because successful reproduction has not been documented. It is also likely that the forage base once used by pallid sturgeon has been greatly altered, thus affecting both growth and reproduction. The largest remaining populations of pallid sturgeon appear to be in the upper Missouri River above Ft. Peck Reservoir in Montana; in the Missouri and Yellowstone rivers above Garrison Reservoir in North Dakota and Montana, respectively; in the Mississippi River below St. Louis, Missouri to the Old River Control Structure in Louisiana; and below the Old River Control Structure in the Atchafalaya and Red rivers of Louisiana.

Artificial Propagation: Pallid sturgeon were first artificially spawned by Missouri Department of Conservation biologists in 1992. A number of other Federal and State resource agencies are now also involved in their own propagation activities. About 10,000 hatchery reared pallids were stocked in the lower Missouri and Middle Mississippi rivers in the mid 1990's. Several thousand more hatchery produced fish were subsequently stocked in the upper Missouri and lower reaches of the Mississippi through the combined efforts of state and federal biologists.

Human Uses: Aside from the pallid sturgeon's importance as a natural inhabitant of the Missouri and Mississippi River systems, it is considered an indicator species whose abundance and distribution is directly related to the quantity and quality of suitable habitats and riverine hydrology.

What is being done to protect the pallid sturgeon? A Pallid Sturgeon Recovery Plan has been established by the U.S. Fish and Wildlife Service, in cooperation with state and private entities, under the auspices of the Endangered Species Act of 1973, as amended. This plan includes habitat restoration to reconnect the river with side channels and quiet backwater habitats (e.g. Lisbon Bottoms); strategies for restoring riverine flow regimes to some semblance of their natural character; and artificial propagation. Under present management procedures of the U.S. Army, Corps of Engineers, Missouri River flows below Gavin's Point dam (the most downstream Missouri River reservoir) are raised in the Spring and held stable throughout the summer spawning and growing season in order to serve the needs of commercial navigation. Biologists recommend that these procedures be altered to include a Spring water level rise, followed by a mid-Summer reduction in flows and water levels in order to simulate characteristics of the natural river hydrograph that the pallid sturgeon evolved under. The Spring rise would trigger spawning activity, and the summer flow reduction would maintain lower flows and quieter water for the rearing and feeding of young pallid sturgeon. This procedure would also allow for commercial navigation traffic to transport fertilizers and fuel upstream on the "Spring rise", and harvested crops downstream on a "Fall rise". However, this procedure has not been implemented due to political opposition coming largely from farming and navigation industry representatives. Also the Pallid Sturgeon Recovery Plan, prepared by the Pallid Sturgeon Recovery Team, has not been fully implemented, largely due to lack of funding support.

Lisbon Bottoms Habitat Restoration Site.

What can you do? Immediately release any fish captured or caught on hook and line that is thought to be a pallid sturgeon. Become better informed about endangered species needs, and support both state and federal endangered species recovery programs, including the Pallid Sturgeon Recovery Plan. With a little help, these "living fossils" can live along side of thriving economies and modern man!

For more information contact:

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U.S. Fish & Wildlife Service

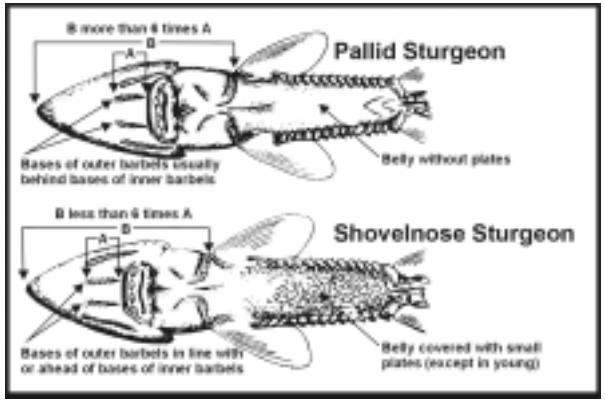
Pallid Sturgeon

Scaphirhynchus albus

Description: The pallid sturgeon, an ancient species that has existed since the days of the dinosaurs, is also one of the most poorly known and infrequently seen freshwater fishes in North American. It was listed by the U.S. Fish & Wildlife Service as endangered on September 6, 1990, in accordance with provisions of the Endangered Species Act of 1973, as amended. Similar in appearance to the shovelnose sturgeon, the pallid has a flattened and shovel-shaped snout and is

