MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: MONTANA PROJECT TITLE: STATEWIDE FISHERIES INVESTIGATIONS

PROJECT NO: F-46-R-3 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, 1989 THROUGH JUNE 30, 1990

ABSTRACT

Gill netting in the Fort Peck dredge cuts/tailwater produced increased catches of walleye, sauger, and cisco. Rainbow smelt were relatively sparse in 1990, but the cisco catch increased for the fifth consecutive year. The presence of cisco in this area may be affecting the relationship between smelt occurrence and walleye/sauger abundance. 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. Gill netting in Fresno Reservoir produced good catches of lake whitefish, walleye, and northern pike. Yellow perch, however, were absent for the first time from the catch. Beach seining indicated good reproductive success for walleye and northern pike. The catch of young-of-the-year (YOY) yellow perch was 2.5 times greater than the highest recorded catch since 1968. Sampling of Age I walleye indicated a relationship between overwinter storage and recruitment. Emigration of fish from Fresno Reservoir was monitored and was determined to be minimal in relation to 1988 levels. Beach seining at Nelson Reservoir indicated a good year-class of walleye was produced but it is unknown what contribution supplemental fingerling stocking may have contributed. Growth of tiger musky in Kuhr Reservoir has been good, but post stocking mortality of small fingerlings was very high in 1988 and 1989. Walleye stocking in Beaver Creek Reservoir has been marginally successful. Growth rates of walleye are consistent with other regional populations. Numbers of suckers have been significantly reduced by predation, and yellow perch are expected to become the major forage fish for northern pike and walleye. Successful reproduction of spottail shiners was documented in 1989. The bass population in Reser Reservoir has flourished under a restrictive 2-fish limit. The average size of largemouth bass increased at Atlas Reservoir, but quantitative population data could not be obtained.

Management recommendations for all waters are presented.

OBJECTIVES AND DEGREE OF ATTAINMENT

Job objectives: (streams)

1) To ensure within hydrologic constraints that streamflows do not fall below 1975-85 averages. Objective accomplished using state funding.

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 in the East Fork Poplar River 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 1990-91.

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 boom-rigged electrofishing boat was employed to sample adult and juvenile fish in Reser, Nelson, and Beaver Creek Reservoirs. A backpack electrofishing unit was used at Reser Reservoir to conduct shoreline sampling of YOY largemouth bass. A car counter and periodic counts of fishermen per vehicle were used to estimate fishing pressure at Reser Reservoir.

RESULTS AND DISCUSSION

Fort Peck Dredge Cuts and Tailwater

Fish population sampling continued in the Fort Peck dredge cut and tailwater complex in August, 1989, utilizing 10 experimental gill nets set overnight. This netting effort was initiated in 1979 to obtain information on the overall fish population due to potential impacts associated with a Corps of Engineers proposal to construct additional hydropower facilities which included a reregulation dam eight miles downstream from Fort Peck Dam. An additional objective is to evaluate the abundance of game fish in relation to cisco and rainbow smelt numbers.

Sauger and walleye are the most popular sport fish species in this area. The combined catch for sauger and walleye increased in 1989 and was the highest recorded in comparison to previous years of 1982-88 (Table 1). The highest catch recorded for sauger and walleye occurred in 1980 and 1981, and was believed to be associated with a migration of rainbow smelt from Lake Sakakawea, North Dakota. The relationship of sauger/walleye and smelt abundance is illustrated in Figure A.

Table 1. A summary of the catch from ten 125-foot experimental gill net sets in the Fort Peck dredge cut/tailwater area, 1979-89.

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. sturg.[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. carpsk.	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			1985			1986			1987			1988			1989		
	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.)	No.	Avg. Lgth. (in.)	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	39	15.9	1.06
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	7	14.9	1.18
Sh. sturg.[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	27	27.6	2.29
Rb. smelt	---	---	---	---	---	---	---	---	---	---	---	---	5	6.4	NA	4	6.4	0.33
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	34	12.9	0.92
R. carpsk.	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	12	15.8	1.65
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	11	13.7	1.22
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	158	11.2	0.38
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	5	19.5	3.79
Ln. suck.	1	---	---	---	---	---	1	17.8	2.30	---	---	---	1	16.4	1.90	4	7.3	0.48
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	74	17.2	1.68
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	1	28.0	4.69
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	2	19.8	9.13
Bm. Buff	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	16.0	2.07
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	62	9.1	0.22
Ch. sal.	---	---	---	---	---	---	1	7.2	0.20	---	---	---	---	---	---	---	---	---
Paddlefish	---	---	---	---	---	---	---	---	---	1	52.0	15.40	---	---	---	1	54.0	31.94

[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, 126 in 1987, 62 in 1988, and 127 in 1989.

