MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: MONTANA PROJECT TITLE: STATEWIDE FISHERIES INVESTIGATIONS

PROJECT NO: F-46-R-2 STUDY TITLE: SURVEY AND INVENTORY OF COLDWATER AND WARMWATER ECOSYSTEMS

JOB NO.: V-e JOB TITLE: NORTHEAST MONTANA WARMWATER ECOSYSTEM INVESTIGATIONS

PROJECT PERIOD: JULY 1, 1988 THROUGH JUNE 30, 1989

ABSTRACT

Gill netting in the Fort Peck dredge cuts/tailwater produced low catches of sauger and walleye for the third consecutive year. The catch of cisco increased for the third consecutive year and significant numbers of smelt were netted. Paddlefish harvest and tagging records were maintained for populations in the dredge cuts and Missouri River above Fort Peck Reservoir. Harvest from both areas remains low. Attempts to locate walleye spawning areas in the Milk River were unsuccessful. Netting in Fresno Reservoir produced good catches of walleye, lake whitefish, yellow perch and northern pike. Beach seining indicated good reproduction of walleye and yellow perch, but poor reproduction of northern pike and emerald shiners. Emigration of fish from Fresno Reservoir was monitored and correlated with reservoir elevation. Beach seining and electrofishing at Nelson Reservoir indicated poor walleye and northern pike reproduction, but good numbers of perch and spottail shiners. Tiger musky introductions in Kuhr Reservoir have been partially successful. Walleye introductions into Beaver Creek Reservoir have been successful though numbers appear low. Stocking recommendations are proposed. Management recommendations for all waters are presented.

OBJECTIVES AND DEGREE OF ATTAINMENT

Job objectives: (streams)

1) To ensure within hydrologic constraints that streamsflows do not fall below 1975-85 averages. Objective accomplished; water surface profile data was collected on Big and Little Dry Creeks and minimum instream flow recommendations submitted.

2) To maintain all the region's streambanks and channels in their present or improved condition. Objective accomplished using state funding.

3) To develop seasonal flow recommendations to improve flows for walleye spawning in the Milk River. Objective partially accomplished; data presented.

4) To ensure that Fort Peck tailwater/dredge cut fish population is adequately protected from development related to hydropower expansion. Objective accomplished and data presented.

5) To acquire maximum spring flows within hydrologic constraints through the International Joint Commission agreement. Objective accomplished using state funding.

6) To maintain paddlefish populations and angler catch rates at existing levels. Objective accomplished and data presented.

7) To acquire public fishing access through lease or purchase and develop a fishing access site acquisition and development plan for the region. Objective accomplished using state funding.

Job Objectives: (lakes)

1) To collect 20-30 million walleye eggs for fry and fingerling stocking from the Miles City hatchery. Objective accomplished using state funding.

2) To develop 2 new fishing reservoirs and maintain 10 existing fisheries per year. Objective accomplished.

3) To acquire public fishing access through lease or purchase and develop a fishing access site acquisition and development plan for the region. Objective accomplished using state funding.

4) To acquire suitable water level and minimum pool for Fresno and Nelson Reservoir. Objective accomplished and data presented.

5) To maintain a variety of species combinations distributed geographically throughout the region in 45 small reservoirs. Objective accomplished using state funding.

6) To provide 10,000 angler days and catch of 0.25 walleye per hour at Nelson Reservoir. Objective accomplished; data presented. Quantification of fishing pressure will be accomplished by utilizing data from the statewide fishing pressure survey scheduled for 1989-90.

7) To maintain a population balance of predators versus perch and crappie. Objective accomplished and data presented.

8) To maintain or improve forage base for predator species in numerous reservoirs throughout the region. Objective accomplished and data presented.

PROCEDURES

Floating and sinking standard experimental nets 125 feet in length and 6 feet deep consisting of 25-foot panels of 3/4-, 1-, 1 1/4-, 1 1/2- and 2-inch square mesh were fished to acquire information on overall fish populations. Beach seining to determine abundance and reproductive success of sport and forage fish was conducted in late summer and early fall utilizing a 100- x 9-foot seine of 1/4-inch square mesh. Monofilament gill nets 100- x 6-foot with 1/2-inch square mesh were set horizontally in the dredge cuts to sample smelt and cisco. A 12- x 18- x 6-inch framed kick net lined with .03-inch mesh Nitex material was used to sample eggs in the Milk River. The net was positioned on the riffle bottom in 1 to 3 feet of water and the bottom substrate disturbed immediately upstream of the net. A boom-rigged electrofishing boat was employed to sample adult and juvenile fish in Nelson, Kuhr, and Beaver Creek Reservoirs.

RESULTS AND DISCUSSION

Fort Peck Dredge Cuts and Tailwater

Fish population sampling continued in the Fort Peck dredge cut and tailwater complex in August, 1988, utilizing 10 experimental gill nets set overnight. This netting effort was initiated in 1979 to obtain information on the fish population due to potential impacts associated with a Corps of Engineers proposal to construct additional hydropower facilities which included a reregulation dam 8 miles downstream from Fort Peck Dam.

Sauger and walleye are the most popular sportfish species in this area. Sauger are more abundant than walleye. The combined catch for sauger and walleye increased somewhat in 1988 compared to 1987 and 1986, but remained low (Table 1). The highest catch on record for sauger and walleye occurred in 1980 and 1981, and was believed to be associated with a migration of rainbow smelt from Garrison Reservoir (Lake Sakakawea). The relationship of sauger/walleye and smelt abundance is illustrated in Figure A.

Five smelt were taken in experimental gill nets in 1988, whereas no smelt were caught in these nets during the previous four years of 1984-87. Four 100- x 8-foot monofilament gill nets with 1/2-inch square mesh were set overnight since nets of this design have been effective for sampling smelt in the past. These monofilament nets captured 41 smelt in 1988, which indicates smelt were significantly more abundant than in previous years. The mean total catch from these four monofilament nets during seven previous years of 1981-87 was 9.9. The highest previous catch of 39 occurred in 1981 and the lowest was 0 in 1983.

Cisco appeared in the experimental net catch for the first time in 1985 with a catch of four. The presence of cisco correlates with new introductions into Fort Peck Reservoir and is attributed to downstream migration through the dam. Numerous dead or injured cisco have been

Table 1. A summary of the catch from ten 125-foot experimental gill net sets in the Fort Peck dredge cut/tailwater area, 1979-88.

