virginia, including tracking seasonal movements, spawning periodicity, and genetics. 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,

for 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 A SCIENTIFIC RESEARCH PERMIT FILE NO. 14176 TO CONDUCT RESEARCH ON SHORTNOSE STURGEON IN THE POTOMAC RIVER, MARYLAND AND VIRGINIA

September 2010

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: Potomac River, Maryland and Virginia

Abstract: The National Marine Fisheries Service (NMFS) proposes to issue a scientific research permit to the U.S. Fish and Wildlife Service, Maryland Fisheries Resource Office (Mike Mangold, Principal Investigator) for takes of shortnose sturgeon (*Acipenser brevirostrum*) in the wild, pursuant to the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. 1531 *et seq.*). The purpose of this research would be to continue to collect biological and life history information on shortnose sturgeon discovered in the Potomac River. The action area of research activities would take place between the mouth of the Potomac river (rkm 0) to near Little Falls Dam (rkm 189). Research objectives would include tracking previously (and newly) acoustically tagged shortnose sturgeon to characterize their seasonal movements, spawning periodicity, and genetics. Up to 30 fish would be authorized to be taken annually via gill nets, measured, weighed, PIT and t-bar tagged, and genetic tissue sampled. A subset of 10 of these would be acoustically tagged each year—five internally and five externally— and tracked. Additionally, to document spawning, researchers propose to use D-net traps, lethally collecting up to 20 shortnose sturgeon early life stages (ELS) annually. No other mortality, unintentional or otherwise, would be authorized in the permit.

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 five year 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 the U.S. Fish and Wildlife Service (FWS), Mike Mangold, Principal Investigator (File No. 14176), NMFS proposes to issue a scientific research permit authorizing "takes"[1] of shortnose sturgeon (*Acipenser brevirostrum*) in the wild pursuant to the Endangered Species Act of 1973 (ESA; 16 U.S.C. 1531 *et seq*.) and the regulations governing the taking, importing, and exporting of endangered and threatened species (50 CFR Parts 222-226).

1.1.1 *Purpose and Need*

The purpose of the proposed research is to characterize the seasonal movements, spawning periodicity, and genetic component of shortnose sturgeon in the Potomac River by capturing and tracking previously (and newly) acoustically tagged shortnose sturgeon. To accomplish this purpose, up to 30 fish would be authorized to be taken annually via gill nets, measured, weighed, PIT and t-bar tagged, and genetic tissue sampled. A subset of 10 of these fish would be acoustically tagged each year—five internally and five externally— and tracked. Additionally, to document spawning activity, researchers propose to use D-net traps to lethally collect up to 20 shortnose ELS annually.

Section 10(a)(1)(A) of the ESA allows NMFS to issue permits and permit modifications to take ESA-listed shortnose sturgeon. The applicant requires a permit to conduct the proposed research. The primary purpose of the permit, therefore, is to provide an exemption from the take prohibitions under the ESA to allow "takes" of shortnose sturgeon 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 threatened and endangered species under its jurisdiction. The ESA prohibits takes of threatened and endangered species, respectively, with only a few very specific exceptions, including scientific research and enhancement purposes. Permit issuance criteria require research activities are consistent with the purposes and policies of these federal laws and will not have significant adverse impact on the species.

1.1.2 *Objectives of the research*

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

1.2 OTHER EA/EIS THAT INFLUENCE SCOPE OF THIS EA

An EA for File No. 14176 was prepared by NMFS in July 2004 entitled *"Environmental Assessment Scientific Research Permit to U.S. Fish and Wildlife Service (USFWS), Maryland Fisheries Resource Office,* (File No. 1444)" issued to analyze effects on the environment for a similar research permit conducted on shortnose sturgeon in the Potomac River. This EA evaluated the effects of research capturing up to 50 adult or juvenile shortnose sturgeon in the Potomac River, focusing on

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

providing critical data on stock status, life history, and survival rates as well as identifying specific habitat requirements of the various life stages. A Finding of No Significant Impact (FONSI) was signed July 21, 2004, 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.

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. However, a Notice of Receipt of the application was published in the *Federal Register*, announcing the availability of the permit application and related documents for public comment (File No. 14176; March 19, 2010; 75 FR 13256). All agency comments received were appropriately addressed and documented in decision memos. No comments were received from the public regarding this application.

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).

NOAA 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 EA is prepared in accordance with NEPA, its implementing regulations, and NAO 216-6.

1.4.2 *Endangered Species Act*

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit 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. This chapter also summarizes the expected outputs and any related mitigation of each alternative. Alternative Number 1 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 No. 1: NO ACTION

Under this alternative, the No Action alternative, scientific research permit (File No. 14176) to capture, sample, tag, release, and track shortnose sturgeon would not be issued at this time.

2.2 ALTERNATIVE No. 2: PROPOSED ACTION –ISSUANCE OF PERMIT WITH STANDARD CONDITIONS

Under the Proposed Action alternative, a permit would be issued for activities by the applicant, with the permit terms and conditions as issued by NMFS for five years. Specifically, the proposed action would authorize researchers to capture (by anchored or drift gill nets), handle, measure, weigh, PIT tag, t-bar tag and acoustic tag, genetic fin clip up to 30 shortnose sturgeon annually from the Potomac River. A subset of 10 of these would be acoustically tagged each year—five internally and five externally— and tracked. Up to 20 ELS may be lethally collected in each river with artificial substrates or D-nets. No other mortality, unintentional or otherwise, for either river would be authorized (Table 1).

Table 1: Activities proposed to be annually authorized for endangered shortnose sturgeon (*Acipenser brevirostrum*) research in the Potomac River under Permit No. 14176

LIFESTAGE	SEX	EXPECTED TAKE	TAKES PER ANIMAL	COLLECT METHOD	PROCEDURES
Adult & Juvenile	Male & Female	20	1	Anchored or Drift Gill Net	Capture; Handle; Measure; Weigh; PIT Tag; T-bar Anchor Tag; Genetic Fin Clip; and Release
Adult	Male & Female	5	1	Anchored or Drift Gill Net	Capture, Handle, Measure, Weigh, PIT Tag, T-bar Anchor Tag, Anesthetize* External Acoustic Tag, Genetic Fin Clip, Release and Track
Adult	Male & Female	5	1	Anchored or Drift Gill Net	Capture, Handle, Measure, Weigh, PIT Tag, T-bar Anchor Tag, Anesthetize* Internal Acoustic Tag, Genetic Fin Clip, Release and Track
Eggs & Larvae	Unknown	20	1	D-Net	Lethal Take

*Anesthetize by electronarcosis

2.2.1 Map of Action Area

Figure 1. Map of action area.