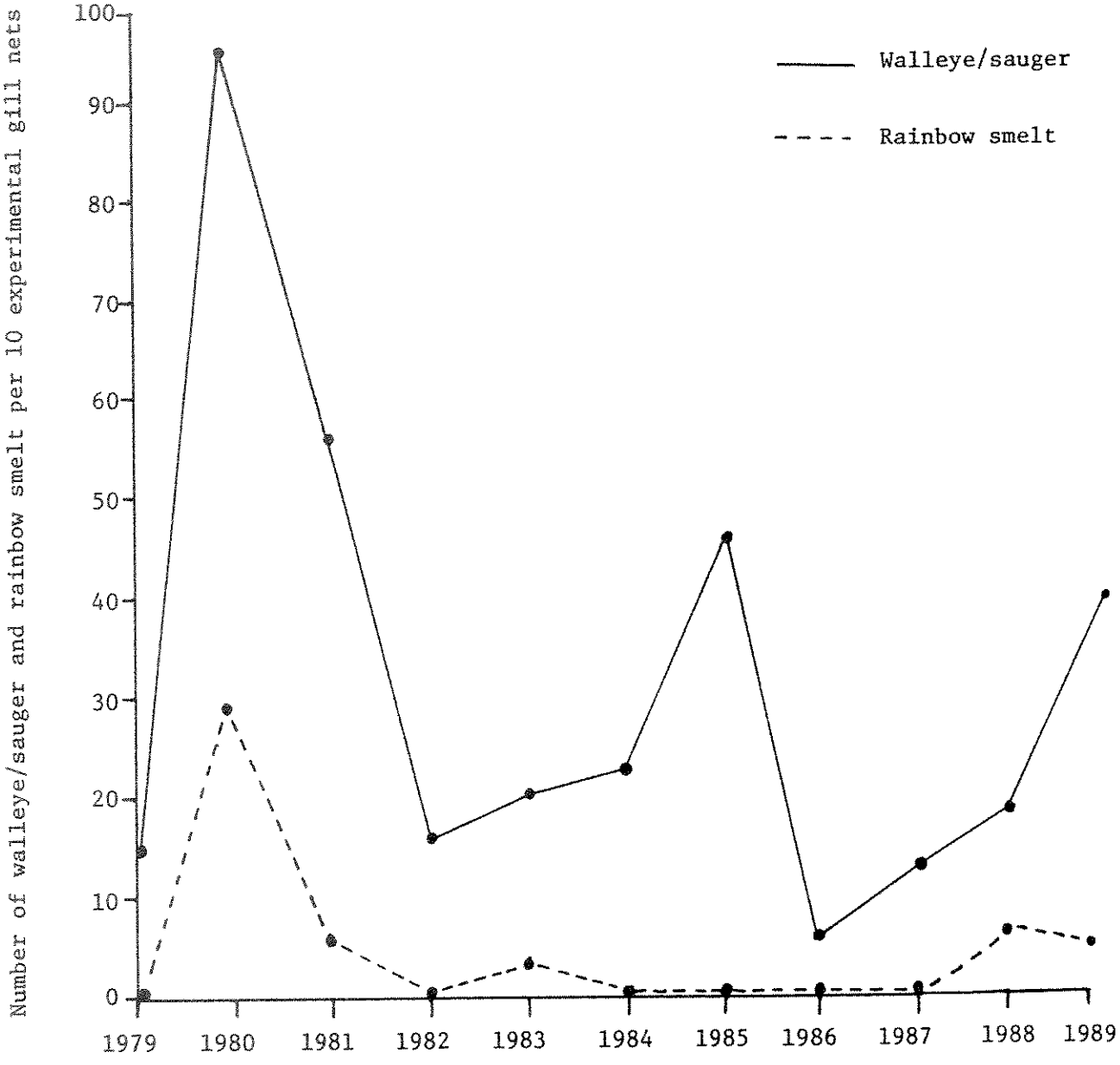

Figure A. An illustration of changes in numbers of walleye and sauger in Fort Peck dredge cuts/tailwater in relation to the catch of rainbow smelt.

Smelt abundance was moderate to low in 1989. Four smelt were taken in experimental gill nets in 1989; whereas, five smelt were taken in these same sets in 1988, but none during 1984-87. Four 100- x 8-foot monofilament gill nets with 1/2-inch square mesh were also set overnight since nets of this design have been effective for sampling smelt in the past. These monofilament nets captured only four smelt in 1989. The highest previous catch from monofilament nets was 41 and 39 in 1988 and 1981, respectively. The mean total catch from these four nets during 1981-88 was 11.7 smelt.

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 observed in the Fort Peck tailpool area on several occasions. The cisco catch in 1989 was 62, which is the highest to date. The cisco catch has increased progressively from 4 in 1985, 12 in 1986, 17 in 1987, and 25 in 1988. The increase in cisco may have affected the relationship between walleye/sauger and smelt that is presented in Figure A.

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 1989. 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.

Eleven tagged paddlefish were harvested by fishermen during 1989; three by bow and arrow in the dredge cuts where tagging originally occurred and eight by snagging at Intake Dam on the Yellowstone River. To date, 134 paddlefish tagged in the study area have been harvested; 65 (48.5%) in the dredge cuts where tagging occurred and 69 (51.5%) in the Yellowstone River, primarily at Intake Dam. During the past eight years of 1982-89, however, 78.8% (52 of 66) of the tag returns for fish tagged in the study area have been harvested in the Yellowstone River. This is due in part to the higher fishing pressure at Intake Dam, but also reveals a high rate of paddlefish mobility and interchange between the Missouri and Yellowstone Rivers.

The harvest rate for paddlefish in this area remains low as summarized in Table 2. The average annual percent harvest for 817 fish tagged during 1974-84 varies from 0.7-2.1%. 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 12 have been returned, representing an average annual harvest rate varying from 0.7-1.2% after exposure to fishing from 8-11 years. All tag returns from this group of river-tagged fish have been from Intake Dam, Yellowstone River, or its confluence with the Missouri River.

