PERFORMANCE REPORT

STATE: **MONTANA**

GRANT TITLE: **MONTANA ENDANGERED FISHES PROGRAM**
GRANT NUMBER: **E-7-8**

LOCATION: **MISSOURI RIVER, MONTANA**

PERIOD COVERED: **July 1, 2001 through June 30, 2002**

PROJECT PERSONNEL:
Bill Gardner Fishery Biologist Lewistown 406-538-4658

OBJECTIVE:

1. **To evaluate pallid sturgeon reintroduction; to determine habitat preference, movements, abundance, feeding and growth of pallid sturgeon in Montana.**

COSTS: **A total of $?????? in federal and state funds were expended on this project.**

RESULTS:

The study objective was to evaluate the pallid sturgeon reintroduction program in the Recovery Priority Management Area 1 (RPMA-1). A total of 758 hatchery-reared (HRJ) yearling pallids (1997 year class) were released into RPMA-1 during the summer, 1998. The pallid sturgeon augmentation plan called for annual stocking of juvenile pallids for 6 consecutive years, at which time the plan will be evaluated based on its effectiveness. No stocking of juvenile pallid sturgeon occurred again in 2001 because of continued concerns about a virus that was detected in the pallid hatchery. Therefore, this report deals with further evaluations of the 1997 year class and a report on propagation effort during 2002.

The study area is a 168-mile reach of the Missouri River immediately upstream of Fort Peck Reservoir (Figure 1). Drift netting and angling were used to sample the 1997 year-class release. Additionally, trawl sampling was conducted in the study area for assessing wild pallid and shovelnose sturgeon reproduction.

Juvenile pallid sturgeon netting survey:

It is important to evaluate the success of the pallid sturgeon augmentation program so that problems can be resolved early on in the program. Stocking densities, age of stocked fish, acclimation and growth of stocked fish, and location of release sites are all important aspects for evaluating survival and ultimately recruitment of the released HRJ pallid sturgeon.

