MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS
FISHERIES DIVISION

JOB PROGRESS REPORT

STATE: Montana PROJECT TITLE: Statewide Fisheries Investigation

PROJECT: F-78-R-2 STUDY TITLE: Survey and Inventory of Warmwater Streams

JOB NO: III-B JOB TITLE: Southeast Montana Warmwater Streams Investigations

PROJECT PERIOD: July 1, 1995 through June 30, 1996

ABSTRACT

Flathead chub and blue sucker, federal T & E candidate species were abundant in Yellowstone River electrofishing samples. Yellowstone River sauger numbers are increasing, with strong year classes formed in 1994 and 1995. Angler exploitation of sauger is probably within acceptable levels. Relatively few hoop net permits are being issued in Region 7.

9-07-97

OBJECTIVES AND DEGREE OF ATTAINMENT

1. To collect up to 50 million walleye eggs each year with average survival to hatching of 60%. This objective was met. All Region 7 efforts in walleye eggs are now at Ft. Peck Reservoir with R-6 personnel. Joint efforts there produced nearly 80 million walleye eggs.

2. Use Cartersville Diversion Dam fish passage feasibility study to plan for additional data needs and choosing engineering passage options. A joint 3 year study has begun with Bureau of Reclamation to obtain physical and biological data necessary to design and build fish passage.

3. To understand the significance to game fish of Yellowstone River non-game species. Information on sauger fish food items is reported in the RESULTS section.

4. To have needed Tongue River flows recognized in the operating plan for the rebuilt Tongue River Dam. The Northern Cheyenne Tribe has agreed to negotiate purchase or lease of tribal water to improve spring flows for spawning sauger in the lower Tongue River.

5. Participate in planning of the Tongue Dam repair project to protect fish populations in the Tongue River and Reservoir. This planning is complete. All requested fisheries considerations have been incorporated into the plan.

6. To ensure that legally mandated instream flows are met. Department instream flows in portions of the Yellowstone River drainage were to met at some locations at some times. This was caused by weather related events and legal withdrawal by senior water users.

7. To maintain existing water quality and bank-channel condition. Projects were reviewed under two state laws. These projects were approved as planned, modified or denied depending on the kind and degree of effect on river banks, channel and specific fish habitat needs.

8. To monitor status and effect of angler harvest on selected Yellowstone River game fish. This objective was met. Progress is reported in the RESULTS section.

9. To monitor status of non-game species - especially sturgeon chub, blue sucker and sicklefin chub. This objective was met. Progress is reported in the RESULTS section.

10. Add new fishing access sites at key locations on the Yellowstone and Tongue Rivers. One new site was added on the Yellowstone River a few miles upstream of Miles City.

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 (fork length for sturgeon) were measured to the nearest millimeter and weights to the nearest gram for smaller fish or nearest 10 grams for larger fish. Sauger gut contents were removed by placing thumb pressure on the gut area of the fishes ventral side. This usually forced regurgitation of gut contents.

RESULTS

Yellowstone River Fish Population Work

Fish were sampled in 11 sections of the Yellowstone River in fall 1995. The data are grouped into four larger sections and shown in Tables 1 and 2. From 10-13 nongame fishes species (Table 1) and 5-9 game species (Table 2) were sampled in each of the four sections.

Of endangered/threatened candidate species, no sturgeon chubs were sampled in 1995. This species is known to be present but is not efficiently sampled by electrofishing gear. A total of 98 flathead chubs were sampled. This species is abundant in the Yellowstone River. Adult blue suckers are common and 33 were sampled in 1995. Small blue suckers are rarely seen; the rearing habitat is probably farther downstream.

Sauger is a key species in the Yellowstone River. Along with the less abundant walleye it is probably the most popular species with anglers. Table 2 shows numbers and sizes of these and other game fish sampled in 1995. Larger numbers of adult sauger were sampled in 1995 than in 1994. Past work has documented a steep decline in sauger numbers from the mid 1980's to the early 1990's. Work in 1995 found a continuation of a numbers rebound that began in 1994 with large numbers of young of the year sauger (Stewart 1995).