Table 2. A summary of paddlefish tagging and harvest from the dredge cut complex and Missouri River, 1974-89. 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	'89	Total	% Harvest	Average Annual % Harvest
1974[1]	189	1	5	0	2	4	5	1	4	3	1	3	0	0	2	0	1	32	20.5	1.3
	185	0.5	2.7		1.1	2.2	2.8	0.6	2.4	1.8	0.6	1.9			1.3		0.6			
1976[2]	48			0	1	1	2	2	1	0	2	0	0	0	0	1	0	10	23.7	1.7
	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	0	10	27.5	2.1
							7.5				2.7	11.1		6.2						
1978[3]	162					3	4	3	2	4	2	0	0	2	1	3	3	27[4]	18.4	1.5
	156					1.9	2.5	2.0	1.3	2.7	1.4			1.4	0.7	2.2	2.3			
1979	151						3	3	1	5	2	4	2	0	0	1	3	24	16.0	1.5
							2.0	2.0	0.7	3.5	1.4	1.9	1.5			0.7	2.3			
1979	40 (river)						0	0	0	0	0	1	0	0	1	0	1	3	7.7	0.7
												2.5			2.6		2.6			
1980	29 (river)							0	1	0	1	0	0	0	0	0	0	2	7.0	0.7
									3.4		3.6									
1981	60 (river)								0	0	2	0	0	1	1	0	1	5	8.6	1.0
											3.3			1.7	1.8		1.8			
1982	21 (river)									0	0	0	0	0	0	0	2	2	9.5	1.2
																	9.5			
1984	77											0	0	2	0	2	0	4	5.3	0.9
														2.6		2.7				

[1]Harvest based on 188 fish beginning in 1979 since one tagged fish found dead; 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.

The largest groups of paddlefish tagged in a single season are 189 in 1974, 162 in 1978, and 151 in 1979. After 16, 12, and 11 years of fishing pressure, these groups have exhibited an average annual harvest rate of 1.3-1.5%, and the overall harvest rate ranges from 16.0-20.5%. 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 20.5% 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 1989. 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.

Six tagged paddlefish were harvested by snagging in 1989. Two of these were tagged in 1978, two in 1979, and two in 1980. Most of the harvest occurs in the spring as fish migrate upstream from Fort Peck Reservoir to spawn, but some fish are also caught in the fall.

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 1.2-7.1%. However, the highest rate of 7.1% is based on only two fish tagged in 1983. The next highest annual harvest rate is 4.9% and 3.8% for fish tagged in 1979 and 1980, respectively.

In 1978, 226 fish were tagged, including 191 (84.5%) tagged in the upper portion of Fort Peck Reservoir near Beauchamp Bay. These fish have exhibited a lower tag return rate than fish tagged in the river, which indicates some fish remain in the reservoir and do not make annual spring migrations into the river where they are subject to snagging.

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 temporarily discontinued in 1974. Traditional gill-net stations have been sampled since 1987 to determine changes in sport fish abundance and species composition. Samples were collected utilizing six experimental gill nets fished overnight.

Lake whitefish, 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. Netting indicated a reduction from the large northern pike population present in 1988. No yellow perch were captured in 1989. Adult yellow perch have never been sampled in large numbers but this is the first time since 1969 they were not represented in the catch. The only other

Table 3. A summary of paddlefish tagging and harvest data from the Missouri River and Fort Peck Reservoir, 1973-89. The actual tag return rate given in bold was derived by adjusting for previous harvest of tagged fish.

Year	No. Tag.	Number Tagged Paddlefish Harvested '73	'74	'75	'76	'77	'78	'79	'80	'81	82	'83	'84	'85	'86	'87	'88	'89	Total	% Har.	Avg. Ann.% Har.
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	0	9	21.9	1.3
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	0	12	24.3	1.5
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**	0	8	31.1	2.1
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	0	0	6	29.2	2.1
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	0	9	15.7	1.2
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**	2 **1.0**	33	15.8	1.3
1979	11							0	0	0	0	2 **18.2**	0	0	1 **11.1**	0	0	2 **25.0**	5	54.3	4.9
1980	33								5 **15.2**	0	2 **7.1**	0	0	0	0	0	2 **7.7**	2 **8.3**	11	38.3	3.8
1983	2											0	0	0	1 **50.0**	0	0	0	1	50.0	7.1
1986	13														0	0	1 **7.7**	0	1	7.7	1.9

[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.

Table 4. A summary of the catch in overnight sinking experimental gill net sets in Fresno Reservoir, 1965-89. Number of nets used varied from four to eight.

Species	Year	Number	Average No. Per. Net Set	Average Length (inches)	Average Weight (pounds)	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
	1989	22	3.7	14.4	1.06	30.1
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
	1989	0	----	----	----	0.0
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
	1989	32	5.3	14.6	1.14	43.8
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
	1989	19	3.2	21.6	2.74	26.0

specie netted was longnose suckers in low numbers. The catch of walleye was good, though below numbers sampled in 1988. The 1987 year-class dominated the catch. Average size of the 1989 catch is indicative of the preponderance of this group in the sample.

