AN ACTION PLAN FOR PALLID STURGEON IN MISSOURI

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EXECUTIVE SUMMARY

The pallid sturgeon is a federally endangered species. Its range includes the Missouri River from Montana to its confluence with the Mississippi River and the Mississippi River from the Missouri River confluence to the Gulf of Mexico. This fish, once adapted to predevelopment habitat conditions of large rivers, may be close to extinction because of riverine modifications made during the past 100 years. Changes in the river and introduction of exotic species may have resulted in a somewhat different riverine fish fauna. Capture information suggests that pallid sturgeon have not reproduced naturally for at least 10 years within their range.

Pallid sturgeon recovery efforts will include understanding more about their life history, restoration of habitat, and artificial propagation. This plan contains proposed actions by the Missouri Department of Conservation during the next 10 years that will lead to recovery of pallid sturgeon in this state to a self-sustaining level.

The Missouri action plan includes the following strategies:

A. RIVERINE HABITAT RESTORATION/ENHANCEMENT

1. Restore riverine diversity.
2. Protect valuable riverine habitat.

B. LIFE HISTORY

1. Monitor sport and commercial fisheries.
2. Identify informational needs in Missouri.
3. Develop partnerships and secure outside funding for life history studies.

C. ARTIFICIAL PROPAGATION

1. Collect and maintain broodstock.
2. Construct or modify hatchery facilities.
3. Produce and stock 10,000 pallid sturgeon fingerlings annually.
4. Develop partnerships to seek outside funding for hatchery renovations.
5. Implement stocking protocol.

D. EDUCATION

1. Inform and educate public.
2. Provide pallid sturgeon for outreach.

E. COORDINATE RECOVERY ACTIVITIES WITH NATIONAL RECOVERY EFFORTS

1. Communicate Missouri's recovery efforts.

FOREWORD

This action plan for pallid sturgeon recovery in Missouri was a team effort, using the expertise available within the Missouri Department of Conservation. Although many people provided input and guidance, the team charged with developing the plan was composed of the following Missouri Department of Conservation staff:

Kim Graham	Chairman
Jerry Hamilton	Member
Tim Grace	Member
Norm Stucky	Member
Bob Hrabik	Member

This plan outlines the Missouri Department of Conservation's long-range (1995-2004) strategic direction for pallid sturgeon recovery in Missouri. It will be reviewed annually and implementation directed by Fisheries Division annual operational plans which consider current priorities and availability of funds and manpower. This plan will be updated or modified as needed in five years (1999).

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RECOVERY BACKGROUND AND STRATEGY

The pallid sturgeon (Scaphirhynchus albus) is native to the Missouri and middle and lower Mississippi rivers and lower reaches of their major tributaries. In Missouri, they are found throughout the Missouri River and in the Mississippi River downstream from St. Louis. Pallid sturgeon are adapted to predevelopment habitat conditions that existed in these large rivers. The rivers generally could be described as large, free-flowing, warmwater, turbid, with an unstable sand-silt substrate, and a diverse assemblage of physical habitats. These have changed considerably since man began to modify the rivers. Modification of the pallid sturgeon's habitat by human activities has blocked fish movement, destroyed or altered spawning areas, reduced food sources or ability to obtain food, altered water temperatures, reduced turbidity and changed the river system hydrograph. Changes in the Missouri River since presettlement and introduction of exotic species have also resulted in a somewhat different riverine fish fauna. These introduced species and changes in distribution and occurrence of native fish species may have contributed to increased competition with pallid sturgeon during certain life stages. Overfishing and pollution may have also contributed to the decline in pallid sturgeon numbers.

Hybridization between pallid sturgeon and shovelnose sturgeon was first documented in Missouri about 20 years ago but the effects on population status are not known. It appears that hybridization is more common in the Mississippi River than in the Missouri River.