distinguished by pale, bony plates instead of scales, a reptile-like body, a sucker-type mouth and large barbels (whisker-like growths next to it's mouth). The barbels, used to sense the river bottom and identify prey, allow the protrusible, vacuum cleaner-like mouth to quickly capture it. Prey consists of aquatic insects

and small bottom dwelling fish. The caudal peduncle (or tail) of the pallid sturgeon is flattened in cross section, completely covered with armor-like plates, and the upper lobe of the tail fin is elongate and shark-like. The pallid is lighter in color (greyish-white) than the shovelnose (tan to gray or yellowish green dorsally and light ventrally) and is much larger in maximum size. While the shovelnose sturgeon rarely exceeds 5 lbs in weight, the pallid can exceed 6 ft. in length and weigh



over 100 lbs. Also, the belly of the pallid sturgeon is completely without bony plates throughout its life and the barbels are positioned differently (see figure above). In the shovelnose, all four barbels are in line and evenly spaced in front of the mouth. In the pallid, the outer barbels are placed slightly farther back.

Biology: While little is known about pallid sturgeon life requirements, we do know that they prefer large, turbid, free-flowing riverine habitats with rocky substrates. Pallid sturgeon are well adapted to life on the river bottom and inhabit areas of swifter water than do the smaller shovelnose. The first documented natural reproduction of pallid sturgeon in the lower Missouri River was recorded by U.S. Fish and Wildlife Service biologists in 1999 and 2000 near Columbia, MO. Several larval pallid sturgeon were collected in a side channel associated with a recently completed habitat restoration project at Lisbon Bottoms on the Big Muddy National Fish and Wildlife Refuge. In October 1992 Louisiana Department of Wildlife and Fisheries biologists captured two small (24 and 26 in) pallid sturgeon below the Old River Control Structure at the headwaters of the Atchafalaya River. The smallest of the two weighed approximately 2 lbs, and both were believed to be less than three years old, indicating recent pallid sturgeon reproduction in the area. Pallids can live beyond 60 years of age, but do not reach sexual maturity until about age 20. Pallid sturgeon are known to hybridize in nature with the closely related shovelnose, and it is thought that loss of habitat and reproductive cues (water level rises) are the likely causes. Since the two sturgeon species are so closely related, and their former unique spawning habitats have been altered or lost largely due to damming, altered hydrology, and channelization, both species are forced to spawn at the few remaining acceptable locations. Fertilization occurs externally, and hybridization occurs when eggs and sperm of the two species are mixed in the river water as it flows over the gravelly spawning beds. In the lower Missouri and in the Missouri reach of the Mississippi River (below St. Louis), hybrids are more common than pallids. Hybrids were first identified in that reach of the Mississippi River in the late 1970's. More recently hybrids have also been captured in Louisiana near the Old River Control Structure in both the Mississippi and Atchafalaya rivers. Fertile hybrids may constitute a serious threat to the survival of pallid sturgeon in the southern portion of their range because of competition and genetic "swamping" (i.e. shovelnose and hybrid genes vastly outnumbering true pallid sturgeon genes causing them to gradually disappear from the gene pool). The primary forage base for adult pallids, prior to extensive modifications of riverine habitat, is assumed to have been flathead chubs, plains minnows, and western silvery minnows which are found over sand and gravel bars. The few pallid sturgeon that have been held in captivity have been successfully fed goldfish, crayfish, and minnows.

Larval pallid sturgeon collected at Lisbon Bottoms habitat restoration site.

Historic and Present Range: The original range and distribution of pallid sturgeon (see map) included the Yellowstone River (from the confluence of the Bighorn River downstream to the confluence of the Missouri River), the Missouri River (from Great Falls, Montana, downstream to the confluence of the Mississippi River), and the Mississippi River (from the confluence of the Missouri River to the Gulf of Mexico). The one or two early records of pallid sturgeon from the Mississippi River above the confluence of the Missouri River were likely strays because prior to construction of navigational features, the upper Mississippi River probably did not provide the preferred turbidity and temperature range of the species. Historic abundance of pallid sturgeon is poorly known, but available information suggests that the species was always rare. In the early 1900's, pallid sturgeon reportedly comprised only 1 in 500 of river sturgeon captured in the Mississippi River at Grafton, Illinois. Since development of the Missouri River dams and reservoirs, the species has declined even further. There are now only remnant, small populations of pallid sturgeon remaining in each of the reservoir complexes in North and South Dakota. Also, the remaining riverine habitat between the dams apparently does not meet the requirements of the species

Historic Range and Distribution of Pallid Sturgeon.

Missouri River dams prevent upstream pallid sturgeon movements.