In 1988, a possible correlation between winter reservoir storage and walleye YOY carryover was observed (Needham and Gilge, 1989). It was theorized that low overwinter storage may be a limiting factor in recruitment of YOY walleye to the population, regardless of how strong a year-class is initially produced. Good walleye reproduction in 1988 and very low overwinter water levels in 1988-89 provided an opportunity to test this theory. No fish from the 1988 year-class were captured by gill netting in 1989 despite good numbers of YOY present in late summer of 1988. A review of YOY walleye numbers and subsequent recruitment at Age I from the 1986 year-class seems to indicate conversely that even a poor walleye year-class will recruit to the population at Age I given suitable overwinter water levels (Figure B). The years 1986-88 exhibited three different scenarios which show the possible affect overwinter water levels may have on walleye recruitment. In 1986, no YOY walleye were captured by beach seining, but recruitment at Age I, evidenced by gill-netting, was good as were overwinter water levels. In 1987, the YOY walleye catch was good and these fish recruited well the following year with good overwinter storage. In 1988, good walleye reproduction was followed by very low reservoir levels through the winter and few, if any, of these fish survived to be gill-netted in 1989.

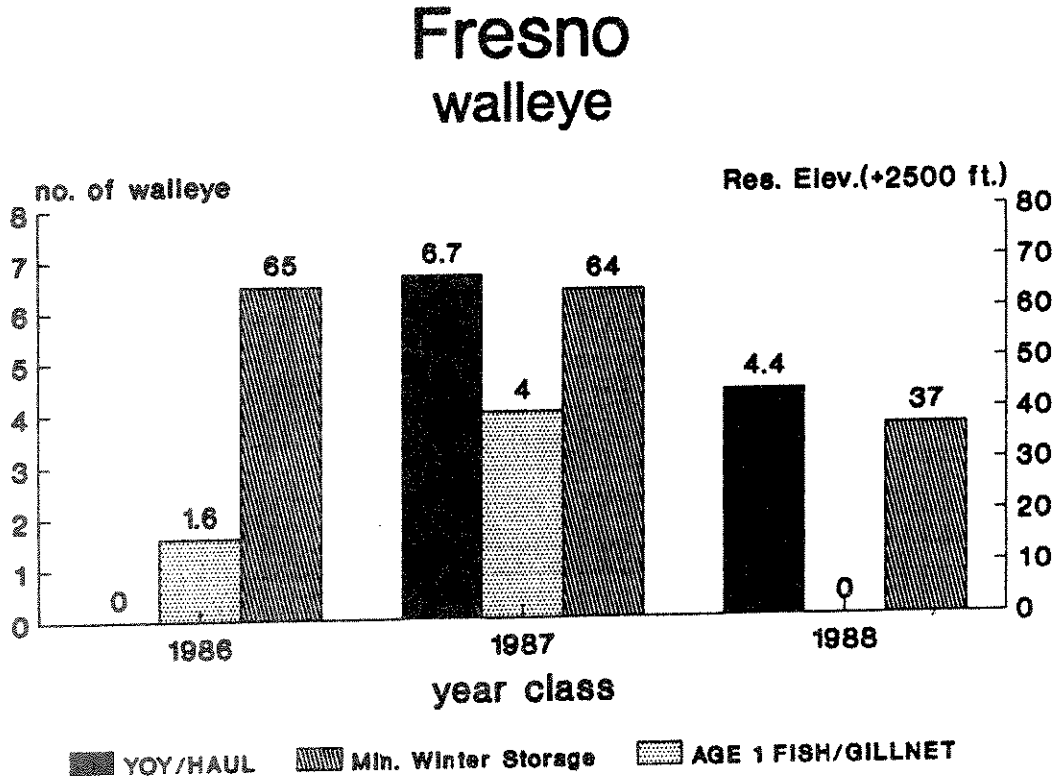

Figure B. Relationship of YOY walleye survival to age I and over-winter water levels in Fresno Reservoir, 1986-1989.

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 northern pike, and below average success for emerald shiners (Table 5). Yellow perch were found in great abundance with a total catch of 24,706. The catch was 2.5 times greater than the highest recorded catch in the last 15 years when sampling was conducted. Optimum spawning conditions are believed responsible as gill netting indicated a very low adult perch population. Spottail shiners continue to comprise a portion of the minnow forage base, but have not proliferated as expected.

A study to determine the effect of drawdown and discharge on sport and forage fish from Fresno Reservoir was begun in 1988 and continued in 1989. A 100-foot 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. The number of fishes taken was compared to reservoir elevation and discharge. Extreme drawdown of the reservoir occurred in 1988 with a significant discharge of fish occurring as reservoir elevation reached approximately 2,550 msl. The number of fish caught increased as reservoir levels dropped rapidly to near dead storage. Reservoir operation in 1989 differed considerably as the lowest elevation achieved was 2,550 msl. Comparisons of the two years sampling are presented in Figures C and D. Although slight increases in the catch of most fishes were observed in 1989 as drawdown approached elevation 2,550 msl, the catches at their highest level were only 10-25% of those in 1988. Yellow perch YOY were captured in 1989 in relatively high numbers due primarily to the exceptionally strong year-class produced that year.

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, 1965-89.

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
August 1989	12	56	32	24,706	22	0	16	2	0	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.