Electrofishing catch rates from 1985 to 1995 shown in Table 3. Catch rate for sauger in all areas increased from 1994, but the increase was largest in the upstream Forsyth to Rosebud Section (Table 3). This increase was expected because of the large number of young-of-the-year sauger sampled in 1994 in downstream areas (Stewart 1995).

Electrofishing catch rates of sauger young-of-the-year are given in Table 4. A strong year class was formed again in 1995, making consecutive years of strong sauger year classes. There is a strong correlation of sauger year class strength and Garrison Reservoir level. Sauger year classes of age 0+ fish were very weak or absent in the low reservoir years of 1992 and 1993 and strong in the high reservoir years of 1994 and 1995.

Length frequencies of Yellowstone River sauger are presented in Table 5. Yearling size sauger (Table 6) were not abundant in the Forsyth to Kinsey Bridge reach in 1994, but made up the bulk of the electrofishing catch in 1995. These 1995 yearling fish were probably supplied from the large 1994 year class in downstream areas.

Sauger Gut Contents

Relatively few sauger (6 fish) were sampled with removable fish food items in 1995. Fish food items in four of these fish were digested beyond recognition. One sauger had eaten a shorthead redhorse of approximately 100 mm total length. Two silvery/plains minnows of approximately 80 mm total length were removed from another sauger.

Yellowstone River Angler Tag Return Rate

Angler tag return rates for sauger/walleye are in Table 7. Rates are calculated only for the first year following tagging to minimize errors from natural mortality. The calculated rates err on the low side because of an unknown, but probably significant percentage of tags that anglers fail to return.

Return rates for all years in Table 7 average 5.5% per year, but are highly variable by location. The overall return rates suggest angler exploitation is probably within acceptable rates, even if actual exploitation rates are twice as high as suggested by tag return rates.

Hoop Net Permits

Fishing with baited or unbaited hoop nets is legal on the Yellowstone River in Region 7. These nets are fished mostly for channel catfish. Until 1994 no special permit was required for use of these nets and there was no daily limit. Beginning in 1994 a free hoop net permit was required and a daily and possession limit of 20 channel catfish was instituted. Permits issued for hoop nets in Region 7 numbered 22 in 1994 and 17 in 1995. Most people receiving these permits resided in towns along the Yellowstone River in Region 7. The low number of people using these nets probably prevents any significant impact on channel catfish.

LITERATURE CITED

Stewart, P.A. 1995. Southeast Montana warmwater streams investigations. Job. Prog. Rept. F-78-R-1, Job III-B. MT Dept. Fish, Wildl. and Parks. 13 pp.

Waters Referred to:

Yellowstone River Sec. 01	7-21-1350
Yellowstone River Sec. 02	7-21-1400

Key Words:

non-game fish - abundance
sauger - exploitation rate, age, size structure, abundance

Prepared by: Phillip A. Stewart

Date: July 24, 1996

Table 1. Non-game fish species sampled from four sections of the Yellowstone River in Fall 1995.

Species	N[a]	N[b]	Length Range (mm)	Weight Range (gm)
Intake to Seven Sisters				
Goldeye	35	27	108-345	10-380
Shorthead redhorse	20		101-364	30-550
Longnose sucker	2		238-257	150-180
Blue sucker	4	5	675-768	2390-4150
River carpsucker	15		318-524	410-2000
Bigmouth buffalo	1		735	4500
Freshwater drum	1		318	410
Flathead chub	5		85-173	30-40
Plains/Silvery/minnow	1	60	121	20
Longnose dace	1		77	-
Bonfield to Glendive				
Goldeye	31	440	85-351	60-420
Shorthead redhorse	29	41	137-460	30-1030
White sucker	3		290-316	270-410
Longnose sucker	5		185-220	70-140
Blue sucker	3	18	717-745	3280-4000
River carpsucker	13		348-498	540-1750
Carp	5		407-730	1020-4500
Freshwater drum	3		326-348	510-520
Stonecat	1		155	30
Flathead chub	30		79-183	10-60
Plains/silvery/minnow	2		63-127	20

Continued Table 1. Non-game fish species sampled from four sections of the Yellowstone River in Fall 1995.

