MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: MONTANA PROJECT TITLE: STATEWIDE FISHERIES INVESTIGATIONS

PROJECT NO.: F-46-R-6 STUDY TITLE: SURVEY AND INVENTORY OF COLDWATER AND WARMWATER ECOSYSTEMS

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

JOB PERIOD: JULY 1, 1992 THROUGH JUNE 30, 1993

ABSTRACT

Paddlefish harvest and tagging records were maintained for populations in the dredge cuts and Missouri River above Fort Peck Reservoir. A paddlefish creel census was conducted on the fishery above Fort Peck Reservoir during the spring of 1992. Total fishing pressure was estimated at 1,592 angler days with a total harvest of 254 paddlefish. Pressure was one-half of that experienced during the last census in 1991 and some of the lowest recorded to date. Catch rates were below average, but the mean weight of female paddlefish was considerably higher than that observed in 1991. Fishermen released 25-30% of the paddlefish landed. Anglers from 28 of Montana's 56 counties utilized the fishery, as well as snaggers from 10 states. Gill netting in Fresno Reservoir produced good catches of lake whitefish, walleye, and northern pike. The catch-per-unit-effect (CPUE) for walleye was the highest recorded to date. Using recaptured marked fish, an estimate was made of the 1990 walleye year-class. Planted walleye contributed less than 10% to the year-class. Beach seining indicated high walleye production and average yellow perch reproductive success. A revised walleye stocking plan was developed and implemented. Beach seining at Nelson Reservoir indicated reproductive success of northern pike and perch was poor. The CPUE for young-of-the-year (YOY) walleye, however, was the highest recorded since 1981. Experimental gill-net stations, which were established in 1991, were sampled again in 1992. Walleye spawning shoals were constructed at three sites on Nelson Reservoir. Large fingerling tiger muskies were planted in H. C. Kuhr Reservoir to aid survival and recruitment. Survival of fish stocked in 1991 was documented. Yellow perch and crappie may overpopulate if suitable predation is not imposed on the populations. Walleye sampled in Beaver Creek Reservoir provided sufficient recaptures to estimate three year-classes of walleye. Natural reproduction of walleye was unconfirmed for the second consecutive year. Introductions of warm/cool water species into Bailey Reservoir have been successful. Large perch and northern pike have declined in numbers. Fishing pressure on large (>10 lbs.) northern pike may be excessive during the ice fishing/spearing season. Management recommendations are provided for all waters discussed.

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 through participation in the Milk River Basin Advisory Committee.

4) To ensure that Fort Peck tailwater/dredge cut fish population is adequately protected from development related to hydropower expansion. Due to powerhouse maintenance and atypical low flows, data collection was postponed until 1993.

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. A creel census was conducted in the spring of 1992 in the Missouri River study area above Fort Peck Reservoir. 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. Objectives 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 Reservoirs. Objective accomplished and data presented.

5) To maintain a variety of species combinations distributed geographically throughout the region in 45 small reservoir. 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 1992-93.

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 gill 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. Whenever possible, fish were measured for total length (TL) and weighed to the nearest 0.01 pound. Scales and/or spines were taken from walleye to determine age composition.

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 fish were tagged in the study area in 1992. This report includes tagging data from work conducted by Ken Frazer in 1984, working on a Corps of Engineers funded study, and projects overseen by Bill Gardner and Phil Stewart under Dingell-Johnson Project FW-2-R.

Three tagged paddlefish were harvested by fishermen during 1992, all returns were from Intake Dam on the Yellowstone River. To date, 157 paddlefish tagged in the study area have been harvested; 72 (45.9%) in the Dredge Cuts and 85 (54.1%) in the Yellowstone River, primarily at Intake Dam. During the past ten years 1983-92, however, 80.0% (60 of 75) of the tag returns have been from the Yellowstone River. This is due, in part, to the higher fishing pressure and harvest at Intake Dam, and also suggests 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 1. The average annual percent harvest for 817 fish tagged during 1974-84 varied from 0.5-1.6%. The average annual harvest rate prior to 1974 was 1.0% (Needham, 1985). Paddlefish tagged in the Missouri River outside the Dredge Cuts have experienced a lower rate of exploitation ranging from 0.5-1.3%; whereas fish tagged in the Dredge Cuts had an annual harvest rate of 1.0-1.6%.