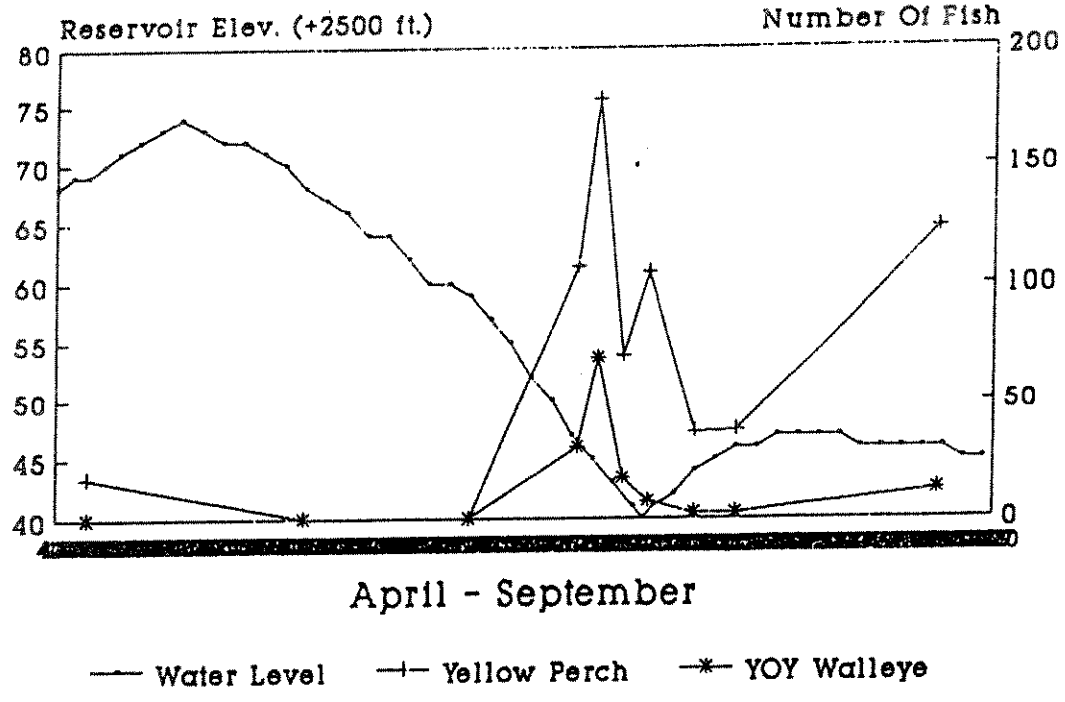

Figure C. Age I and older yellow perch and YOY walleye sampled below Fresno Dam and water elevations,1988.

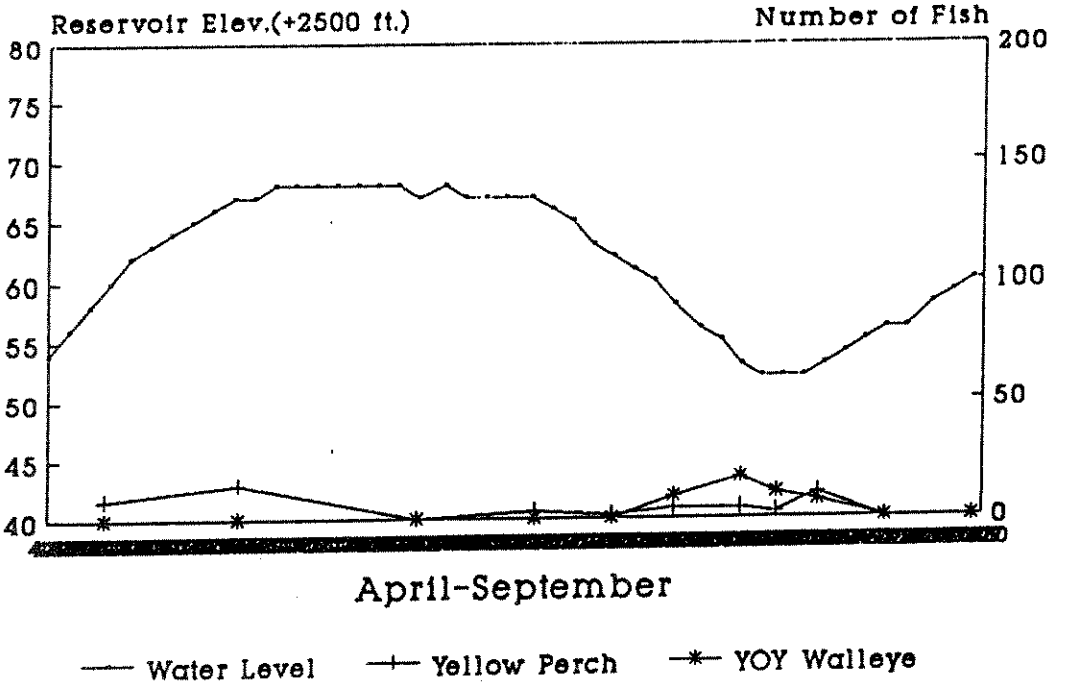

Figure D. Age I and older yellow perch and YOY walleye sampled below Fresno Dam and water elevations,1989.

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 six years.

Beach seining was conducted in July at eight sites on the reservoir, encompassing 910 feet of shoreline (Table 6). Aquatic vegetation did not hamper seining efforts as in previous years. The sport fish YOY catch consisted of 10 walleye, 4 northern pike, and 736 yellow perch. Some reproduction of northern pike was observed after two poor years. Other forage species sampled in decreasing order of abundance were spottail shiner, white sucker, crappie sp., carp, and buffalo sp. The catch of YOY walleye was the greatest since 1981. A plant of 20,000 walleye fingerlings was made in midsummer, which made evaluation of natural reproduction difficult.

Table 6. A summary of walleye, yellow perch, and northern pike young-of-year captured by beach seining in Nelson Reservoir, 1974-89.

