MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS
FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: Montana PROJECT NO. F-46-R-2
PROJECT TITLE: Statewide Fisheries Investigations JOB NO: IV-b
STUDY TITLE: Survey and Inventory of Warmwater Lakes
JOB TITLE: Northcentral Montana Warmwater Lakes Investigations

PERIOD COVERED: July 1, 1988 through June 30, 1989

ABSTRACT

A total of eight waters were sampled during the report period. Walleye eggs totaling 3.6 million were collected from Lake Elwell and the resulting fry were stocked into Bynum Reservoir. Yellow perch and spottail shiner were also planted in Bynum reservoir to further develop the warm water fishery. Tagging studies involving northern pike and walleye continued in Lake Elwell and Lake Frances. First year angler harvest for northern pike ranged from 10.0 percent in Lake Elwell to 15.4 percent in Lake Frances while walleye ranged from 14.4 percent in Lake Elwell to 19.0 percent in Lake Frances. Forage fish numbers varied from fair to good in waters surveyed. Yellow perch are doing well with numbers increasing in Pishkun Reservoir and Lake Frances, while we observed no change in Lake Elwell. Larger sizes of perch used as forage are lacking in Lake Elwell. We observed substantial increases in spottail shiner numbers in Lake Frances and Lake Elwell over previous years. In Bynum Reservoir, yellow perch and spottail shiner numbers tripled when compared to last year. Stomach analysis indicates that walleye and northern pike prefer yellow perch, shrimp, and crayfish. Black crappie and largemouth bass survival in Eyraud Lakes and Little Pishkun Pond is discussed.

OBJECTIVES AND DEGREE OF ATTAINMENT

1. To find a source of walleye eggs that can be used to satisfy management demand.

2. To improve spawning habitat to maintain natural sport fish and forage fish populations. **(State funded).**

3. To enhance over-winter survival in Split Rock Lake for yellow perch and northern pike. **(State funded).**

4. To provide 2,000 angler days use for yellow perch and 3 to 6 pound northern pike in Pishkun Reservoir.

5. To provide a walleye fishery in Bynum and Morony Reservoirs to provide 6,000 angler days for two pound fish.

6. To provide 25,000 angler days for 2-4 pound walleye and 4-8 pound northern pike in Tiber Reservoir and Lake Frances.

7. To maintain current population level of walleye in Holter and Hauser Reservoirs. **(State funded).**

8. To develop a largemouth or smallmouth bass fishery in Lake Helena to provide 1,000 angler days of use. **(State funded).**

9. To develop fishable populations of largemouth bass, crappie and yellow perch in 20 farm ponds to provide 5,000 angler days use.

10. To maintain forage fish species to sustain game fish populations.

11. To evaluate need for new introductions of forage fish. **(State funded).**

12. To involve sportsman groups and general fishing public in management and planning process. **(State funded).**

Progress was made on all federally funded objectives and data are included in this report. Data for some state funded objectives were included for Regional purposes.

PROCEDURES

Fish populations were sampled with 125 x 6 foot experimental gill nets with 25 foot sections of 0.75, 1.0, 1.25, 1.5, and 2.0 inch square mesh; 300 x 8 foot gill nets with 100 foot sections of 2.5, 3.0, and 3.5 inch square mesh; 3x4 foot frame trap nets (0.25 inch mesh) and 4 x 6 foot frame trap nets (1 inch mesh) and a 100 x 10 foot seine (1/4 inch mesh). Captured fish were measured to the nearest tenth of an inch and weighed to the nearest hundredth of a pound. Stomach and scale samples were collected from some fish for food habit and age and growth studies.

Trap nets captured northern pike, walleye, and yellow perch in Lake Elwell, Lake Frances, and Eyraud Lakes. In Lake Elwell and Lake Francis, northern pike were tagged with T-tags while cinch-up tags provided a means of individual identification of walleye to determine survival, growth, movement and angler harvest. Gill nets sampled fall fish populations in Pishkun, Bynum, and Petrolia reservoirs as well as in Lake Frances and Lake Elwell to determine year class strength, species composition, and growth of game and sport fish. Some stomach samples were collected for food habit analysis. Periodic seining sampled forage species in designated areas. Unscheduled creel checks by area wardens were conducted on Lake Frances and Lake Elwell.

FINDINGS

Walleye Egg Source

Efforts continued in 1988 to collect walleye eggs to ensure adequate numbers for stocking in Bynum Reservoir. A total of 3.6 million eggs were taken on April 18 in the Willow Creek Arm of Lake Elwell. These eggs were once again hatched at the Giant Springs Trout Hatchery. Walleye fry were then stocked directly into Bynum Reservoir and three rearing ponds on May 3. Fingerling production from rearing ponds was zero. Two of the ponds completely dried up due to drought conditions. Fry apparently did not survive in the other pond.

Bynum Reservoir

Development of a fishery in Bynum Reservoir continued with a total of 950,000 walleye fry stocked on May 3, 1988. In addition, 550 adult yellow perch and 700 adult spottail shiner, were planted on May 31 and June 8, respectively.

Forage fish populations continue to increase. Surveys conducted on August 12 (Appendix I) indicate that yellow perch and spottail shiner numbers tripled since 1987 (Hill, et. al. 1988). Water levels have been low since converting this reservoir to warmwater management in 1985. Forage fish numbers should dramatically increase if reservoir levels return to near normal conditions.