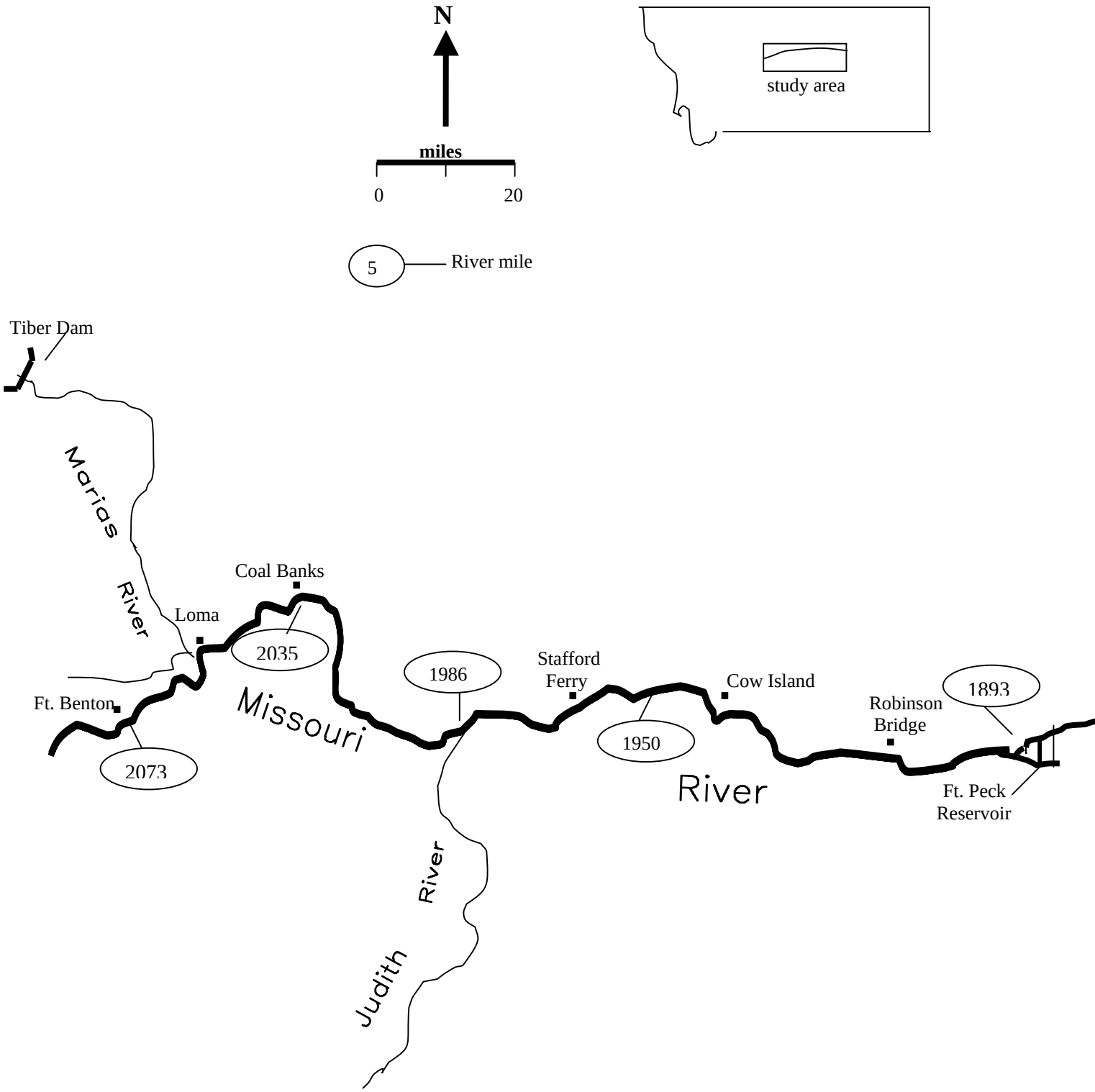

Figure 1. Map of study area

A total of 758 hatchery-reared yearling (HRJ) pallid sturgeon (1997 year class) were released 2 years ago (1998) at 3 locations of the Upper Missouri River by the USFWS. The average weight of these yearling fish were 0.17 lbs. and all were PIT-tagged. No other pallid releases have subsequently occurred because of the concern about the Missouri River Sturgeon Irido Virus (MRSIV) discovered in the pallid sturgeon hatcheries since 1999. Therefore, only this initial pallid sturgeon release has been evaluated over the past 4 years.

Attempts were made to capture the HRJ pallid sturgeon by drifting small mesh trammel nets and by angling. A total of 8 HRJ pallid sturgeon were captured; 7 by netting and 1 by angling (Table 1). All of the HRJ pallid sturgeon were captured in the Robinson Bridge Section (RM 1907.2 - 1920.9). Additionally, a total of 2,005 fish, representing 20 species, were sampled while netting throughout the study area (Table 2). Shovelnose sturgeon (SNS), goldeye, shorthead redhorse and longnose sucker dominated the catch comprising 52, 14, 12 and 7 percent of the fish sampled, respectively.

Benthic trawling:

The main purpose for trawling was to evaluate pallid and shovelnose sturgeon spawning success. A total of 627 fish, representing 14 species, were sampled while trawling during August in the lowest section of the study area (Table 4). The average physical conditions measured for the 125 tows were: Column water velocity = 2.1fps (1.3-2.8); Depth = 6.1ft (3-18); Channel location/macro-habitat = 62% channel cross-over area (CHXO), 18% inside bend area (ISB), 14% outside bend area (OSB), 3% side channel-connected (SCC), and 1% at tributary mouth (TRM). Most of the trawling occurred in the lower 36 miles of the study area between RM-1921 and RM-1885 where it is thought most of the age-0 SNS usually reside. Age-0 channel catfish were by far the most abundant species sampled comprising 42% of the total catch. Only 2 age-0 SNS were sampled this year compared to 3 in 2000 (Gardner 2001). The first year of intensive trawling (1995) a total of 28 age-0 SNS were sampled in about 100 tows (Gardner 1996) indicating this method was effective at sampling age-0 SNS when they are more numerous. Based on the low catches of age-0 SNS this year and previous years, it appears there has been poor SNS spawning success at least during the past 2 years.

