

BEFORE THE SECRETARY OF INTERIOR

PETITION TO DESIGNATE CRITICAL HABITAT FOR
THE ENDANGERED PALLID STURGEON (*Scaphirhynchus albus*)

UNDER THE ENDANGERED SPECIES ACT

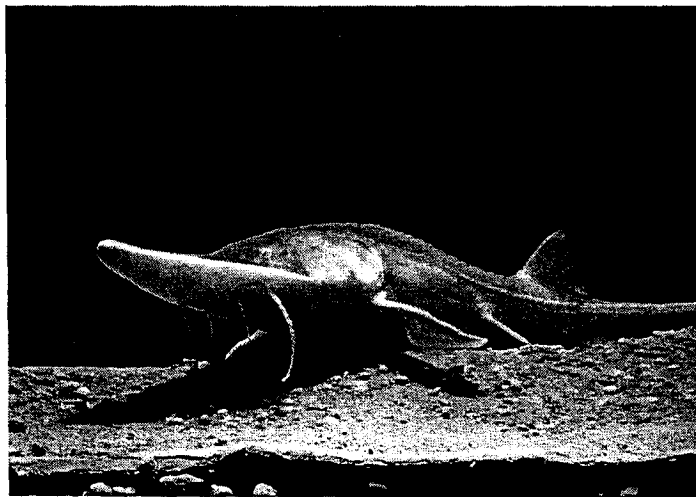


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MISSOURI COALITION FOR THE ENVIRONMENT,
MISSOURI CLEAN WATER CAMPAIGN,

and

GREAT RIVERS ENVIRONMENTAL LAW CENTER

November 17, 2010

NOTICE OF PETITION

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The Missouri Coalition for the Environment is a nonprofit citizens' group that works to protect and restore the environment through education, public engagement, and legal action.

The Missouri Clean Water Campaign is a program of the National Water Sentinels of the Sierra Club. The Missouri Campaign works to protect Missouri waterways by monitoring water quality, administrative advocacy and direct citizen actions including trash cleanups, household hazardous waste and electronics recycling events, and installing rain gardens to clean polluted urban stormwater runoff.

Great Rivers Environmental Law Center is a nonprofit public interest law firm dedicated to providing free and reduced-fee legal services to individuals and organizations seeking to preserve and protect the environment and public health. Great Rivers is also devoted to preserving floodplains and wetlands for their recreational, aesthetic, and agricultural benefits, and their values as flood storage and habitat for native species.

ACTION REQUESTED

The Missouri Coalition for the Environment, Missouri Clean Water Campaign and Great Rivers Environmental Law Center (collectively "Petitioners") hereby petition the Secretary of the Interior (Secretary), through the U.S. Fish and Wildlife Service (Service), pursuant to the

Endangered Species Act of 1973 (ESA)¹, to revise its 1990 determination that designation of critical habitat for the endangered pallid sturgeon (*Scaphirhynchus albus*) was not prudent or determinable, based on criteria outlined in the applicable regulations, and to designate critical habitat.² As detailed below, the rationales for the Service's previous determination are no longer viable. This petition is filed pursuant to Section 4 of the Administrative Procedure Act (APA), 5 U.S.C. § 553³ and 50 C.F.R. § 424.14.⁴ The act of designating critical habitat is within the Secretary's jurisdiction and is a duty delegated to the Service.⁵

The submission of this petition to the Service initiates the process delineated at 50 C.F.R. § 424.14 and requires a definite response from the Service.⁶ Indeed, the ESA and its corresponding regulations require that "within 90 days of receiving a petition to revise a critical habitat designation, the Secretary shall make a finding as to whether the petition presents substantial scientific information indicating that the revision *may* be warranted."⁷ The Secretary shall promptly publish such finding in the Federal Register and so notify the petitioner.⁸ The language used does not indicate that the revision *must* be warranted. The use of the word "may" denotes that if there is a possibility that substantial scientific information would show designation is warranted, the Secretary must so find and promptly publish that finding in the Federal Register. Given the substantial scientific information presented in this petition, we believe that critical habitat designation pallid sturgeon *is*, indeed, warranted. It follows that it cannot reasonably be disputed that critical habitat designation *may* be warranted, particularly in light of the fact that the arguments for designation rest upon the best available studies, most of which are the product of research done by the Service. Within 12 months of receiving this petition, the Secretary must also decide how to proceed with the requested designation and propose a rule designating critical habitat if deemed proper.⁹ This is also a petition for rulemaking under the APA, which states, "Each agency (of the Federal Government) shall give an interested person the right to petition for the issuance...of a rule."¹⁰

The areas proposed for critical habitat designation meet the requirements specified at 16 U.S.C. § 1532(5)(A) and 50 C.F.R. §§ 424.02, 424.12.¹¹ The proposed areas represent a baseline for what may be designated as critical habitat; there may be additional areas not proposed in this petition that meet the requirements for designation, as well. In the event that the Service determines any portion of the proposed areas do not meet the criteria for critical habitat designation, we, in the alternative, ask that the Service determine whether the remaining proposed areas, and/or other essential habitat would satisfy the criteria for critical habitat designation.

¹ 16 U.S.C. § 1533(b)(3)(D)(i).

² 50 C.F.R. § 424.12(a).

³ 5 U.S.C. § 553(e).

⁴ 50 C.F.R. § 424.14(a).

⁵ 16 U.S.C. § 1532(5)(B).

⁶ 50 C.F.R. § 424.14.

⁷ 50 C.F.R. § 424.14(c)(1) (emphasis added). *See also* 1533(b)(3)(D)(i).

⁸ *Id.*

⁹ 50 C.F.R. § 424.14(c)(3). *See also* 1533(b)(3)(D)(ii).

¹⁰ 5 U.S.C. § 553(e).

¹¹ 50 C.F.R. § 424.02(d); 50 C.F.R. § 424.12.