The pallid sturgeon was not identified as a species until 1905 and may never have been abundant within its native range. It was listed as a federally endangered species on September 6, 1990, in accordance with provisions of the Endangered Species Act of 1973, as amended.

The Pallid Sturgeon Recovery Plan was completed in 1993 by the U. S. Fish and Wildlife Service, with assistance from an eight-member, multi-disciplinary recovery team. The Recovery Plan includes a short-term recovery objective to prevent species extinction by establishing captive broodstock populations by 1998 and a long-term recovery objective to downlist and delist the species by 2040 through protection, habitat restoration, and propagation activities. Under the current preliminary criteria, downlisting may be considered when (1) a population structure with at least 10 percent sexually mature females occurring in the lower Missouri and lower Mississippi rivers has been achieved, and when (2) sufficient population numbers are present to maintain stability.

Missouri's Action Plan addresses components of the Pallid Sturgeon Recovery Plan applicable to recovery efforts by the Missouri Department of Conservation.

GOAL STATEMENT

The goal in Missouri is to restore pallid sturgeon numbers in the lower Missouri and lower Mississippi rivers so the species is self-sustaining and can be downlisted and delisted as outlined in the Pallid Sturgeon Recovery Plan. Achievement of this goal will require coordinated effort of all Fisheries Division sections (Administration, Research, Management and Hatcheries) to implement tasks involving riverine habitat restoration and enhancement, life history studies, propagation, and education.

OBJECTIVES

A. PROTECT AND RESTORE HABITAT

We are basing our recovery efforts on the premise that pollution in the big rivers has decreased during the past 50 years and that hatchery-produced pallid sturgeon can be protected through regulations. We believe that spawning habitat still exists in both rivers but that shallow, backwater areas believed to be important as feeding and nursery areas are limited because of prior river modification. Although efforts to restore habitat may be opportunistic and continuing, it will be important to purchase additional wetland areas where old channels can be reconnected to the main channel and to continue negotiations with the U. S. Army Corps of Engineers to preserve blew holes and scour holes believed to be important habitat for most riverine fish species. Close coordination with the U. S. Army Corps of Engineers and U. S. Fish and Wildlife Service (Ecological Services) will help ensure that these backwater areas and reclaimed river channels are protected and that negotiations continue to purchase and improve habitat critical for pallid sturgeon. Efforts should include encouragement of habitat diversity on private lands, particularly those where remnant old river channels or scour holes were created by the 1993 flood.

Two of six recovery-priority management areas identified in the Pallid Sturgeon Recovery Plan are located in Missouri. These areas include the Missouri River from Gavins Point Dam to St. Louis and the Mississippi River from St. Louis to the Missouri/Arkansas border. They were selected as high priority recovery areas based upon most recent pallid sturgeon records of occurrence and the probability that these areas, though degraded, still provide suitable habitat for species restoration and recovery. The confluence areas of major Missouri and Mississippi river tributaries were emphasized in selection of recovery priority areas because of their importance as feeding and nursery areas for large-river fish.

Strategy 1: Restore riverine habitat diversity in the Missouri and Mississippi rivers.

Task a: Restore natural hydrograph of Missouri River.

- Continued coordination with U. S. Army Corps of Engineers, Master Manual Study

Task b: Create, restore, or reconnect off-channel, low velocity, riverine habitat,including sand bars and islands.

- Continued coordination with U. S. Army Corps of Engineers regarding navigation channel maintenance.

- Continued coordination with U. S. Army Corps of Engineers regarding Missouri River mitigation.

- Identify and acquire additional lands with blew holes and old river channels that can be reconnected to the main channel.

- Develop existing lands to provide an opportunity for big river fish to use them during certain portions of the year.

- Identify and develop private lands, through easements, with blew holes and old river channels that can be reconnected to the main channel.

Strategy 2: Protect valuable riverine habitat, including all habitat immediately above and below tributary streams, and habitat in lower portions of tributary streams.

Task a: Identify, classify, and map critical habitat.