		Walleye		Yellow Perch		No. Pike	
Year	Shoreline Seined (ft.)	No.	No./ 1,000 (ft.)	No.	No./ 1,000 (ft.)	No.	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
1989	910	10	11.0	736	809	4	4.4

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 40 minutes and yielded one YOY walleye. Visibility was obscured due to an unusually heavy late fall algal bloom. Very few fish of any kind were observed, which was unusual in light of successful sampling in previous years. An extremely bright full moon was present at the time and may have kept fish in deeper water.

Kuhr Reservoir

This 25-acre reservoir is located 15 miles south of Chinook on private land. For any 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 darter, and northern redbelly dace. Adult yellow perch were stocked in April, 1987 at a rate of 55/acre. Adult black 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 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.

In 1989, 2-inch fingerlings were stocked at a rate of 48/acre and a rearing pond was stocked at a rate of 140/acre. No musky from this plant were taken by gill net, traps or seines, and only seven tiger musky ranging from 10.6-12.8 inches were taken from the rearing pond in the fall. Although the only tiger musky sampled from the reservoir to date are from the 1987 year-class, growth has been good (Figure E).

In light of the apparent loss of two tiger musky year-classes, fingerling walleye were stocked to increase predation on juvenile perch and suckers. Walleye ranging from 3.0-5.0 inches were stocked in 1988 at a rate of 28/acre and in 1989 at 14/acres. Low to moderate reproductive success of perch and crappie has been observed since their

introduction in 1987. Beach seining in 1989 indicated a significant reduction in forage fishes from previous years (Table 7). The combined predation of tiger musky, walleye, yellow perch, and crappie is having a noticeable affect on the sucker/minnow population.

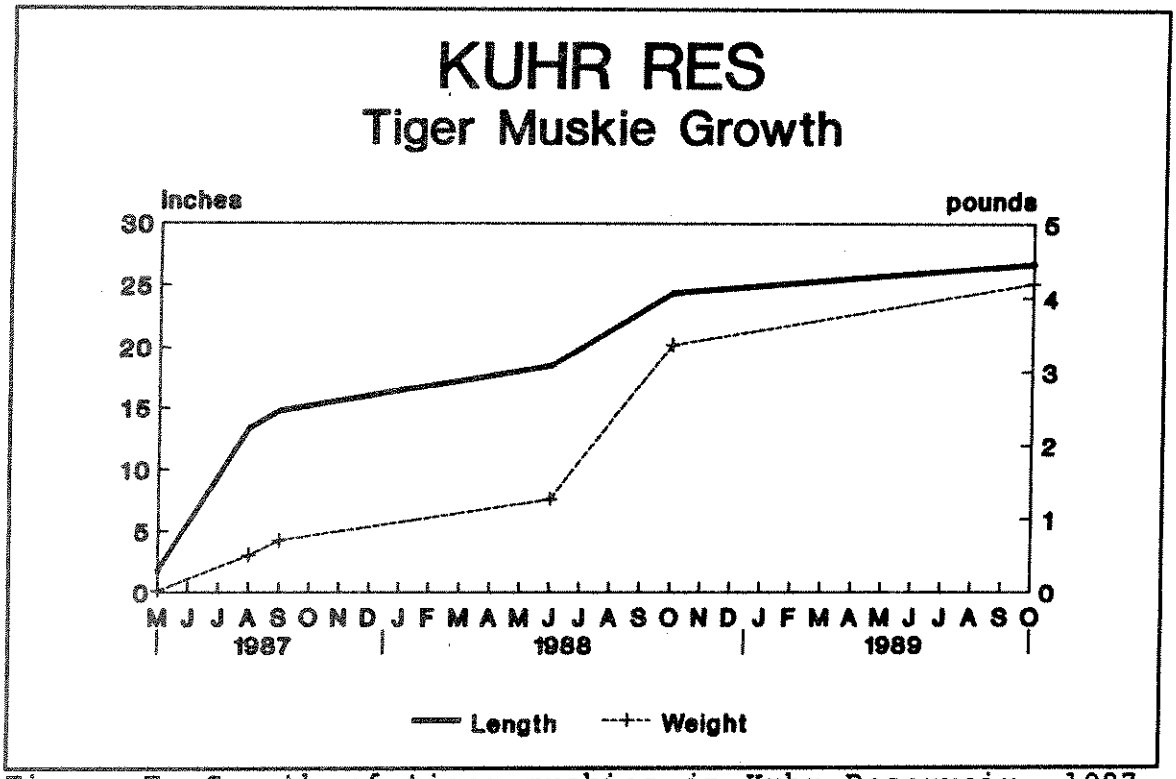

Figure E. Growth of tiger muskies in Kuhr Reservoir, 1987-1989.

Table 7. Forage fish abundance determined by beach seining at H.C. Kuhr Reservoir, 1987-89.

Number Hauls	Date	White Suckers (<10 in.)	Fathead Minnow	Silvery Minnow	Lake Chub	Black Crappie	Yellow Perch YOY	Yellow Perch Age I
3	7-14-87	77	1,450	58	26	0	332	0
4	6-28-88	83	294	34	10	5	20	127
4	7-07-89	0	1	0	0	0	8	26

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 its initial filling in 1975. Its 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 sport fish. 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 increased steadily and peaked in 1987. No natural reproduction was documented in 1988 or 1989. Yellow perch were found in the reservoir in 1986 as a result of illegal introductions. Good reproduction was observed in 1987, but poor spawning success occurred in 1988 and 1989.