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EXECUTIVE SUMMARY

This petition requests the designation of critical habitat for the federally endangered pallid sturgeon (*Scaphirhynchus albus*) pursuant to the Endangered Species Act of 1973.¹² The pallid sturgeon has been listed as a federally endangered species since September 6, 1990.¹³ The damming and channelization of rivers in the pallid sturgeon's range have caused the disappearance of 90 percent of the species' habitat.¹⁴ Human-induced modifications have been identified as the leading threat to the pallid sturgeon's survival.¹⁵ In some segments of the species' range, predictions estimate that the pallid sturgeon could become extinct by 2018 if current management practices remain in effect.¹⁶ Despite the fact the species was listed as endangered in 1990, it has not yet received critical habitat designation. This petition is being submitted pursuant to the language of the ESA, which states, "Critical habitat may be established for those species now listed as threatened or endangered species for which no critical habitat has heretofore been established...."¹⁷

Designation of critical habitat fulfills the purpose behind the ESA, which is to protect endangered species and their habitats.¹⁸ The ESA provides for the conservation of the qualities of ecosystem found "essential to the conservation of the species" and that "may require special management considerations or protection...."¹⁹ Critical habitat designation provides an additional layer of protection over that provided by the listing of an endangered species. The protection that is afforded by listing an endangered species includes ensuring that any agency action "authorized, funded, or carried out by such agency...is not likely to jeopardize the continued existence of any endangered species...."²⁰ However, when critical habitat is designated in addition to listing, the same types of actions also cannot "result in the destruction or adverse modification of [the] habitat of such species...."²¹

This petition discusses the pallid sturgeon's biology, behavior and habitat needs, along with the threats to the species' continuation. It further addresses the factors the Service must take into account in its decision to designate critical habitat for the species. In this petition, the proposed areas for critical habitat for the pallid sturgeon most aptly meet the requirements of the ESA's definition for critical habitat. These are the same areas originally described in the pallid sturgeon's Recovery Plan.²² The areas proposed for designation include, but are not limited to:

¹² 16 U.S.C. §§ 1531-1544.

¹³ 55 Fed. Reg. 36641 (Sept. 6, 1990) ("Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Pallid Sturgeon") [hereinafter Determination of Endangered Status].

¹⁴ U.S. Fish and Wildlife Serv., *2003 Amendment to the 2000 Biological Opinion on the Operation of the Missouri River Main Stem Reservoir System, Operation and Maintenance of the Missouri River Bank Stabilization and Navigation Project and Operation of the Kansas River Reservoir System*, at 44, (2003) [hereinafter 2003 BiOp].

¹⁵ U.S. Fish and Wildlife Serv., *Missouri River Final Biological Opinion*, at 112, (2000) [hereinafter 2000 BiOp].

¹⁶ U.S. Fish and Wildlife Serv., *Pallid Sturgeon Recovery Update*, at 3, (April, 2004) [hereinafter Recovery Update].

¹⁷ 16 U.S.C. § 1532(5)(B).

¹⁸ 16 U.S.C. § 1531(b).

¹⁹ 16 U.S.C. § 1532(5)(A).

²⁰ 16 U.S.C. § 1536(a)(2).

²¹ *Id.*

²² U.S. Fish and Wildlife Serv., *Pallid Sturgeon (Scaphirhynchus albus) Recovery Plan*, at 17 (Nov. 7, 1993) [hereinafter Recovery Plan].

1. The Missouri River from the mouth of the Marias River to the headwaters of the Fort Peck Reservoir;
2. The Missouri River from the Fort Peck Dam to the headwaters of Lake Sakakawea, including the Yellowstone River upstream to the mouth of the Tongue River;
3. The Missouri River from 20 miles upstream of the mouth of the Niobrara River to the Lewis and Clark Lake;
4. The Missouri River below Gavins Point Dam to its confluence with the Mississippi River;
5. The Mississippi River from its confluence with the Missouri River to the Gulf of Mexico; and
6. The Atchafalaya River Distributary system to the Gulf of Mexico.

Critical habitat for the pallid sturgeon contains areas that have the characteristics needed for the species to survive which include sandbar complexes, side-channels and deep holes that have warm, free-flowing waters with high turbidity.²³ These regions are described with greater detail below and can be found on the map depicted in Section IV.C.3 on page 23.

I. INTRODUCTION

The pallid sturgeon, once common throughout its historical range, has become the most rare species of freshwater fish in North America.²⁴ The pallid sturgeon originated in the Cretaceous Period over 70 million years ago.²⁵ Although the species was robust enough to survive the Ice Age, it was no match for the more than 50 years of human-induced modifications that occurred throughout its habitat range.²⁶ Due to the construction of dams and channelization of the rivers upon which this fish depends, 90 percent of its wetland habitat has been destroyed.²⁷ The species continues to be confronted with these threats along with others such as fishing and caviar harvesting, entrainment, contaminants, hybridization, invasive species and Iridovirus.²⁸

Considerable research has been done to understand the pallid sturgeon's behavior, biology and habitat. These studies enable areas of habitat that are "essential to the conservation of the species" and that "may require special management considerations or protection"²⁹ to be identified and designated. While measures have been put in place to aid in the conservation and protection of the pallid sturgeon, no evidence indicates that the wild population is capable of sustaining itself. Meanwhile, the species' habitat continues to degrade, signifying grave consequences for the recovery of its numbers. If critical habitat were designated, the areas that provide for the pallid sturgeon's physiological needs would be protected. Protection of the species from peril, by itself, is of no use if the habitat in which it needs to live and propagate no

²³ *Id.* at 16-17.

²⁴ Daniel Cusick, *Conflicting Priorities Snare 'Big Muddy' Restoration*, Earth News, Apr. 8, 2008, at para. 14, <http://www.earthportal.org/news/?p=1017> (last visited Sept. 30, 2010).

²⁵ United States Fish & Wildlife Service, Mountain-Prairie Region, *The Pallid Sturgeon, a Missouri River "Dinosaur"*, at para. 2, (n.d.) <http://www.fws.gov/mountain-prairie/feature/sturgeon.html> (last visited Sept. 30, 2010) [hereinafter *Sturgeon* 1].

²⁶ 2003 BiOp, *supra* note 14, at 27.

²⁷ 2000 BiOp, *supra* note 15, at 121.

²⁸ 2003 BiOp, *supra* note 14, at 73-78.

²⁹ 50 C.F.R. § 424.02(d)(1).

longer exists. If critical habitat is not designated, the pallid sturgeon will eventually be extirpated. As will be established in this petition, the requirements for critical habitat designation under the ESA have been satisfied and, thus, the Service is mandated by the Act to make such designation.