Task b: Protect selected areas through environmental assessment (federal regulatory program 401, 404 permits).

B. PROVIDE LIFE HISTORY INFORMATION NEEDED FOR RECOVERY

Information about pallid sturgeon life history is needed to better understand the habitats and processes necessary for recovery of this fish. Basic information such as spawning location, substrate preference, or water temperature at time of spawning is not known. Larval or fingerling pallid sturgeon have never been captured. Limited capture information indicates that pallid sturgeon have not reproduced in the wild for at least the last 10 years. Most pallid sturgeon catches reported by commercial fishermen are from the lower Mississippi River. We assume the catches are pallid sturgeon because shovelnose sturgeon seldom exceed 3 pounds and several commercial fishermen report occasionally capturing river sturgeon between 10-30 pounds.

Although little information is available about pallid sturgeon food habits, adult pallid sturgeon reportedly have a higher incidence of fish in their diet than shovelnose sturgeon which feed predominantly on aquatic invertebrates. Information regarding age and growth is scarce because we have few records of pallid sturgeon.

Potential partnerships and funding sources are needed to support studies on various aspects of life history of the species. These studies could be accomplished through assignment of Fisheries Division personnel or through contracts with other agencies or institutions.

Strategy 1: Monitor sport and commercial catch of all sturgeon species.

Task a: Maintain cooperation of commercial fishermen to report their catch of all sturgeon species.

- Continue to provide postage-paid sturgeon report cards to all commercial fishermen who fish the big rivers in Missouri and Illinois.

- Continue to use monthly commercial fisheries report cards to monitor sturgeon harvest.

Task b: Contract with key commercial fishermen to capture and provide information about all sturgeon species.

Task c: Collect sturgeon sport capture information for all sturgeon species.

- Use mass media to educate and disseminate information about pallid sturgeon recovery to gain cooperation of sport anglers.

- Place sport anglers report cards at key launch ramps along the Missouri and Mississippi rivers.

Strategy 2: Satisfy pallid sturgeon information needs in Missouri.

Task a: Age and growth.

Task b: Food habits of all life stages.

Task c: Critical sturgeon habitat

- Contact known commercial fishermen who occasionally capture pallid sturgeon.

- Use Long Term Resource Monitoring Station (LTRM) data.

Task d: Movements of tagged and stocked pallid sturgeon fingerlings.

- Use pallid sturgeon commercial fisheries data currently being collected from Missouri and Illinois by report card.

- Use Missouri Department of Conservation, Fisheries Management annual river surveys.

- Use LTRM river survey information.

- Use sport angler returns.

Strategy 3: Develop partnerships for short-term and long-term assessments.

Task a: Develop partnerships for short-term and long-term assessments.

- U. S. Army Corps of Engineers.

- U. S. Fish and Wildlife Service.

- National Biological Service.

- Private foundations/funds.

C. IMPLEMENT ARTIFICIAL PROPAGATION PROGRAM

We believe current numbers of wild pallid sturgeon are too few to reestablish a self-sustaining population in the foreseeable future. Therefore, we hope to develop a self-sustaining population of pallid sturgeon in the Missouri and lower Mississippi rivers by stocking approximately 10,000 fingerlings each year for 10 years. The Mississippi River below St. Louis contains about 103,000 surface acres. Stocking 50,000 pallid sturgeon fingerlings in each site over a 10-year period will result in a stocking density of about 0.5 fish per acre in the Mississippi River below St. Louis, assuming equal distribution. The Missouri River in Missouri contains approximately 61,000 surface acres and during the same 10-year period will also be stocked with 50,000 pallid sturgeon fingerlings. After 10 years, the Missouri River stocking density will be about 0.8 sturgeon per surface acre.

In 1992, we successfully spawned and reared pallid sturgeon in captivity. Artificial propagation techniques developed for paddlefish were used, however eggs were hand-stripped. Young were fed both artificial diet and frozen, adult brine shrimp.