Table 1. A list of hatchery-reared pallid sturgeon recaptured in the Upper Missouri River, MT, 2001-02.

PIT Number	Color	Recap date	Recap Rivermile	Release Rivermile	Recap Meth.	FL (in)	TL (lb)
414D3F414A	RED	9/26/01	1917.1	1984.3	Tram	19.0	0.80
411D-series	ORA	9/27/01	1907.0	UNK	Tram	17.3	0.51
411D291301	YEL	9/25/01	1920.9	UNK	Tram	15.9	0.45
414D62056B	GRE	9/27/01	1907.2	1920.6	Tram	18.5	0.78
411D273F62	YEL	10/30/01	1907.2	UNK	Tram	17.0	0.58
41095F113E	YEL	10/30/01	1907.2	1920.6	Tram	17.7	0.62
411D124A3C	GRE	10/31/01	1915.5	UNK	Tram	15.5	0.44
132338770A	ORA	6/14/02	1917.3	UNK	Tram	15.5	0.70

Table 2. Average catch rates (no./drift) of fish sampled while drifting trammel nets in the Upper Missouri River, MT, 2001 and 2002.

	Ft. Benton	Loma	White Rock	Stafford Fy.	Robinson	Total #
Bigmouth Buffalo			0.1			1
Brown trout		tr				1
Blue sucker	0.2	0.5	0.5	0.3		34
Carp	0.5	0.2	0.1	0.2	0.2	40
Channel catfish		tr	0.1	0.2	tr	7
Flathead chub			0.2	0.4	0.1	12
Freshwater drum	tr	tr	0.1		tr	6
Goldeye	3.1	1.9	3.8	5.7	0.1	274
Longnose sucker	1.3	2.9	0.3	0.3	tr	141
Mountain whitefish	0.1	tr				3
Northern pike	tr				tr	2
Pallid sturgeon					0.1	7
River carpsucker	0.6	0.1	1.2	0.6	0.3	67
Sauger	0.4	0.3	0.3	1.8	0.4	75
Shorthead redhorse	4.4	1.8	1.7	2.8	0.4	247
Shovelnose sturgeon	3.6	7.8	4.9	5.6	7.0	1039
Stonecat					tr	1
Smallmouth buffalo	0.3	0.2		0.2	tr	19
Walleye	tr		0.2	0.1	tr	8
White sucker	0.5	0.3			tr	22
Total # fish	321	565	241	216	663	2005
Total # drifts	21	35	18	12	76	162
Average depth (ft.)	6.0	5.4	6.1	6.8	4.9	5.8
Avg. velocity (fps)	2.8	2.7	2.4	2.3	2.3	2.5
Average distance (yd.)	315	297	217	340	275	288
Avg. duration (min.)	7.0	7.0	6.7	8.3	7.4	7.3

Table 3. Average catch rates (average number/tow) of fish sampled by trawling in the Middle Missouri River, MT, 2001.

	Loma	White Rock	Stafford Fy.	Robinson	Total #
Burbot y				tr	1
Carp y				tr	1
Channel catfish y		0.2	0.2	2.61	264
Emerald shiner y			0.1		1
Flathead chub	0.1	0.5	1.9	0.2	38
Hybognathus spp				tr	4
Longnose dace	1.8	3.3			40
Sand shiner	0.1		0.1		2
Sauger y				tr	2
Shorthead redhorse y				tr	1
Shovelnose sturgeon y				tr	2
Sicklefin chub				1.0	101
Stonecat	0.1	0.2	0.2	0.8	83
Sturgeon chub		0.3	0.4	09	87
# Tows	11	6	8	100	125
Avg. Depth (ft)	4.6	5.9	4.0	6.4	
Avg. Col. Velocity (fps)	2.4	2.2	2.2	2.1	
Macro-habitat type (%)					
CHXO	27	67	62	66	
ISB	45	16	12	16	
OSB	27	16	12	13	
SCC				4	
TRM			12		