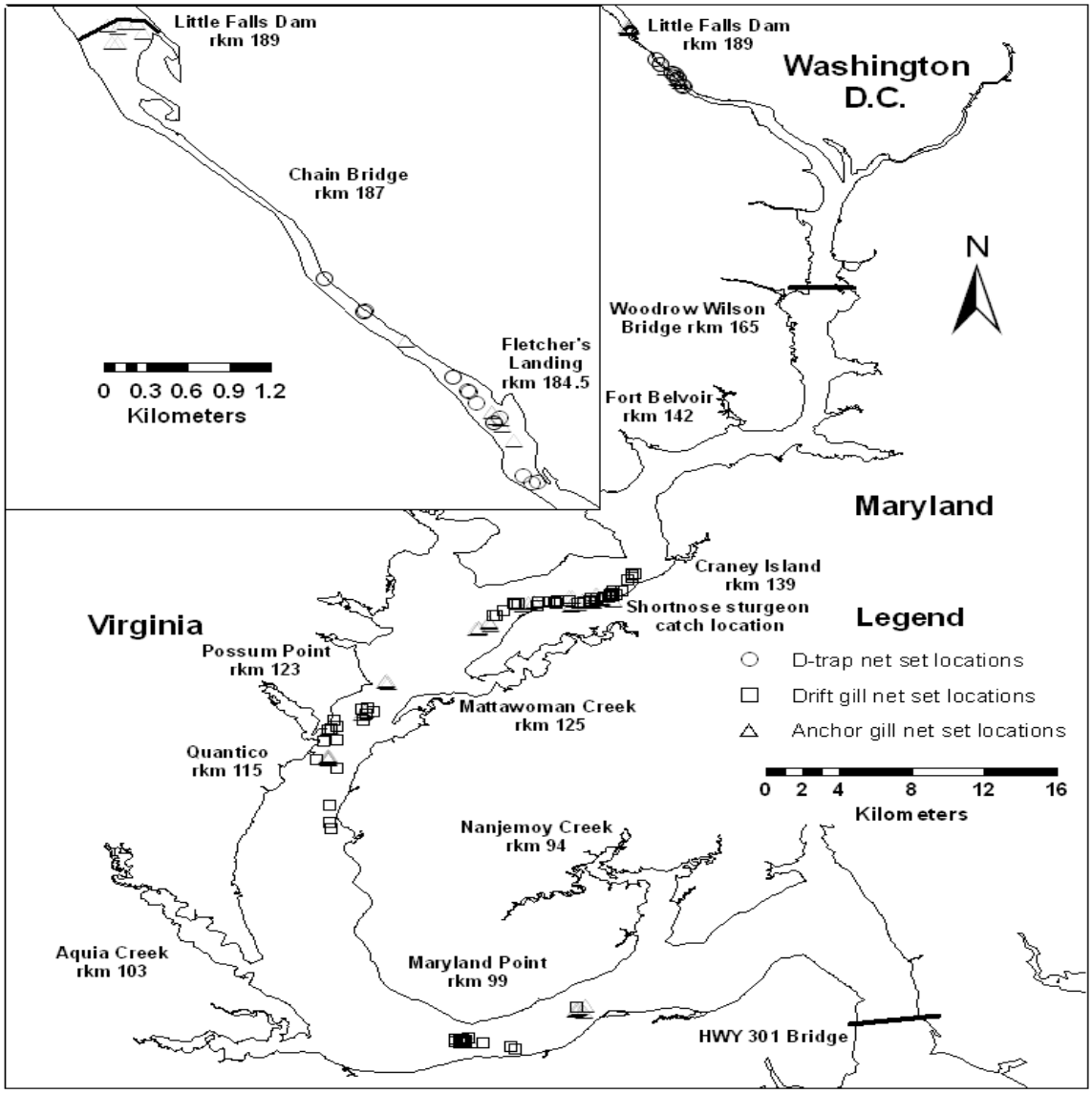

Figure 1. Map showing the study area for shortnose sturgeon during 2006. Inset map shows the river reach sampled in the spring.

2.2.2. Description of Proposed Action Area:

The proposed action area includes the Potomac River from the mouth (rkm 0) to near Little Falls Dam (rkm 189). Netting would occur primarily above the Highway 301 Bridge (rkm 77); however, tracking of animals would occur over the entire described length of the river to Little Falls Dam.

2.2.3 *Research Activities*

The following sections provide a description of the proposed research activities:

2.2.3.1 Capture of Adults or Juveniles:

Up to a total of 30 juvenile and/or adult shortnose sturgeon would be captured annually using a standardized netting protocol with anchored or drift gill nets 1 to 5 days per week. 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.

Sturgeon would be captured mainly using sinking multifilament drift gillnets (150 m long x 3.1m deep with 12.5-cm stretch mesh) fished with the current in the channel, on the channel edge, and in shoals in the lower part of the Potomac river. The net would be drifted perpendicular to the current for up to one hour. Drift gill nets would be allowed to move with the prevailing flow for 15 to 60 minutes. In the upper study area, near Fletcher's cove researchers plan to use anchored multifilament or monofilament gillnets (100 m long x 1.7 m deep with 15-cm stretch mesh) fished parallel to river flow to capture sturgeon. One to six anchored gill nets would be set for 1 to 14 hours per location, depending on temperature and dissolved oxygen regimes. Nets would be deployed and tended by researchers using a 20-foot crew boat equipped with a 55 HP motor. Only experienced fisheries biologists and technicians would participate in gill netting activities for shortnose sturgeon.

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

Sampling in the summer months would concentrate on the capture of adult and juvenile shortnose sturgeon upstream of the Highway 301 Bridge when the population is most likely to become congregated in deepwater areas (holes) located near the fresh-saltwater interface. However, sampling efforts would also be conducted at upstream overwintering locations prior to spawning near Fletchers Cove (October to February).

2.2.3.2 Capture of ELS with D-Nets:

The use of D-shaped ichthyoplankton nets (D-nets) is requested as a method for collecting up to 20 shortnose sturgeon eggs and larvae annually to document spawning activity in the river. The

proposed D-nets are bottom-anchored drift nets 5-m long, with a D-shaped mouth 130-cm wide by 45-cm high (mouth opening, 0.44 m^2). The net has 2-mm mesh size and is designed to capture 3-4 mm diameter eggs, free embryos, and larvae while passing smaller particles. A velocity meter, mounted within the mouth of nets, measures volumes of water (m^3/s) sampled to make possible calculations of ELS catch rate. Egg collection materials would be removed from the river once the water temperature exceeds 15°C, by the end of May, or once the amount of authorized shortnose sturgeon eggs and/or larvae has been collected; whichever comes first.

The potential spawning area to be sampled for ELS would be downstream from Little Falls Dam (rkm 189) to Fletcher's Cove (rkm 184.5). If there is evidence of spawning or upstream movement of acoustically tagged sturgeon (between March and April), up to three drift D-nets — described by Kieffer and Kynard (1996) for sampling early life stages (ELS) — will be deployed for no more than 3 hours at a time. After each 3-hour period, the D-nets would be raised and examined for eggs or larvae before being re-deployed. Any captured eggs would be removed with soft tipped tweezers. No more than 20 eggs would be collected, which may be preserved and returned to the lab for identification and aging. Any ELS in excess of the proposed 20 would be placed back into the river onto suitable substrate near-by in hopes of successful maturation of the eggs.

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

Once removed from the nets, captured shortnose sturgeon would be recovered in a floating net pen (2 ft x 4 ft x 3 ft). Fish would be allowed to recover for 10-15 minutes prior to further handling/sampling. Once recovered, sturgeon 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 over the side of the research vessel. Shortnose sturgeon would be weighed on a platform scale, which is fitted with a small waterproof cushion. The total time required to complete routine handling and tagging (*i.e.*, PIT tagging, measuring, weighing) would be approximately one minute. Following processing, the fish would be treated with a slime coat restorative and returned to the net pen to ensure full recovery from any stress prior to release. Total holding time in the net pens may be somewhat variable depending on water temperature and the condition of each fish; however, no fish would be held longer than one hour from the time of capture until the time it is released.

2.2.3.4 PIT Tags:

All shortnose sturgeon captured ($\geq$ 300 mm TL) would be identified with 11.5 mm by 2.1 mm or smaller PIT tags. PIT tags would be injected in the left dorsal musculature (near and anterior to the dorsal fin) with 12 gauge syringes using sterile procedure. Prior to placement of PIT tags, the entire dorsal surface of each fish would be scanned with an AVID Powertracker II detector to detect any previously tagged fish. No juvenile fish captured less than 300 mm (TL) would be PIT tagged.

2.2.3.5 T-bar Anchor Tags:

Shortnose shortnose sturgeon would also be tagged with external T-bar anchor tags (Floy) which would allow fishermen to report recaptures. These tags would be inserted at the dorsal fin base in the musculature just forward and slightly downward (from the left side to the right) locking into the dorsal pterygiophores of the dorsal fin. After removing the injecting needle, the tags would be spun between the fingers and gently tugged to be locked in place. To document tag retention of these tags, recapture data would be crossed referenced with PIT tag results reported to NMFS in annual reports. No juvenile fish captured less than 300 mm (TL) would be T-bar tagged.