More extensive diet testing is required as recovery efforts begin because it was apparent in 1992 that current artificial diets are incomplete. Frozen, adult brine shrimp are excellent feed and readily eaten by pallid sturgeon fingerlings but cost is high. We should continue to cooperate with the U. S. Fish and Wildlife Service to evaluate diets currently being developed specifically for pallid sturgeon.

Artificial propagation techniques currently used to spawn and rear pallid sturgeon are adequate for reliably producing fingerlings; however, propagation procedures should continue to be refined and improved. Additional study is required to develop cryopreservation techniques for preserving sperm. This will allow hatchery personnel to maintain fewer males at Blind Pony Hatchery and maintain genetic diversity of progeny.

The Pallid Sturgeon Recovery Plan asks that Blind Pony Hatchery hold and maintain 5-7 pair of broodstock for recovery efforts. We should attempt to capture or purchase from commercial fishermen at least 1-2 pair of additional broodstock each year to guarantee genetic diversity.

Currently, all pallid sturgeon are reared outside in rectangular, concrete raceways. These facilities are less than satisfactory because concrete is abrasive and injured fish are more susceptible to disease, young are too crowded in the available facilities, fish are exposed to direct sunlight, and predation by a variety of wild animals can be significant. A small building will be required so that sturgeon fingerlings can be reared under cover and in round fiberglass tanks that are less abrasive and where crowding is less of a problem, and where predation by wild animals can be eliminated. Plastic pond liners will be required for all broodstock holding ponds. Without pond liners, a layer of flocculent caused by burrowing crayfish in unlined ponds interferes with the sturgeon's ability to feed.

The Pallid Sturgeon Recovery Plan specifically mentions providing federal monetary assistance to Blind Pony Hatchery for structural modification, operation, and required maintenance to improve its pallid sturgeon artificial propagation capability. Additionally, we should solicit end-of-year excess funds from other agencies and organizations if they become available.

Strategy 1: Collect annually from the wild 1-2 pair of pallid sturgeon broodstock from Missouri and Mississippi rivers.

Task a: Purchase pallid sturgeon broodstock from commercial fishermen annually.

Task b: Maintain pallid sturgeon broodstock in aerated, flow-through, lined ponds.

Strategy 2: Construct or modify existing facilities at Blind Pony Hatchery to rear and hold pallid sturgeon.

Task a: Install pond liners for one 0.1-acre and one 0.5-acre ponds.
Task b: Construct a building with two 50’ x 4’ raceways and sufficient room for 6 tanks.

Task c: Purchase (two 20’ diameter and four 10’ diameter) circular fiberglass tanks.

Strategy 3: Produce 10,000 pallid sturgeon fingerlings annually for recovery efforts.

Task a: collect sufficient pallid sturgeon eggs annually to meet commitment.

Task b: Modify or refine existing artificial propagation techniques for producing fingerling.

Task c: Modify or refine existing procedures for holding broodstock pallid sturgeon in ponds.

Task d: Develop additional artificial propagation techniques to improve sturgeon production and rearing (e.g., cryopreservation).

Strategy 4: Develop partnerships to fund Blind Pony Hatchery renovations.

Task a: Renovate Blind Pony Hatchery to improve long-term propagation capabilities.

- Use existing Missouri Department of Conservation funding.
- Develop partnerships and seek funding from U. S. Army Corps of Engineers.
- Develop partnerships and seek funding from U. S. Fish and Wildlife Service.
- Develop partnerships and seek funding from National Biological Service.
- Develop partnerships and seek funding from private foundations/funds.

Strategy 5: Implement pallid sturgeon stocking protocol.

Task a: Provide input and coordinate with Pallid Sturgeon Recovery Team regarding propagation plans, stocking and tagging plans, and stocking evaluation plans.

