MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS
FISHERIES DIVISION

JOB PROGRESS REPORT

STATE: Montana PROJECT: Statewide Fisheries Investigations

PROJECT NO: F-46-R-4 STUDY TITLE: Survey and Inventory of Warm Water Streams

JOB NO: III-B JOB TITLE: Southeast Montana Warm Water Streams Investigation

SEGMENT (FISCAL) PERIOD: July 1, 1990 through June 30, 1991

REPORT PERIOD: April 1, 1990 through March 31, 1991

ABSTRACT

Numbers of sauger and sauger size structure in a Yellowstone River section at Miles City were similar in 1985 and 1990. Sauger tag return rates continue to suggest a relatively low harvest rate. No evidence was found for survival of walleye fingerlings planted in either the Tongue or Yellowstone rivers. Relatively few walleye eggs were collected at Intake in 1990 because few walleye spawners were present. Eye-up percentage, however, was much higher in 1990 than in 1989.

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. (State funded only)

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. (State funded only)

METHODS

River fish populations were sampled with boat-mounted electrofishing gear. Fish population estimates were made using the Schabel method (Ricker 1975).

Walleye eggs were collected by methods previously described (Stewart 1989).

Fish total lengths were measured to the nearest millimeter. Weights were recorded to the nearest 10 grams.

Sauger gut contents were examined by placing hand pressure on the gut area of the ventral side of fish. This usually forces regurgitation of gut contents.

RESULTS

Yellowstone River Fish Populations Work

Fish were sampled in September and October 1990 in an eight kilometer section of the Yellowstone River at Miles City. The upper and lower boundaries of this section are the Ft. Keogh bridge and the head of Pirogue Island.

General results of the sampling are shown in Table 1. Smallmouth bass were outnumbered only by sauger. Although sampling for smallmouth bass has been non-quantitative, this species seems to be increasing in abundance in this section.

Population estimates for the same section for sauger and walleye are presented in Table 2 along with information for previous years. Data for 1978, 1979 and 1980 is from Penkal (1990). Sauger numbers were somewhat higher in 1990 than in 1985, but not as high as were measured from 1978 to 1980. Estimated walleye numbers were twice as high in 1990 as in 1985. This apparent walleye increase may be real. Of the total walleye-sauger sample in 1985, 14% was walleye. The comparable percentage in 1990 was 19%.

Sample size and number of recaptures of sauger in 1985 and 1990 were too small to make age or size specific estimates. As an alternative the percentage of the samples in size classes was compared for the two years (Table 3). The size structure of the population seems quite similar for the two years. Very small and very large sauger seem more abundant in 1990. The differences are

likely not significant. Fish less than 200 mm total length are known to be ages 0+ from earlier aging.

A smaller sample of fish was collected from an upstream area in fall 1990 (Table 4). Sizes of sauger are similar to those in the Miles City section, except that age 0+ sauger were not collected in the Rosebud-Forsyth area.

Gut Contents

Of approximately 150 sauger examined in the Miles City section in fall 1990, only 17 (11%) regurgitated food items. Of these 17, 7 fish unidentifiable fish in the gut, 3 fish had a stonecat, one a flathead chub and one a goldeye.

Cartersville Diversion Dam Fish Passage

Some progress has been made toward improvement of fish passage over the Cartersville Diversion Dam. Ben Rizzo, hydraulic engineer with the U.S. Fish and Wildlife Service at Newton, Massachusetts has agreed to assist with the preliminary design for a fish passage structure. Mr. Rizzo has been involved with fish passage problems in Atlantic Coast drainages having warm water fish species.

Tag Return Rates

In fall 1989, 28 sauger were tagged in the Yellowstone River section immediately upstream of the Cartersville Diversion Dam near Forsyth. In the first year after tagging only one of these tags were returned by anglers (3.6% annual rate of harvest). This fish was caught near Miles City. For 135 sauger tagged near Miles City in fall 1990, tags were returned from 5 fish (3.7% return rate). Of the 35 sauger tagged fall 1990 between Forsyth and Rosebud, none have been returned by anglers to date.

Results of Yellowstone River Walleye Planting

On June 15, 1990, 50,000 walleye fingerlings (1.4 inches long) were planted in the Yellowstone River between Ranchers Ditch Diverison and Myers Bridge. In October 1990 one day was spent electrofishing in this same river reach. No small walleye were observed. Electrofishing at downstream points in October failed to sample any small walleye.

Tongue River

In June 1989, 30,000 walleye fingerlings (1.8 inches length) were planted in the middle portion of the Tongue River between Brandenberg Bridge and the S-H irrigation diversion dam. Attempts were made to assess the survival of these fish in October 1990. Two days were spent electrofishing in this area (Table 5) but no

walleye that could have originated from the plant were found.

Channel catfish were much more abundant in both sections than is suggested by the numbers in Table 5. Several dozen channel catfish were observed in each section.