II. NATURAL HISTORY OF THE PALLID STURGEON

A. Taxonomy and Physical Description

The pallid sturgeon, *Scaphirhynchus albus*, is a fish that is one of three species in the subfamily *Scaphirhynchinae* of the *Acipenseridae* family.³⁰ The word 'pallid' means deficient in color, and the first part of its scientific name means 'spade-snout,' while the latter means 'white.'³¹ Initially, the pallid sturgeon, shovelnose sturgeon and Alabama sturgeon were all thought to be the same species of fish. However, genetic studies led to the conclusion that there were three distinct species.³² Its closest relative is the shovelnose sturgeon and, at younger life stages, its characteristics are frequently confused with this non-endangered breed.³³

The pallid sturgeon can weigh upwards of 80 pounds and measure over 6 feet in length.³⁴ Juvenile fish are darker, but when the fish reaches maturity, it becomes white. The fish has a flat, shovel-shaped snout, and its body is armored with cartilage plates rather than scales.^{35,36} The skeleton is made entirely of cartilage, making it difficult to determine the fish's age.³⁷ Its toothless mouth is positioned under its snout, and it is able to stretch outwards to swallow prey.³⁸ Four whisker-like barbels located by the mouth also aid in seeking food.³⁹ The sturgeon has tiny, beady eyes that cannot see very well, but this is due to its adaptation to waters with low visibility.⁴⁰ It has a reptilian-like tail.⁴¹

B. Distribution and Movement

The pallid sturgeon's historical range included the Yellowstone, Platte, Kansas, Missouri and middle and lower Mississippi River regions.^{42,43} Today, it can be found in most of its

³⁰ Edward J. Peters, et al., *Pallid Sturgeon Literature Review: Final Report to the Platte River Recovery Implementation Program*, at 10 (Oct. 27, 2008).

³¹ Jim Riis, South Dakota Department of Game, Fish and Parks, *Pallid Sturgeon (Scaphirhynchus albus)*, at para. 1, (1993), <http://www3.northern.edu/natsource/ENDANG1/Pallid1.htm> (last visited Sept. 30, 2010).

³² 2003 BiOp, *supra* note 14, at 56-57.

³³ 2000 BiOp, *supra* note 15, at 95.

³⁴ *Id.*

³⁵ *Id.* at 96.

³⁶ Paul A. Johnsgard, *The Nature of Nebraska*, at 169-170, (2005).

³⁷ *Id.*

³⁸ 2000 BiOp, *supra* note 15, at 95.

³⁹ *Id.*

⁴⁰ Bureau of Reclamation, *Intake Diversion Dam Modification, Lower Yellowstone Project Science Review Report-Missouri River Recovery Implementation Committee Questions on the Intake Project*, at 15, (2009), <http://www.usbr.gov/gp/mtao/loweryellowstone/Intake%20Diversion%20Dam%20Modification%20-%20Science%20Review%20Final%20Report%20PBSJ%20%28November%202009%29.pdf> (last visited Sept. 30, 2010).

⁴¹ Sturgeon 1, *supra* note 25, at para. 2.

⁴² 2000 BiOp, *supra* note 15, at 97.

original range, albeit the population has declined dramatically throughout it.⁴⁴ During the months of July through October, the fish travels upstream, and between December and March it travels downstream.⁴⁵ This migration has been attributed to fluctuating temperatures and discharges.⁴⁶

The sturgeon can cover great distances when it migrates.⁴⁷ It has been documented as going lengths of 16 miles per day swimming upstream and 25 miles per day swimming downstream.⁴⁸ It can swim as fast as 5.7 miles per hour.⁴⁹ The longest distances the fish has been recorded to have traveled correlate with flow events in the spring and late fall.⁵⁰ However, due to river modification, the natural pulses do not occur, and the fish cannot migrate to spawning areas they once could reach.⁵¹

C. Abundance and Population

The pallid sturgeon was not recognized as a distinct species until 1905, and, thus, there is no supporting data of its population prior to that date.⁵² Until the middle of the 20th century, the pallid sturgeon was frequently misidentified by the commercial fishing industry as a shovelnose sturgeon.⁵³ The species was relatively common in the Missouri and Mississippi Rivers until the incidence of river channelization and stabilization in the mid to late 1960's.⁵⁴ Despite this being the case, the pallid sturgeon was not, at any time, as numerous as the shovelnose sturgeon.⁵⁵

In a study conducted in 1905, one-fifth of the sturgeons captured in the lower Missouri River were pallid sturgeons.⁵⁶ In contrast, a study implemented from November 1997 to April 2000 on the lower Missouri River and middle Mississippi River revealed that of 4,435 sturgeons captured, only 18 (0.41 percent) were pallid sturgeons.⁵⁷ Nine of these originated from hatchery releases and nine were presumed bred in the wild.⁵⁸ Studies in 2002 and 2003 showed estimates that there were approximately 151 adult pallid sturgeons in the upper Missouri River and between 25 and 50 adults in the middle Missouri River (from Gavins Point Dam to Fort Randall

⁴³ 2003 BiOp, *supra* note 14, at 57.

⁴⁴ 2000 BiOp, *supra* note 15, at 99.

⁴⁵ 2003 BiOp, *supra* note 14, at 60.

⁴⁶ *Id.*

⁴⁷ *Id.* at 59.

⁴⁸ *Id.* at 60.

⁴⁹ Robert Bramblett & Robert White, *Habitat Use and Movements of Pallid and Shovelnose Sturgeon in the Yellowstone and Missouri Rivers in Montana and North Dakota*, Transactions of the American Fisheries Society, at 1006-1025, (2001).

⁵⁰ 2003 BiOp, *supra* note 14, at 60.

⁵¹ Andrew McKean, *A Whisker Away from Winking Out... Will the pallid sturgeon go extinct on our watch?*, Montana Outdoors, May-June 2006, at para. 9, <http://fwp.mt.gov/mtoutdoors/HTML/articles/2006/pallidsturgeon.htm> (last visited Sept. 30, 2010) [hereinafter Sturgeon 2].

⁵² 2000 BiOp, *supra* note 15, at 104.