Walleye were stocked in 1987 due to local demand. The walleye management plan included three consecutive years of 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, 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. A plant of 100,000 fry was made in 1988, along with 193 marked fingerlings. No fish from this year-class were sampled in 1989. Walleye fry (300,000) and marked fingerlings (802) were stocked in 1989. Insufficient numbers of marked fish were sampled to estimate the population. Growth of walleye to date is consistent with other regional populations. Few walleye have been captured by beach seining. Night electrofishing appears to be a more effective technique for sampling YOY and yearling walleye.

Despite poor reproductive success of yellow perch in 1989, they are expected to replace suckers as the primary forage fish in this Reservoir (Table 8). Low water levels experienced the last two years have promoted much vegetative growth on dewatered shorelines. Yellow perch numbers are expected to increase dramatically in 1990 if water levels rise sufficiently to inundate this spawning substrate. Emerald and spottail shiners were introduced in 1987 to improve and diversify forage. Reproductive success of spottail shiners was observed in 1989.

Table 8. A summary of forage fish taken by beach seining from Beaver Creek Reservoir, 1985-89.

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
8/21/89	6	45	29	2	0	0	0	3	602

[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

Reser Reservoir

This 25-surface acre reservoir was constructed in 1980 and first filled in 1982. Golden shiners, fathead minnows, and black crappie were introduced to establish a forage base. Largemouth bass fingerlings were stocked at a rate of 300/acre in 1982 and 150/acre in 1983. The bass exhibited good survival and attained catchable size by 1984 when large numbers of 8- to 10-inch fish were harvested under a 10 fish limit, which apparently resulted in over-harvest. Fishing pressure was light in both 1985 and 1986 due to poor fishing success. Forty-two fishermen were interviewed in 1986 and none had caught a bass. A 2-bass limit was imposed in 1986 to assist in rebuilding the population.

Electrofishing after dark has been conducted in most years since 1984 to determine the status of the bass population. The number of bass captured in one complete circuit of the reservoir has been used as an indicator of relative abundance. Largemouth bass reproduction has been

monitored since 1985 by electrofishing shoreline vegetation in late summer. Figure F shows relative abundance of YOY, yearling, and older bass over a 6-year period. The strong year-class produced in 1986, along with the restrictive limit, allowed the population to recover to high levels. Reproductive success since 1986 has been relatively stable, though at lower levels. The 1986 year-class dominates the fishery at present.

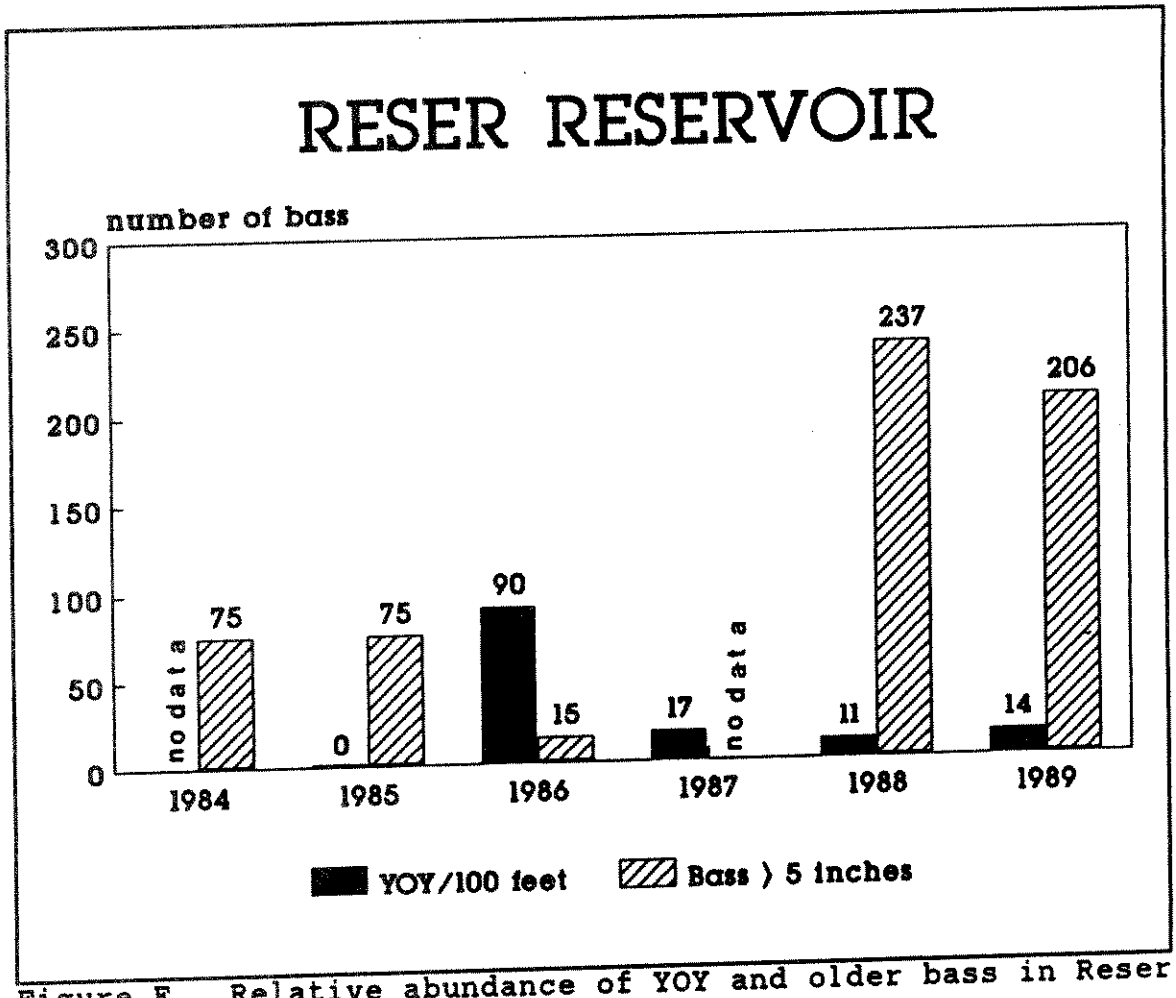

Figure F. Relative abundance of YOY and older bass in Reser Reservoir,1984-1989.