2.2.3.6 Acoustic Tags:

Annually, a maximum of 10 adult or juvenile shortnose sturgeons would be fitted for internal (5) or external (5) implantation of sonic transmitters tags. The internal tag (Vemco V-16-6H) measures 95mm in length and 16 mm in diameter and weighs 16 grams (H_2O weight) with a battery life of 36 months. Fish would be tracked passively with a Vemco array of remote VR2W receivers positioned in the river to document movement within the river. Additionally, between October and February at the Fletcher's Cove location, researchers would attempt to gill net adults and attach external acoustic tags to scutes on up to 5 fish. 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 gill netted for implanting telemetry tags.
    ii. Captured fish would be anesthetized using electronarcosis (Henyey et al. 2002).
    iii. Anesthetized fish would be held on their backs in a small cradle while held motionless under narcosis. The incision site would be disinfected and a surgical opening of 2-3 cm would then be made in the belly of the fish immediately posterior of the pelvic girdle. 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 would be inserted into the surgical opening;
    v. The incision would then be closed with a resorbable suture and sealed with a thin layer of surgical glue; and
    vi. The fish would then be allowed to recover (to equilibrium) in a net pen and released.

- External transmitters would be attached to adult shortnose sturgeon using the following 3-5 minute procedure:
    i. Adult shortnose sturgeon would be gill netted between October and February prior to spawning migrations
    ii. Captured fish would be anesthetized using electronarcosis (Henyey et al. 2002).
    iii. Anesthetized fish would be held on their backs in a small cradle while held motionless under narcosis. A pair of 2-mm holes would then be drilled into the 3rd or 4th dorsal scutes using a battery-powered, high-speed drill, carefully avoiding penetration of the dorsal musculature;
    iv. The sterilized attachment wires of the transmitter would be threaded through the holes in the scute and a plastic retaining washer placed over the protruding end of each. The wires would then be crimped and cut within 1 cm of the retaining washer; and
    v. The fish would then be allowed to recover (to equilibrium) in a net pen and released.

2.2.3.7 Electronarcosis:

Using the method described by Henyey et al. (2002), the researchers would use (non-pulsed) DC voltage (0.3-0.5 V/cm, 0.01 A) to immobilize fish during surgery to implant or attach sonic transmitters. In this procedure, fish would be placed in a tank with a screen anode at one end of the tank and a cathode screen at the other end. As voltage is applied quickly to the anode (1-2 sec), the subject fish would lose equilibrium and would relax and sink to the bottom. Voltage would then be adjusted downward until the fish became immobilized except for strong opercula movement. Fish would be supported with a cradle so only their back or ventral surface emerged from the water while work would be conducted.

2.2.3.8 Genetic Fin Clips:

Immediately prior to release, a small sample (1 – 2.0 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. 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.

2.2.4 *Unintentional Mortality*

It is possible that the capture activities (i.e. gillnetting) 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) 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 of the by-catch would be released alive.

CHAPTER 3: DESCRIPTION OF THE AFFECTED ENVIRONMENT

The affected environment is biological and physical resources occurring within the watersheds of the Potomac River in the states of Maryland and Virginia (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 BIOLOGICAL ENVIRONMENT

3.1.1 *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/.

3.1.1.1 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 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.

3.1.1.2 Natural History and Habitat Information of Shortnose Sturgeon in the Potomac River:

Spawning: During previous shortnose sturgeon research by the applicant on the Potomac River (File 1444), two late-stage females were captured, telemetered and tracked between 2005 and 2007. However, only one was observed to make an apparent spawning migration in the spring. A third female was captured after the spring spawning season ended in 2008; its movements are currently being tracked.

Remote and manual tracking showed one gravid female arrived at the Fletchers Marina (rkm 184.5) on April 9, 2006 and remained within a 2-km reach (rkm 187–185) for approximately five days. During this time, mean daily river temperatures were 12.6–16.0°C and mean daily river discharge was 157–178 m^3/s. Video camera monitoring along three sampling transects within the reach used by this migrant showed the substrate was predominantly large and small boulders (70–80%), along with the suitable spawning substrate of gravel-pebble and cobble-rubble (15.5–24.0%). During spring 2007, researchers determined mean bottom velocity along the channel shoulder in the Fletcher's Marina-Chain Bridge reach (rkm 184.5–187.0) was 1.05 m/s and mean depth was 6.3 m. The Potomac River is considered to be tidally influenced up to the Chain Bridge (rkm 187) which lies just 2 km upstream of the suspected spawning area at Fletcher's Marina (Kynard et al. 2007). Although researchers filtered 100,000 m^3 of water at the Fletcher's site through 2-mm mesh anchored D-nets, no sturgeon ELS were captured (Kynard et al. 2007).

Foraging: During the time the two female fish were tracked (2005–2007) they spent the summer-fall in a 78-km reach (rkm 141–63). Most of this area was in tidal freshwater, however, the downstream section of the range experiences tidal salinity. The two fish shared the same 10-20 km reach in June–July of 2006 (fish were never tracked in the same specific location); however, winter sites used by each fish were about 35 km apart or greater. The fish used depths between 4.1–21.3 m, but most locations (89.2%) were in the channel. Throughout the summer and winter, fish were observed in a wide range of water temperature (1.8–32.0°C), DO (4.8–14.6 mg/L) and salinity (0.1–5.6 ppt; Kynard et al. 2007). Substrate measured at fish locations were mud (80.7%), sand/mud (15.8%), and gravel-mud (3.5%). The foraging area is also characterized by prolific tracts of submerged aquatic vegetation and algal blooms. In addition, tidal cycles cause currents to reverse throughout the entire summer-winter range.

Over-wintering/resting: Researchers tracked one female throughout an entire winter season (2005–2006). All winter sites selected by this female occurred within the 78-km summer-fall reach. This female returned to the same reach for wintering three consecutive years and occupied < 2 km during winter. The other female that was tagged in spring 2006, was tracked only until February 2007, after which, it was not found again. In February 2007, it occupied a site at rkm 85, which is the farthest downstream location that this fish was tracked during the study.

Migration corridor/seasonal movements: Annual movements were most typical of north-central adults. The tracked fish in the study remained in fresh water for at least one year. Based on the observations of a single tracked female, pre-spawning migration occurs in spring during mid-April and is a one-step spawning migration as described by Kynard (1997).

Shortnose sturgeon found in Chesapeake Bay may ultimately be migrants from the Delaware River. A movement study of 13 shortnose sturgeon radio-tagged in the upper Chesapeake Bay and 26 tagged in the Delaware River (near Scudders Falls) showed movement through the C & D canal (joining the Delaware River and Chesapeake Bay) (Welsh et al. 2002).

3.1.2 *Non Target Species*

3.1.2.1 ESA or Marine Mammal Protection Act Protected Species Potentially Affected by the Proposed Action:

Listed Species

The dwarf wedge mussel, (*Alasmidonta heterodon*) is an ESA-listed species of freshwater mussel, with a population occurring in Nanjemoy and Aquia Creeks, tributaries of the Potomac River located in Virginia (USFWS 1993). After consulting with USFWS, it was determined that there will be no significant impacts on the dwarf wedge mussel by the proposed research since the species occurs in the freshwater areas of these creeks, well upstream of the tidal portions of the Potomac River where gill-netting for shortnose sturgeon is proposed; see Section 4.3.1.2.

Sea Turtles

A sea turtle mark-recapture program conducted by the Virginia Institute of Marine Science from 1980-1999 captured 457 sea turtles, the majority (96.68%) of which were loggerhead sea turtles (*Caretta caretta*) in pound nets at the mouth of the Potomac River; generally, loggerhead sea turtles are thought to enter the Chesapeake Bay annually when water temperatures are approximately 18°C (Mansfield and Musick 2001). Additionally, the Maryland Department of Natural Resources has documented loggerhead, Kemp's Ridley (*Lepidochelys kempii*), and green (*Chelonia mydis*) sea turtles utilizing Chesapeake Bay during summer months (Kimmel et al. 2008). 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 location of proposed netting in the Potomac River beginning at rkm 77. An informal consultation with NMFS Northeast Regional Office Protected Species Division was initiated; see Section 4.3.1.3.