Species	1979			1980			1981			1982			1983		
	No.	Avg. Lgth. (in.)	Avg. Wt. (lb.)	No.	Avg. Lgth. (in.)	Avg. Wt. (lb.)	No.	Avg. Lgth. (in.)	Avg. Wt. (lb.)	No.	Avg. Lgth. (in.)	Avg. Wt. (lb.)	No.	Avg. Lgth. (in.)	Avg. Wt. (lb.)
Sauger	7	15.3	0.96	67	14.7	1.03	47	15.0	0.93	9	16.1	1.06	12	14.3	0.92
Walleye	8	16.4	1.48	27	16.8	1.80	9	17.4	1.86	7	18.3	1.82	8	17.2	1.58
Sh. strug.[1]	137	25.1	1.94	66	25.4	2.15	83	25.9	2.25	52	25.6	2.19	54	26.8	2.55
Rb. smelt	---	---	---	29	6.9	0.08	4	7.0	0.08	---	---	---	2	7.2	0.10
Wht. suck.	5	13.6	1.78	7	14.6	1.57	16	12.5	1.04	7	15.7	1.85	8	14.6	1.65
R. carps.	32	15.2	1.62	23	15.6	1.75	12	15.2	1.72	17	15.0	1.58	16	15.6	1.59
Sht. redh.	---	---	---	6	15.0	1.45	2	16.4	1.98	2	13.1	0.80	---	---	---
Goldeye[2]	150	12.4	0.55	255	12.5	0.55	190	12.1	0.51	167	12.0	0.52	159	11.6	0.54
Carp	9	17.3	2.41	9	17.6	2.66	10	18.7	3.04	5	17.5	2.32	11	17.4	2.35
Ln. suck.	---	---	---	7	13.3	1.43	4	15.2	1.67	3	18.6	2.98	---	---	---
Ch. cat.	13	17.8	1.77	5	20.6	2.68	4	17.3	1.86	15	18.4	2.08	5	18.4	1.98
Bl. suck.	5	23.2	4.05	1	23.8	4.46	2	24.2	4.05	---	---	---	---	---	---
No. pike	3	26.8	4.33	1	28.5	6.90	---	---	---	23	22.8	2.27	3	31.0	8.10
Sm. buff.	1	27.5	12.20	---	---	---	1	24.3	6.25	2	16.7	1.98	1	19.2	2.98
Burbot	---	---	---	---	---	---	---	---	---	1	12.8	0.43	---	---	---
Lk. white.	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Yel. perch	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Cisco	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Ch. sal.	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Paddlefish	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Table 1. Continued.

Species	1984 No.	1984 Avg. Lgth. (in.)	1984 Avg. Wt. (lb.)	1985 No.	1985 Avg. Lgth. (in.)	1985 Avg. Wt. (lb.)	1986 No.	1986 Avg. Lgth. (in.)	1986 Avg. Wt. (lb.)	1987 No.	1987 Avg. Lgth. (in.)	1987 Avg. Wt. (lb.)	1988 No.	1988 Avg. Lgth. (in.)	1988 Avg. Wt. (lb.)
Sauger	14	12.6	0.50	41	14.4	0.93	6	16.7	1.35	12	14.3	0.89	16	14.8	1.00
Walleye	8	13.6	0.92	6	14.1	0.82	1	18.6	1.90	2	15.6	1.20	3	16.3	2.00
Sh. strug.[1]	30	26.1	2.28	53	27.4	2.70	23	26.9	2.76	20	26.8	2.35	40	27.5	2.40
Rb. smelt	---	---	---	---	---	---	---	---	---	---	---	---	5	6.4	NA
Wht. suck.	17	13.9	1.39	3	13.4	1.39	13	13.7	1.15	10	11.3	0.93	30	12.9	1.30
R. carps.	21	15.9	1.75	25	15.7	2.11	15	15.6	1.70	9	15.3	1.67	10	15.7	2.00
Sht. redh.	3	14.5	1.19	4	14.5	1.87	1	15.6	1.80	4	15.5	1.78	6	15.6	1.80
Goldeye[2]	241	11.9	0.45	187	11.3	0.47	224	11.5	0.54	208	11.4	0.49	150	11.1	0.50
Carp	2	18.5	3.04	5	17.3	2.64	3	17.3	2.33	4	17.2	2.34	2	20.2	3.50
Ln. suck.	1	---	---	---	---	---	1	17.8	2.30	---	---	---	1	16.4	1.90
Ch. cat.	6	18.8	2.10	2	20.2	3.30	5	17.8	1.84	11	17.3	1.88	5	18.8	3.40
Bl. suck.	1	26.8	6.50	---	---	---	---	---	---	---	---	---	1	25.6	5.80
No. pike	4	23.8	3.46	6	26.8	4.16	3	28.9	6.88	---	---	---	3	24.2	4.56
Sm. buff.	1	20.5	4.20	2	18.1	3.91	2	15.7	1.90	1	22.5	6.20	3	17.5	2.90
Burbot	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lk. white.	1	23.0	6.58	---	---	---	---	---	---	---	---	---	2	22.9	4.80
Yel. perch	2	5.9	0.10	8	5.9	0.09	3	6.9	0.15	1	7.1	0.22	1	7.5	0.20
Cisco	---	---	---	4	10.6	0.45	12	13.5	0.86	17	9.9	0.34	25	11.0	0.50
Ch. sal.	---	---	---	---	---	---	1	7.2	0.20	---	---	---	---	---	---
Paddlefish	---	---	---	---	---	---	---	---	---	1	52.0	15.40	---	---	---

[1]Length data in 1981 is based on 66 fish.
[2]Length and weight data based on 122 fish in 1984, 127 in 1985 and 1986, and 126 in 1987, and 62 in 1988.

