

**1999 Summary Report  
of work conducted by the  
Missouri River FWMAO on  
Missouri-Yellowstone River's  
Pallid Sturgeon**



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## **Study Area**

Sampling for pallid sturgeons was primarily conducted on the first 20 miles of the Yellowstone River upstream from its confluence with the Missouri River and the Missouri River from the confluence with the Yellowstone River downstream to Highway 85 Bridge near Williston, North Dakota. The two primary purposes for collecting pallid sturgeon for 1999 was for propagation purposes and viral testing.

## **Methods**

Drift netting is the most effective method to capture adult pallid sturgeon for this area. These nets are a modified trammel net. The modified trammel nets are 120 feet in length and 8 feet deep and semi-buoyant with a one-half inch foam-core float line and 50 pound lead-core lead line. The net consists of two walls; one wall of 6" square mesh and the other wall consists of 10 inch square mesh. Both meshes are constructed of #9 multi-filament twine.

Each drift is timed with the use of a stopwatch and the time is recorded when the net is being deployed and when retrieval is started. During the 1997 field season, we began to collect global position coordinates using a Precision Lightweight GPS Receiver (PLGR) for each drift to develop a database of sampling coordinates and catch. This information will be used to develop a data layer of our sampling effort and results within RPMA #2. Waypoints were collected at the initial setting of the net, when the net set was completed and when we began to pull the net. This will provide information on the drift, drift distance, area sampled, as well as species sampled that will be incorporated onto a database layer for the map of the river and its habitats.

Each pallid sturgeon captured is placed into a six-foot 'sheep tank' with fresh water. All morphological data is collected while the fish is in the water. Weight information is collected with the use of a stretcher and a hanging scale. All pallid sturgeons are scanned for PIT tags or other tags. Previous injuries are also noted. This year we began collecting meristic data on the dorsal and anal fin ray counts to incorporate into a character index developed by Sheehan (1998).

For all fish being transported, an injection of oxytetracycline (aqueous solution) at a rate of .045 ml/lb of body weight is injected inter-musculature to reduce stress and bacterial infections. Doses greater than 1.4 cc are split between two injection sites. Pallid sturgeon were also transported in a 0.5% salt solution to reduce stress.

## **Results**

A majority of the work accomplished this year was directed toward the capture of broodstock pallid sturgeon and sampling for fish health. We also assisted Garrison Dam National Fish Hatchery personnel with the spawning of pallid sturgeon. Crews from Montana Department of Fish, Wildlife and Parks, North Dakota Game and Fish Department and the U.S. Fish and Wildlife

Service collaborated on these efforts. A total of six pallid sturgeon were captured by this office during 1999.

## **Discussion**

Table one list the fish that were sampled during the months of April, July and August. The fish recorded for April were the result of a consolidated effort by Montana Fish, Wildlife and Parks and U.S. Fish and Wildlife Service. The main purpose for capturing these fish was for propagation purposes and efforts were primarily directed toward capturing broodstock pallid sturgeon that would be ready to spawn this year. Results of the spawning have been reported by Garrison Dam personnel in the annual report.

During field operations in April, approximately five of the pallid sturgeon were observed to have distended abdomens. Upon observation of one of the pallid sturgeon after capture, a fish tail was observed protruding into the mouth cavity. The fish was carefully removed and subsequently identified as a ten inch goldeye (*Hiodon alosoides*). This is one the first observations of food items that are utilized by pallid sturgeon.

Another observation this past year was the capture of pallid sturgeon 7F7B021573. This fish was originally captured in April, 1993 and was part of the telemetry project (Bramblett 1996). In May, 1993, this same fish was observed expelling eggs after being captured by a paddlefish angler. This fish was captured again in the fall of 1998 for transport to Gavins Point NFH for spawning in 1999. It is not known if this fish had spawned in the interim, but the spawning interval between these two occurrences was six years.