⁵³ *Id.*

⁵⁴ *Id.*

⁵⁵ *Id.*

⁵⁶ *Id.*

⁵⁷ *Id.*

⁵⁸ *Id.*

Dam).⁵⁹ Ratios of pallid sturgeons to shovelnose sturgeons were recorded as 1:89 on the middle Mississippi, and 1:387 on the lower Missouri and middle Mississippi, combined.⁶⁰

While efforts to restock rivers with hatchery-reared fish have inflated pallid sturgeon numbers, evidence of successful reproduction is rare. In a study by the Service's Columbia Missouri Fishery Resources Office, a collection of more than 10,000 small fish contained only 1 confirmed and 2 probable pallid sturgeon larvae.⁶¹ Today, it is believed there are fewer than 10,000 pallid sturgeons left in the Missouri and Mississippi rivers.⁶²

D. Habitat

Pallid sturgeons prefer large, warm, free-flowing waters with high turbidity.⁶³ The fish can be found in different types of habitat including sandbar complexes, deep holes or, occasionally, side-channel border habitat types.⁶⁴ Areas that have complex current patterns, such as wing dike tips, sandbars and drop offs, are the most ideal for the fish; slack water areas seem to be devoid of the adult species.⁶⁵ The ideal range of current speed is between .33 and 2.9 feet per second.⁶⁶ The pallid sturgeon has a propensity towards certain substrates. In one study, the species was found in sandy areas 81.8 percent of the time, in gravel 9.1 percent of the time, and mud or silt 5.5 percent of the time.⁶⁷ It has been found at depths between three and 26 feet and in temperatures ranging from 32 to 86 degrees Fahrenheit.⁶⁸

E. Feeding and Prey Selection

During its earliest life stages, the pallid sturgeon eats benthic macroinvertebrates.⁶⁹ As the fish matures, it eats more fish, but will also continue to eat drifting invertebrates.⁷⁰ It is believed the species is an opportunistic feeder because it will eat certain fish and insects during some seasons and different ones in others.⁷¹ The pallid sturgeon has been known to stand on its fins and wait for currents to wash food into its mouth.⁷² It is also a suction bottom feeder, which means it will use its protrusible mouth to take in fish.⁷³ In one study, 82 percent of the fish's

⁵⁹ 2003 BiOp, *supra* note 14, at 60-61.

⁶⁰ *Id.* at 63-64.

⁶¹ 2000 BiOp, *supra* note 15, at 106-07.

⁶² Tennessee Technological University, *Biologists Help Save Endangered Pallid Sturgeon*, Science Daily, (Jul. 23, 2010) <http://www.sciencedaily.com/releases/2010/07/100722144423.htm> (last visited Sept. 30, 2010).

⁶³ 2003 BiOp, *supra* note 14, at 55.

⁶⁴ *Id.* at 67.

⁶⁵ *Id.* at 68.

⁶⁶ Office of Pesticide Programs, United States Environmental Protection Agency, *Status and Life History of the Pallid Sturgeon*, at 2, (2007), http://www.epa.gov/espp/litstatus/effects/appendix_c_life_history_sturgeon.pdf (last visited Sept. 30, 2010) [hereinafter *Sturgeon 3*].

⁶⁷ 2003 BiOp, *supra* note 14, at 69.

⁶⁸ *Sturgeon 3*, *supra* note 66, at 6.

⁶⁹ 2003 BiOp, *supra* note 14, at 56.

⁷⁰ *Id.*

⁷¹ *Sturgeon 3*, *supra* note 66, at 7.

⁷² 2000 BiOp, *supra* note 15, at 111.

⁷³ *Sturgeon 3*, *supra* note 66, at 7.

stomach contents consisted of fish.⁷⁴ The remainder was comprised of mosquitoes, mayflies, caddy flies, detritus and plant material.⁷⁵

F. Reproduction

The pallid sturgeon is slow to reach reproductive capability. Males reach sexual maturity between the ages of 7 and 9 years; females are able to reproduce between 15 and 20 years of age.⁷⁶ Years between spawning events are between two to three for males and three to ten for females.⁷⁷ Food availability is the predominant factor that determines the amount of time between spawning events.⁷⁸ Also critical is the incidence of flooding, which allows the fish to migrate to spawning areas.⁷⁹ All of these characteristics, in addition to its habitat specificity, have made it more difficult for the species' numbers to rebound in the environment it lives in today.⁸⁰

Spawning takes place between June and August.⁸¹ The fish will lay its adhesive eggs on gravel or cobble substrates in areas with moderate current flow.⁸² They will hatch within 5 to 8 days.⁸³ Oftentimes, the fish will spawn at the heads of islands, and after hatching, larvae will float downstream to eddy pools and the tips of islands where they will be protected.⁸⁴ When the juveniles grow tails, they will move to slower moving waters until they are more mature.⁸⁵ One female pallid sturgeon studied was carrying over 170,000 eggs, which accounted for 11 percent of its weight.⁸⁶ Of the thousands of eggs laid, only a small number will reach maturity.⁸⁷ A further impediment to the species' survival is that its population is aging, and it is thought that this has led to fewer spawning events.⁸⁸

⁷⁴ Recovery Update, *supra* note 16, at 3.

⁷⁵ *Id.*

⁷⁶ 2003 BiOp, *supra* note 14, at 55.

⁷⁷ *Id.*

⁷⁸ *Id.*

⁷⁹ *Id.*

⁸⁰ State of Montana, *Pallid Sturgeon - Scaphirhynchus albus*, Montana Field Guide, at para. 8, (n.d.), http://fieldguide.mt.gov/detail_AFCAA02010.aspx (last visited Sept. 30, 2010) [hereinafter Sturgeon 4].

⁸¹ Sturgeon 3, *supra* note 66, at 6.

⁸² 2003 BiOp, *supra* note 14, at 55.

⁸³ Natural Resources Conservation Service, United States Department of Agriculture, *Threatened and Endangered Species: Pallid Sturgeon Scaphirhynchus Fact Sheet*, at para. 10, (2005),

<http://www.mt.nrcs.usda.gov/news/factsheets/pallidsturgeon.html> (last visited Sept. 30, 2010).

⁸⁴ 2003 BiOp, *supra* note 14, at 58.