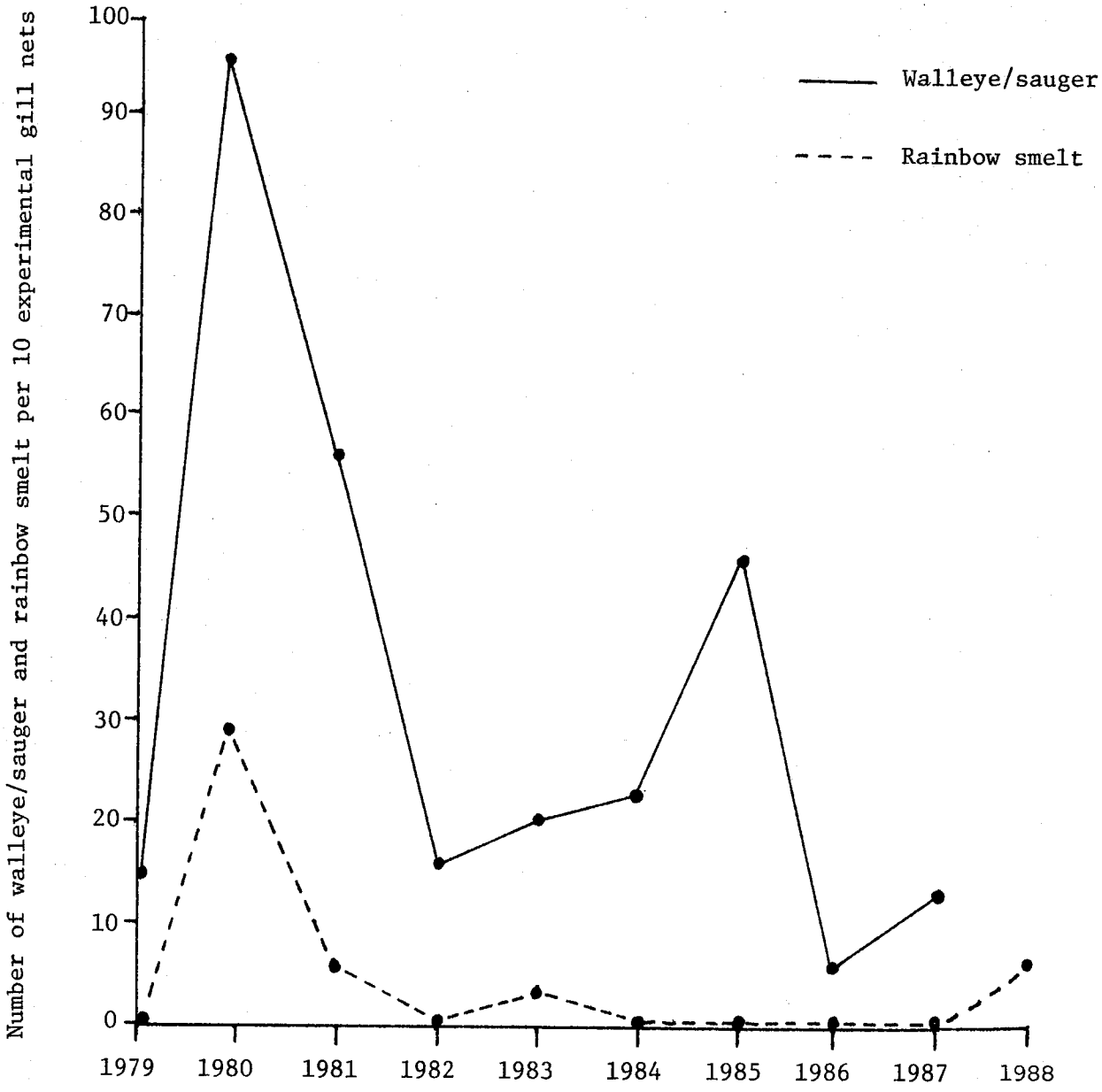

Figure A. An illustration of changes in numbers of walleye and sauger in Fort Peck dredge cuts/tailwater in relation to the catch of rainbow smelt.

observed and recovered from the Fort Peck tailpool during the winter months starting in 1984-85. The cisco catch in experimental gill nets has increased progressively to 12 in 1986 and 17 in 1987. In 1988 the catch was 25 cisco which is the highest to date. Cisco captured in 1988 averaged 11.0 inches in T.L. (range 9.8-15.9 inches T.L.) and 0.5 pounds (range 0.2-1.3 pounds).

Paddlefish

Dredge Cut Complex

Harvest and movement records for tagged paddlefish in the Dredge Cut area and Missouri River below Fort Peck Dam were maintained. No additional paddlefish were tagged in the study area in 1988. This report includes tagging data from work conducted by Ken Frazer in 1984, working on a Corps of Engineers funded study, and tagging work by Bill Gardner and Phil Stewart under Dingell-Johnson Project FW-2-R.

Seven tagged paddlefish were harvested by fishermen during 1988; two by bow and arrow in the dredge cuts where tagging originally occurred and five by snagging at Intake Dam on the Yellowstone River. To date, 123 paddlefish tagged in this study area have been harvested; 62 (50.4%) in the dredge cuts where tagging occurred and 61 (49.6%) in the Yellowstone River, primarily at Intake Dam. During the past seven years of 1982-88, however, 80.0% (44 of 55) of the tag returns for fish tagged in the study area have been harvested in the Yellowstone River.

The harvest rate for paddlefish in this area remains low as summarized in Table 2. The average annual percent harvest rate for 817 fish tagged during 1974-84 varies from 0.0-2.3%. The average annual harvest rate prior to 1974 was 1.0% (Needham, 1985). Paddlefish tagged in the Missouri River outside the Dredge Cuts and downstream from the Milk River also have experienced a low exploitation rate. In this river segment of the study area, 150 paddlefish were tagged during 1979-82 and eight have been returned, representing an average annual harvest varying from 0.0-0.8% after exposure to fishing for 7-10 years. All tag returns from this group of fish have been from the Yellowstone River or the confluence with the Missouri River.

The largest groups of paddlefish tagged in a single season are 189 in 1974, 162 in 1978, and 151 in 1979; and after 15, 11, and 9 years of fishing pressure, all groups have exhibited an average annual harvest rate of 1.3-1.5%. The highest overall harvest rates for any group are 27.5% for 40 fish tagged in 1977, 23.7% for 48 fish tagged in 1976, and 19.9% for 189 fish tagged in 1974.

Fort Peck Reservoir and Missouri River Upstream

Paddlefish tagging and harvest records were maintained, but no additional fish were tagged in 1988. From 1973-86 a total of 497 paddlefish were tagged in this study area. This total includes 191 fish tagged in the upper portion of Fort Peck Reservoir in 1978.

Table 2. A summary of paddlefish tagging and harvest data from the dredge cut complex and Missouri River, 1974-88. Actual tag return rate is given in bold and was derived by adjusting for harvest of tagged fish. All fish were tagged in the dredge cuts except 40 fish in 1979 and all fish in 1980-82 which were tagged in the Missouri River.

Year	No. Tagged	Number Tagged Paddlefish Harvested '74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	Total	% Harvest	Average Annual % Harvest
1974[1]	189	1	5	0	2	4	5	1	4	3	1	3	0	0	2	0	31	19.9	1.3
	186	**0.5**	**2.7**		**1.1**	**2.2**	**2.8**	**0.6**	**2.4**	**1.8**	**0.6**	**1.9**			**1.3**				
1976[2]	48			0	1	1	2	2	1	0	2	0	0	0	0	1	10	23.7	1.8
	47				**2.1**	**2.2**	**4.4**	**4.7**	**2.4**		**5.3**					**2.6**			
1977	40				0	0	3	0	0	0	1	4	0	2	0	0	10	27.5	2.3
							7.5				**2.7**	**11.1**		**6.2**					
1978[3]	162					3	4	3	2	4	2	0	0	2	1	3	24[4]	16.1	1.5
	156					**1.9**	**2.5**	**2.0**	**1.3**	**2.7**	**1.4**			**1.4**	**0.7**	**2.2**			
1979	151						3	3	1	5	2	4	2	0	0	1	21	13.7	1.4
							2.0	**2.0**	**0.7**	**3.5**	**1.4**	**1.9**	**1.5**			**0.7**			
1979	40 (river)						0	0	0	0	0	1	0	0	1	0	2	5.1	0.5
												2.5			**2.6**				
1980	29 (river)							0	1	0	1	0	0	0	0	0	2	7.0	0.8
									3.4		**3.6**								
1981	60 (river)								0	0	2	0	0	1	1	0	4	6.8	0.8
											3.3			**1.7**	**1.8**				
1982	21 (river)									0	0	0	0	0	0	0	0	0	0
1984	77											0	0	2	0	2	4	5.3	1.1
														2.6		**2.7**			

[1]Harvest based on 188 fish beginning in 1979 since one tagged fish found dead; and 187 fish in 1983, 186 fish in 1984, and 185 in 1987 due to removal of tags.

[2]Harvest based on 47 fish beginning in 1978 since one tagged fish found dead.

[3]Harvest based on 161 fish in 1979, 160 in 1980, 158 in 1982, 157 in 1986 and 156 in 1988 due to tagged fish found dead.

[4]Total includes one fish which may have been tagged in 1977.

Seven tagged paddlefish were harvested by snagging in 1988. Three of these were tagged in 1978, two in 1980, and one in 1975 and 1986. Most of the harvest occurs in spring as fish migrate upstream from Fort Peck Reservoir to spawn. However, in 1988 two of the tag returns occurred in September at the Turkey Joe area several miles above Fort Peck Reservoir. Two of the tagged fish harvested in 1988 received radio tag implants in the body cavity in the spring of 1980. Although these radio tags are relatively bulky, measuring approximately 6 inches in length and 1 inch in diameter, the fishermen did not notice the radio tags when cleaning the fish and were totally unaware of their presence when contacted later.