3.1.2.2 Non-Listed By-catch Species:

From previous catch records of the applicant, NMFS would expect netting some other non-target species such as quillback sucker (*Carpiodes cyprinus*); walleye (*Stizostedion vitreum*); common carp (*Cyprinus carpio*); blue catfish (*Ictalurus furcatus*);channel catfish (*Ictalurus punctatus*); flathead catfish (*Pylodictis olivaris*); gizzard shad (*Dorosoma cepedianum*); striped bass (*Morone saxatilis*); goldfish (*Carassius auratus*); white sucker (*Catostomus commerson*i); hog choker (*Trinectes maculates*); menhaden (*Brevoortia tyrannus*); large mouth bass (*Micropterus salmoides*); and longnose gar (*Lepisosteus osseus*). 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 the Delaware River study area with shortnose sturgeon. 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.

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 4.5.2.5 of this EA.

3.1.2.3 Aquatic Nuisance Species:

The U.S.Geological Survey (USGS) has documented several aquatic nuisance species (USGS 2010) in the lower watershed of the Potomac River including: water-chestnut (*Trapa natans*); Brazilian waterweed (*Egeria densa*); water-hyacinth (*Eichhornia crassipes*); hydrilla (*Hydrilla verticillata*); parrot-feather (*Myriophyllum aquaticum*); Eurasian water-milfoil (*Myriophyllum spicatum*); brittle naiad (N*ajas minor*); zebra mussel (*Dreissena polymorpha*); Asian clam (*Corbicula fluminea*); goldfish (*Carassius auratus*); northern snakehead (*Channa argus*); and giant snakehead (*Channa micropeltes*). 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 4.5.2.7 of this EA, were agreed to by the researcher to be implemented as standard practices.

3.2 SOCIAL AND ECONOMIC 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.

3.3 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 mouth of the Potomac River

(rkm 0) have designated EFH. A description of specific designated EFH for species within the action area can be found at: http://www.nmfs.noaa.gov/habitat/habitatprotection/profile/midatlantic_council.htm, and http://www.nmfs.noaa.gov/habitat/habitatprotection/efh/GIS_inven.htm.

3.3.1 *Description of the Potomac River watershed*

The Potomac River is a major tributary within the Chesapeake Bay system. The drainage area of the Potomac includes approximately 14.7K square miles in four states: 3.8K in Maryland; 5.7K in Virginia; 3.5K in West Virginia; 1.6K in Pennsylvania; and a small portion in the District of Columbia. The length of the river measures over 350 miles from its origination point in Fairfax Stone, West Virginia to its mouth at Point Lookout, Maryland. The majority of the basin's land is covered by forests (57.6%) followed by agriculture which covers 31.8%, while water and wetlands make up 5%, and developed land makes up 4.8%. The human population of the entire basin is around 5.35 million, based on the 2000 Census, and almost 75% of that population resides in the Washington Metropolitan area. Major industries include agriculture, forestry, coal mining, pulp, chemical and paper production, and fishing in the Lower Potomac Estuary. The average daily flow, as measured in Washington, D.C. before water supply withdrawals, is approximately 7 billion gallons.

3.3.2 *Critical Habitat*

Critical habitat has not been designated for shortnose sturgeon. 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.

3.3.3 *Essential Fish Habitat*

Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) requires NMFS to complete an EFH consultation for any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by the agency that may adversely affect EFH. Because of the limited anticipated impacts of the proposed netting and boating activity on EFH, the Office of Protected Resources determined the activities in Permit No. 14176 would not adversely affect EFH.

NMFS PR requested concurrence by email on June 10, 2010, from NMFS, Northeast Office of Habitat Conservation whether the proposed action, as conditioned, would have adverse impacts on designated EFH in the Potomac River. On June 16, 2010, Karen Abrams, National 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. Therefore, no further discussion of essential fish habitat is warranted in this analysis.

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 PROPOSED ALTERNATIVE 2:** ISSUANCE OF 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 trammel 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 28ºC 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. Further, there has been zero mortality or injuries during the past two years by researchers using more conservative measures implemented by NMFS PR.

To limit stress and mortality of sturgeon due to capture, the USFWS researchers have agreed to NMFS PR's more conservative recent set of conditions related to capture. 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 and 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. Lastly, related to capture, while it is possible that interaction with the capture methods described above could result in fewer adults reaching spawning grounds—by externally tagging pre-spawning fish in the fall and winter— it is anticipated that spawning runs would not be interrupted.

4.2.2 *Effects of Lethal Take of Eggs with D-nets*

The additional use of D-nets would have a lesser effect than the previously analyzed anchored and drift gill nets. Due to their relatively small size, D-nets would not disrupt the water flow or habitat. Drifting or dislodged embryos and larvae would be captured in the nets, identified, and preserved, and the excess of the authorized take would immediately be returned to the river. Therefore, no adverse impacts to the physical environment are anticipated. Researchers would check nets every 3 hours to be sure that there is minimal or no mortality of eggs or larvae. D-nets would be removed from the river once the water temperature exceeds 15°C, by the end of May, or once the amount of authorized shortnose sturgeon eggs and/or larvae has been collected; whichever comes first.

Additionally, the request by the researchers to collect up to 20 shortnose sturgeon eggs annually to document spawning activity is not expected to impact the biological environment and the ability of shortnose sturgeon to survive. Each adult female sturgeon produces between 94,000 and 200,000 eggs every 3 years (COSEWIC 2005). The survival from egg to juvenile is likely the most critical aspect in determining the strength of the year class (COSEWIC 2005). The population (if any) and sex ratio of shortnose sturgeon in the Potomac River is unknown; therefore, it is important to be conservative when analyzing the impacts of removing eggs and larvae from the river systems. For that reason, if only 1 female sturgeon reproduces each year in the river and produces a minimal number of eggs (94,000), this project would collect approximately 0.03% of the eggs produced in that year. As such, the annual proposed take of 20 eggs or larvae would be considered to have minimal effects on the shortnose sturgeon population in the Potomac River.

Although there has not been evidence confirmed of spawning activity in the Potomac River, past tracking research in the river has documented likely spawning migrations of gravid female sturgeon to potential spawning sites. If the presence of spawning activity can be confirmed, the location of spawning areas and the timing of the spawn would be important for future recovery planning and protection. The use of D-nets for egg and larvae collection would likely result in more timely and conclusive data pertaining to sturgeon spawning in the Potomac River.

4.2.3 *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.

4.2.4 *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.

4.2.5 *Effects of T-Bar Tags*

NMFS has authorized a variety of external-identifier tag designs and placement sites on shortnose sturgeon over the past 10 years including the proposed T-bar tags. Placing an external T-bar tag in the dorsal musculature (see Section 2.2.3.5) has shown promise for tag retention with minor impacts to shortnose sturgeon (Moser et al. 2000). Smith et al. (1990) compared the effectiveness of dart tags with nylon T-bars, anchor tags, and Carlin tags in shortnose and Atlantic sturgeon. Carlin tags applied to scutes had low retention rates as did dart tags; however, it was noted that the dart tags caused some tissue damage. The T-bar anchor tags had the highest retention rate in the study. Collins et al. (1994) found no significant difference in healing between fish tagged in freshwater or brackish water. Clugston (1996) also looked at T-bar anchor tags placed at the base of the pectoral

fins and found that beyond two years, retention rates were about 60%. Collins et al. (1994) compared T-bar tags inserted near the dorsal fin, T-anchor tags implanted abdominally, dart tags attached near the dorsal fin, and disk anchor tags implanted abdominally. He found that, in the long-term, T-bar anchor tags were most effective (92%), but also noted that all of the insertion points healed slowly or not at all, and, in many cases, small lesions developed.

Researchers would be tagging sturgeon (≥300mm) using (medium) T-bar anchor tags manufactured by Floy Tag & Mfg. Tag retention would be monitored by comparing recapture results with PIT tag results on recaptures; and effects of tagging would be measured by examining the tissue or recaptured sturgeon at insertion points.

4.2.6 *Effects of External Sonic Tags*

The applicant proposes to attach external sonic tags mounted to a large forward scute of up to five shortnose sturgeon annually. The researcher is also choosing to mount the smaller acoustic tags externally rather than internally to avoid destroying eggs of female adults. That is, the use of external sonic tags would be a minimally intrusive method of tagging on late stage female sturgeon when targeting spawning behavior. Further, the external tag is not thought to have adverse effects on sturgeon when installed with buffer pads as the applicant proposes. The researcher estimates the procedure to attach the external tags would be non stressful, lasting approximately two to three minutes.