Three gill nets fished in September caught an average of 7.0 walleye per net (Table 1). These walleye represent fish stocked in 1985, 1986 and 1987. Twelve walleye stomachs were examined for food contents. Yellow perch and unidentified fish remains occurred most often (Appendix II).

Lake Elwell (Tiber Reservoir)

Trap nets fished a total of 90 trap days from April 9 - 18, 1988 in the Willow Creek Arm (WCA). Approximately 700 walleye, 500 northern pike and 435 yellow perch were captured. Other species taken in order of abundance were white sucker, burbot, carp, rainbow trout and black crappie. Walleye and northern pike populations appear stable when compared to 1987 data. Yellow perch numbers have decreased and burbot are building rapidly. As discussed earlier, eggs were collected from walleye during spring trapping operations. Water temperatures ranged from 44 - 50^{0} F. in the lower portions of the Arm to 45 - 54 F. in the upper portions.

To determine movement and harvest, 299 walleye were tagged with Cinch-up tags. These fish averaged 18.2 inches (range 14.0 - 26.5 inches). Approximately 83 percent of these spawning fish were 16 inches or larger. Likewise, 249 northern pike averaging 20.2 inches (range 16.5 - 28.4) were tagged with T-tags. About 25 percent of these were larger than 20 inches. Anglers returned

Table 1. Gill netting results from five reservoirs in Region 4 during 1988.

Lake (Date)	Surface Acres[1]	No. of Nets[2]	Species[3]	No of Fish	Length Range (Average)	Weight Range (Average)
Bynum Res. (9/13/88)	1200	3-S	WE	6	7.6- 8.4(8.1)	0.14-0.18(0.16)
				2	12.3-12.9(12.6)	0.57-0.73(0.65)
				13	14.0-15.8(14.8)	0.83-1.34(1.06)
			Wf	1	(13.0)	(1.10)
			Eb	2	12.9-15.5(14.2)	1.00-1.84(1.42)
			WSu	101	8.7- 9.5(8.7)	0.33-0.48(0.36)
				80	11.9-15.0(13.8)	0.73-1.50(1.31)
				2	16.3-18.2(17.3)	1.90-2.40(2.15)
L. Elwell (9/20-22/88)	13,900	22-S	WE	59	7.7-12.9(11.7)	0.11-0.71(0.48)
				79	13.0-15.9(14.2)	0.60-1.30(0.92)
				25	16.2-19.9(17.7)	1.36-2.84(1.88)
				6	20.3-23.6(21.6)	2.43-4.18(3.24)
			NP	7	8.2-15.7(10.6)	0.14-0.81(0.30)
				49	16.1-19.7(18.1)	0.87-1.65(1.29)
				18	20.0-26.5(21.8)	1.50-5.70(2.29)
			YP	3	5.0- 5.9(5.5)	0.09-0.12(0.10)
				16	9.2-10.9(10.3)	0.32-0.72(0.54)
				18	11.0-12.7(11.4)	0.59-1.04(0.72)
			Rb	6	14.3-20.3(17.4)	1.11-3.02(1.91)
			LT	1	(24.5)	(4.20)
			SNS	3	35.0-38.5(37.1)	--
			Wf	1	(11.8)	(0.54)
			Ling	1	(15.3)	(0.76)
			WSu	9	12.7-15.0(14.1)	0.94-1.50(1.27)
				70	15.9-19.6(17.1)	1.82-3.40(2.25)
			LnSu	1	(8.2)	(0.19)
				10	17.3-20.5(18.8)	2.35-3.15(2.81)
			Carp	4	25.0-31.0(27.4)	--

1 - Approximate surface acres at time of survey.
2 - Type of net: S = sinking.
3 - Species abbreviations: WE=walleye; Wf=mountain whitefish; Eb=brook trout; WSu=white sucker; NP=northern pike; LnSu= longnose sucker; YP=yellow perch; Rb=rainbow trout; SNS=shovelnose sturgeon; Ling=burbot; KOK=kokanee salmon; LT=lake trout.

Table 1. (continued).

Lake (Date)	Surface Acres[1]	No. of Nets[2]	Species[3]	No of Fish	Length Range (Average)	Weight Range (Average)
L. Frances (9/16/88)	4000	3-S	WE	23	7.8-12.9(11.1)	0.13-0.67(0.42)
				3	13.0-13.4(13.2)	0.65-0.80(0.72)
				2	18.2-19.3(18.8)	2.20-2.43(2.32)
			NP	1	(9.4)	(0.18)
				1	(18.1)	(1.32)
				3	22.6-25.2(23.8)	3.00-3.83(3.31)
			YP	57	5.7- 8.7(7.7)	0.09-0.35(0.24)
				8	9.4-10.4(9.6)	0.48-0.72(0.53)
				1	(11.3)	(1.00)
			WSu	3	14.0-15.7(14.6)	1.40-2.00(1.60)
Pishkun Res.	1500	5-S	Rb	1	(22.0)	(3.83)
			KOK	1	(15.2)	(1.17)
			NP	2	14.9-15.5(15.2)	0.73-0.90(0.82)
				8	16.1-19.5(18.1)	0.98-1.84(1.45)
				6	20.0-25.0(21.5)	1.85-4.23(2.68)
			YP	94	5.5- 8.8(7.2)	0.08-0.39(0.21)
				24	9.4-10.4(9.9)	0.40-0.60(0.47)
				1	(11.3)	(0.66)
Petrolia Res. (9/21/88)	5	1-F, 1-S	WE	44	8.1-17.3(12.8)	0.13-1.92(0.69)
			NP	15	17.7-24.1(21.0)	1.14-2.97(2.11)
			YP	3	6.7-9.7 (8.5)	0.10-0.40(0.27)
			WSu	13	14.2-15.8(15.0)	1.22-1.52(1.37)
			Carp	11	9.0-20.7(16.8)	-
			YP	94	5.5- 8.8(7.2)	0.08-0.39(0.21)

