

MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS
FISHERIES DIVISION

JOB PROGRESS REPORT

STATE: Montana PROJECT: Statewide Fisheries Investigations

PROJECT NO.: F-46-R-6 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, 1992 through June 30, 1993

REPORT PERIOD: April 1, 1992 through March 31, 1993

ABSTRACT

Smallmouth bass in the Yellowstone River from Miles City to Forsyth may be increasing. Size of Yellowstone River sauger seems similar to previous years. Stonecats and flathead chubs were found in sauger guts. A study to determine feasibility of building fish passage at the Cartersville Diversion Dam is planned. LHRHa seemed effective in promoting final ripening of walleye spawners and 7.28 million walleye eggs were collected from Tongue River and Tongue River Reservoir.

OBJECTIVES AND DEGREE OF ATTAINMENT

1. To collect up to 50 million walleye eggs each year with average survival to hatching of 60%. Walleye eggs were collected, but the goal was not fully met. More information is given in the RESULTS section.
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 & W diversion of 525 cfs for the period April 1 through May 10. Progress toward this objective is reported under RESULTS.
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 bank and channels.

METHODS

River fish populations were sampled with boat-mounted electrofishing gear. Fish were tagged with Floy "T" tags and "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 thumb pressure on the gut area of the fishes ventral side. This usually forced regurgitation of gut contents.

Walleye spawners were collected by electrofishing in the Tongue River upstream of the reservoir and by frame trap nets and sinking 2 1/2 inch mesh gill nets in the Tongue River Reservoir. Green females were injected with a synthetic Luteinizing-Releasing Hormone analogue (LHRHa) to encourage final ripening of eggs. Chemical use rate was 0.02 mg/kg body weight. Fish were retained until ripening or released at seven days after injection.

RESULTS

Yellowstone River Fish Population Work

Fish were sampled in three sections of the Yellowstone River in late summer and fall 1992 (Table 1). This was the first year that smallmouth bass were more abundant than sauger in samples in the Forsyth and Miles City areas. Smallmouth bass may be increasing in the Miles City to Forsyth area of the Yellowstone River. This species was not observed in the Fallon section and is rarely observed in areas downstream of Miles City. Many of these bass weigh from 500 - 1000 grams.

Sauger catch rates (fish per electrofishing day) were lower than in some past years, but sizes of adult sauger are similar to earlier years. Young of the year sauger (often 170 - 200 mm total length in fall) were not observed in any of the sections in 1992.

A few blue suckers were sampled in each of the three sections. This species has received increasing interest because of its relative scarcity in downstream areas of the Missouri River drainage. All blue suckers sampled weighed at least 2,000 grams. Small blue suckers have not been observed in the Yellowstone River.

Channel catfish are probably more abundant than relative numbers would suggest. This species responds only sluggishly to electrofishing.

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 (Table 2). These two species are probably the most sought after in the lower Yellowstone River. Harvest rates calculated from tag returns are underestimates 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 30 sauger tagged in 1991 along with similar data for previous years. For fish tagged in 1991, 3 tags were returned (Table 2), for a 10% tag return rate. Using first year tag returns for all 873 sauger/walleye tagged in Table 2, overall, 6.2% of tags were returned.

Tag returns from fish tagged in 1991 continue to show long distance movement by sauger/walleye in the Yellowstone River. For the three returns of fish tagged in 1991 above Forsyth, two were caught at Intake (over 100 miles downstream) and one at Huntley (approximately 100 miles upstream).

Sauger Gut Contents

Of 107 sauger examined in 1992, recognizable fish food items were found in only seven fish. These food items consisted of five stonecats approximately 125 to 200 mm total length and four flathead chubs of approximately 100 mm total length.

Cartersville Diversion Dam Fish Passage

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).

We now plan to fund work to study the feasibility of building fish passage at this diversion dam. This study will be done by Dr. Dennis Scarnecchia of the University of Idaho. The study will rely heavily on literature describing efforts to improve fish passage for similar species elsewhere.

Lower Tongue River Spawning Flows

The lowermost 10 miles of the Tongue River were electrofished on April 16, 17 and 27, 1992. A total of only two sauger and three walleye were observed. Lower Tongue River flows averaged 162 cfs for the month of April 1992. The flow exceeded 300 cfs on only three days in that month. These flows are far lower than the 525 cfs previously identified as required for significant movement of sauger spawners from the Yellowstone River into the Tongue River.