4.2.7 *Effects of Internal Sonic Tags*

The issuance would also authorize the use of internally implanted sonic transmitters. This activity would cause stress during capture and restraint and minor wounds from surgical procedure 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 (1985) 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, of which 26 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 attempted by Collins in South Carolina (M. Collins, *pers. comm.*, November 2006) has thus far not resulted in a known mortality. Additionally, Kieffer and Kynard (In press) report that tag rejection internally 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 day), and poor incision healing was rare.

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). 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.

4.2.8 *Effects of Electronarcosis*

Evaluations comparing anesthesia induced using MS-222 and electrical narcosis have yielded similar results of muscle relaxation and immobility (Kynard and Lonsdale 1975; Henyey et al. 2002); however, a marked increase in induction and recovery time was experienced when using MS-222 compared to electronarcosis. Induction and recovery from electronarcosis both take less than one minute while induction and recovery takes place in 3-5 minutes and 5 to 7 minutes respectively with MS-222. Further, as soon as the sturgeon is placed in, or is removed from the electrical current, several researchers have reported immediate narcosis or recovery (Gunstrom and Bethers 1985; Summerfelt and Smith 1990; Henyey et al. 2002). Henyey et al. (2002) state that electronarcosis is ideal for non-invasive research, but that more research is needed to determine exactly how electronarcosis works. Hartley (1967) states that using straight DC provides no anesthetic effect, but rather acts to block cerebral messages to the longitudinal efferent nerves to prevent the sensation of pain. Coyle et al. (2004) also notes that electronarcosis immobilizes fish but isn't a true anesthetic. The methods in Henyey et al. (2002) elicited narcosis, not tetany; Kynard (*pers comm*., December 2008) states that the fish's nerve pathway is blocked at the medulla oblongata.

Since Henyey et al. (2002) published their methods, the applicants began using similar electronarcosis techniques (since 2004) on the Potomac River and Chesapeake Bay anesthetizing shortnose and Atlantic sturgeon. Internal transmitter tags were surgically implanted under electronarcosis with no adverse affects reported (Mike Mangold, *pers comm*., January 2009). In another study in South America researchers followed similar methods and reported similar results (Alves et al. 2007). Henyey et al. (2002) also used this method in the lab and monitored shortnose sturgeon for 6 weeks following electronarcosis measuring no adverse effects in that time. There were no changes in swimming or feeding behavior, no burns, no bruising, and no mortality. Furthermore, Kynard (application for Permit No. 1549) reported several years of data showing no mortality following anesthetization with electronarcosis.

The risk associated with the procedure is over-applying the direct current causing cessation of opercula movement and involuntary respiration. However, NMFS believes that with proper training this method is safe for inducing narcosis and, if used carefully on green, shortnose, and Atlantic sturgeon, there is very little chance of mortality or harmful injury.

4.2.9 *Effects of Genetic Tissue Sampled*

The applicant proposes to take a small (2 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. 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).

4.2.10 *Effects on Non-Target Species*

Listed Species

Based on informal consultations with USFWS (see Section 3.1.2.1), no significant impacts on the listed dwarf wedge mussel are expected.

Sea Turtles

As per the informal consultation with NMFS Northeast Regional Office Protected Species Division (see Section 4.3.1.3), and the mitigation conditions set forth in the permit, no significant impacts on sea turtles are expected.

Non-Listed By-catch Species

All non-listed by-catch species are expected to be released alive (see Section 3.1.2.2 for a list of potentially encountered by-catch species). 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.

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

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.

4.3.1 *Compliance with Endangered Species Act* (*ESA*)

4.3.1.1 *Consultations on Non-Target Species under NMFS Jurisdiction:*

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.

4.3.1.2 *Consultations on Non-Target Species under USFWS Jurisdiction:*
The USFWS was contacted by email with regard to potential impacts of the proposed activity on listed species under USFWS's jurisdiction. USFWS biologist Andy Moser (Chesapeake Bay Field Office, Annapolis, MD) concurred by email dated June 29, 2010 with NMFS PR that the researcher's activity in the Potomac River would not likely adversely affect the listed non-target species identified in Section 3.1.2.1 in this EA.

4.3.1.3 *Consultations on Non-Target Species under NMFS Jurisdiction:*
Communication received by email on 6/29/2010 from Carrie Upite (NMFS Northeast Region Sea Turtle Coordinator) indicated that based on the relative low occurrence and distribution of sea turtles in the action area, the proposed net protocol would eliminate/minimize sea turtle interactions. The appropriate precautionary measures for the proposed net protocol are contained in Section 4.5.2.6 of this EA.

4.3.2 *Compliance with the Magnuson-Stevens Fishery Conservation and Management Act*
NMFS PR contacted the NMFS Office of Habitat Conservation (Silver Spring, MD) by email on 6/10/2010. The Office concurred with NMFS PR on 6/16/2010 (by email from Karen Abrams, (National Coordinator, Essential Fish Habitat Program) 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 information that would contribute to better understanding of shortnose sturgeon and to provide information to NMFS needed to implement NMFS management activities for shortnose sturgeon in the Potomac River. 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
There are no additional mitigation measures beyond those conditions required by permit. The conditions required if a permit were issued are outlined below. All of these conditions are intended to minimize unavoidable adverse effects of the various research activities. The permit conditions also require regular reports on the effectiveness of the research at achieving the applicant's stated objectives (and thus at achieving the purpose and need of the federal action) and on the effectiveness of the mitigation measures required by the permit. By statute, regulation, and permit conditions,

NMFS has authority to modify the permit or suspend the research if information suggests it is having a greater than anticipated adverse impact on target species or the environment.

4.5.1 *Applicant's Mitigation Measure*s

- Shortnose sturgeon capture would be handled with care and net sets would be limited to approximately 1-2 hours depending on the seasonal temperature of the water.
- Once captured, fish would be quickly freed from the nets and released into a floating net pen.
- To minimize risk of sturgeon movement during surgical procedures researchers would be using a portable anesthesia machine and protocol designed to keep the animal in a quiescent state throughout the procedure.
- The protocols that will be used for anesthesia have been developed and tested extensively by the USFWS, Warm Springs Fish Health Center (Harms and Bakal 1994).
- To aid in blood clotting, direct pressure would be applied to surgical sites until no additional bleeding is observed.
- To combat infection from surgical procedures, a small incision would be used, minimizing the amount of suture necessary, as well as decreasing the healing time.
- Suture tags would be kept as short as possible and povidone iodine ointment would be applied to the sutures prior to recovering the animal from anesthesia. This treatment helps prevent fungal growth on the sutures, providing a time period sufficient for the mucous layer to correct any disruptions that had occurred during the procedure.
- Any stressed fish not recovering inside a pen would be released without additional handling.

4.5.2 *NMFS Mitigation Measures*

4.5.2.1 Capture, Holding, and Handling Conditions:

- The Permit Holder must take all necessary precautions to ensure that sturgeon are not harmed during captures, including use of appropriate gill net and trammel net mesh size and twine type that prevents shutting gill opercula, restricting gill netting activities and decreasing the time of net sets.
- Nets must be deployed only in waters with dissolved oxygen levels $\geq$ 4.5mg/l.
- Nets may only be fished when water temperatures are between 0°C and 28°C.
- Temperature and dissolved oxygen must be measured at the depth that the nets would be fished for the entire deployment (to ensure appropriate values according to the conditions above).
- At water temperatures less than 15°C, a net soak-time of 14 hours is acceptable.
- At water temperatures between 15°C and 20°C, net sets must not exceed 4 hours.
- At water temperatures between 20°C and 25°C, net sets must not exceed 2 hours
- Soak times of nets would be limited to 1 hour at water temperatures above 25°C.
- Netting must cease at temperatures above 28°C.
- Once removed from the nets, captured shortnose sturgeon must be allowed to recover in a floating net pen for 10-15 minutes before they are processed. Following processing, fish must be returned to the net pen to ensure full recovery prior to release. Any stressed fish not recovering inside a pen would be released without additional handling
- Unless specifically otherwise authorized, the total holding time of any one shortnose sturgeon, after removal from the net, must not exceed one hour when water temperatures are

equal to or less than 27°C.