1 - Approximate surface acres at time of survey.
2 - Type of net: S = sinking.
3 - Species abbreviations: WE=walleye; Wf=mountain whitefish; Eb=brook trout; WSu=white sucker; NP=northern pike; LnSu= longnose sucker; YP=yellow perch; Rb=rainbow trout; SNS=shovelnose sturgeon; Ling=burbot; KOK=kokanee salmon; LT=lake trout.

91 tags from walleye and 32 tags from northern pike during 1988 (Table 2). First-year returns for walleye range from 9.1 percent in 1986 to 15.1 percent in 1988. Northern pike harvest of tagged fish ranges from 10.0 percent (1988) to 18.8 percent (1985) for first-year returns. For fish tagged in the WCA in 1988, 78 percent of the walleye taken by anglers were caught in the WCA and 20 percent in the Dam area. Approximately 63 percent of angler caught northern pike were also taken in the WCA and 18 percent were take near the Dam area. Tag returns for 1988 indicate that the best months to fish for walleye are May, June and July (Table 3) and for northern pike are May and June.

To improve yellow perch spawning habitat, approximately 15 acres covering 3.3 miles of shoreline were seeded on May 21, 1988. Yellow-blossom sweet clover, wheat and barley were spread by electric broadcast seeders mounted on 4-wheel ATV's. Seeds were worked into the soil by dragging harrow sections behind ATV's. Due to poor soil moisture and lack of rainfall during the growing season, few of the seeds sprouted. A total of 8 areas were seeded in the WCA, Miller Slough and Dike area.

Spottail shiner were collected by trapping and seining on June 7 - 8. A total of 700 adult spottail captured in the WCA were transplanted into Bynum Reservoir on June 8. Water temperatures ranged from 60 - 70^{0} F. in the collection areas.

A total of 12,301 forage fish were collected in 71 seine hauls in 5 areas of Lake Elwell from August 15 - 18. In addition, 84 walleye and 6 northern pike young-of-the-year fish and 191 crayfish were taken. Yellow perch numbers in 1988 are stable when compared to 1987 (87.6 fish/haul vs. 86.3 fish/haul) but much lower than 1986 of 139.9 fish/haul. Spottail shiner are increasing rapidly. This species increased from 3.6 fish/haul in 1986 to 13.8 fish/haul in 1987, and to 63.1 fish/haul in 1988. Several other forage species occur with fairly stable numbers. Results of 1988 forage surveys are found in Appendix I.

Twenty-two experimental gill nets were fished in Lake Elwell from September 20 - 22 to monitor trends. A total of 11 species were taken from four areas of the reservoir (Table 1). Walleye and northern pike were taken in good numbers representing several age classes. Yellow perch numbers are somewhat depressed, suggesting a downward trend as noted in an earlier report (Hill, et. al. 1988). Three shovelnose sturgeon were taken during the sampling. These are presumably fish that were trapped in the reservoir when the dam gates were closed in 1955. Most of the fish taken in the fall netting were in the WCA and Dam areas. Individual gill net summaries for the four areas surveyed are presented in Appendix III. Stomach analysis from fish caught in gill nets indicate that walleye prefer yellow perch and that northern pike feed heavily on crayfish. Occurrence of other items are listed in Appendix II.

Walleye condition factors have fluctuated throughout the years since walleye were first introduced. Table 4 presents average

Table 2. Angler harvest of walleye and northern pike, 1955-88.

Area	Species	Year Tagged	Number Tagged	Number Returns (%)				
				1985	1986	1987	1988	cumulative
L. Elwell	WE	1985	294	33(11.2)	14(4.8)	3(1.0)	9(3.1)	59(20.0)
		1986	416		38(9.1)	19(4.6)	9(2.2)	66(15.9)
		1987	444			50(11.3)	28(6.3)	78)17.6)
		1988	299				45(15.1)	45(15.1)
	NP	1985	194	17(18.8)	6(3.1)	2(1.0)	0(0.0)	25(12.9)
		1986	279		34(12.2)	8(2.9)	0(0.0)	42(15.1)
		1987	495			55(11.1)	7(1.4)	62(12.5)
		1988	249				25(10.0)	25(10.0)
L. Frances	WE	1985	125	18(4.4)	6(4.8)	9(7.2)	1(0.8)	34(27.2)
		1986	114		10(8.8)	8(7.0)	2(1.8)	20(17.5)
		1988	21				4(19.0)	4(19.0)
	NP	1985	137	29(21.1)	6(4.4)	2(1.4)	0(0.0)	37(27.0)
		1986	212		36(17.0)	19(8.9)	3(1.4)	58(27.4)
		1988	13				2(15.4)	2(15.4)

Table 3. The percentage of walleye and northern pike tag returns reported in each month of 1988 by anglers fishing Lake Elwell.