<b>PIT tag #</b>	<b>Date of capture</b>	<b>Location of capture River &amp; Rivermile (RM)</b>	<b>Gender</b>
1F4A111C6A	04/14/1999	Confluence	
1F482F3F2B <sup>B</sup>	04/12/1999	Confluence	Male
2204657963 <sup>AB</sup>	04/15/1999	Confluence	Female
115553544A <sup>B</sup>	04/14/1999	Confluence	Female
1F477B3A65 <sup>AB</sup>	04/14/1999	Confluence	Male
1F4A27214F <sup>B</sup>	04/14/1999	Confluence	Male
7F7F054855 <sup>AB</sup>	04/13/1999	Confluence	Female
115552116A <sup>AB</sup>	04/13/1999	Confluence	Male
220C7D0429 <sup>A</sup>	04/13/1999	Confluence	
1F4772396F <sup>A</sup>	04/15/1999	Confluence	
1F477B4E51 <sup>A</sup>	04/15/1999	Confluence	
1F4A363031 <sup>A</sup>	04/15/1999	Confluence	
7F7F06685C <sup>A</sup>	08/04/1999	MO rm 1553	
7F7D24754C <sup>A</sup>	05/05/1999	YE rm 14.5	
7F7D7C2E4B <sup>A</sup>	04/13/1999	Confluence	

<sup>A</sup> indicates recapture

<sup>B</sup> indicates that this fish was used for spawning

Table 1. A list of pallid sturgeon sampled during 1999. Also included are the passive integrated transponder number, date of capture, location of capture, and gender.

The seven pallid sturgeon broodstock used during the 1999 propagation at Garrison Dam NFH were returned to the Missouri River near Williston, ND in August, 1999. The fish were released at the Missouri River boat ramp on Highway 85 near Williston and appeared in excellent health.

We calculated effort rates and catch rates for the last three years (Table 2) using the modified trammel nets. With the exception of 1998, the effort required to capture pallid sturgeon has remained fairly constant for the last few years. This is an indication that we are becoming fairly effective at capturing pallid sturgeon under certain environmental conditions. Some preliminary analysis does indicate that effort required to capture pallid sturgeon increases as the flows

increase. It is unclear if this is a result of increased drift speed of the net, behavior of the net under high flows making it less effective, the increased stage height increases the amount of available habitat, or if the reduction in effectiveness is related to the fish moving more in response to flow. During 1999, thirteen pallid sturgeon were captured from within a one mile section of the river near the confluence of the Yellowstone River over a three day period. This type of catch frequency is similar to what is seen in the fall when the fish will appear to be congregated in “schools” or staging. Once flows increase in the spring, there appears to be a reaction by the fish to migrate upriver and disseminate throughout the available habitat upriver. Occasionally, congregations have been found during the suspected spawning period that would tend to indicate spawning concentrations. One note to add is that although catch rates were calculated, this is not a random sampling and productive habitats are targeted and caution should be used for any analysis of relative abundance.

	1997(fall)	1998(spring)	1999(spring)
Catch by amount of time drifting	1 pls/127 minutes	1 pls/96 minutes	1 pls/ 147 minutes
Catch by # drifts	1 pls/15.5 drifts	1 pls/39 drifts	1 pls/17.5 drifts
Average drift time	8:13 minutes	7:02 minutes	8:25 minutes
Number of pallids captured	6	4	4
# of drifts	93	157	70
Total amount of time drifting nets	12:44:12	6:25:24	9:49:41
CPUE	.47 pls/1 hour	.62 pls/1 hour	.41 pls/1 hour

Table 2. Calculated effort and catch rates for pallid sturgeon captured by this office from 1997 through 1999.

## Future Recommendations

- Continue to collect broodstock during the fall or spring prior to spawning.

Using this procedure increases our likelihood of having a successful propagation. Results to date would suggest that holding these fish over winter prior to spawning does not have an adverse affect to propagation efforts and does result in successful reproduction.

Modifications to improve Garrison Dam NFH's pallid sturgeon holding facilities did not result in any mortalities of adult pallid sturgeon in 1999.