Walleye Egg Collection

Results of walleye egg collection at Intake in April 1990 are shown in Table 6. Only a little over four million eggs were collected in 1990, but the eye-up percentage was much higher than in 1989. All green females were injected with LHRHa. All injected fish ripened within a few days. Eye-up percentages were good with river water temperatures at time of spawning in the range of 48-51°F (Table 7). Eye-up was poor with fertilization temperatures of 58 and 59°F.

Length and weight of walleye spawners in 1990 and previous years is given in Table 8. Size of both sexes has fluctuated only within a small range over the years 1984-1990.

Numbers of walleye spawners migrating to the Intake area from Garrison Reservoir has been much lower in 1989 and 1990 than in earlier years. Conversation with North Dakota Game and Fish personnel indicate that walleye numbers in the upper reservoir have become quite low and are not likely to increase soon. For that reason other areas will be investigated for collecting walleye eggs.

LITERATURE CITED

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Ricker, W.E. 1975. Computation and interpretation of biological statistics of fish populations. Bulletin 191. Dept. of the Environment. Fisheries and Marine Service. Ottawa, Can. 382 pp.

Stewart, P.A. 1989. Southeast Montana Warm Water Streams Investigations. Job Prog. Rept. F-46-R-2, Job III-b. MT. Dept. Fish, Wildlife & Parks. 9 pp.

Waters Referred to:

Tongue River Sec. 01	7-21-1150
Yellowstone River Sec. 01	7-21-1350
Yellowstone River Sec. 02	7-21-4100

Key Words:

Sauger - passage, population estimate, harvest rate
Walleye - egg collection, river survival

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Table 1. Numbers and sizes of fish sampled in an eight kilometer section of the Yellowstone River at Miles City.

Species	Number Sampled	Mean Length (mm)	Length Range (mm)	Mean Weight (gm)	Weight Range(gm)
SMB	92	209	77-364	204	5- 900
Saug	135	373	164-616	510	35-2180
WE	32	374	220-659	673	80-2590
CCat	34	510	192-792	1676	30-6590
Burbot	12	266	173-490	141	30- 570
Drum	24	299	228-444	392	140-1200
NP	1	865	-	3500	-
LL	2	444	221-666	1855	110-3600
BCr	3	220	195-253	140	20- 300

Table 2. Sauger and walleye population estimates for the Miles City section of the Yellowstone River.

Year	Total Sauger Estimate	Sauger Per Kilometer	Total Walleye Estimate	Walleye Per Kilometer
1978	1981	248		
1979	1416	177		
1980	1809	226		
1985	1042	130	152	19
1990	1305	163	306	38

Table 3. Sauger size distribution for the Yellowstone River - Miles City section in 1985 (132 fish) and 1990 (136 fish).

Length class (mm)	Percentage of sample 1985	1990
<200	2.3	8.1
200-249	0.0	0.7
250-299	12.9	3.7
300-349	25.0	21.3
350-399	36.4	31.6
400-449	17.4	19.9
450-499	2.3	9.6
>500	3.8	5.1

Table 4. Numbers and sizes of fish sampled by electrofishing on the Yellowstone River between Forsyth and Rosebud, October 1990.

Species	Number sampled	Mean length (mm)	Length range (mm)	Mean weight (gm)	Weight range (gm)
Saug	35	409	296-540	619	200-1340
WE	2	539	451-627	1535	470-2600
SMB	2	358	300-415	646	470-1380
NP	1	800	-	842	-

Table 5. Results of electrofishing two Tongue River sections, October 1990.

Species	Number sampled	Mean length (mm)	Length range (mm)	Mean weight (gm	Weight range (gm)
			S-H Ranch Section		
CCat	11	376	215-598	937	70-3650
WE	6	498	425-556	1433	750-2240
Saug	5	445	390-563	630	500- 820
SMB	23	269	150-382	327	55- 770
NP	1	803	-	3400	-
			Brandenberg Bridge Section		
CCat	19	422	210-698	716	60-3850
SMB	2	196	170-223	97	65- 130

Table 6. Results of walleye egg collection at Intake, Yellowstone River, 1984-1990.

Year	Number of eggs collected	Percent eye-up
1984	Not recorded	10
1985	26,000,000	40
1986	12,700,000	40
1987	31,000,000	28
1988	25,000,000	28
1989	5,600,000	10
1990	4,294,000	35

Table 7. Results of walleye egg collection at Intake, Yellowstone River, 1990.

Date	Treatment	Number of females spawned	Number of eggs	Water temp (^{0}F)	Percentage of eye-up
4/14	LHRHa	1	136,000	48	60
4/14	None	6	719,000	48	48
4/16	LHRHa	9	1,397,000	51	54
4/18	LHRHa	5	564,000	50	38
4/20	LHRHa	10	1,272,000	58	9
4/22	LHRHa	3	206,000	59	0
Totals		34	4,294,000		35

Table 8. Size of walleye sampled from the spawning run in April at Intake, Yellowstone River.

Year	N	Mean Length (mm)	Mean Weight (gm)	Length Range (mm)	Weight Range (gm)
			Males		
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
			Females		
1984	78	569	2040	470-695	1090-3650
1985	42	581	2214	498-704	1500-7300
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