

MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS
FISHERIES DIVISION

JOB PROGRESS REPORT

STATE: Montana PROJECT: Statewide Fisheries Investigations
PROJECT NO: F-46-R-5 STUDY TITLE: Survey and Inventory of Warm
Water Streams
JOB NO: III-B JOB TITLE: Southeast Montana Warm Water
Streams Investigations
SEGMENT (FISCAL) PERIOD: July 1, 1991 through June 30, 1992
REPORT PERIOD: April 1, 1991 through March 31, 1992

ABSTRACT

Sauger density in a Yellowstone River section immediately upstream of the Cartersville Diversion Dam appears similar to 1989. Planting of fingerling walleye in the Yellowstone River near Myers has been unsuccessful. Yellowstone River angler exploitation rates for sauger may be in the range of 10-20% annually. No pallid sturgeon were found in the Intake ditch. Walleye egg collection was unsuccessful in 1991. An application to the River Restoration Fund for a study-design project to improve fish passage over the Cartersville Diversion Dam was not approved for funding.

OBJECTIVES AND DEGREE OF ATTAINMENT

1. To collect up to 50 million walleye eggs each year with average survival to hatching of 60%. This goal was not met for reasons listed under RESULTS.
2. To determine the effect of Yellowstone River low-head diversion dams on game fish distribution and abundance; provide for additional angler days for warm water species at upstream locations. Progress toward this objective is reported under RESULTS.
3. To understand the significance to game fish of Yellowstone River non-game fish species. Progress toward this objective is reported under RESULTS.
4. To obtain a minimum flow on the Tongue River downstream of the T and Y diversion of 525 cfs for the period April 1 through May 10. No additional work toward this objective has been done since that reported in F-46-R-3.

5. To ensure that legally mandated instream flows are met. These flows were met during the report period.
6. To maintain existing water quality and bank-channel condition. Projects were reviewed under two state laws. These projects were approved as planned or modified, depending on the kind and degree of effect on river banks and channels.

METHODS

River fish populations were sampled with boat-mounted electrofishing gear. The Intake ditch was sampled using a backpack shocker. Sauger were tagged with Floy "T" tags and shovelnose sturgeon with Floy "cinch-up" tags. Fish total lengths were measured to the nearest millimeter and weights to the nearest 10 grams. Sauger gut contents were examined by placing hand pressure on the gut area of the ventral side of the fish. This usually forced regurgitation of gut contents.

RESULTS

Yellowstone River Fish Population Work

In September and October 1991 sauger were sampled and marked in a seven mile long section of the Yellowstone River immediately upstream of the Cartersville Diversion Dam near Forsyth (Armell's Creek Section). Insufficient numbers of sauger were recaptured for making an estimate of sauger numbers in the section. However, the average catch rate of 3.0 sauger per day was similar to past catch rates in this area of the Yellowstone River (Stewart 1990). Size and number of game fish species sampled in this section are shown in Table 1.

Several days were also spent electrofishing for sauger in the Yellowstone and lower Tongue Rivers in April and early May 1991. Very few sauger were sampled.

Success of Walleye Planting

Walleye fingerlings have been planted in the Yellowstone River near Myers in recent years to increase numbers of game fish upstream of Forsyth. In 1991 25,000 fingerlings were planted at Myers. None of these fish were sampled in nine days of electrofishing in the Armell's Creek Section. They may have survived poorly or moved to points downstream of Forsyth.

Tag Return Rates

In recent years I have inferred angler harvest rate of sauger/walleye in the Yellowstone River based on return of tagged fish. Harvest rates calculated in this manner are always low because of non-return of tags by anglers and because of non-angling

mortality. Harvest rates are calculated only for the first year following tagging to minimize bias from non-angling mortality.

In Table 2 data is shown for 198 sauger/walleye tagged in 1990, along with similar data for previous years. For 1990, 14 tags were returned the first year from 198 fish for 7.1% tag return rate. Using first year tag returns from all 813 sauger/walleye tagged in Table 2, overall, 6.2% of tags were returned.

Actual angler harvest rates are certainly much higher. For a relatively short-lived fish such as sauger, annual exploitation rates as high as 20% are probably safe. Were all tags returned and non-angling mortality included in calculated exploitation rates, actual exploitation rates could be in the range of 10-20%.

Sauger/walleye anglers are becoming more sophisticated and efficient. Jet boats and fish locators are common. Angler harvest from the Yellowstone River needs continued monitoring.

Shovelnose Sturgeon

In 1991 the U.S. Bureau of Reclamation funded the Montana Dept. of Fish, Wildlife and Parks to make a search for pallid sturgeon in the Yellowstone River from the Forsyth (Cartersville) Diversion Dam to Intake. Also included in this work were the lower portions of the Tongue and Powder Rivers. Most of that work has been reported elsewhere (Watson and Stewart 1991). In the course of that work previously tagged shovelnose sturgeon were recaptured but results of that work were not included in the 1991 report.