⁸⁵ Sturgeon 2, *supra* note 51, at para. 9.

⁸⁶ K. D. Keenlyne, *Fecundity of the Pallid Sturgeon*, American Fisheries Society, January 1992, at 139-40.

⁸⁷ Ken Burton, *New Hope for the Pallid Sturgeon*, Endangered Species Bulletin, United States Fish & Wildlife Service, January-April 2000, at 5, <http://www.fws.gov/endangered/bulletin/2000/01-04/04-05.pdf> (last visited Sept. 30, 2010).

⁸⁸ Montana Fish, Wildlife & Parks, *Pallid Sturgeon*, at para. 5-6, (n.d.), <http://fwp.mt.gov/wildthings/tande/pallid.html> (last visited Sept. 30, 2010).

III. Threats to the Pallid Sturgeon

A. Habitat Loss

1. Historical Habitat Characteristics

Due to a variety of manmade causes, the pallid sturgeon has suffered the disappearance of 90 percent of its wetland habitat.⁸⁹ Before humans altered the pallid sturgeon's habitat, the rivers to which it has become adapted contained a variety of characteristics that were essential to its survival. Sediment that flows downstream to continually recreate sandbars is critical to the species' macrohabitat requirements.⁹⁰ Furthermore, the movement of sand, organic material and other debris is needed to preserve the turbidity in which the pallid sturgeon has evolved.⁹¹ Backwater areas are also necessary to the survival of the species because the slower moving currents provide areas for feeding, reproduction and shelter.⁹² Preservation of floodplain regions are vital because a drop in the river water level enables small fish in the floodplain to migrate to the river where they become available as food.⁹³ Finally, the quality of a river's water flow is also key to the pallid sturgeon's survival. In the spring, flows are increased due to melting snow.⁹⁴ This increase provides the fish with spawning cues critical to breeding.⁹⁵ After spawning, the river's flow naturally decreases, allowing sandbar and shallow water habitat to reform and pallid sturgeon larvae to develop. Slack water areas that result from the decrease in flow provide space for young sturgeon to mature.

2. Channelization and Control Structures

Before any modification of the rivers that make up the pallid sturgeon's habitat occurred, navigation was treacherous to boaters because of swift currents and shallow waters.⁹⁶ This led to frequent collisions with snags and the bottoming out of watercraft.⁹⁷ To make traveling more safe, snags were removed and prevented by clear-cutting trees on the banks.⁹⁸ Rivers were channelized using a variety of structures, including water diversions, levees, revetments and pile dikes.⁹⁹ Six major dams were constructed on the Missouri River, making it the largest reservoir system in North America.¹⁰⁰ Substantial stretches of the middle Mississippi River have been diked, and there has been a 39 percent reduction of the floodplain due to flood control levees that were constructed to maintain a 9-foot navigation channel.¹⁰¹ Ninety percent of the lower

⁸⁹ 2003 BiOp, *supra* note 14, at 44.

⁹⁰ 2000 BiOp, *supra* note 15, at 107.

⁹¹ *Id.* at 124.

⁹² *Id.* at 107.

⁹³ 2003 BiOp, *supra* note 14, at 44.

⁹⁴ 2000 BiOp, *supra* note 15, at 119.

⁹⁵ *Id.* at 103.

⁹⁶ U.S. Army Corps of Eng'rs, Dep't of the Army, *Final Supplemental Environmental Impact Statement for the Missouri Fish and Wildlife and Mitigation Project-Affected Environment*, at 6, (2003), <http://www.nwk.usace.army.mil/projects/mitigation/fseis/fseis-chapter3.pdf> (last visited Sept. 30, 2010).

⁹⁷ *Id.*

⁹⁸ Arthur C. Benke, *Rivers of North America*, at 438, (2005).

⁹⁹ 2003 BiOp, *supra* note 14, at 23.

¹⁰⁰ 2000 BiOp, *supra* note 15, at 121.

¹⁰¹ *Id.* at 111.

Mississippi floodplain has disappeared as a result of levee construction.¹⁰² Many of the river stabilization structures of the past are utilized to this day, and they prevent natural river processes that form wetland habitat, such as erosion, deposition and accretion.¹⁰³ Consequently, the incidence of side-channels, islands and sandbars has declined dramatically, leading to the virtual total disappearance of barren sandbars from Sioux City, Iowa to St. Louis, Missouri.¹⁰⁴ On the lower Mississippi, nearly 90 million square yards of barren sandbar disappeared between the years 1962 and 1976, alone.^{105,106} As a result of river modifications, 36 percent of the pallid sturgeon's range of habitat has been eliminated due to dam operations, 40 percent has been channelized, and 24 percent has been altered because of water flow changes created by dams.¹⁰⁷

The construction of dams and other inhibiting structures has caused a decrease in the magnitude of natural spring flows, leading to a reduction in the amount of sediment load that travels downstream.¹⁰⁸ This results in more degradation and less aggradation of the riverbed because reservoir pools trap sediment loads behind their barriers.¹⁰⁹ The sandbars that do form usually occur in reservoir areas, which are closer to the water level and frequently subjected to inundation from the high water levels that are artificially withheld.¹¹⁰ Currently, the areas where sandbars used to exist have been supplanted with forested corridors.¹¹¹

Manmade structures also cause a dwindling in the population of the once-abundant small fish needed for sustenance of the pallid sturgeon.¹¹² This is due to the fact that reservoirs tend to have colder temperatures, which are not ideal for small fish breeding.¹¹³ Control structures also prevent fish that spawn in the floodplain from reaching the river via spring pulses.¹¹⁴ The continual fluctuation of water levels from dam operations disturbs macroinvertebrate communities and areas where larval fish grow because of the constant dewatering and flooding of their habitats.¹¹⁵ Organic matter necessary to aquatic invertebrate communities has been severely reduced by damming and channelization, resulting in a decrease of food that the pallid sturgeon population requires to sustain itself.¹¹⁶ Furthermore, snags in the river provide habitat for aquatic insects.¹¹⁷ The removal of this habitat has led to a 65 percent decline in snag insect production.¹¹⁸

¹⁰² *Id.*

¹⁰³ *Id.* at 84; *Id.* at 121.

¹⁰⁴ *Id.* at 84.