Month(s)	Walleye	Northern Pike
Spring/Summer/Fall		
April	11.5	9.1
May	23.1	27.3
June	20.5	21.2
July	19.2	9.1
August	7.7	6.1
September	12.8	15.2
Winter		
October-March	5.1	12.1

Table 4. The average condition factor for various length groups of walleye collected in Lake Elwell from 1973-1988. Sample size (N) is in parentheses.

	Length group (inches)				All fish
Year	12.9	13.0-15.9	16.0-19.9	20.0	12.9-20.0
1973	26.7(26)	32.4(5)	-	-	27.6(31)
1974	33.2(88)	33.3(5)	34.3(4)	-	33.3(97)
1975	-	38.7(36)	39.9(18)	-	39.1(54)
1976	-	34.4(6)	35.3(146)	40.5(1)	35.3(153)
1977	29.2(6)	34.5(3)	34.8(214)	36.4(5)	34.7(228)
1978	30.5(45)	32.0(7)	33.3(77)	33.8(17)	32.8(146)
1979	28.9(38)	29.6(11)	31.1(18)	32.1(8)	29.9(75)
1980	30.4(80)	32.0(41)	32.9(20)	34.3(13)	31.5(154)
1981	27.1(30)	27.9(11)	32.5(4)	29.0(5)	27.9(50)
1982	32.2(58)	35.1(61)	37.7(12)	33.6(1)	34.1(132)
1983	32.2(28)	33.3(57)	35.8(21)	36.6(2)	33.6(108)
1984	29.6(33)	32.7(12)	35.8(21)	35.0(3)	32.2(69)
1985	31.9(12)	34.4(12)	35.8(8)	-	33.8(32)
1986	35.1(58)	35.0(44)	37.4(60)	37.3(5)	36.0(167)
1987	30.5(67)	32.9(38)	35.3(44)	36.3(4)	32.6(153)
1988	29.2(59)	31.8(79)	33.4(25)	31.9(6)	31.1(169)

condition factors by various size groups. It is apparent from this table that larger fish generally have higher condition factors. Measurements from 1,818 walleye collected from 1973 - 88 indicate condition factors range from 27.6 to 39.1 when size groups are combined. Condition factor also closely follows the number of yellow perch available as forage. Fluctuations in walleye condition factor is plotted against numbers of yellow perch taken per gill net (Figure 1).

The maximum elevation of Lake Elwell attained during 1988 was 2,981.8 feet msl and occurred on June 18. Negotiations are continuing with the Bureau of Reclamation and other interested groups to manipulate water levels in 1989 or 1990 to improve yellow perch spawning potential. Spawning habitat is available above the 1988 peak level.

Limited creel census was conducted by project personnel and area wardens from May 11 through July 9. A total of 157 anglers caught 251 walleye, 93 northern pike, 57 yellow perch and 14 rainbow trout (Table 5). Of fish kept by anglers, walleye averaged 14.8 inches, northern pike 18.9 inches, yellow perch 11.2 inches and rainbow trout 19.2 inches. People fishing Lake Elwell came from 23 Montana communities from as far away as Miles City, Missoula and Kalispell. Non-resident anglers from Iowa and Minnesota were also contacted.

Lake Frances

A total of 23 trap days were fished in Lake Frances from April 4 - 10 and April 18 - 20, 1988. Few fish were caught as nets were hampered by wind and were tampered with. Only 18 northern pike and 21 walleye were taken. In addition, 23 burbot and no yellow perch were captured. Water temperatures varied from 40 - 41 F. on the earlier trapping dates and 46 - 49° F. on the latter.

Although few northern pike and walleye were taken, all mature fish were tagged to help determine harvest. During 1988, anglers returned tags from 7 walleye and 5 northern pike (Table 2). Nineteen percent of the walleye and 15.4 percent of the northern pike tagged in 1988 were harvested. Accumulative returns for both species tagged in previous years is slightly over 27 percent.

A total of 20 seine hauls were made on August 22 to sample forage fish and game fish reproduction (Appendix I). The main prey species have increased significantly over the last two years. Yellow perch averaged 50.3 fish/seine haul in 1988 compared to 38.7 (1987) and 7.4 (1986). Spottail shiner averaged 12.4 fish/haul in 1988 with 2.7 (1987) and 3.8 (1986). Reproduction of northern pike and walleye is comparable to past years. Young-of-the-year burbot were taken for the first time by seining during 1988.