Of 349 shovelnose sturgeon sampled, 21 (6.0%) carried tags from previous years. Numbers on tags could not be read or tagging information could not be found for 10 of these fish. The remaining 11 tagged fish were tagged over the period 1975 to 1982. In other words, these tagged fish had survived 9-16 years following tagging. The sturgeon tagged in 1975 weighed eight pounds in 1975 and 12.5 pounds in 1991, suggesting that these sturgeon are very old fish. More information on the status of this shovelnose sturgeon population would be useful.

Walleye Egg Collection

Plans were made for 1991 to attempt collection of walleye eggs for cultural purposes from Tongue River Reservoir and from the portion of the Tongue River immediately upstream of the Reservoir. Frame trap nets were set in the reservoir beginning April 4, 1991 and electrofishing for walleye in the river began on April 5. It quickly became evident that the walleye spawning was well advanced because of the collection of spent females in both the reservoir and river. A small number of eggs could have been collected but I decided to move the field crew to the Yellowstone River instead to see if possibly larger numbers of walleye eggs could be collected

there.

Several days were spent downstream of Intake attempting to collect walleye spawners by electrofishing, but numbers of walleye spawners in the area seemed even lower than in 1989 and 1990. Sizes of walleye collected near Intake in 1991 along with sizes for previous years are shown in Table 3.

Gut Contents

Few sauger examined had food items in the gut. Only one sauger had an identifiable food item. That item was a flathead chub.

Sauger Brood Collection

In response to a request from the State of Nebraska for brood sauger, approximately 125 saugers were collected in September 1991 from the two miles of Yellowstone River immediately downstream from Intake Diversion Dam. These fish were smaller than were observed in this same area in 1985. Sauger in 1991 were not weighed but most were probably in the range of 300-600 grams.

Intake Ditch Sampling

In September and October 1991 fish were sampled in the Intake Ditch with a back-pack electrofishing unit. This work was done largely to find any pallid sturgeon (especially small ones) that might have entered the ditch from the Yellowstone River. This work was done after water to the ditch was shut off. Although small flows still existed in parts of the ditch, remaining water was mostly less than two feet deep with a width of mostly 15-20 feet. Twelve 1000 ft. sections (approximate average length) were sampled. Results are shown in Table 4.

No pallid sturgeon were found in the ditch and only a single shovelnose sturgeon. A total of 17 fish species were sampled. Flathead chub, carp, goldeye and white sucker were the most abundant fish species. Game fish found in addition to the sturgeon were sauger, channel catfish, walleye, northern pike and burbot.

River Restoration Act Application

In recent years considerable work has been done to understand the mechanisms for a sharply lower sauger density upstream of the Cartersville Diversion Dam near Forsyth. This work and its implications has been discussed in a previous report (Stewart 1990).

In December 1991 an application for funding of a study-design project to ultimately build sauger and sturgeon passage into the Cartersville Diversion Dam was made to the Fisheries Division of the Montana Department of Fish, Wildlife and Parks. The requested

amount was \$51,165. This amount was the maximum I felt would be needed for all required work up to the point of construction. The money was to come from the River Restoration Fund. This fund was created in 1989 by act of the state legislature. The money comes from an earmarked portion of fishing license sales.

The application was turned down for funding from the River Restoration Act Fund. The Fisheries Division felt the project may not have fit funding criteria. Its \$50,000 plus cost was approximately half of the annual income to the fund.

A new approach will be taken by funding the study-design phase of the project piecemeal. A small feasibility study will first be done using existing literature.

LITERATURE CITED

Stewart, P.A. 1990. Southeast Montana Warm Water Streams Investigations. Job Prog. Rept. F-46-R-3, Job III-b. Mt. Dept. Fish, Wildlife and Parks. 10 pp.

Watson, J.H. and P.A. Stewart 1991. Lower Yellowstone River Pallid Sturgeon Study. Mt. Dept. of Fish, Wildlife & Parks and U.S. Bureau of Reclamation, Great Plains Region. 24 pp.

Waters Referred to:

Tongue River Sec. 03	7-21-1250
Tongue River Reservoir	7-21-9000
Yellowstone River Sec. 01	7-21-1350
Yellowstone River Sec. 02	7-21-1400

Key Words:

sauger-passage, exploitation rate
walleye - egg collection
shovelnose sturgeon - tag return

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Table 1. Numbers and size of fish species sampled in the Armell's Creek Section of the Yellowstone River, September and October 1991.

Species	Number	Mean		Length (mm)		Mean Weight (gm)		Length Range (mm)		Weight Range (gm)	
Sauger	30	405				675		169-563		30-1880	
Smallmouth bass	4	226				342		115-345		20-700	
Channel catfish	8	519				1570		446-680		720-4200	
Burbot	3	272				110		260-285		90-150	

Table 2. Yellowstone River sauger/walleye angler harvest rate.