¹⁰⁵ U.S. Fish and Wildlife Serv., *Interior Population of the Least Tern (Sterna Antillarum) Recovery Plan*, at 21 (Sept. 1990).

¹⁰⁶ 7,518 hectares = 85,608,967.514 yards squared.

¹⁰⁷ 2000 BiOp, *supra* note 15, at 111.

¹⁰⁸ *Id.* at 123.

¹⁰⁹ *Id.* at 85.

¹¹⁰ *Id.* at 123.

¹¹¹ Fair Funding for Wildlife, National Wildlife Federation, *Showcase Species: Missouri-Upper Missouri Interior Least Tern*, at 46, (2009), <http://www.nwf.org/endangered/pdfs/UMI-LeastTern.pdf> (last visited Sept. 30, 2010).

¹¹² 2003 BiOp, *supra* note 14, at 41.

¹¹³ United States Fish & Wildlife Service, North Dakota Field Office, *Least Tern (Sterna antillarum)*, at para. 8, (2008), http://www.fws.gov/northdakotafieldoffice/endspecies/species/least_tern.htm (last visited Sept. 30, 2010).

¹¹⁴ 2003 BiOp, *supra* note 14, at 44.

¹¹⁵ 2000 BiOp, *supra* note 15, at 218.

¹¹⁶ *Id.* at 107.

¹¹⁷ Recovery Plan, *supra* note 22, at 13.

¹¹⁸ *Id.*

In addition to preventing small fish from migrating, river modification has affected the pallid sturgeon's migration as well. The pallid sturgeon migrates upstream to spawn.¹¹⁹ When spring water pulses are not allowed to occur, the fish may not receive spawning cues.¹²⁰ In the event that water is released from dams, the fish may receive spawning cues, but is obstructed from traveling as far upstream as it did prior to the construction of dams.¹²¹ This has led the pallid's population to become isolated in sections, limiting genetic exchange and reducing successful reproduction and recruitment.¹²² Newly-hatched pallid sturgeons that travel downstream are also blocked by dams, leaving them to die in reservoirs.¹²³

Yet another consequence of channelization is that the surface area of rivers has been reduced dramatically, with a concomitant surge of the water current velocity.¹²⁴ This can destroy spawning and rearing habitats, stop water flow from entering backwaters and prevent sediment and other materials from traveling downstream, lowering turbidity.¹²⁵ Turbid water is crucial to the pallid sturgeon because the suspended sediment provides the fish with cover.¹²⁶ The pallid sturgeon has limited vision, and it hunts prey by using its barbels and sensory organs.¹²⁷ Because the species has evolved this way, its survival depends on its ability to hunt without being detected by prey.¹²⁸ The resultant increase in water clarity has led to other species of fish that have evolved in clear water to have an advantage in hunting the prey that are essential to the pallid sturgeon's diet.¹²⁹ Now, such species as the northern pike, walleye, and smallmouth bass consume what the pallid sturgeon needs to survive, reducing food availability.¹³⁰

B. Fishing and Caviar Harvesting

Although it is illegal for fishermen to keep any pallid sturgeon they catch because of the fish's endangered status, commercial and sport fishing have contributed to their decline.¹³¹ Pallid sturgeon populations in at least a third of the Service's recovery-priority management areas continue to be affected by illegal commercial harvesting.¹³² After the failure of the caviar industry in Russia, it was speculated that the pallid sturgeon and its roe would be taken in increasing numbers, leading to the reduction in the species' population.¹³³ The roe of a similar

¹¹⁹ 2003 BiOp, *supra* note 14, at 164.

¹²⁰ *Id.* at 24.

¹²¹ *Id.*

¹²² 2000 BiOp, *supra* note 15, at 122.

¹²³ Sturgeon 4, *supra* note 80, at para. 8.

¹²⁴ Sturgeon 3, *supra* note 66, at 9.

¹²⁵ 2000 BiOp, *supra* note 15, at 112.

¹²⁶ *Id.* at 122.

¹²⁷ Mark Henckel, *Death of a dinosaur: Pallid sturgeon a short step from extinction*, Billings Gazette, at para. 14, (Aug. 17, 2003) http://billingsgazette.com/news/local/article_e8385d35-f7ac-516c-be23-c00267637108.html (last visited, Sept. 30, 2010).

¹²⁸ 2003 BiOp, *supra* note 14, at 23.

¹²⁹ 2000 BiOp, *supra* note 15, at 122.

¹³⁰ *Id.*

¹³¹ 2003 BiOp, *supra* note 14, at 73.

¹³² U.S Fish and Wildlife Serv., *Pallid Sturgeon (Scaphirhynchus albus) 5-Year Review Summary and Evaluation*, at 57 (2007) [hereinafter 5-Year Review].

¹³³ 2003 BiOp, *supra* note 14, at 73.

species, the shovelnose sturgeon, is the intended target of such harvesting; pallid sturgeons are captured incidentally in the process.¹³⁴

C. Entrainment and Watercraft Propellers

Another manmade cause of the species' downfall is entrainment. This occurs when the suction from such tools as drag heads and cutter heads, which are used in dredging projects, extracts fish or eggs from the water, killing them.¹³⁵ Entrainment may also result from water withdrawal at power facilities or irrigation diversions.¹³⁶ For example, at the Intake Dam on the Yellowstone River it has been observed that the irrigation canal that supplies the dam causes the entrainment of pallid sturgeon.¹³⁷ Power facilities can withdraw millions of gallons a day into their cooling intake structures, which also capture the fish.¹³⁸ In one study of a Missouri River power facility, it was confirmed that hatchery-reared pallid sturgeons became entrained from extracting water for cooling purposes.¹³⁹ It has been reported that the force of jet propellers of towboats has killed the fish, as well.¹⁴⁰ Unfortunately, studies on the effects of these threats are limited.¹⁴¹

D. Contaminants

Contaminants found throughout the pallid sturgeon's habitat such as PCB's, cadmium, mercury, selenium and DDT can make their way into the fish's bloodstream and change its physiology.¹⁴² Studies undertaken in North Dakota and Nebraska concluded there were traceable amounts of chlordane, DDE and dieldrin in pallid sturgeons' tissue.¹⁴³ The prevalence of these pollutants is attributed to mines, sewage treatment plants, other industries and abandoned landfills found in many of the states in the pallid sturgeon's range.¹⁴⁴ The pollutants affect reproduction because they are passed on to embryos, reducing their likelihood of survival.¹⁴⁵ As a result of pollutants, some fish have abnormal sex organs, and researchers have reported instances of hermaphroditism.¹⁴⁶ This could possibly be due to an array of factors, including senescence, genetic abnormalities, hybridization, radiation, chemicals, diet, temperature and environmental disturbance.¹⁴⁷ Studies on the impacts of contaminants on the pallid sturgeon population are limited, however.¹⁴⁸ Various agencies have issued "do not eat" advisories for

¹³⁴ *Id.*

¹³⁵ *Id.* at 75.