Tag return data reveals a low rate of harvest for this paddlefish population as summarized in Table 3. The average annual rate of harvest varies from 1.3-8.3%. However, the highest harvest rate of 8.3% is based on only two fish tagged in 1983. The tag return rate of 1.3% involves 226 fish tagged in 1978; however, 191 (84.5%) of this total consists of fish tagged in the upper portion of Fort Peck Reservoir from the UL Bend to Beauchamp Bay rather than the river where snagging occurs. The lower tag return rate for paddlefish tagged in the reservoir indicates some fish remain in the reservoir and do not make annual spring migrations into the Missouri River where they are subject to snagging. The 1978 and 1983 tag return rates are extremes, and if excluded, the average annual rate of harvest for eight other groups of tagged fish varies from 1.3-3.3%.

Milk River

The Milk River is 490 miles in length from the Alberta/United States Boundary to the Missouri River. The river is characterized by highly erosive, vertical banks, low gradient, and high turbidity. Thirty-four fish species have been identified but the primary sportfish are walleye and sauger. Sampling of walleye/sauger larvae in the Milk River from 1978 through 1982 revealed successful reproduction (Needham and Gilge, 1979-83). It was unclear, however, how much of the larval fish catch in the upper river was attributable to flushing of larvae into the Milk River from fish hatched in Fresno Reservoir.

An egg basket kick-sampler was used at three locations in the upper river below Fresno Dam to locate walleye/sauger spawning sites. The objective was to determine spawning sites, substrate utilized, depths, and velocity of water over the eggs. This information would be used to predict and/or recommend flows necessary for successful reproduction. Three samples were taken on the first riffle below Fresno Dam on April 7, 14, and 25. Water temperatures ranged from 41^{o}-49^{o}F during this period and flows increased from 33-486 cubic feet per second (cfs). No eggs were sampled in any of the attempts. Samples also taken below the Fort Belknap Diversion Dam, 44 miles downstream from Fresno Dam, and below Paradise Valley Dam, 63 miles downstream from Fresno Dam, contained no eggs. Sampling ceased by April 27 when water temperatures at Paradise Valley Dam reached 57^{o}F and flows increased to 867 cfs.

Table 3. A summary of paddlefish tagging and harvest data from the Missouri River and Fort Peck Reservoir, 1973-88. The actual tag return rate given in bold was derived by adjusting for previous harvest of tagged fish.

Year	No. Tagged	Number Tagged Paddlefish Harvested '73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	Total	% Harvest	Average Annual Harvest
1973	45	0	1 **2.2**	1 **2.3**	0	1 **2.4**	0	1 **2.4**	3 **7.3**	1 **2.6**	0	1 **2.7**	0	0	0	0	0	9	21.9	1.4
1974	55		3 **5.6**	0	1 **1.9**	1 **2.0**	1 **2.0**	0	1 **2.0**	0	1 **2.1**	0	1 **2.1**	1 **2.2**	2 **4.4**	0	0	12	24.3	1.6
1975	29			0	0	1 **3.4**	0	2 **7.1**	0	1 **3.8**	0	0	0	1 **4.0**	0	2 **8.3**	1 **4.5**	8	31.1	2.2
1976	23				1 **4.3**	1 **4.5**	2 **9.5**	0	0	1 **5.3**	0	0	1 **5.6**	0	0	0	0	6	29.2	2.2
1977[1]	60					4 **6.6**	1 **1.8**	0	1 **1.8**	2 **3.6**	0	0	0	1 **1.9**	0	0	0	9	15.7	1.3
1978	226[2]						4 **1.8**	2 **0.9**	1 **0.5**	1 **0.6**	2 **0.9**	1 **0.5**	7 **3.3**	0	8 **3.8**	2 **1.0**	3 **1.5**	31	14.8	1.3
1979	11							0	0	0	0	2 **18.2**	0	0	1 **11.1**	0	0	3	29.3	2.9
1980	33								5 **15.2**	0	2 **7.1**	0	0	0	0	0	2 **7.7**	9	30.0	3.3
1983	2											0	0	0	1 **50.0**	0	0	1	50.0	8.3
1986	13														0	0	1	1 **7.7**	7.7	2.6

[1]Total adjusted for one fish killed by commercial fisherman in August, 1981.
[2]191 tagged in Fort Peck Reservoir from the UL Bend to Beauchamp Bay.

Fresno Reservoir

Fresno Reservoir is a highly fluctuating reservoir of 5,757 surface-acres located on the Milk River 12 miles northwest of Havre. In most years, the demand for irrigation water results in water level fluctuations of 10-25 feet. Systematic gill netting at predetermined stations was conducted in the 1960's and 1970's but was discontinued in 1974. Traditional gill net stations were again utilized in 1987 and 1988 to determine changes in sport fish abundance and species composition. Samples were collected utilizing six experimental gill nets fished overnight.

Lake whitefish, yellow perch, walleye, and northern pike were well represented in the catch (Table 4). Lake whitefish continue to comprise a significant portion of the gill net catch, but are rarely caught by fishermen. The netting also indicated a large northern pike population is present. Other species netted included longnose suckers and black crappie.

The catch of walleye was good and average size was comparable to 1987. Despite a poor young-of-the-year (YOY) beach seining catch, the 1986 walleye year-class was well represented in the 1987 and 1988 gill net catch. However, the 1984 walleye year-class, which produced record numbers of YOY fish in summer beach seining, showed little or no representation in the 1987 and 1988 gill net catch. Recruitment to the adult population appears to be limited by factors other than reproductive success and first summer survival of YOY walleye. Successful recruitment of juvenile walleye to the adult population may be related to winter reservoir storage. Gill netting in 1989 should indicate this relationship since walleye reproduction in 1988 was good, but winter storage was exceptionally low.

Beach seining was conducted at 12 standard sampling sites around the reservoir in a continued effort to evaluate reproductive success of sport fishes and assess forage abundance. The seining results indicate good reproduction of walleye and yellow perch, below average success for emerald shiners, and poor success for northern pike (Table 5). Despite three drought years since 1984, the catch of YOY walleye in the 1980's has been 6.8 fish per haul compared with 2.8 YOY walleye per haul in the 1970's.

Extreme drafting of the reservoir was anticipated and experienced in 1988. A study to determine the effect of extreme drawdowns on sport and forage fish from Fresno Reservoir was initiated in the spring of 1988. A 100-foot x 9-foot x 1/4-inch square mesh seine was utilized to sample a portion of the first major pool below Fresno Dam. A single haul was made in the same area on each sampling date and results tabulated for comparison with reservoir elevation and discharge. One seine haul was made in April, May, and June. When the catch increased in July, hauls were made every 5 to 10 days until the catch declined in August. The catch of walleye, northern pike, and perch was insignificant until July 11 when numbers of all species increased dramatically (Figures B, C, D). The catch of all species declined by

Table 4. A summary of the catch in overnight sinking experimental gill net sets in Fresno Reservoir, 1965-88. Number of nets used varied from four to eight.