Walleye Egg Collection

Size of walleye spawners collected from the Tongue River Reservoir and Tongue River immediately upstream of the reservoir is shown in Table 3. Walleye were present in the river only in the lowermost one to two miles of river immediately upstream of the reservoir. Males far outnumbered females and females were present in the river for only a few days.

Females were spawned over the period 3-26-92 through 4-9-92. A total of 7.28 million eggs were collected of which 30.5% (2.22 million) survived to the eyed stage. Eggs were collected from approximately 100 females.

LHRHa appeared to be effective in promoting female ripening of gravid female walleye spawners. Of 106 females injected with LH and allowed one week for final ripening, 83 fish (78.3%) ripened and released eggs. The remainder of the females were collected in a ripe state and were spawned without injection.

LITERATURE CITED

Stewart, P.A. 1990. Southeast Montana Warm Water Streams Investigations. Job Progress Report F-46-R-3, Job III-B. Montana Dept. Fish, Wildlife and Parks. 10 pp.

Waters Referred to:

Tongue River Sec. 01	7-21-1150
Tongue River Sec. 03	7-21-1250
Yellowstone River Sec. 01	7-21-1350
Yellowstone River Sec. 02	7-21-1400
Tongue River Reservoir	7-21-9000

Key Words:

Sauger - exploitation rate, food items, spawning flows
Walleye - egg collection

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Table 1. Fish Species Weighed and Measured from three sections of the Yellowstone River.

Species	N	Mean Length(mm)	Length Range(mm)	Mean Weight(gm)	Weight Range(gm)
<u>Near Forsyth</u>					
Sauger	23	416	283-583	671	170-1930
Walleye	2	545	471-668	2075	710-3440
Smallmouth bass	114	302	133-413	544	30-1250
Channel catfish	24	464	187-705	1287	60-4270
Northern pike	1	870	-	5250	-
Brown trout	2	304	203-405	395	80- 710
Freshwater drum	10	321	252-426	442	170- 970
Blue sucker	3	801	753-897	4980	3510-7500
Burbot	5	314	265-460	158	90- 380
	<u>184</u>				
<u>Near Miles City</u>					
Sauger	33	372	275-520	456	140-1050
Walleye	13	490	285-598	1055	210-2220
Smallmouth bass	58	256	151-361	327	50- 860
Channel catfish	49	406	160-715	800	30-5448
Black crappie	2	182	128-235	115	30- 200
Brown trout	2	257	252-262	175	170- 180
Rainbow trout	1	470	-	880	-
Freshwater drum	15	313	243-415	393	160- 950
Blue sucker	5	672	626-730	2556	2090-3280
Shovelnose sturgeon	1	631	-	1060	-
	<u>179</u>				
<u>Near Fallon</u>					
Sauger	51	416	280-631	665	160-1990
Walleye	2	441	443-448	790	710- 870
Channel catfish	22	465	175-735	1166	40-5500
Northern pike	2	584	580-587	1290	1160-1420
Burbot	1	320	-	130	-
Freshwater drum	7	265	229-319	261	170- 400
Blue sucker	4	714	653-772	3375	2640-3820
Shovelnose sturgeon	7	706	613-773	1830	1130-2910
	<u>96</u>				

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

Year Tagged	Location	Number Tagged	No. Returned Year by Anglers	First Annual Harvest Rate	Percentage
1985	Miles City	143	17		11.9
1987	Below Forsyth	276	17		6.2
1988	Below Forsyth	196	2		1.0
1989	Above Forsyth	30	1		3.3
1990	Below Forsyth	37	2		5.4
1990	Miles City	161	12		7.5
1991	Above Forsyth	30	3		10.0
All Years		873	54		6.2

Table 3. Size of walleye spawners collected from Tongue Reservoir and Tongue River upstream of the reservoir, spring 1992.

Sex	Sample Size	Mean Length (mm)	Length Range (mm)	Mean Weight (gm)	Weight Range (gm)
Female	118	564	350-770	2271	500-5250
Male	98	447	337-605	982	400-2450