- Continue augmentation program of pallid sturgeon and begin monitoring juvenile pallid sturgeon populations in their habitats.

- Investigate the impacts to larval sturgeon survival by downstream riverine habitats.

It is suspected that successful spawning is occurring, however, lack of recruitment could be one of the main limiting factors of the pallid sturgeon population. The substrate of the headwaters of Lake Sakakawea is composed of primarily an unconsolidated silt and a low incidence of sand.

- Develop/utilize facilities at Garrison Dam NFH and Valley City NFH to retain a secondary source of pallid sturgeon progeny as a backup source for future broodstock.

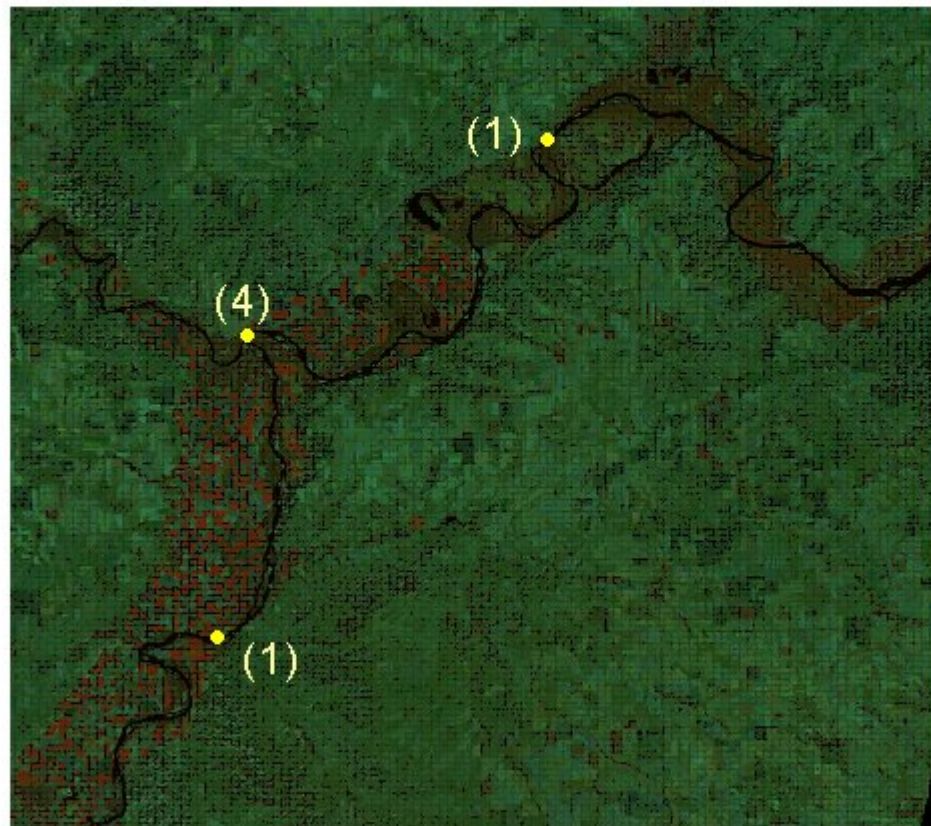
Culturing the pallid sturgeon progeny that will be held as a future broodstock source at one facility, could allow a catastrophic event to essentially eliminate several years work. The main goal would be to "store" excess pallid sturgeon at a second facility that would serve as a reservoir in the event that the primary source of pallid sturgeon broodstock would be lost.

- Continue to improve sampling efficiency of juvenile sturgeon.

- Increase efforts to develop fish by-pass on low-head dams on Yellowstone River and the tributaries to allow fish passage by pallid sturgeon to utilize the middle Yellowstone River for spawning purposes, as well, modify water intakes to reduce potential impacts by entrainment.

- Evaluate streamside modifications (rip-rap, weirs) and the impacts they may have on various in-channel habitats, especially shallow sandbar habitats.

## Pallid Sturgeon Capture Locations For 1999



● Capture Locations