Species	Year	Number	Average No. Per. Net Set	Average Length (inches)	Average Weight (weight)	Percent of Total
Lake whitefish	1970	1	0.1	19.9	3.30	0.7
	1971	1	0.2	18.7	2.94	1.2
	1972	4	0.5	17.8	2.35	6.2
	1974	3	0.8	19.5	3.15	8.6
	1987	65	10.8	12.2	0.71	36.1
	1988	55	9.2	17.5	2.45	28.6
Yellow Perch	1969	7	0.9	5.4	0.07	12.3
	1970	20	2.5	6.9	0.16	13.8
	1971	6	1.5	7.6	0.23	7.4
	1972	2	0.3	8.7	0.40	3.1
	1974	2	0.5	5.7	0.09	5.7
	1987	43	7.2	6.2	0.13	23.9
	1988	24	4.0	8.7	0.32	12.5
Walleye	1965	14	0.9	12.4	0.80	17.9
	1966	14	2.3	11.6	0.62	34.2
	1967	11	1.6	12.9	0.88	24.4
	1968	29	3.6	12.3	0.64	56.9
	1969	24	3.0	12.9	0.92	42.9
	1970	95	11.9	14.4	1.16	65.5
	1971	28	7.0	13.6	1.08	34.6
	1972	34	4.3	16.1	1.44	52.4
	1974	22	5.5	15.9	1.35	62.9
	1987	37	6.2	16.7	1.99	20.6
	1988	67	11.2	15.5	1.97	34.9
Northern pike	1965	23	1.6	18.2	1.23	29.5
	1966	6	1.0	20.1	1.68	14.6
	1967	7	1.0	20.6	2.50	15.6
	1968	9	1.1	17.8	1.66	17.6
	1969	9	1.1	19.7	1.88	16.1
	1970	12	1.5	16.3	1.33	8.3
	1971	30	7.5	17.0	1.12	37.0
	1972	5	0.6	17.3	0.93	7.7
	1974	1	0.3	20.6	1.84	2.9
	1987	35	5.8	19.1	1.74	19.4
	1988	46	7.7	20.6	2.85	24.0

Table 5. A summary of forage fish and young-of-year game and sport fish taken with a 100- x 9-foot x 1/4-inch square mesh beach seine in Fresno Reservoir, 1965-88.

Date	No. Seine Hauls	Species and Number								
		Walleye	No. Pike	Yellow Perch	Emerald Shiner	Crappie sp.	Spottail Shiner	Sucker sp.[1]	Minnow sp.[2]	Other[3]
July 1965	7	0	8	0	0	2	0	0	0	0
August 1966	6	0	2	0	0	14	0	0	11	0
August 1967	10	24	5	0	15	19	0	0	276	0
August 1968	12	16	6	2,909	147	552	0	0	161	0
August 1969	12	4	6	1,140	385	67	0	2	380	0
August 1970	12	27	45	10,151	521	883	0	1	122	0
August 1972	12	102	22	1,005	205	379	0	0	72	0
August 1974	12	13	59	1,583	29	1,355	0	0	25	0
August 1975	11	10	32	4,154	155	59	0	0	0	0
August 1978	12	22	42	10,684	12	3	0	0	0	0
August 1979	12	29	45	8,516	340	127	0	1	0	1
August 1982	12	102	70	8,993	121	166	0	0	0	3
August 1983	12	23	0	2,254	448	9	0	1	7	0
August 1984	12	247	0	197	375	0	2	40	55	0
August 1985	12	64	0	379	684	3	2	0	9	0
August 1986	12	0	23	3,077	142	2	20	1	5	1
August 1987	12	80	113	6,233	1,979	7	3	0	3	0
August 1988	12	53	4	3,122	182	0	20	0	1	0

[1]Consists of white and longnose suckers.
[2]Consists of silvery minnows, lake chubs, flathead chubs, and fathead minnows.
[3]Consists of burbot, smallmouth bass, and brook sticklebacks.

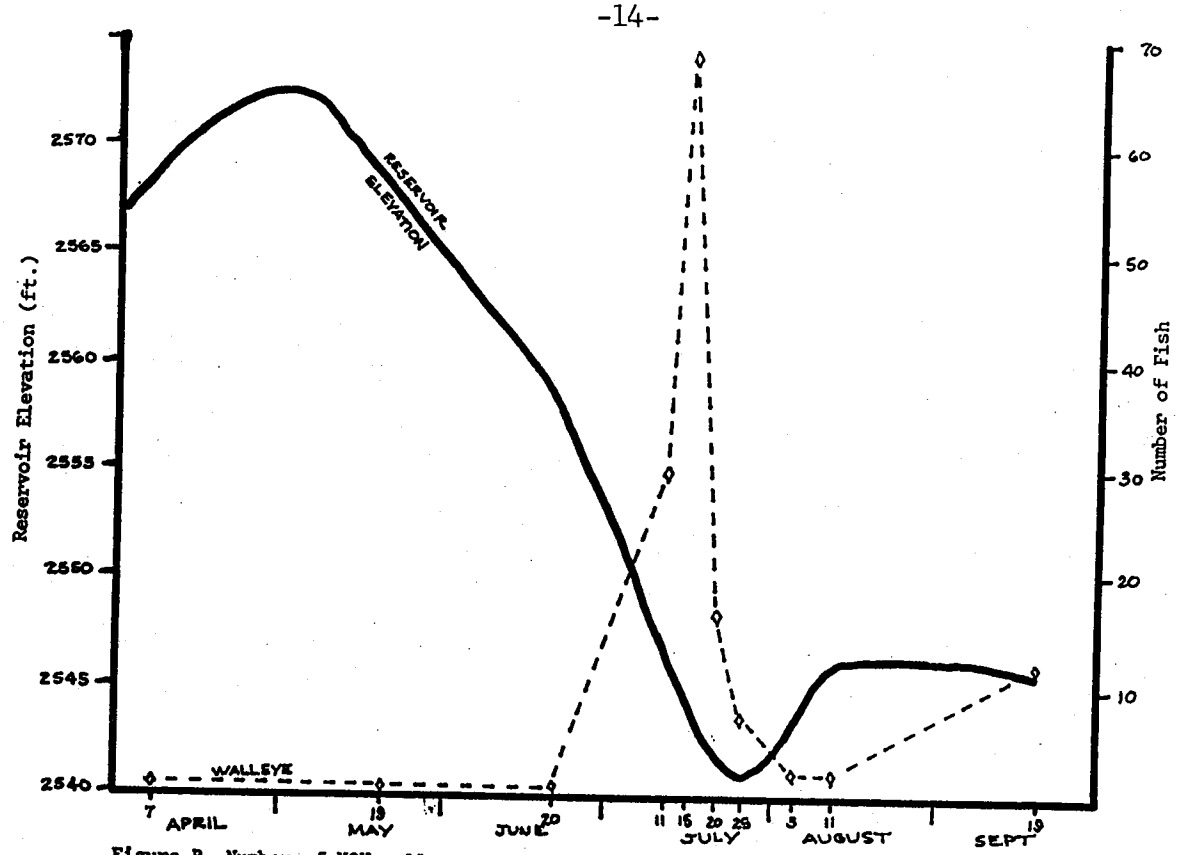

Figure B. Number of YOY walleye sampled by beach seining below Fresno Dam and Fresno Reservoir water elevations, April through September, 1988.