¹³⁶ 5-Year Review, *supra* note 132, at 39.

¹³⁷ *Id.*

¹³⁸ *Id.* at 53.

¹³⁹ *Id.* at 54.

¹⁴⁰ 2003 BiOp, *supra* note 14, at 76.

¹⁴¹ 5-Year Review, *supra* note 132, at 54.

¹⁴² 2003 BiOp, *supra* note 14, at 74.

¹⁴³ 5-Year Review, *supra* note 132, at 52.

¹⁴⁴ Recovery Plan, *supra* note 22, at 14.

¹⁴⁵ 2003 BiOp, *supra* note 14, at 74.

¹⁴⁶ *Id.*

¹⁴⁷ *Id.* at 75.

¹⁴⁸ 5-Year Review, *supra* note 132, at 52.

shovelnose sturgeons, suggesting that pallid sturgeon individuals are likely to have similar levels of contaminants in their tissues.¹⁴⁹

E. Hybridization

The incidence of hybridization between pallid sturgeons and shovelnose sturgeons decreases the number of pallid sturgeons because fewer pure pallids are bred.¹⁵⁰ The occurrence of hybridization is the result of reduction of habitat diversity by human-induced alterations.¹⁵¹ Conversion of habitat interferes with the species' reproductive isolating mechanisms that occur naturally.¹⁵² Furthermore, changes in turbidity, flow regimes and substrate types also increase the likelihood hybridization takes place.¹⁵³ The reduction in suitable spawning habitat for the pallid sturgeon leads the fish to share what little of that habitat is left with other species that also require it.¹⁵⁴ This competition also promotes hybridization.¹⁵⁵ The phenomenon is believed to occur in at least half of the pallid sturgeon's range and accounts for a large proportion of individuals in the remaining pallid sturgeon stocks.¹⁵⁶

F. Invasive Species

Several invasive species jeopardize the pallid sturgeon's numbers. Asian carp, bighead carp, silver carp and grass carp consume such an abundance of food on the lowest trophic level of the food web that they eventually negatively impact the pallid sturgeon and its interrelationship to the food chain.¹⁵⁷ The carp also eat pallid sturgeon larvae and compete with them for spawning areas, which is a further impediment to the recovery of the species' numbers.¹⁵⁸

G. Iridovirus

Iridovirus, an infectious disease that puts another crippling strain on the pallid sturgeon's numbers, has been introduced to the fish's wild population through the operation of hatcheries.¹⁵⁹ In an effort to bolster the species' numbers, the Service created hatcheries to breed pallid sturgeons and release them into the Missouri River.¹⁶⁰ The virus spread among the fish in some of the hatcheries, and the Service released the infected individuals into the ecosystem, which, in turn, caused it to spread in the wild population.¹⁶¹

¹⁴⁹ *Id.*

¹⁵⁰ 2003 BiOp, *supra* note 14, at 75.

¹⁵¹ Recovery Plan, *supra* note 22, at 15.

¹⁵² *Id.*

¹⁵³ *Id.*

¹⁵⁴ *Id.*

¹⁵⁵ *Id.*

¹⁵⁶ *Id.*

¹⁵⁷ 2003 BiOp, *supra* note 14, at 77-78.

¹⁵⁸ *Id.*

¹⁵⁹ Sturgeon 3, *supra* note 66, at 11.

¹⁶⁰ Rob Holm, North Dakota Fish and Game Department, *Prehistoric Presence, The Pallid Sturgeon*, North Dakota Outdoors, April-May 2002, at 14, <http://gf.nd.gov/multimedia/ndoutdoors/issues/2002/apr-may/docs/sturgeon.pdf> (last visited Sept. 30, 2010).

¹⁶¹ *Id.*

IV. CRITICAL HABITAT FOR THE PALLID STURGEON

A. The Importance of Critical Habitat under the Endangered Species Act

The purpose of the ESA is to “provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, [and] to provide a program for the conservation of such endangered species and threatened species....”¹⁶² In order to effectuate this purpose, the Service is required by the Act to designate critical habitat for endangered species. Critical habitat is defined as:

- (i) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 1533 of this title, on which are found those physical or biological features
 - (I) *essential to the conservation* of the species and
 - (II) which may require special management considerations or protection; and
- (ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 1533 of this title, upon a determination by the Secretary that such areas are essential for the conservation of the species.¹⁶³

Further, conservation is defined as “the use of all methods and procedures which are necessary to bring any endangered species...to the point at which the measures provided pursuant to this chapter are no longer necessary.”¹⁶⁴ This requires that the features “essential to the conservation” of the species be protected in a way that does not merely maintain the status quo with respect to its numbers, but brings the population to such a level that would allow a determination that it is no longer endangered or threatened.¹⁶⁵ The primary means of assuring this type of protection is through critical habitat designation.

In the legislative history of the ESA, Congress expressed the importance of the designation of critical habitat in order to fulfill the purpose of conservation of endangered species:

[C]lassifying a species as endangered or threatened is only the first step in insuring its survival. Of equal or greater importance is the determination of the habitat necessary to that species' continued existence.... If the protection of endangered and threatened species depends in large measure on the preservation of the species' habitat, then *the ultimate effectiveness of the Endangered Species Act will depend on the designation of critical habitat.*¹⁶⁶

The principle manner in which critical habitat designation achieves the purpose of endangered species conservation under the ESA is the Section 7 consultation process.¹⁶⁷ This

¹⁶² 16 U.S.C. § 1531(b).