The September gill net survey (Table 1) caught 28 walleye, 5 northern pike and 66 yellow perch. The 1988 sample of yellow

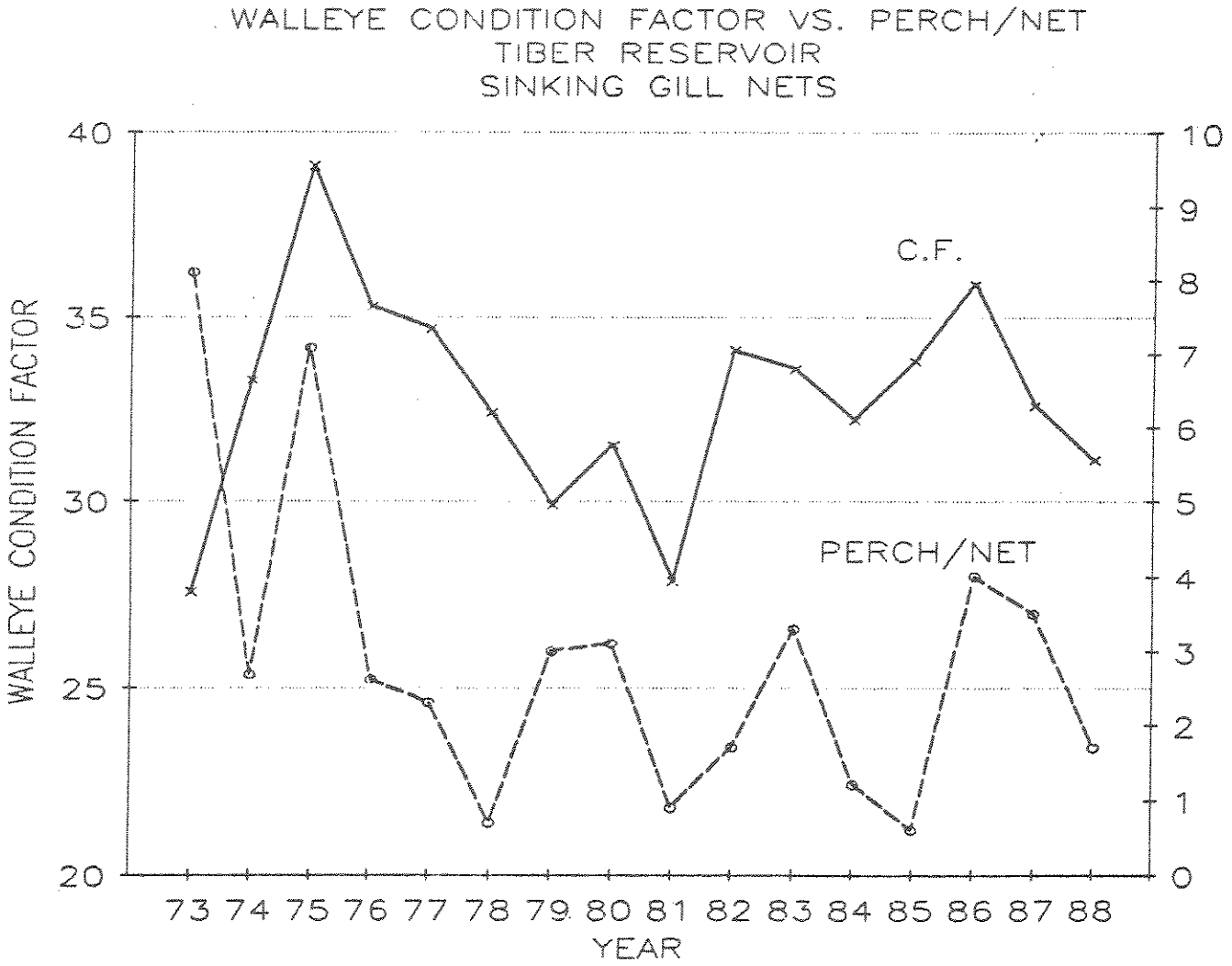

Figure 1. Variation in walleye condition factor and catch of yellow perch / gill net in Lake Elwell Reservoir), Mt from 1973-1988.

Table 5. Lake Elwell creel census, 1988.

Species	No. of Fish Kept	No. of Fish Released	Fish/Hour	
WE	173	78	0.306	
NP	45	48	0.114	
YP	51	6	0.070	Total Anglers - 157
Rb	13	1	0.017	Total hrs. fished - 819
				Fish/hr. (species combined - 0.507

perch (22 fish/net) is the highest recorded since their presence was first documented in 1961. A previous high of 13 fish/net was recorded in 1970 but numbers have averaged less than 1 fish/net from 1985 to 1987. The increase in yellow perch numbers will benefit northern pike and walleye populations in years to come. Based on analysis of stomach contents, walleye preferred to feed on shrimp even though yellow perch were abundant (Appendix II). Items found in northern pike stomachs include yellow perch, fish remains, and shrimp.

Although we observed flucuations from year to year in the average condition factor of walleye from Lake Francis, a general decline appears evident from 1976-1988 (Table 6). Based on the increased number of forage fish available we expect condition factors to improve.

Pishkun Reservoir

Forage fish abundance was sampled on August 23. A total of 1,392 yellow perch and 1,427 white sucker were taken in 16 seine hauls (Appendix I). These species were taken in greater proportions in 1988 than in 1987 but comparable to 1986 surveys. Crayfish numbers appeared adequate in 1988, averaging 11.0/seine haul. Spottail shiners introduced previously (Hill, et al., 1988) were not captured during the August survey, but several mature fish were taken in spot checks on June 9.