Although exploitation rates are unknown, an estimate of fishing pressure for the period April-September 1989 was made utilizing an electronic car counter and the average number of fishermen per vehicle observed. Fishing pressure was heaviest in June and July and total use for the summer was estimated at 1,788 angler-days.

Atlas Reservoir

This reservoir was built in 1985 and is approximately 10 surface acres in size. Largemouth bass stocking consisted of 592 5-inch in the fall of 1987, and 865 5-inch in the spring of 1988. An additional 600 5-inch bass were stocked in the spring of 1989 due to partial winterkill. Approximately 40,000 fathead minnows were also stocked in 1988 to enhance the forage supply.

Beach seining conducted in the spring of 1989 revealed bass averaged 8.8 inches total length (range 7.7-10.2 inches) and weighed 0.34 pounds (range 0.20-0.53 pounds). This sampling was again conducted in May, 1990, to evaluate growth and population abundance. Bass captured in 1990 had increased in average length to 11.1 inches total length (range 10.7-11.5 inches); and the average weight more than doubled to 0.75 pounds (range 0.65-0.82 pounds). No suitable quantitative information was obtained on bass densities due to limited seining sites caused by low water levels.

Although bass growth and condition appeared adequate, low water levels undoubtedly have restricted the food supply. No fathead minnows were taken by seining in 1990, which is due to intensive predation by bass.

A restrictive 5-bass limit was adopted beginning in the spring of 1990 to help avoid over-harvest. Future population monitoring will be required to determine population abundance and evaluate the impact of angler harvest.

RECOMMENDATIONS

Continued gill-net sampling is recommended in the Dredge Cuts to acquire information on the status of sport and forage fish due to the importance of this area for sport fishing. The development and expansion of cisco and spottail shiners in Fort Peck Reservoir have enhanced the forage fish supply in the Dredge Cuts and associated impacts on the sport fishery due to fish passage through the dam should be evaluated. Several years ago the Corps of Engineers proposed 10 scenarios for increasing hydropower at Fort Peck Dam. Although these proposals appear to be inactive at this time, they present potential negative impacts involving rereg dams, afterbays, and higher outflows and fluctuations which would impact fish habitat and movement.

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. Creel census work is recommended and has been budgeted for 1991.

All phases of paddlefish investigations downstream from Fort Peck Dam should continue to provide valuable on harvest and 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.

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. Two years of sampling indicate YOY are particularly vulnerable to flushing. Significant losses could be avoided with a conservation pool maintained at or above 2,550 msl.

Walleye reproduction is still considered to be below optimum at Nelson Reservoir. Alternate years of walleye fingerling stocking should be continued. Monitoring of reproductive success of sport and forage fish should be continued. Electrofishing under different moon phases should be attempted to determine the effect it might have on sampling efficiency.

Beach seining, gill netting, and electrofishing should be continued at Beaver Creek Reservoir to capture enough marked fish to estimate the 1988 and 1989 year-classes. A creel census in the next two years would help assess the contribution of walleye to the fishery, and help determine their vulnerability to angling in this accessible reservoir. Sampling for YOY fish should be expanded to document any natural reproduction.

It will be several years before significant numbers of yellow perch and crappie reach quality size in Kuhr Reservoir. The reservoir will open in 1990 with a majority of fishing pressure directed at tiger musky. A limit of one fish per day over 30 inches will be in effect. Only 20-30 percent of the tiger musky are expected to exceed 30 inches by the summer of 1990. High post-stocking mortality of tiger musky will create management problems if the trend continues. Limiting factors have not been identified and the degree of predation related mortality is unknown. Size at stocking may be an important factor. Attempts should be made to stock larger fish in the fall of the year.

The Reser Reservoir bass population has flourished under the restrictive 2-fish limit. Despite large number of catchable bass, golden shiners are numerous and should provide adequate forage. Bass reproduction has been regular and fishing pressure is increasing but not considered excessive. Raising the bass limit to five per day is recommended. Annual monitoring should continue.

Sampling efforts should continue at Atlas Reservoir to evaluate the 5-bass limit. In addition to spring seining, fall electrofishing should be utilized to determine population abundance. Additional stocking of fathead minnows is recommended to improve the forage fish supply.

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Waters Referred to:

16-5140 Fort Peck Reservoir
16-2500 Missouri River Sec. 05
16-2520 Missouri River Sec. 06
15-5240 Fresno Reservoir
15-6480 Nelson Reservoir
15-5880 H. C. Kuhr Reservoir
15-4570 Beaver Creek Reservoir
15-8860 Reser Reservoir
15-4532 Atlas Reservoir

Key Words or Fish Species:

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

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Date: June 30, 1990