D. EDUCATE PUBLIC ABOUT PALLID STURGEON

If Pallid sturgeon recovery is to be successful, all Missourians, especially sport and commercial fishermen, must be informed of the importance of pallid sturgeon and the riverine habitats upon which they depend. Educational materials such as brochures, newspaper and magazine articles, poster displays, videos, television spots, etc., should be produced for specific audiences. Live pallid sturgeon fingerlings that are excess to recovery needs should be given to conservation-oriented agencies and groups for educational display.

Strategy 1: Inform and educate the Missouri public about pallid sturgeon.

Task a: Missouri Department of Conservation Nature Centers.

- Live sturgeon display.
- Interpretive display.

Task b: U. S. Army Corps of Engineers, Riverlands Management Area Office, West Alton, Illinois.

- Interpretive display.

Task c: Missouri Conservationist

- One article every three years.
- Back cover once a year (yearly update).

Task d: Missouri State Fair.

- Live sturgeon display.
- Sturgeon video.
- Brochures.

Task e: Missouri Department of Conservation mobile aquarium.

- Live sturgeon display.

Task f: Major Missouri newspapers.

- Two articles for All Outdoors annually.

Task g: Major Missouri boat shows in St. Louis, Columbia, and Kansas City.

- Interpretive display.
- Brochures

Task h: Target all commercial fishermen along Missouri and lower Mississippi rivers.

- Annual letter of update and request for assistance if needed.
- Pamphlets.

Task i: Target sport anglers near Missouri and Mississippi rivers.

- Annual statewide fishing prospectus.
- Annual summary of fishing regulations (booklet).
- Boat shows and fishing clinics.
- Brochures.
- Seek Missouri and Mississippi river sport anglers' cooperation in reporting pallid sturgeon capture information.

Strategy 2: Provide pallid sturgeon for outreach.

Task a: All outreach requests will be first approved by the Pallid Sturgeon Recovery Team Leader, U. S. Fish and Wildlife Service, and the Fisheries Division Chief.

Task b: All requesting parties must have a valid federal permit.

Task c: All pallid sturgeon used for outreach must be excess to production needs.

Task d: Not more than three pallid sturgeon will be given to each successful outreach applicant.

Task e: All successful applicants requesting pallid sturgeon for outreach must contact Hatchery Manager, Blind Pony Hatchery, in

advance and make arrangements to pick up sturgeon at the hatchery.

E. COORDINATE MISSOURI PALLID STURGEON RECOVERY ACTIVITIES WITH NATIONAL RECOVERY EFFORTS

Success of pallid sturgeon recovery in Missouri depends upon effective communication between the Missouri Department of Conservation and other entities in the Mississippi River Basin who are involved with pallid sturgeon recovery. Coordination will be required between the states of Missouri, Nebraska, Iowa, Kansas, Illinois, and Kentucky within the newly formed Central States Pallid Sturgeon Work Group, the already formed Upper Basin Pallid Sturgeon Work Group, and the planned Lower Basin Pallid Sturgeon Work Group.

Strategy 1: Communicate results of Missouri's pallid sturgeon recovery efforts.

Task a: Appoint a coordinator to serve as a clearinghouse for all outreach requests, after Fisheries Division Chief approval, to coordinate preparation of annual reports of progress, and to provide liaison with the other pallid sturgeon work groups, the Pallid Sturgeon Recovery Team, MICRA, and other entities involved with pallid sturgeon recovery efforts.

Task b: Monitor success of recovery projects' status.

Task c: Provide annual summaries of results of ongoing habitat restoration/enhancement, life history, artificial propagation, or educational studies or programs.

Task d: Publish appropriate results.

SCHEDULE AND COSTS

Pallid sturgeon recovery efforts will cost the Missouri Department of Conservation about $350,000 over the next 10 years. It will require about 170 person days annually (27 Administration days, 49 Management days, 50 Research days, and 44 Hatchery days) to accomplish the tasks as set forth in this 10-year recovery plan. A more detailed breakdown of annual costs and person days is presented in the following implementation schedule.