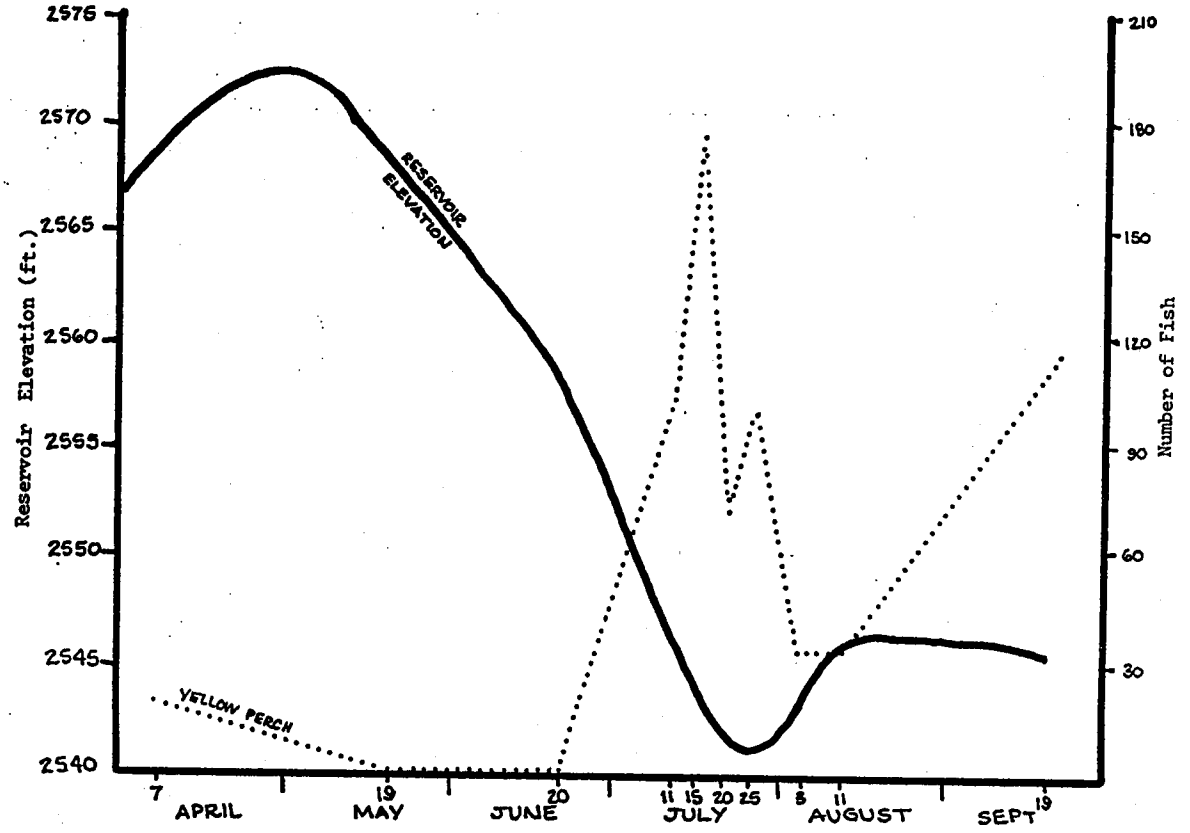

Figure C. Number of yearling and older yellow perch sampled by seining below Fresno Dam and Fresno Reservoir water elevations, April through September, 1988.

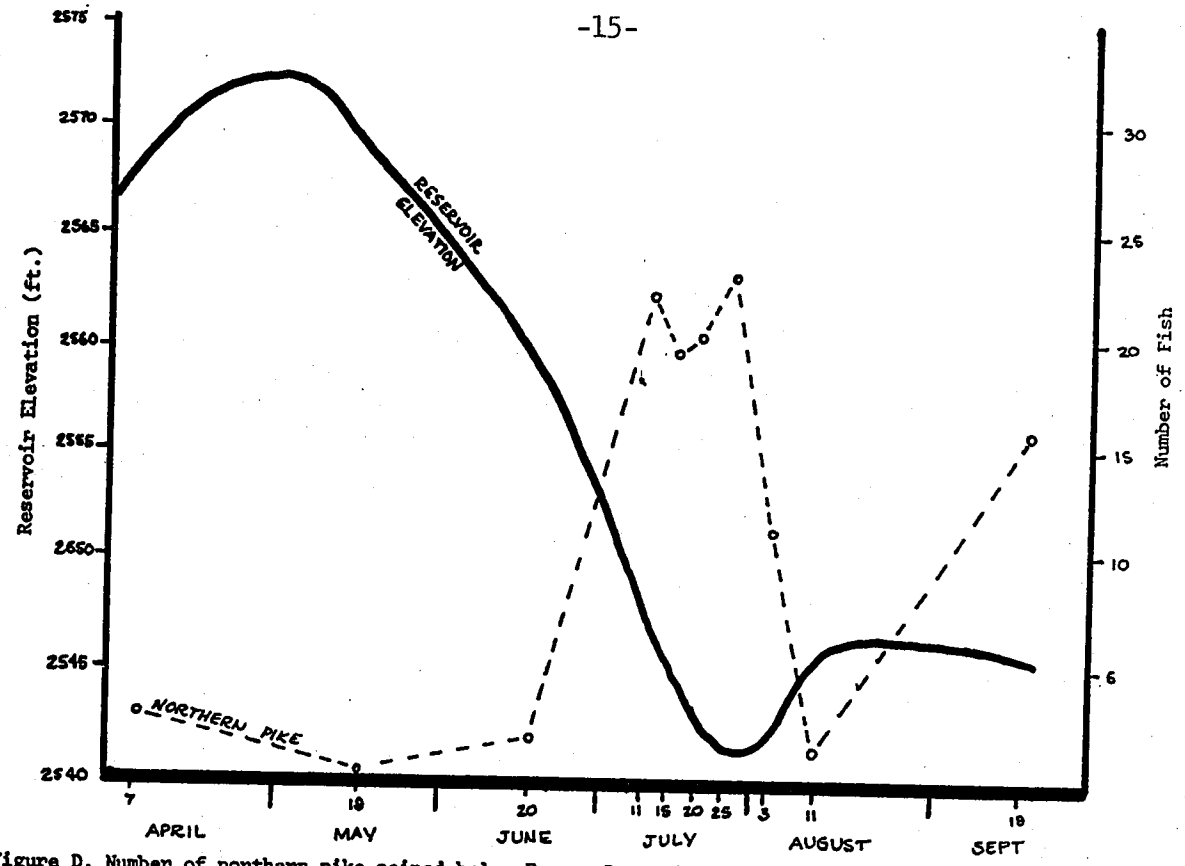

Figure D. Number of northern pike seined below Fresno Dam and Fresno Reservoir water elevations, April through September,1988.