- Above 27°C, no surgical procedure should be scheduled and animals should be returned to the water after 15 minutes removed from the net.
- Total handling time (outside of net pen or live well) of any individual shortnose sturgeon must not exceed 15 minutes.
- Fish must be handled with care and kept in water to the maximum extent possible during sampling and processing procedures. To reduce stress, all fish handled out-of-water must be transferred using a sanctuary net that holds water during transfer.
- For weight measurements, sturgeon must be supported using a sling or net and handling should be minimized throughout the procedure. Smooth rubber gloves must be worn to reduce abrasion of skin and removal of mucus.
- Sturgeon must be held in floating net pens or live cars during processing.
- When fish are onboard the research vessel, they must be placed in flow-through tanks that allow for total replacement of water volume every 15-20 minutes. Oxygenation of holding tanks is necessary during periods of high temperature and/or low dissolved oxygen to ensure that dissolved oxygen levels are not less than 5 mg/l.
- Sturgeon is extremely sensitive to chlorine; therefore, thorough flushing of holding tanks sterilized with bleach would be required between sampling periods.

4.5.2.2 Tagging Conditions:

- PIT tags must be used to individually identify all captured fish not previously tagged. Prior to placement of PIT tags, the entire dorsal surface of each fish must be scanned with a waterproof PIT tag reader and visually inspected to ensure detection of fish tagged in other studies. Previously PIT-tagged fish must not be retagged.
- Researchers must not insert PIT tags into shortnose sturgeon less than 300 mm in length.
- PIT tags must be injected in the left, dorsal musculature just anterior to the dorsal fin with the copper antenna oriented up for maximum signal strength and scanned after implantation to ensure proper tag function.
- Numbered Floy tags must be anchored in the dorsal fin musculature base, inserted forwardly and slightly downward from the left side to the right through the dorsal pterygiophores.
- The rate of PIT tag and Floy tag retention and the condition of fish at the site of tag injection must be documented during the study and results reported to NMFS in annual and final reports.
- Surgical tagging of shortnose sturgeon must only be attempted when fish are in excellent condition, and must not be attempted on pre-spawning fish in spring or fish on the spawning ground, or above 27^{o}C.
- During surgical procedures, instruments must be sterilized or changed between uses.
- To ensure proper closure of surgical incisions, a single uninterrupted suturing technique should be applied.
- The total weight of tags must not exceed 2% of the sturgeon's total body weight unless otherwise authorized by NMFS-PR.

4.5.2.3 Larval/Egg Sampling with D-nets:

- The total number of shortnose sturgeon eggs or larvae collected by D-nets must not exceed 20 annually.
- Once a total of 20 shortnose sturgeon eggs or larvae have been taken annually D-nets must be removed from the river.

- D-net samples must be examined at least every three hours after deployed.

4.5.2.4 Tissue Sampling:

- Submission and archival of genetic tissue samples must be coordinated with Julie Carter at the NOAA-NOS tissue archive in Charleston, SC (843)762-8547. Samples must be submitted between six and twelve months after collection.
- Care must be used when collecting genetic tissues. Instruments must be cleaned between sampling to avoid possible disease transmission and/or cross-genetic contamination.
- The terms and conditions concerning samples collected under this authorization will remain in effect as long as the material taken is maintained under the authority and responsibility of the Responsible Party. The Responsible Party is asked not to transfer samples to anyone not listed in the application without obtaining prior written approval from NMFS.

4.5.2.5 Atlantic Sturgeon:

- If an Atlantic sturgeon is incidentally captured, NMFS requests that it minimally be PIT tagged, genetically sampled, and released. NMFS also requests that all other netting protocols and research conditions protective of shortnose sturgeon be used by researchers to ensure survival of Atlantic sturgeon during research activities.

- NMFS requests Atlantic sturgeon interactions to be reported to Lynn Lankshear, NMFS-PR at 978-281-9300 x 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.

4.5.2.6 Sea Turtles:

- To mitigate possible impacts of sea turtle interactions, the following contains net protocol conditions that the researchers will use to eliminate/minimize sea turtle interactions:
    - Tending the nets continuously when water temperatures are above 15°C
    - Short net soak durations (4 hours or less) when water temperatures are above 15°C
    - Delaying net deployment if a sea turtle is seen in the action area until it is no longer seen
    - If a sea turtle is captured by chance, it will be removed immediately

4.5.2.7 Aquatic Nuisance Species:

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

In addition, the permit would be conditioned such that if the authorized level of take were exceeded, or if circumstances indicate that such an event were imminent, the research would immediately cease and the Permit Holder would notify the NMFS Office of Protected Resources, Permits, Conservation and Education Division by phone as soon as possible, but no later than two days following the event. The Permit Holder would then submit a written report describing the circumstances of the event. The Permit Holder would re-evaluate the techniques used and revise techniques accordingly to

prevent further injury or death. Pending review, NMFS could suspend research activities or amend the permit to allow research activities to continue. Additional mitigation measures could also be conditioned in the permit and also monitored and enforced.

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 and the removal of a limited number of eggs/larvae is not expected to have an adverse or long-term effect on target or non-target individuals or populations.

4.7 CUMULATIVE EFFECTS

In addition to the direct and indirect effects assessed above, in accordance with NEPA, this EA considers the potential for cumulative effects. 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. For shortnose sturgeon in the Potomac River, these include industrial, dredging, agricultural, dams, commercial and recreational fisheries, water quality and research activities.

4.7.1 *Historical Takes of Shortnose Sturgeon in the Potomac River*

Little historic information exists about shortnose sturgeon takes in the Potomac River. Four papers between 1876 and 1929 document that shortnose sturgeon inhabited and were captured in the Potomac River during this period. However, Smith and Bean (1899) explained that fishermen did not typically differentiate between the two species of sturgeon and noted that Atlantic sturgeon typically ascended the Potomac River to spawn in the spring. Historic reports indicate that shortnose sturgeon likely spawned in the vicinity of Little Falls (rkm 198). In 1915, McAtee and Weed stated: "two [species] of sturgeon ascended to Little Falls, but no further" (Lippson 1979).

More recently, twelve shortnose sturgeon have been captured in the Potomac River since 1996. Eleven of these captures were documented via an ongoing reward program sponsored by the USFWS to compensate commercial fishermen reporting captures of Atlantic sturgeon in the Chesapeake Bay system. These captures are part of the total capture of 80 shortnose sturgeon in the Chesapeake Bay and its tributaries reported in the reward program since 1996. All shortnose sturgeon captured in the Potomac River were caught between the river mouth to Indian Head (rkm 103). The eleven fish reported via the USFWS reward program were documented in the following locations: six at the mouth of the river (May 3, 2000, March 26, 2001, two on March 8, 2002, December 10, 2004, May 22, 2005); one at the mouth of the Saint Mary's River (rkm14) (April 21, 1998); one at the mouth of Potomac Creek (rkm 101) (May 17, 1996); one at rkm 63 (March 22, 2006); one at rkm 57 (Cobb Bar; December 23, 2007); and, one at rkm 48 (March 14, 2008). Additionally, one adult female was captured by the USGS and NPS researchers within the Potomac River (at rkm 103) in September 2005.

4.7.2 *Other Shortnose Sturgeon Research Permits*

Shortnose sturgeon have been the focus of field studies since the 1970s. The primary purposes of most studies are 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, examples of which include, capture, handling, biopsy sampling, lavage, laparoscopy, attachment of scientific instruments, and release. Research on shortnose sturgeon in the U.S. is carefully controlled and managed so that 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.

There are currently 17 scientific research permits targeting shortnose sturgeon having similar objectives (capture, handle, tag & release) as the proposed study in the Potomac River (Appendix B). There is potential for overlap in time and space in the different permitted research. However, it is a standard condition of NMFS permits for research on sturgeon that researchers coordinate their activities with those of other permit holders to avoid unnecessary disturbance of animals. Permitted researchers are also required to notify the appropriate NMFS Regional Office at least two weeks in advance of any planned field work so that the Regional Office can facilitate this coordination and take other steps appropriate to minimize disturbance from multiple permits. A Biological Opinion was issued for each of the permits authorized for shortnose sturgeon, including the requirement for consideration of cumulative effects to the species (as defined for the ESA). For each permit, a Biological Opinion concluded that issuance was not likely to jeopardize the continued existence of the shortnose sturgeon, either individually or cumulatively.