Five sinking gill nets were fished in July to continue monitoring longterm trends (Table 1). Nearly 24 yellow perch were taken per net; this is the highest abundance observed in recent years. The density of this forage fish should improve overall condition of the northern pike population in future years. Spottail shiner should establish a population and hopefully increase in numbers since predation will probably be directed at the more abundant yellow perch. Yellow perch densities have historically fluctuated at Pishkun Reservoir. Hopefully, spottail shiner will become abundant before perch numbers crash. A total of 16 northern pike stomachs were analyzed for food contents (Appendix II). Yellow perch are preferred but kokanee salmon appeared in two stomachs.

Petriola Reservoir

Fall netting activities at Petriola Reservoir occurred after irrigation demands for water had resulted in a large drawdown. The reservoir was approximately 5 acres in size and water elevations were 30-40 feet below full pool. The most common game fish was walleye, which averaged 12.8 inches in total length and 0.69 pounds (Table 1). A substantial number of northern pike were also captured in the gill nets. Yellow perch were also present. On 7 April 1988, we planted 150,000 walleye fry in Petriola Reservoir.

Table 6. The average condition factor for various length groups of walleye collected in Lake Francis from 1976-1988. Sample size (N) is in parentheses.

	Length group (inches)				All fish
Year	12.9	13.0-15.9	16.0-19.9	20.0	12.9-20.0
1976	-	-	32.8(1)	39.9(1)	36.4(2)
1979	31.8(21)	34.0(12)	34.3(5)	37.9(2)	33.1(40)
1980	31.5(3)	36.1(2)	36.3(4)	35.4(1)	34.7(10)
1981	30.6(7)	32.2(2)	34.1(8)	33.8(1)	32.5(18)
1982	29.2(33)	33.1(7)	34.9(11)	31.6(1)	31.0(52)
1983	29.1(35)	31.9(10)	35.1(13)	-	30.9(58)
1984	30.3(19)	31.7(1)	33.9(1)	-	30.5(21)
1985	31.6(2)	31.2(4)	-	-	31.3(6)
1986	29.6(34)	34.4(32)	35.5(11)	-	32.4(77)
1987	29.6(40)	31.6(12)	33.7(14)	-	30.8(66)
1988	29.2(23)	31.3(3)	35.2(2)	-	29.9(28)

Table 7. Gill netting results for small ponds and reservoirs in 1988.

Pond (Date)	No. of Nets	Species	No. of Fish	Length Range (Average)	Weight Range (Average)
Little Pishkun (6/29/88)	1-S	NP	3	17.1-17.2(17.2)	1.33-1.56(1.46)
			4	20.7-24.5(23.1)	2.50-4.10(3.42)
		YP	4	7.2- 9.5(8.6)	0.20-0.60(0.44)
			2	10.2-10.7(10.5)	0.73-0.75(0.74)
		WSu	8	9.8-11.8(10.8)	0.45-0.73(0.59)
			5	(18.6)	(2.36)
Split Rock Lake	2-S	NP	1	(12.8)	(0.50)
			7	16.2-19.8(17.9)	1.00-1.70(1.30)
			5	20.0-21.7(20.7)	1.76-2.25(2.02)
		YP	30	5.4- 8.9(7.3)	0.10-0.45(0.23)
			23	9.2-10.8(10.3)	0.44-0.80(0.63)
			20	11.0-12.2(11.6)	0.74-1.40(0.99)
		WSu	4	16.8-20.0(17.9)	1.95-2.93(2.40)

Type of net: S = sinking
Species: NP = northern pike,
YP = yellow perch,
WSu = white sucker.

Morony Reservoir

Survey work on Morony Reservoir performed late in the last reporting period provided adequate information for management decisions from 6/88-6/89.

Small Ponds and Reservoirs

Choteau area

Attempts to increase diversification of warmwater fisheries in the Choteau area continued. Black crappie and largemouth bass were introduced into Eyraud Lakes in 1986 and an additional 60,000 one inch largemouth were stocked in 1988. We captured two large crappie during trapping operations in May while August sein-hauls provided four largemouth bass which had been stocked in June.

A gill net survey of little Pishkun Pond produced northern pike, yellow perch, and white sucker (Table 7). Largemouth bass introduced in 1986 were not taken. A total of 20,000 one inch largemouth bass were stocked on June 14, 1988. Several young bass were seen inside yellow perch schools in shoreline areas.

Trends in the warmwater fish populations of Split Rock Lake were again monitored on June 17. Two gill nets caught 73 yellow perch and 13 northern pike (Table 7). This Lake produces large yellow perch and is popular with fisherman. Attempts have been made for several years to cooperate with landowners to repair the dam and thereby increase water storage. The landowners accomplished the project and the lake now has a maximum depth of 11.5 feet.

Helena, Great Falls, and Lewistown areas

Efforts continued to establish a largemouth bass fishery in Lake Helena. Although no plants were possible in 1986 and 1987, we were able to plant 20,000 fry during the last reporting period in addition to 20,000 fingerling planted in July, 1988. Size of the largemouth bass varied from 0.5-1.0 inch in total length.

Wadsworth Pond was not planted with bass since the city of Great Falls still prohibits trespass in the area. Angling groups continue to express interest in the pond; we will attempt the development of a warmwater fishery in Wadsworth Pond immediately after public access is secured.