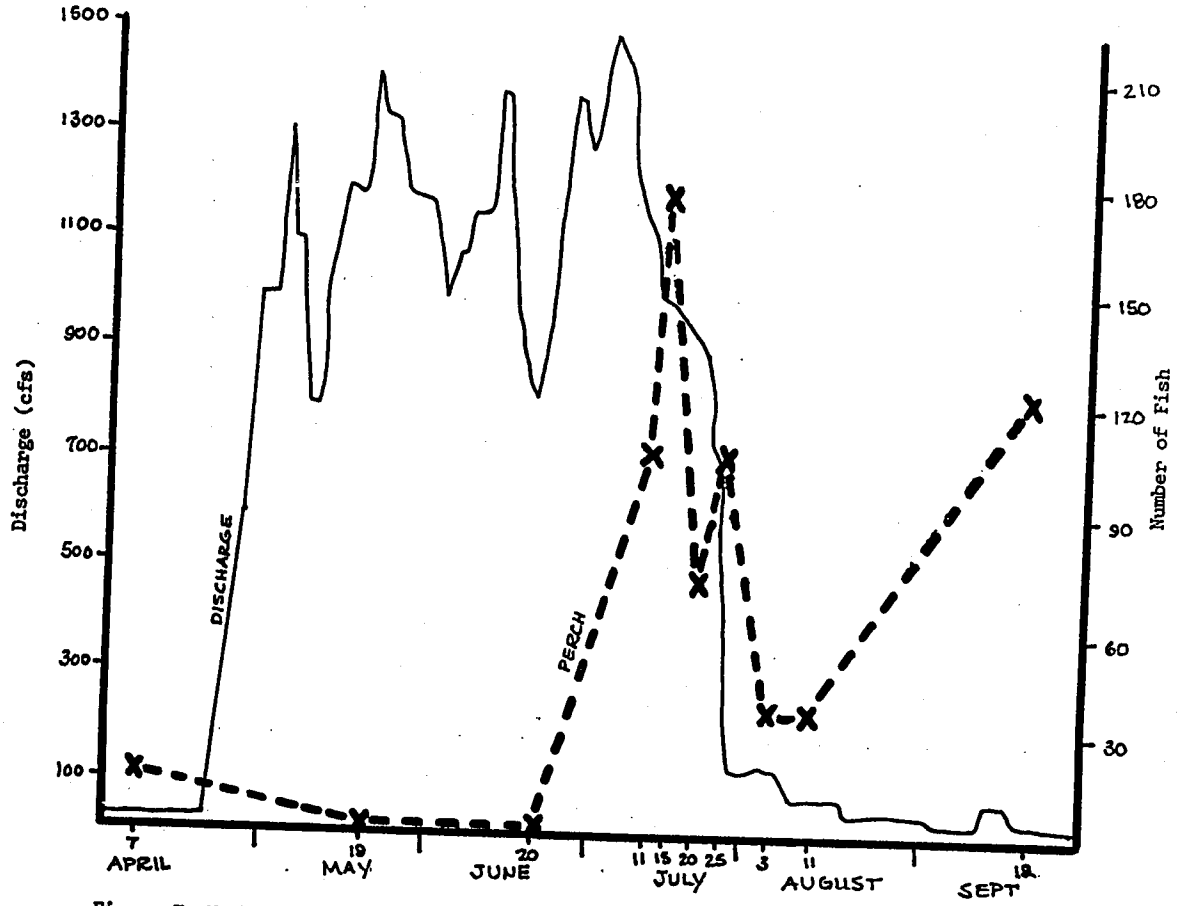

Figure E. Number of yearling and older yellow perch seined below Fresno Dam plotted against Fresno Reservoir discharge,April through September,1988.

early August. Initial fish emigration from the reservoir appeared to be correlated with reservoir elevations between 2552 and 2548 msl. An additional sample taken about July 1 would have helped define the elevation at which significant fish emigration commenced. Fish numbers immediately below the dam were judged to be a function of reservoir level and fish emigration. Walleye YOY were not large enough to be captured by seining until July. However, Age I+ and older yellow perch and northern pike were seinable throughout the sampling period and exhibited similar catch curves.

The catch did increase slightly again in fall which is believed to be due to repositioning of fish in the river. The best habitat for overwintering is located immediately below the dam. The increase in the September catch may also be due to an increase in discharge several days prior to sampling. There appears to be no simple correlation between discharge rate and emigration of fish (Figure D) though at reduced reservoir levels it is probably a major factor in rate of fish loss.

Nelson Reservoir

This reservoir is utilized by the Bureau of Reclamation for off-stream storage of irrigation water. At full storage capacity, it covers approximately 4,500 surface acres, but reservoir levels have fluctuated dramatically during the last 10 years. Extreme drought conditions reduced the reservoir to its conservation pool of 1,700 surface acres in three of the last five years.

Beach seining was conducted in July at seven sites on the reservoir, encompassing 520 feet of shoreline (Table 6). Aquatic vegetation hampered seining efforts considerably. The sport fish YOY catch consisted of 783 yellow perch. No YOY northern pike or walleye were captured. Other forage species sampled in decreasing order of abundance were spottail shiner, white sucker, and crappie sp.. Spottail shiners have expanded their numbers greatly since introduction in 1984. Over 20,000 adult spottails were seined from an irrigation ditch outflowing from Nelson Reservoir in the fall of 1988.

In mid-October, approximately 1.0 mile of shoreline adjacent to the state park was electrofished after dark with a boom-rigged AC shocking boat. A single pass down this shoreline was accomplished in 35 minutes and yielded one YOY walleye and seven yearlings. A total of 743 stocked fingerlings were marked by fin-clipping in 1987, but none of these yearling walleye were captured in 1988. Walleye were found over clear sandy or gravel bottoms in water less than 3 feet deep. Due to the extremely low water level and dense weed growth, clear shallows were difficult to locate. Visibility was also obscured due to an unusually heavy lake fall algal bloom. Despite poor sampling conditions, this technique has demonstrated significantly higher catch-per-unit-effort (CPUE) for walleye than either beach seining or 1/2-inch monofilament gill nets. Despite a supplemental plant of 400,000 walleye fry in 1988, a good year-class did not develop.

Table 6. A summary of walleye, yellow perch, and northern pike young-of-year captured by beach seining in Nelson Reservoir, 1974-88.

Year	Shoreline Seined (ft.)	Walleye No.	Walleye No./1,000 (ft.)	Yellow Perch No.	Yellow Perch No./1,000 (ft.)	No. Pike No.	No. Pike No./1,000 (ft.)
1974	1,590	36	22.6	1,365	860	0	0.0
1975	1,845	112	60.5	3,008	1,630	0	0.0
1976	1,590	119	74.8	74	50	1	0.6
1977	1,740	1	0.6	2,939	1,690	0	0.0
1978	870	428	492.0	6,568	7,550	0	0.0
1979	1,530	23	15.0	1,832	1,200	2	1.3
1980	- - - - - - - - - - no seining conducted - - - - - - - - - -						
1981	615	31	50.6	8,859	14,400	1	1.6
1982	660	0	0.0	4,553	6,898	3	5.0
1983	1,420	4	2.8	138	100	18	12.7
1984	1,530	0	0.0	133	87	0	0.0
1985	510	3	6.0	2,272	4,455	16	31.4
1986	700	0	0.0	3	4	7	10.0
1987	495	5	10.1	1,987	4,014	0	0.0
1988	520	0	0.0	783	1,506	0	0.0

Kuhr Reservoir

This 25-acre reservoir is located 15 miles south of Chinook on private land. For many years the reservoir provided good trout fishing for a private fishing club until white suckers appeared in the early 80's. The sucker population expanded and trout growth and survival became poor. The landowner did not want the reservoir chemically treated but desired to provide some kind of fishing opportunity. The Department of Fish, Wildlife and Parks agreed to develop a perch/crappie fishery in exchange for public use of the reservoir.

The reservoir also contains a variety of forage fish consisting of fathead minnows, brook sticklebacks, silvery minnows, lake chubs, Iowa darters, and northern redbelly dace. Adult yellow perch were stocked in April of 1987 at a rate of 55/acre. Adult crappie were planted simultaneously at a rate of 8/acre. Both species spawned successfully in 1987 and 1988. The reservoir contained significant forage but over-population of perch and crappie was anticipated in the absence of predators. Northern pike are usually chosen to control panfish populations but problems with sporadic or excessive reproduction occur regularly, creating frequent imbalances. Utilizing a sexually sterile predator, such as the tiger musky, was selected as a possible

management tool. Tiger musky were stocked in 1987 and 1988 for panfish control and to reduce some of the variability involved with northern pike reproduction. The original introduction of tiger musky in 1987 was made from 2-inch fingerlings obtained from Pennsylvania. Tiger musky were stocked at a rate of 27/acre in 1987 and 22/acre in 1988. The 1987 plant had some survival, however, the 1988 plant was apparently unsuccessful. A beach seine, electrofishing boat, and frame traps were utilized unsuccessfully to sample Age 0 and Age I muskies. Gill nets were successful, but mortality of muskies was over 50%. Three tiger muskies were netted in the fall of 1987 and 15 in 1988. By fall of 1987, the muskies averaged 14.8 inches TL and 0.70 pounds. The 1987 year-class averaged 24.4 inches TL and 3.37 pounds in the fall of 1988. Stomach analysis of Age I muskies indicated a preferred prey size of 8- to 10-inch white suckers and perch.