The proposed permit would replace the only current research permit authorized on the Potomac River — NMFS Permit No. 1444 —expired on July 31, 2009. In this permit, researchers reported results of a study taking place between 2004 and 2007 focused on capturing and tracking shortnose sturgeon. Although a total of 5,400 gillnetting hours were used during this project, in addition to an undetermined period of time of commercial netting under the USFWS rewards program, only four individual shortnose sturgeon were captured. 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 were present.

4.7.3 *Other Cumulative Threats*

Because of passage through rural landscape (forests and agriculture) and urban (Washington DC) metropolitan areas, the Potomac watershed has been affected to a great extent by human activities of both agricultural and silvicultural practices and industrial and residential development. The following information summarizes the primary human and natural phenomena common to the Potomac River believed to affect the status and trend of endangered shortnose sturgeon in the river.

4.7.3.1 Dams and diversions:

The first mainstem dam on the Potomac River occurs at Little Falls (rkm 189). Although passage upstream of the low-head dam by sturgeon is not known, the 2-km reach downstream of the dam is a high gradient, boulder strewn reach of rapids, characterized by a small but turbulent falls that are likely prohibitive for sturgeon swimming abilities, especially egg-laden females. As the Little Falls Dam is thought to occur near the natural upstream limit of shortnose sturgeon it is not thought to block passage to historic habitat. Additionally, in 1999, construction began on a fishway resulting in

the removal of a 10.1 m dam segment for fish passage. Baffles designed to diffuse water energy pouring through the removed section were placed immediately downstream of the opening, but it is unknown if the opening is used by sturgeon. During three springs of gillnet sampling and two years of remote tracking just below the Little Falls Dam, no sturgeon were captured or tracked there Kynard et al. 2007).

Diversion of water from the Potomac River mainstem just upstream of the potential spawning site at Fletcher's Marina occurs at two sites associated with the Little Falls Dam. An old diversion dam (rkm 189) completed early in the canal's construction (late 1700s), to channel water from the mainstem into the Chesapeake and Ohio Canal, currently diverts a small amount of water to maintain a recreational kayak course. The diverted water is then reintroduced back into the river about a kilometer downstream. The second diversion is just upstream of the Little Falls Dam where ACOE maintains a pumping station that removes water from the ponded reservoir for municipal use.

4.7.3.2 LNG facilities:

Although no LNG terminals exist on the Potomac River, the Cove Point facility at Cove Point, Maryland lies less than 50 miles from Washington DC, and a natural gas pipeline running from the terminal to the Potomac River is proposed.

4.7.3.3 Dredging and blasting:

Dredging in the Potomac River was authorized by the River and Harbor Act of 1899 to maintain a navigable channel from the Chesapeake Bay to Washington DC 24 feet deep by 200 feet wide. The river is naturally deeper than 24 feet except for eleven disjointed segments that are routinely dredged.

A gillnetting study by the Maryland Fisheries Resource Office (MFRO) showed no use of the proposed dredging and dumping areas by shortnose sturgeon in the Chesapeake Bay (Skjeveland et al. 2000), although commercial fishermen captured both shortnose and Atlantic sturgeon on dredge-spoil areas in the river. In addition, USGS researchers tracked one telemetry-tagged Potomac River female over a shallow dredge spoil area in winter of 2006 (Kynard et al. 2007).

4.7.3.4 Water quality and contaminants:

The Interstate Commission on the Potomac River Basin (ICPRB) 2007 conducted a review of PCB contamination for tidal portions of the Potomac and Anacostia rivers (Haywood and Buchanan 2007). The Potomac River is considered tidal up to the Chain Bridge (rkm 187) which lies just 2 km upstream of the suspected spawning area at Fletcher's Marina (Kynard et al. 2007). This three-district collaboration (Maryland, Virginia, and the District of Columbia) examined how extensively the total maximum daily limits (TMDL) were exceeded in the water bodies assessed. The executive summary lists numerous water quality impairments over the past 10 years including high levels of nutrients, sediments, toxins (PCBs in fish tissues), bacteria, metals, and trash/debris. The report goes on to identify point and non-point sources of PCB contamination and establishes TMDL targets.

Sediment pollution lies at the heart of an ongoing case regarding the practices of the ACOE during drinking water treatment. A settlement was recently reached in 2003 between the ACOE and the EPA regarding the discharge of settling pond sediments from the Dalecarlia and Georgetown municipal reservoirs within immediate proximity to the likely shortnose sturgeon spawning area between Chain Bridge and Fletchers Marina (rkm 187–185) (Kynard et al. 2009) just upstream from

Washington DC. The practice includes diverting raw Potomac River water into settling ponds where suspended solids are settled using alum (aluminum sulphate). Between 2–5 times a year, solids are washed out of the basins back into the Potomac River (NMFS 2003). Shortly after the permit was issued, however, appeals both by the National Wilderness Institute and the ACOE were filed. Although the appeals are currently under consideration, continued sediment discharging under the 2003 permit is currently approved pending resolution of appeals.

In addition to contaminants and sediment issues, a recent ecology study of the river inhabited by shortnose sturgeon showed that during warm summer months DO routinely fell below 6.0 mg/L (Kynard et al. 2007). Although overall monitoring reports indicate DO levels that are generally suitable for aquatic life, algal blooms resulting in periods of low DO have likely caused frequent fish kills. These fish kills are reported not only by numerous private "river watch" organizations, but also by state water quality monitoring agencies.

Finally, a 2006 USFWS Division of Environmental Quality news article discussed the observation of male smallmouth bass found with eggs. Between 80 and 100% of fish sampled at five sites in the Potomac River displayed this condition. These "intersex" fish are believed to have been affected by endocrine disruptors, but scientists remain uncertain as to the exact cause; some suggest the presence of pharmaceuticals in the water perhaps in combination with other pollutants. One of the sites where intersex fish were located was at the Woodrow Wilson Bridge (rkm 165) located between the summer-fall foraging and suspected spawning areas of shortnose sturgeon.

4.7.3.5 Water withdrawals:

Removal of water from the Potomac River for drinking water occurs through the ACOE pumping facility located at Little Falls Dam. Up to 180 million gallons of water/day are diverted by the ACOE just upstream of the suspected spawning area at Fletcher's Marina and into the Washington Aqueduct system (NMFS 2003).

4.7.3.6 Commercial bycatch:

There are numerous active commercial fishing efforts in the river and the majority of sturgeon (both Atlantic and shortnose) tagged through the Chesapeake Bay Rewards Program are captured by commercial fishers, mostly in gillnets set for striped bass. Although fishermen can collect a reward for providing live sturgeon captures (which likely results in an increase in reports), under-reporting is still suspected (Skjeveland et al. 2000, Welsh et al. 2002).

4.7.3.7 Competition and predation:

Competition between sturgeon species is likely minimal due to the low number of fish observed either as reported from commercial fishing or natural resource agencies (Skjeveland et al. 2000, Welsh et al. 2002, and Kynard et al. 2007). Predation on early life stages would likely be a factor as benthic predators such as catfish and suckers have been captured near the likely spawning site at Fletcher's Marina (rkm 187.5) (Kynard et al. 2007).

In addition to predation, the Potomac River is home to several threatening invasive species that may be sources of additional stress to Potomac sturgeon. The water chestnut (*Trapa natans*) is present in the Potomac River and had major impacts years ago. A massive removal effort ending around 1965 cleared up much of the infestations, but is still a problem in several Potomac tributaries.