Three farm ponds north of Great Falls were surveyed during May 1989. All three appear barren of fish. Silvan Reservoir, south of Big Sandy, and Boyle Coulee Reservoir, between Fort Benton and Geraldine, had been previously planted with trout by the landowners. Schoonover Reservoir #1, located north of Loma, contained a yellow perch population until it dried up in 1988. This population had been introduced by the MDFWP. All three

reservoirs are scheduled for largemouth bass plants during July or August 1988. Yellow Perch introductions may also be attempted in Schoonover and Silvan Reservoirs.

We did not survey warmwater ponds in the Lewistown area during the reporting period. However, we did sample ponds in the eastern portion of Region Four in May-June 1988 and July 1989. Additional largemouth bass plants in Drag Creek, South Fork Dry Blood, and Upper Wolf Coulee Reservoirs were made in June 1988 in a continuing effort to maintain warmwater fishing opportunities in the region.

DISCUSSIONS AND RECOMMENDATIONS

Walleye eggs were taken again from the WCA of Lake Elwell with the resulting fry stocked in Bynum Reservoir. Walleye will be stocked into Bynum Reservoir until 1989 but eggs will not be collected from Region Four waters. Walleye, yellow perch, and spottail shiner have been planted annually in Bynum Reservoir since 1985. Walleye in Bynum Reservoir should spawn for the first time in spring 1989. Forage species have reproduced each year since being introduced. Improved water levels are anticipated in 1989 which should benefit forage fish production.

Forage fish, particularly yellow perch, are essential in maintaining warmwater fisheries. Currently, perch numbers are good in Lake Frances and Pishkun Reservoir but declining in Lake Elwell. Negotiations should continue with the Bureau of Reclamation through the Marias Management committee to improve spawning conditions in Lake Elwell. In addition, selected shoreline areas should be seeded to establish vegetation for spawning. We plan to place experimental spawning structures in the WCA and monitor perch utilization. Spottail shiner are increasing in Lake Elwell and Lake Frances. Additional spottail plants should be made in Pishkun Reservoir to supplement yellow perch.

Three irrigation storage reservoirs in Region Four are providing anglers with good walleye and/or northern pike fisheries. Northern pike in Pishkun Reservoir are thought to be increasing and there is a greater abundance of yellow perch. A population estimate of northern pike should be made in 1989. Walleye and northern pike numbers are presently good in both Lake Frances and Lake Elwell. A fourth water, Bynum Reservoir, is scheduled to open to fishing on May 20,1989, but several more years will be needed to develop a good walleye fishery.

Black crappie and largemouth bass were introduced into Eyraud Lakes and Little Piskun Pond in 1986 and 1988. Future surveys should be directed at determining their survival and the potential of establishing a bass fishery in these waters.

Although data suggests that Petrolia Reservoir has the capability to produce larger walleye, irrigation demands result in very low water levels. The continuation of bass plants in Lake Helena, Lewistown area ponds, and the introduction of bass in small

reservoirs in the Fort Benton - Big Sandy area should increase the diversity of fishing opportunities throughout much of Region 4 at a time when greater interest in warmwater fisheries has developed among anglers.

ACKNOWLEDGEMENTS

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LITERATURE CITED

Hill, William J., S. A. Leathe and A. H. Wipperman. 1988. Survey and Inventory of Warm Water Lakes. Mt. Dept. of Fish, Wildlife, and Parks. Job Progress Report F-46-R-1, Job No. IV-b.

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DATE: August, 1989

PRINCIPAL FISH SPECIES INVOLVED:
Walleye, northern pike, largemouth bass, black crappie, yellow perch, spottail shiner

CODE NUMBERS OF WATERS REFERRED TO IN REPORT:

14-7080 Bynum Reservoir
14-6840 Eyraud Lake
14-7440 Lake Frances
14-9240 Lake Elwell
16-8275 Silvan Reservoir
17-8773 Boyle Creek Reservoir
17-9072 Lake Helena
17-9509 Schoonover Reservoir #1
18-7560 Drag Creek Reservoir
18-8750 Petriola Reservoir
18-9150 S. Fork Dry Blood Reservoir
18-8985 Upper Wolf Coulee Reservoir
20-7730 Little Pishkun Pond
20-7950 Pishkun Reservoir
20-8200 Split Rock Lake
20-8470 Wadsworth Reservoir

Appendix I. Forage fish/reproduction surveys, 1988 (100' x 10' seine)

Water	Date	Water Temp.	No. of pulls	Number of fish/pull 1/												
				WE	NP	YP	Cr	SpS	EmS	WSu	Carp	Burbot	Cray fish	Lake Chub	Sculpin	FH chub	LN dace
Bymum Res.	8/12/88	65°	16	0.1	N/A	19.6	N/A	21.7	N/A	0.8	N/A	N/A	0.2	N/A	0.6	N/A	N/A
Lake Elwell																	
Devon	8/15/88	73°	11	2.7	--	10.4	--	117.5	6.2	0.1	--	--	0.5	8.1	--	--	--
So. Bt.	8/16/88	70°	12	2.2	--	4.3	--	46.9	49.2	0.3	0.1	--	0.9	0.8	--	1.1	0.1
No. Bt.	8/15/88	72°	10	0.9	0.2	61.5	--	50.8	0.1	4.9	1.5	--	5.9	0.2	0.1	0.2	0.1
Dam	8/17/88	70°	19	0.3	--	96.3	--	61.2	8.3	4.1	0.8	--	1.2	--	0.1	0.1	--
WCA	8/18/88	69°	19	0.7	0.2	189.9	--	50.2	9.1	0.4	16.9	--	4.8	0.1	--	--	--
Areas Combined			71	1.2	0.1	87.6	--	63.1	13.9	2.0	5.0	--	2.7	1.4	Tr.	0.2	Tr.
L. Frances	8/22/88	66°	20	0.5	0.9	50.3	N/A	12.4	N/A	1.2	N/A	0.4	1.2	N/A	0.4	N/A	--
Pishkun R.	8/23/88	64°	16	N/A	0.6	87.0	N/A	--	N/A	89.2	N/A	N/A	11.0	N/A	0.1	N/A	--