¹⁶³ 16 U.S.C. § 1532(5)(A) (emphasis added).

¹⁶⁴ 16 U.S.C. § 1532(3).

¹⁶⁵ 16 U.S.C. § 1532(5)(A)(i); 16 U.S.C. § 1532(3).

¹⁶⁶ H.R. Rep. No. 94-887 at 3 (1976) (emphasis added).

¹⁶⁷ 16 U.S.C. § 1536(a)(2).

procedure requires that federal agencies “insure that any action authorized, funded, or carried out by such agency...is not likely to jeopardize the continued existence of any endangered species...or result in the destruction or adverse modification of habitat of such species which is determined...to be critical...”¹⁶⁸ ESA regulations define “destruction or adverse modification” as “alteration [of habitat] that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species.”¹⁶⁹ The destruction or adverse modification standard is independent from the “jeopardize the continued existence” standard, which is defined as “to reduce appreciably the likelihood of both the survival and recovery of a species by reducing the reproduction, numbers, or distribution of that species.”¹⁷⁰ Without critical habitat designation, species are only protected from actions that would jeopardize the species itself. However, when critical habitat is designated, the habitat then becomes protected through the use of the “destruction or adverse modification” standard.¹⁷¹ Because the listing of the pallid sturgeon as endangered has been deficient as a protection, its habitat must receive protection, as well. In the final rule designating critical habitat for the spotted owl, the Service explained the distinction between these two standards:

The Act’s definition of critical habitat indicates that the purpose of critical habitat is to contribute to a species’ conservation, which definition equates to recovery. Section 7 prohibitions against the destruction or adverse modification of critical habitat apply to actions that would impair survival and recovery of the listed species, thus providing a regulatory means of ensuring that Federal actions within critical habitat are considered in relation to the goals and recommendations of a recovery plan. As a result of the link between critical habitat and recovery, the prohibition against destruction or adverse modification of the critical habitat would provide for the protection of the critical habitat’s ability to contribute fully to a species’ recovery. *Thus, the adverse modification standard may be reached closer to the recovery end of the survival continuum, whereas, the jeopardy standard traditionally has been applied nearer to the extinction end of the continuum.*¹⁷²

Several benefits result from the designation of critical habitat, one of which is that designation sends clear notice of the location of the important habitat of the endangered species.¹⁷³ This, in turn, informs the landowners, stakeholders and proponents involved in a possible project that would affect critical habitat areas, and allows them to make prudent decisions. Having critical habitat maps allows for sound planning for the future.¹⁷⁴

Designation of critical habitat can also provide educational benefits and public awareness. In a recent critical habitat designation for the bull trout, the Service noted, “the benefits of critical habitat include educational benefits resulting from identification of the features essential to the conservation of bull trout and the delineation of the areas important for its recovery. Thus, critical habitat designation increases public awareness of bull trout presence

¹⁶⁸ *Id.*

¹⁶⁹ 50 C.F.R. § 402.02.

¹⁷⁰ *Id.*

¹⁷¹ 16 U.S.C. § 1536(a)(2).

¹⁷² *Center for Biological Diversity v. Norton*, 240 F. Supp. 2d 1090, 1099 (D. Ariz. 2003) (emphasis added).

¹⁷³ 73 Fed. Reg. 19000, 19008 (Apr. 8, 2008).

¹⁷⁴ 58 Fed. Reg. 29186, 29187. (May 19, 1983).

and...increases habitat protection...from adverse modification or destruction....”¹⁷⁵ Critical habitat designation would benefit the pallid sturgeon in the same way.

Another advantage of critical habitat designation is that it assists the conservation and management efforts of the government and private individuals and groups by informing parties where their undertakings would have the most significant effect.¹⁷⁶ This also facilitates cooperation between federal and state governments and private parties, so that special concerns can be adequately addressed.¹⁷⁷ Furthermore, actions taken with respect to implementation of recovery plans may also be served by designation.

Critical habitat designation also promotes government accountability. Under the ESA, the citizen suit provision allows those affected by agency action to seek judicial review to ensure compliance with the Act.¹⁷⁸ If an action is taken that destroys or adversely modifies pallid sturgeon habitat, private citizens can compel conformity of agencies’ actions to ESA requirements.¹⁷⁹

Evidence of the benefits of critical habitat designation to endangered species can be demonstrated through studies conducted on the effects of such a designation. Recent research has determined that endangered species that received critical habitat designation were two times as likely to recover from imperiled status as those that did not.¹⁸⁰ Given the desperate state of the pallid sturgeon’s plight, designation is urgently needed as well as required under the ESA.

B. Recovery Plan

The designation of the proposed critical habitat for the pallid sturgeon would be consistent with the recovery plan that was created for the species after its listing. In 1993, the Service issued The Pallid Sturgeon (*Scaphirhynchus albus*) Recovery Plan (Recovery Plan), which is currently in effect and has never been revised.¹⁸¹ Pursuant to 16 U.S.C. § 1533(f), the Service must “develop and implement plans for the conservation and survival of endangered species...listed pursuant to this section” by describing “site-specific management actions as may be necessary to achieve the plan’s goal for the conservation and survival of the species” and must develop “objective, measurable criteria which, when met, would result in a determination...that the species be removed from the list....”¹⁸² The Recovery Plan identifies a short-term objective of preventing extinction through the establishment of hatchery brood stock populations and a long-term goal of downlisting or delisting the pallid sturgeon “through protection, habitat restoration, and propagation activities by 2040.”¹⁸³ The species will be downlisted or delisted if it

¹⁷⁵ 75 Fed. Reg. 2270, 2294. (Jan. 14, 2010).

¹⁷⁶ 58 Fed. Reg. 29186, 29187. (May 19, 1983).

¹⁷⁷ *Id.*

¹⁷⁸ 16 U.S.C. § 1540(g).

¹⁷⁹ *Id.*

¹⁸⁰ Taylor, M.F., K.F. Suckling, and R. Rachlinski. 2005. *The effectiveness of the Endangered Species Act: A quantitative assessment*. *BioScience* 55:360-367.

¹⁸¹ Recovery Plan, *supra* note 22.

¹⁸² 16 U.S.C. § 1533(f).

¹⁸³ Recovery Plan, *supra* note 22, at 16.