It appears that predation on the target panfish (subcatchables) occurs primarily during the first year of musky growth. Age II muskies may prey excessively on larger panfish and thereby lose their usefulness as a management tool. Developing a suitable density of muskies may be a secondary problem as these fish are generally solitary and territorial in nature. To put greater pressure on the smaller forage and panfish, 6-inch walleye fingerlings were planted at a rate of 28/acre in 1988. Adult walleye are not expected to prey excessively on catchable crappie and perch since natural reproduction is not expected and the walleye population can be controlled by stocking.

Beaver Creek Reservoir

This 200-acre reservoir has a maximum depth of 90 feet and has provided a rainbow trout fishery of varying success since it's initial filling in 1975. It's proximity to the city of Havre makes this reservoir a valuable local resource and it has been managed intensively in recent years with a variety of species. In the early 1980's largemouth bass were introduced to help curb excessive sucker numbers and provide an additional sportfish. Although bass reproduction has been documented, largemouth bass have not contributed significantly to the fishery. Soon after bass introductions were made, northern pike appeared from an illegal introduction. The northern pike population increases steadily and peaked in 1987. No natural reproduction was documented in 1988. Yellow perch were found in the reservoir in 1986 and good reproduction was observed in 1987.

Walleye were stocked in 1987 due to local demand. The walleye management plan included three consecutive years of fry stocking followed by two non-stocking years to evaluate natural reproduction. An introductory plant of walleye was made in the spring of 1987 with 50,000 fry. This was followed by a fall plant of 322 marked fingerlings. Eleven fish of the 1987 year-class were subsequently sampled in 1988 of which four were marked. Using the modified Peterson formula, the 1987 year-class, as of fall 1987, was estimated at 775 walleye $\pm$310 fish. A plant of 100,000 fry was made in 1988 along with 193 marked fingerlings. Insufficient numbers of the 1988 year-class were sampled to make an estimate.

Beach seining had low success in capturing YOY walleye in this reservoir. However, night electrofishing appeared to be a viable technique for sampling both YOY and yearling walleye. Beach seining results since 1985 indicate the primary forage base of white suckers is quickly being replaced by yellow perch (Table 7). Emerald and spottail shiners have been introduced in the last two years to diversify forage, but no reproduction has been documented to date.

Table 7. A summary of forage fish taken by beach seining from Beaver Creek Reservoir, 1985-88.

Date	No. Hauls	Species[1] WSU/LSU	YP	LK CH	FTHD MIN	S/P MIN	ID	EM SH	SP SH
9/14/85	5	2,535	0	7	0	0	11	0	0
6/16/86	4	3,110	0	1	0	0	2	0	0
8/19/87	6	969	2,281	2	1	2	72	1	0
8/23/88	6	54	4,401	0	0	0	4	0	1

[1] WSU/LSU - white/longnose sucker; YP - yellow perch; LK CH - lake chub; FTHD MIN - fathead minnow; S/P MIN - silvery/plains minnow; ID - Iowa darter; EM SH - emerald shiner; SP SH - spottail shiner

RECOMMENDATIONS

Continued gill-net sampling is recommended in the Dredge Cuts study area to acquire information on the status of sport and forage fish. The Corps of Engineers has proposed ten scenarios to increase hydropower at Fort Peck Dam consisting of reregulating dams, afterbays, off-stream storage, and higher unregulated flows producing greater daily fluctuations which would impact fish movement and habitat.

Efforts to maintain records on harvest and movement of existing tagged paddlefish should continue. Low harvest rates occur in both study areas and no major emphasis on additional tagging is recommended for the immediate future. Fishing pressure and harvest during 1986 in the study area involving upper Fort Peck Reservoir and Missouri River upstream were comparable to 1973-78, and creel census efforts are recommended at 4- to 5-year intervals to provide harvest data for management needs. A snagging fishery has developed in the Frazer area on the Missouri River below Fort Peck Dam and this may merit creel census efforts in the future.

All phases of paddlefish investigations downstream from Fort Peck Dam will provide valuable information to address potential impacts associated with the Corps of Engineers' proposals to develop additional hydropower at Fort Peck Dam. New hydro projects would increase peaking power capacity and river stage fluctuations, and/or involve construction of a reregulating dam which could block paddlefish access to the upper dredge cuts.

Attempts to locate walleye/sauger spawning sites in the Milk River should continue. Different techniques may be required due to high April streamflows, which make egg basket kick sampling impossible.

Standardized late summer seining to assess sport fish reproduction and forage fish abundance should be continued at Fresno Reservoir. Sampling of adult sport fishes should be continued utilizing fall gill netting to gather recruitment information relating to YOY walleye abundance and winter reservoir water levels. Periodic beach seining should continue below Fresno Reservoir to determine critical reservoir water levels as they relate to fish emigration. Fresno reservoir has a mean storage ratio of 0.37. Studies done in Kansas (Willis and Stephen, 1985) showed little walleye fry stocking success in reservoirs having mean storage ratios less than 1.00. Due to the excellent natural reproduction of walleye that consistently occurs in Fresno Reservoir and its mean storage ratio, supplemental stocking would not be expected to significantly benefit the walleye population.

Traditional beach seining locations are becoming unusable at Nelson Reservoir due to expansion of aquatic vegetation. Electrofishing after dark proved successful in 1987 and 1988 for sampling YOY and yearling walleye and should be continued. Walleye reproduction has been inconsistent in recent years. The increase in aquatic vegetation is indicative of a siltation problem which may be affecting spawning substrate. The addition of new artificial spawning beds should be investigated and supplemental fingerling stocking is recommended following years of poor walleye reproduction.

Raising tiger muskies in-state to a larger size for stocking would provide increased survival rates and help predict suitable stocking rates for waters such as Kuhr Reservoir. A minimum size restriction and strict creel limit should be placed on tiger muskies in Kuhr Reservoir to restrict harvest to only larger trophy fish. Occasional walleye/sauger plants should be made as needed to assist in controlling panfish numbers.

Walleye fry stocking success should continue to be evaluated at Beaver Creek Reservoir. Fingerling plants were much more successful than fry stockings and should be considered in lieu of future fry plants. Evaluating reproduction of other sport and forage fish should continue.

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Waters Referred to:

16-5140 Ft. Peck Reservoir
16-2500 Missouri River Sec. 05
16-2520 Missouri River Sec. 06
15-2760 Milk River Sec. 03
15-2800 Milk River Sec. 04
15-5240 Fresno Reservoir
15-6480 Nelson Reservoir
15-5880 H.C. Kuhr Reservoir
15-4570 Beaver Creek Reservoir

Key words or fish species:

paddlefish, harvest, cisco, smelt, walleye, water levels, tiger musky, stocking