1/ Species abbreviation: WE-walleye; NP-northern pike; YP-yellow perch; CR-black crappie; SpS-spottail shiner; EmS-emerald shiner; WSu-white sucker; FH Chub-flathead chub; LN dace-longnose dace.

Appendix II. Food preference of northern pike and walleye, Stomach analysis, 1988

Water	Species	No. stomachs	No. empty	Number of stomachs with food item									
				YP	WSu	Fish Remains	KOK	Shrimp	Cray-fish	insects	vegetation	Fish hooks	leeches
Lake Elwell	N. pike	24	8	3	--	6	--	--	12	--	1	1	--
L. Frances	N. pike	4	1	1	--	1	--	1	--	--	--	--	--
Pishkun Res.	N. pike	16	8	6	--	--	2	--	--	--	--	--	--
Lake Elwell	walleye	50	14	10	--	25	--	--	1	1	13	--	--
L. Frances	walleye	15	2	1	--	--	--	13	--	1	--	--	3
Bynum Res.	walleye	12	1	4	1	5	--	1	--	1	1	--	--

APPENDIX III. Gill net summaries by area, Lake Ellwell, 1988.

Area (Date)	No. of Nets	Species	No. of Fish	Length Range (Avg.)	Weight Range (Avg.)
Devon	4	WE	6	7.7-11.7 (10.0)	0.11-0.44 (0.28)
(9/20/88)			1	(18.6)	(2.00)
		NP	1	(18.4)	(1.30)
			5	21.5-23.7 (22.4)	2.00-3.19 (2.43)
		YP	1	(5.9)	(0.09)
			8	9.5-10.8 (10.2)	0.39-0.72 (0.51)
			7	11.2-11.6 (11.4)	0.59-0.74 (0.68)
		Rb	1	(18.3)	(2.40)
		SNStur.	2	37.8-38.5 (38.2)	--
		WF	1	(11.8)	(0.54)
		Carp	1	(26.5)	--
		WSu	7	15.0-19.6 (16.3)	1.50-3.40 (2.04)
		LnSu	1	(8.2)	(0.19)
			6	(18.2)	(2.71)
Bootlegger	6	WE	8	9.5-12.0 (10.8)	0.17-0.55 (0.34)
9/21/88			3	13.1-15.0 (14.3)	0.60-1.10 (0.84)
		NP	3	16.3-17.9 (17.0)	0.90-1.12 (1.01)
			2	21.7-26.5 (24.1)	2.20-5.70 (3.95)
		YP	1	(5.0)	(0.12)
		WSu	4	16.6-19.4 (17.5)	2.10-3.30 (2.50)
Dam	3	WE	9	12.0-12.9 (12.6)	0.50-0.65 (0.58)
9/21/88			16	13.0-15.9 (14.5)	0.64-1.17 (0.97)
			9	17.0-18.9 (17.7)	1.57-2.20 (1.84)
		NP	1	(9.1)	(0.19)
			6	17.9-19.5 (18.9)	1.21-1.64 (1.37)
			3	20.2-21.5 (20.7)	1.50-2.11 (1.80)
		YP	1	(5.7)	(0.09)
			3	10.4-10.6 (10.5)	0.56-0.70 (0.61)
		Rb	2	16.5-20.3 (18.4)	1.64-2.10 (1.87)
		SNStur.	1	(35.0)	--
		Ling	1	(15.3)	(0.76)
		WSu	1	(13.5)	(1.10)
			9	(15.9)	(1.82)
WCA	9	WE	36	9.0-12.9 (12.0)	0.20-0.72 (0.53)
9/22/88			60	13.0-15.5 (14.1)	0.64-1.30 (0.91)
			15	16.2-19.9 (17.7)	1.36-2.84 (1.90)
			6	20.3-23.6 (21.6)	2.43-4.18 (3.24)
		NP	6	8.2-15.7 (10.8)	0.14-0.81 (0.31)
			39	16.1-19.7 (18.0)	0.87-1.65 (1.30)
			8	20.0-22.8 (21.2)	1.58-2.50 (1.97)
		YP	5	9.2-10.9 (10.4)	0.32-0.65 (0.55)
			11	11.0-12.7 (11.4)	0.60-1.04 (0.75)
		Rb	3	14.3-20.3 (16.5)	1.11-3.02 (1.77)
		Carp	3	25.0-31.0 (27.7)	--
		WSu	3	(12.7)	(0.94)
			55	16.0-19.1 (17.2)	1.85-2.98 (2.26)
		LnSu	4	17.3-20.5 (19.7)	2.35-3.15 (2.95)