Y = age-0 fish

Fall pallid sturgeon abundance standardized survey:

A total of 305 fish, representing 11 species, were sampled while conducting the fall survey in the 16-mile Robinson Bridge trend area (Table 4). No adult pallid sturgeon were netted, however, 4 HRJ pallid sturgeon were sampled during the survey. Shovelnose sturgeon dominated the catch comprising 90% of the fish sampled. The highest SNS catch rate of 7.1 fish per drift occurred in the outside bend (OSB) macro habitat type.

The standardized survey has been completed 4 times since 1996. Table 5 summarizes these survey results.

Table 4. Catch rates for fish trammel netted while conducting the fall pallid sturgeon standardized abundance survey, Upper Missouri River, September, 2001.

	HABITAT TYPE				
	CHXO	ISB	OSB	Not Designated	Average CPUE	Total # fish
Carp	0.1		0.5	0.1	0.2	8
Flathead chub	0.1				*	2
Freshwater drum	0.1				*	2
Goldeye			0.1		*	1
Pallid sturgeon	0.1		0.1	0.1	0.1	4
River carpsucker	0.1		0.1	0.1	0.1	5
Sauger			0.1	0.2	0.1	4
Shorthead redhorse	0.1				*	1
Shovelnose sturgeon	5.1	4.3	7.1	5.3	5.5	274
Smallmouth buffalo	0.1	0.3		0.1	0.1	3
Stonecat	0.1				*	1
Total fish	108	18	81	98	--	305
Total drifts	19	4	10	17		
Average depth (ft.)	4.3	5.2	5.1	4.5		
Avg. velocity (fps)	2.5	2.3	2.3	--		
Average distance (yd.)	309	311	288	218		
Avg. duration (min.)	7.0	7.0	7.0	7.6		

Table 5. Sampling statistics recorded for the pallid sturgeon standardized sampling program in the Upper Missouri River, 1996-2001.

	1996	1997	1999	2000	2001
No. pallids sampled	3	1	1	3	4
Avg. Wt. (lb)	38.0	40.6	0.33	0.61	0.60
No. pallids/drift	0.06	0.02	0.02	0.06	0.08
No. shovelnose sampled	225	131	153	392	274
Avg Wt. (lb)	3.15	3.17	3.30	3.42	3.4
Avg.No. shovelnose/drift	4.5	2.6	3.1	7.8	5.5
Average drift duration (min)	6.3	6.5	6.7	7.1	7.2
Average drift distance (yd)	239	294	239	222	2.81
Average depth @ drift site (ft)	7.1	8.3	7.1	6.0	4.7

Pallid sturgeon sightings, July1, 2001 to June 30, 2002:

Angler reports of pallid sturgeon sightings were recorded by FWP Region-6 seasonal paddlefish creel clerks, FWP game wardens and the pallid sturgeon crew. All sighting reports were scrutinized for identification and accuracy because of the taxonomic similarities between pallid and the commonly caught shovelnose sturgeon. Only pallid sturgeon sightings that included observations of colored elastomere marks on the ventral rostrum, presence of a transmitter, actual measurements of inner and outer barbel lengths (OBL $\geq$ 2X IBL), body length measurements (TL > 48 inches) or weight (>16 lbs.) were accepted as valid sightings.

Angler reports:

Number caught while snagging for paddlefish = 0
Number caught while bait fishing = 0

Pallid crew sampling:

Number caught in 6x10 gillnets = 3 (adults)
Number caught in trammel nets = 6 (all HRJ)
Number caught by angling = 2 (1 HRJ and 1 adult)

Propagation assistance:

Preserving a representation of the Upper Missouri River pallid sturgeon gene pool is an important goal for recovery. To that end, a pilot effort was initiated in 2000 to test the feasibility of collecting sperm from wild male pallids in this area and ship the fresh milt to Garrison National Fish Hatchery (GNFH) for use in their pallid sturgeon propagation program. Results from the initial effort proved worthwhile and collection of pallid sperm from the wild population was incorporated into my work plan.