IMPLEMENTATION SCHEDULE							
Obj.	Strategy	Task	Work Description	Lead	Annual Person Days	Schedule	Total Salary & Operating Costs
A.	1.	a.	Restore natural hydrograph	Plan.	5-10	Ongoing Coord. COE	
		b.	Create/restore habitat	Plan./Res./ Mgt.	5-10	Ongoing Coord. COE	
	2.	a.	Identify/classify habitat	LTRM/Mgt.	20	1995-2004	$46,000
		b.	Protect areas (401,404)	Plan./Mgt.	5	1995-2004	$5,000
B.	1.	a.	Comm. fish report cards	Res.	5	1995-2004	$5,000
		b.	Contract comm. fishermen	Res.	5	1995-2004	$5,000
		c.	Collect sport harvest info.	LTRM/Mgt.	5	1995-1998	$2,000
	2.	a.	Determine age & growth	LTRM/Mgt.	2	1995-1998	$2,000
		b.	Determine food habits	LTRM/Mgt.	2	1995-1998	$3,000
		c.	Determine critical habitat	LTRM/Mgt./ Res.	10	1995-1998	$10,000
		d.	Determine movement	LTRM/Res.	10	1995-2004	$40,000
	3.	a.	Develop partnerships for funding	Admin./Res.	5	1995-1998	$2,000
C.	1.	a.	Collect broodstock	Hatch/Res.	10	1995-2004	$20,000
		b.	Maintain broodstock	Hatch.	2	1995-2004	$5,000
	2.	a.	Purchase pond liners	Hatch.	2	1996	$8,000
		b.	Construct hatchery building	Admin./Hatch.	3	1996	$50,000
		c.	Purchase tanks	Admin./Hatch.	2	1996	$5,000
	3.	a.	Collect eggs	Hatch.	5	1995-2001	$7,000
		b.	Refine art. prop. techniques	Hatch.	5	1995-1998	$2,000
		c.	Refine broodstock holding	Hatch.	5	1995-2001	$7,000
		d.	Develop artf. prop. techniques	Hatch.	5	1995-2001	$7,000
	4.	a.	Develop partnerships for funding	Admin./Hatch.	5	1995-1998	$2,000

	5.	a.	Implement stock protocol	Hatch/Res.	2	1996-2001	$30,000
D.	1.	a.	Educate public – MDC Nat. Cntr.	Admin./Res.	2	1996-1998	$1,500
		b.	Corps. of Eng. display	Admin./Res.	2	1996-1998	$3,000

IMPLEMENTATION SCHEDULE (cont.)

Obj.	Strategy	Task	Work Description	Lead	Annual Person Days	Schedule	Total Salary & Operating Costs
		c.	MO Conservationist article	Admin.	5	1996-2001	$3,000
		d.	State Fair display	Admin./Hatch.	2	1995-2001	$7,000
		e.	Mobile aquarium	Admin./Hatch.	3	1996-2001	$12,000
		f.	Newspapers	Admin.	5	1996-2001	$6,000
		g.	Boat shows	Admin./Mgt	5	1996-2001	$15,000
		h.	Comm. fishermen	Admin./Res.	3	1996-1998	$3,000
		i.	Sport fishermen	Admin./Res.	3	1996-1998	$3,000
	2.	a.	Outreach-FWS approval	FWS	-	-	-
		b.	Permit	Res.	-	-	-
		c.	Excess to need	Hatch./Res.	-	-	-
		d.	3 fish per party	Hatch./Res.	-	-	-
		e.	Pick up at Hatchery	Hatch./Res.	2	1995-2001	$5,000
E.	1.	a.	Appoint coordinator	Admin.	-	-	-
	3.	b.	Monitor project status	Res.	5	1996-2001	$4,500
		c.	Provide summaries of recovery	Res.	10	1996-2001	$6,000
		d.	Publish information	Res./Hatch.	10	1996-2001	$18,000