The most recent predatory fish introduction is the snakehead (*Channa argus*), first discovered in the Potomac River in 2002. Although still believed to occur in isolated areas, this voracious predator, adept at survival in harsh conditions and already producing gravid adult females and recruitment of juveniles, may, in greater numbers, have a significant impact on juvenile sturgeon. State and federal resources are in place to provide immediate eradication responses to sighting reports. A 2005 article in the Potomac Basin Reporter described a single day's electro-shocking effort in a Potomac River tributary (Dogue Creek) resulted in the capture of 200 snakeheads. The mouth of this tributary lies approximately 30 km downstream of the suspected Fletchers Marina-Chain Bridge spawning reach (Kynard et al. 2009).

4.7.3 *Summary of Cumulative Impacts*

Effects of past and ongoing human and natural factors and current threats (fisheries, water quality, dams, research permits, dredging, industrial, 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. Since the extent of the species in the Potomac River — the subject of this proposed research — is unknown, the research itself will aid in the assessment of the extent to which these cumulative factors may be affecting any populations that are extant in the specific research locations.

Overall, the preferred alternative would not be expected to have more than short-term effects on shortnose sturgeon. 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 (August 2010), NMFS expects that 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 adult 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 capture, handling, and release of 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. The data collected during sampling activities associated with the proposed action would help determine the presence or absence and the movement and habitat use of shortnose sturgeon found in the waters of the Potomac River. The research would provide information that would help manage, conserve, and recover these species and would outweigh any adverse impacts that may occur.

Moreover, the Biological Opinion prepared for File No. 14176 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 was that 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
Endangered Species Program Chesapeake Bay Field Office U.S. Fish and Wildlife Service Annapolis, MD 21401	Informal consultations of effects of proposed actions on ESA-listed species (dwarf wedge mussel)
NMFS Northeast Region Office Protected Resources Division Gloucester, MA 01930	Informal consultations of effects of proposed actions on ESA-listed species (sea turtles)

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Appendix A: Estimated shortnose sturgeon population densities.					
Population/Subpopulation	**Distribution**	**Datum**	**Estimate**	**CI**	**Authority**
Saint John River	New Brunswick, CA	1973/1977	18,000	30%	Dadswell 1979
Kennebecasis River	Canada	1998 – 2005	2,068	801 - 11,277	COSEWIC 2005
Penobscot River	ME	2006-2007	Unpub.	Unpub.	Univ Maine, 2008
Kennbec River	ME	1977/1981	7,200	5,046 - 10,765	Squiers et al. 1982
		2003	9,500	6,942 - 13,358	Squiers 2003
Androscoggin River	ME		3,000		Squiers et al. 1993
Merrimack River	MA	1989 – 1990	33	18 - 89	NMFS 1998
Connecticut River	MA, CT	2003	-	1,500 - 1,800	Connecticut DEP 2003
		1998-2002	-	1,042 - 1,580	Savoy 2004
Above Holyoke Dam		1976 – 1977	515	317 - 898	Taubert 1980, NMFS 1998
		1977 – 1978	370	235 - 623	Taubert 1980, NMFS 1998
		1976 – 1978	714	280 - 2,856	Taubert 1980, NMFS 1998
		1976 – 1978	297	267 - 618	Taubert 1980, NMFS 1998
Below Holyoke Dam		1988 – 1993	895	799 - 1,018	Savoy and Shake 1992,
Hudson River	NY	1980	30,311		Dovel 1979, NMFS 1998
		1995	38,000	26,427 - 55,072	Bain et al. 1995, NMFS 1998
		1997	61,000	52,898 - 72,191	Bain et al. 2000
Delaware River	NJ, DE, PA	1981/1984	12,796	10,288 - 16,367	Hastings et al. 1987
		1999/2003	12,047	10,757 - 13,589	Brundage and O'Herron 2003
Chesapeake Bay	MD, VA	no data	-	-	
Potomac River	MD, VA	no data	-	-	
Neuse River	NC	2001-2002	extirpated		Oakley 2003
Cape Fear River	NC	1997	>100		Kynard 1997, NMFS 1998
Winyah Bay	NC, SC	no data	-	-	
Waccamaw - Pee Dee River	SC	no data	-	-	
Santee River	SC	no data	-	-	
Lake Marion (dam-locked)	SC	no data	-	-	
Cooper River	SC	no data	-	-	
ACE Basin	SC	no data	-	-	
Savannah River	SC, GA		1,000 - 3,000		Bill Post, SCDNR 2003
Ogeechee River	GA	1990s	266		Bryce et al. 2002
		1993	266	236 - 300	Kirk et al. 2005
		1993	361	326 - 400	Rogers and Weber 1994
		1999/2000	195	-	Bryce et al. 2002
		2000	147	105 - 249	Kirk et al. 2005
		2004	174	97 - 874	Kirk et al. 2005
		2007	368	244-745	Peterson 2007
Altamaha River	GA	1988	2,862	1,069 - 4,226	NMFS 1998
		1990	798	645 - 1,045	NMFS 1998
		1993	468	315 - 903	NMFS 1998
		2003-2005	6,320	4,387-9,249	DeVries 2006
Satilla River	GA		unk	-	Kahnle et al. 1998
Saint Marys River	FL		unk	-	Kahnle et al. 1998, Rogers & Weber 1994
Saint Johns River	FL	2002	1	-	FFWCC 2007

Appendix B Existing shortnose sturgeon research permits authorized for wild populations.			
Permit No.	**Location**	**Authorized Take**	**Research Activity**
1420-01 Expires: 9/30/09	Altamaha River and Estuary, GA	1,000 adult/juv. (2 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
10115 University of Georgia Expires 08/03/2013	Satilla & St. Marys GA & FL	85 adult/juv. 20 ELS	1) Presence/Absence and 2) Genetics: Capture, handle, measure, weigh, PIT and dart tag, anesthetize, tissue sample, 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
1444 Expires: 7/31/2009	Potomac River and Estuary, MD	50 adult/juv., 2500 ELS	Capture, handle, measure, weigh, PIT tag, T-Bar tag, CART tag, anesthetize, Temperature-depth logger, tissue sample, borescope, ELS collection
1486 Expires: 1/31/2010	Delaware River and Estuary NJ & DE	1,750 adult/juv. (10 lethal), 1000 ELS	Capture, handle, measure, weigh, Floy & T-bar tag, PIT tag, tissue sample, anesthetize, ultrasonic tag, laparoscopy, blood collection, collect ELS
1547 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
1449 Expires: 3/31/2010	Upper Conn. River, MA	80 adult/juv.; 200 ELS	Capture, handle, measure, weigh, PIT tag, external radio tag, collect ELS
1549 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 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
1595-02 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

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. 14176

Background

In March 2010, the National Marine Fisheries Service (NMFS) received an application for a permit (File No. 14176) from Michael Mangold of the United States Fish and Wildlife Service, Maryland Fisheries Resource Office, to conduct research on shortnose sturgeon in the Potomac River. 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 on the Effects of the Issuance of a Scientific Research Permit to Conduct Research on Shortnose Sturgeon in the Potomac River, Maryland and Virginia; August 2010). In addition, a Biological Opinion was issued under the Endangered Species Act August 17, 2010 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 activity taking place in the Potomac River, 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 fished (both anchored and drifted), 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 June 10, 2010, from NMFS

Northeast Office of Habitat Conservation whether the proposed action, as conditioned, would have adverse impacts on designated EFH in the Potomac River. On June 16, 2010, Karen Abrams, National 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); 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 were encountered while netting, researchers would be directed by permit conditions to avoid contact with the animals. An ESA-listed species of freshwater mussel, the dwarf wedge mussel, has a population occurring in the freshwater portions of Nanjemoy and Aquia Creeks, tributaries of the Potomac River located in Virginia, well upstream of the proposed action areas. USFWS biologists and the NMFS, Northeast Regional Office reviewed the application for potential interaction with these mussel populations and sea turtles and agreed with NMFS-PR that netting in areas detailed in the accompanying EA would serve to limit interactions. However, in the unlikely event researchers do come into contact with sea turtles, either through boating or netting activities, appropriate precautionary measures were suggested and incorporated into the permit.

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 13256) was published on March 19, 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 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.

Because a new status review for the Atlantic sturgeon has begun, 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. 14176, 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.

SEP 10 2010

James H. Lecky
Director, Office of Protected Resources

Date