River flow conditions during June, 2002 were more normal compared to the previous 3 years with discharges ranging from 8,330 to 19,400 cfs during June. However, these normal higher flows made netting for adult pallid sturgeon considerably more difficult than it had been during previous years.

One female pallid and 2 males were captured and examined for spawning readiness. A list the pallid sturgeon captured and their sizes and tag numbers are presented in Table 7. All were sexually mature and the one female and 1 male were held in a 16 ft diameter tank for staging. Additionally, sperm samples from all male pallid sturgeon were cryopreserved to insure preservation of the Upper Missouri River population gene pool. Unfortunately the female pallid died during ovulation and only a few eggs were successfully fertilized. These eggs were reared at Garrison National Fish Hatchery and later developed into about 12 fingerlings, and were transferred to Gavins Point National Fish Hatchery and incorporated in the captive broodstock program. In addition to spawning pallid sturgeon, 6 SNS were spawned producing several thousand eggs for experimental purposes at the USFWS Bozeman Fish Tech Center.

Table 6. A list of pallid sturgeon sampled during spring 2002, Upper Missouri River, MT.

PIT #	DATE	FL (in.)	WT (lb.)	Rivermile	Sex	Recap
7F7D303232*	May 17	51.5	32.0	1938	Unk	Yes
132319571A	June 11	59.0	48.0	1916.3	F	No
7F7D461025	June 11	51.0	30.0	1915.9	M	Yes
411D0E2C5F	June 4	57.0	--	1915.7	M	Yes

* This fish was not used in the propagation effort and caught earlier in the year

Missouri River Sturgeon Irido Virus assistance:

The recently discovered MRSIV could be a serious threat to the wild sturgeon populations in the Missouri River. It is unknown where the virus originated, although most investigators suspect it may exist in the wild. Because of the uncertainty of the virus origin, the viruses virulence and concern for wild sturgeon populations in Montana, the FWP suspended all pallid sturgeon stocking (from outside sources) in RMA-1until more information is available. Therefore, it is important to know if the MRSIV exists in the wild. The USFWS Fish Health Lab, Bozeman, MT, initiated MRSIV evaluations of wild sturgeon in 1999. Tissues samples were collected from 50 shovelnose and 2 pallid sturgeon from the Upper Missouri River, during 2002. These samples were fixed in a preservative and sent to the lab for histological and PCR analyses.

RECOMMENDATIONS

1. Continue with the intensive drift netting for HRJ pallid sturgeon. The success of the 1998 pallid release remains unknown and recapturing these fish will give better information on acclimation, survival and desirable release locations. The pallid sturgeon radio telemetry study should be resumed for gathering more information on movements and habitat preferences of HRJ pallid sturgeon.

2. The fall pallid sturgeon abundance survey should be continued on an annual basis as funding allows. The HRJ pallid sturgeon should be approaching a size where they are more effectively sampled and this effort will more accurately describe their abundance in the area.

3. The Upper Missouri River pallid sturgeon gene pool has not yet been preserved. Efforts to collect sperm from ripe males should continue as conditions allow. The fresh sperm should be either used during the current propagation year or reserved in cryopreservation.

4. Continue sampling for age-0 pallid and shovelnose sturgeon with the trawl. Trawling has provided a considerable amount of information on shovelnose spawning success and the distribution and abundance of several unique fish species such as the sicklefin and sturgeon chubs. A better habitat description and quantification of the river reach where the age-0 sturgeon are found is needed so that age-0 sturgeon rearing requirements can be determined.

LITERATURE CITED

Gardner, W.M. 1996. Missouri River pallid sturgeon inventory. Montana Fish Wildlife and Parks. Fed. Aid to Fish and Wildlife Rest. Proj. F-78-R-3. Helena.

Gardner, W.M. 2001. Montana Endangered Fishes Program. E-7-6. Helena.