Species	N[a]	N[b]	Length Range (mm)	Weight Range (gm)
Hathaway to Kinsey Bridge				
Goldeye	20	65	202-344	70-340
Shorthead redhorse	30	31	114-452	20-1120
White sucker	3		277-324	210-440
Longnose sucker	186		186-445	60-1040
Blue sucker	1		-	-
Mountain sucker	1	2	133	20
River carpsucker	15		134-438	30-1310
Carp	4		432-595	1080-2830
Smallmouth buffalo	1		565	2700
Flathead chub	39		91-191	10-70
Forsyth to Rosebud				
Goldeye	20	407	208-354	90-360
Shorthead redhorse	20	294	140-443	20-880
White sucker	12		211-408	100-800
Longnose sucker	16		192-443	80-900
Blue sucker	2		662-783	2140-4030
Mountain sucker	4		153-188	40-80
River carpsucker	23	89	333-419	490-1100
Carp	22		228-614	170-2910
Smallmouth buffalo	2		355-572	640-2270
Bigmouth buffalo	1		515	2280
Flathead chub	4	20	159-198	30-80
Plains/silvery minnow		150	-	-
Longnose dace		2	-	-

[a] Number weighed and measured
[b] Number counted only

Table 2. Game fish sampled from four reaches of the Yellowstone River in Fall 1995.

Species	N	Length Range (mm)	Mean Length (mm)	Weight Range (mm)	Mean Weight (gm)
Intake to Seven Sisters					
Sauger (adult)	61	226-590	356	90-1740	435
Sauger (YOY)	19	140-200	170	15-50	38
Walleye	11	162-475	303	30-1000	336
Smallmouth bass	1	-	222	-	160
Channel catfish	1	-	55	-	-
Shovelnose sturgeon	8	435-625	512	210-930	509
Burbot	9	172-485	299	30-550	189
Northern pike	2	567-692	630	1150-1710	1430
Brown trout	2	450-675	563	1050-2780	1915
Bonfield to Glendive					
Sauger (adult)	107	242-572	350	100-1850	412
Sauger (YOY)	2	190-201	196	-	70
Walleye	2	277-402	340	200-580	390
Channel catfish	38	242-725	413	140-3930	934
Shovelnose sturgeon	4	560-890	726	700-3250	1883
Burbot	7	262-535	357	90-800	294

Continued Table 2. Game fish sampled from four reaches of the Yellowstone River in Fall 1995.

Species	N	Length Range (mm)	Mean Length (mm)	Weight Range (mm)	Mean Weight (gm)
Hathaway to Kinsey Bridge					
Sauger (adult)	20	271-483	345	160-880	347
Walleye	2	315-491	403	300-1200	750
Smallmouth bass	11	91-240	199	10-250	145
Channel catfish	9	270-742	485	170-4650	1549
Brown trout	2	290-427	359	260-820	540
Forsyth to Rosebud					
Sauger (adult)	56	230-526	343	140-1290	354
Walleye	1	-	345	-	370
Smallmouth bass	67	90-392	217	10-1100	223
Largemouth bass	1	-	277	-	390
Channel catfish	37	250-650	345	140-2990	443
Shovelnose sturgeon	4	825-925	851	2410-3750	2928
Burbot	5	178-235	197	20-170	58
Northern pike	3	525-700	608	1100-2630	1703
Brown trout	1	-	178	-	50

Table 3. Electrofishing catch rate (fish per day) for Yellowstone River sauger in the autumn.