Year Tagged	Location	Number Tagged	Number returned 1st Year by anglers		Annual Percentage Angler harvest rate	
1985	Miles City	143	17		11.9	
1987	Forsyth	276	17		6.2	
1988	Forsyth	196	2		1.0	
1990	Forsyth	37	2		5.4	
1990	Miles City	161	12		7.5	
All 4 years		813	50		6.2	

Table 3. Size of walleye sampled from the spawning run at Intake, Yellowstone River.

Year	Number	Mean Length (mm)	Mean Weight (gm)	Length Range (mm)	Weight Range (gm)
<u>MALES</u>					
1984	129	499	1340	366-631	350-2970
1985	46	505	1350	362-619	460-2700
1986	141	508	1493	361-625	450-3100
1987	109	510	1446	377-630	490-2600
1988	22	468	1146	388-620	500-3000
1989	49	548	1645	438-635	700-2850
1990	44	511	1322	331-665	300-2950
1991	19	504	1285	323-650	260-2500
<u>FEMALES</u>					
1984	78	569	2040	470-695	1090-3650
1985	42	581	2214	498-704	1500-3700
1986	40	600	2428	505-674	1410-3600
1987	187	570	2150	483-710	1200-4000
1988	207	592	2500	480-730	1300-5000
1989	52	609	2630	483-697	1200-3800
1990	31	617	2573	487-740	1100-4200
1991	10	566	1923	460-690	780-4000

Table 4. Results of backpack electrofishing in the Intake ditch, fall 1991.

Species	Number caught	Length/range
<u>Section 1 - At Intake</u>		
Carp	2	334-447
Longnose sucker	1	397
Shorthead redhorse	3	178-324
Flathead chub	34	109-240
Freshwater Drum	1	264
Burbot	2	180-260
Goldeye	16	106-127
Emerald shiner	4	60-90
Unidentified catostomidae	2	52-91
<u>Section 2 - 2 miles downstream from Intake</u>		
Carp	60	Adult
Longnose sucker	1	355
Flathead chub	20	-
Shorthead Redhorse	6	323-336
Sauger	3	300-512
Stonecat	2	90-95
Goldeye	3	117-211
Emerald shiner	34	75-85
Channel catfish	1	90
<u>Section 3 - 4 miles downstream from Intake</u>		
Carp	15	Adult
Shorthead redhorse	3	270-345
White sucker	2	323-390
Goldeye	11	247-334
River carpsucker	1	220
Sauger	3	346-487
Longnose dace	1	74
Emerald shiner	1	-
Flathead chub	3	-
<u>Section 4 - One mile upstream of Burns Creek</u>		
Channel catfish	1	412
Flathead chub	147	-
Carp	6	260-294
Sauger	3	302-447
Shorthead redhorse	1	350

Table 4. Continued.

Species	Number caught	Length/range
<u>Section 5 - one mile downstream of Burns Creek</u>		
Shovelnose sturgeon	1	658
Sauger	6	245-463
Carp	1	170
Flathead chub	102	95-245
Goldeye	66	100-335
Walleye	1	400
White sucker	1	245
Northern pike	1	478
River carpsucker	1	225
<u>Section 6 - Two miles downstream of Burns Creek</u>		
No fish sampled		
<u>Section 7 - Four miles downstream of Burns Creek</u>		
Flathead chub	500-1000 (estimate)	90-150 (estimate)
<u>Section 8 - Near Elk Island</u>		
Flathead chub	1000 (estimate)	66-263
Creek chub	2	108-110
Carp	5	130-310
Whitesucker	7	52-360
Goldeye	4	106-120
Emerald shiner	3	42-72
<u>Section 9 - Four miles downstream of Elk Island</u>		
Flathead chub	142	100-(approx)-248
Emerald shiner	9	47-83
Carp	2	125-128
Goldeye	8	103-122
<u>Section 10 - 1 1/2 miles upstream of Crane</u>		
Flathead chub	38	-
Longnose dace	2	-

Table 4. Continued.

Species	Number caught	Length/range
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Section 11 - Two miles downstream of Gartside Reservoir

Channel catfish	1	66
Shorthead redhorse	16	36-70
Longnose dace	2	32-90
White sucker	2	38-50
Flathead chub	200 (approx)	

Section 12 - Two miles downstream of Fox Creek

No fish sampled

Section 13 - Four miles upstream of First Hay Creek

Goldeye	14	72-228
Longnose dace	3	45-88
Shorthead redhorse	25	45-163
Carp	11	58-151
Emerald shiner	13	-
Unidentified cyprinidae	8	42-66
Flathead chub	5	-