Year	Number of Days	Number of Sauger	Sauger per day
		Intake to Seven Sisters	
1995	6	80	13.3
1994	7	77	11.0
1993	6	103	17.2
1985	3	58	119.3
		Bonfield to Glendive	
1995	8	109	13.6
1994	8	40	5.0
1993	5	54	10.8
1992	8	51	6.4
		Hathaway to Kinsey Bridge	
1995	4	20	5.0
1994	5	6	1.2
1993	8	8	1.0
1992	12	33	2.8
1990	17	135	8.1
1985	5	135	27.0
		Forsyth to Rosebud	
1995	4	56	14.0
1994	4	8	2.0
1993	6	10	1.7
1992	6	23	3.8
1990	1	25	25.0
1988	8	233	29.1
1987	15	273	18.2

Table 4. Historical relative abundance of sauger young-of-the-year sampled by electrofishing in the Yellowstone River during autumn.

	Upstream of Intake			Downstream of Intake		
Year	# of days	# of sauger	# per day	# of days	# of sauger	#per day
1995	16	2	0.13	6	19	3.17
1994	17	12	0.71	7	47	6.17
1993	19	0	0.00	6	1	0.17
1992	26	0	0.00	0		
1990	18	10	0.56	0		
1988	8	20	2.50	0		
1987	15	0	0.00	0		
1985	20	3	0.15	3	8	2.67

Table 5. Length frequency of sauger in the Yellowstone River in September and October, 1994 and 1995.

	RIVER SECTION			
	Bonfield to Seven Sisters		Forsyth to Kinsey Bridge	
Length Class (mm)	No.	Percent	No.	Percent
1994				
<200	42	35.9	0	
200-249	18	15.4	0	
250-299	4	3.4	0	
300-349	23	19.7	3	21.4
350-399	16	13.7	7	50.0
400-449	8	6.8	2	14.3
450-499	5	4.3	1	7.1
>500	1	0.9	1	7.1
1995				
<200	20	8.8	0	
200-249	8	4.2	1	1.3
250-299	46	21.4	20	26.3
300-349	33	15.8	24	31.6
350-399	43	31.6	19	25.0
400-449	20	9.3	5	6.6
450-499	9	4.2	6	7.9
>500	10	4.7	1	1.3

Table 6. Results of Yellowstone River sauger aging in 1994 and 1995.

Age	Upstream of Intake: Sample size	Mean length	Length range	Downstream of Intake: Sample size	Mean length	Length range
			1994			
0+	13	219	200-245	43	175	143-213
1+	11	328	302-350	11	290	245-315
2+	5	356	352-366	12	347	328-398
3+	16	394	362-454	4	412	371-473
4+ and older	8	461	432-512	1	511	-
			1995			
0+	1	190	-	19	175	140-237
1+	54	284	201-321	20	274	231-314
2+	26	368	277-440	11	339	316-364
3+	39	389	363-450	15	396	360-438
4+ and older	14	486	415-572	11	489	376-590

Table 7. Yellowstone River sauger/walleye harvest rate in the first year following tagging.

Year tagged	Location tagged	Number tagged	# Returned first year	Annual % harvest rate
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
1992	Below Forsyth	22	3	13.6
1992	Miles City	46	4	8.7
1992	Fallon Bridge	51	0	0.0
1993	Below Forsyth	21	1	4.8
1993	Miles City	10	0	0.0
1993	Near Fallon	54	1	1.9
1993	Below Intake	42	0	0.0
1994	Below Forsyth	8	0	0.0
1994	Miles City	8	0	0.0
1994	Near Fallon	28	3	10.7
1994	Below Intake	31	0	0.0
All years		1194	66	5.4

Table 8. Distribution by town of residency for hoop net permits sold in the Miles City regional office.

Town	1994	1995
Billings	1	1
Brusett	0	0
Cascade	1	0
Colstrip	1	0
Crane	2	1
Fallon	1	0
Forsyth	1	2
Glendive	2	1
Joliet	0	1
Miles City	4	4
Nye	1	0
Rosebud	2	1
Sidney	2	2
Shepherd	0	1
Terry	4	2
Totals	22	17