Table 1. A summary of paddlefish tagging and harvest from the dredge cut complex and Missouri River, 1974-92. Percent harvest 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	No. Tag Returns 1992	Total No. Tags Returned	Percent Tags Returned	Avg. Annual % Harvest
1968	12	0	1	8.3	*
1969[1]	94 (92)	0	15	16.3	*
1970	5	0	0	0	*
1974[2]	189 (185)	1	35	18.9	1.0
1976[3]	48 (47)	0	10	21.2	1.2
1977	40	0	9	22.5	1.4
1978[4]	162 (156)	1	37[5]	23.7	1.6
1979	151	0	29	19.2	1.4
1979	40 (River)	0	3	7.5	0.5
1980	29 (River)	0	2	6.9	0.5
1981	60 (River)	0	6	10.0	0.8
1982	21 (River)	1	3	14.3	1.3
1984	77	0	7	9.1	1.0
	928	3	157		

*Calculation discontinued.

[1]Harvest based on 93 fish in 1978 and 92 in 1984 for dead fish or tag removal.
[2]Harvest based on 188 fish in 1979; 187 in 1983; 186 in 1984; and 185 in 1987 for dead fish or tag removal.
[3]Harvest based on 47 fish in 1978 for one fish found dead.
[4]Harvest based on 161 fish in 1979; 160 in 1980; 158 in 1982; 157 in 1986; and 156 in 1988 due to dead fish.
[5]Total includes one fish possibly 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 19, 15, and 14 years of fishing pressure and harvest exposure, these groups have exhibited an average annual harvest rate of 1.0-1.6%, and the total harvest rate ranged from 18.9-23.7%.

Fort Peck Reservoir and Missouri River Upstream

Twenty-nine paddlefish were jaw tagged in 1992 in the eastern portion of the UL Bend of Fort Peck Reservoir. Eight of these fish were fitted with radio transmitters under a project funded by the Bureau of Land Management. The fish were tagged during the later part of the snagging season and also during the summer. These fish were not susceptible to harvest in 1992. Tagging and harvest records for previously tagged fish were maintained. During the period 1973-92, a total of 527 paddlefish were tagged in this study area. This total includes 192 fish tagged in the upper portion of Fort Peck Reservoir in 1978 and the 29 fish tagged in 1992.

One tagged paddlefish was harvested by snagging in 1992. It was tagged in 1978 in the UL Bend area of Fort Peck Reservoir. Tag return data reveals a low rate of harvest for this paddlefish population as summarized in Table 2. The average annual rate of harvest varies from 1.0-5.0%. However, the highest rate of 5.0% is based on only 2 fish tagged in 1983.

Table 2. A summary of paddlefish tagging and harvest data from the Missouri River and Fort Peck Reservoir, 1973-92. Percent harvest was derived by adjusting for previous harvest of tagged fish.

Year	No. Tagged	No. Tags Returned in 1992	Total No. Tags Returned	% Harvest	Avg. Annual % Harvest
1973	45	0	10	22.2	1.1
1974	55	0	12	21.8	1.1
1975	29	0	8	27.6	1.5
1976	23	0	6	26.1	1.5
1977[1]	60	0	10	16.7	1.0
1978	227[2]	1	40	17.6	1.2
1979	11	0	5	45.5	3.3
1980	33	0	13	39.4	3.0
1983	2	0	1	50.0	5.0
1986	13	0	4	30.8	4.4
	498	1	109		

[1]Total adjusted for one fish killed by commercial fisherman August, 1981.
[2]192 tagged in Fort Peck Reservoir from UL Bend to Beauchamp Bay.

In 1978, 227 fish were tagged which includes 192 (84.6%) tagged in the upper reservoir near Beauchamp Bay. These fish exhibited a low tag return rate for several years following tagging compared to fish tagged in the river. This

indicated some fish remain in the reservoir and do not make annual spring migrations into the river where they are subject to harvest by snagging. However, beginning in 1986, fish tagged in the reservoir appeared in the harvest at a slightly higher rate. The overall harvest for fish tagged in 1978 is now becoming more comparable to other groups of tagged fish.

The harvest of paddlefish from the Fort Peck Reservoir stock was determined by creel census in 1992. The study area consisted of approximately 20 miles of river downstream from Fred Robinson Bridge, upstream from Fort Peck Reservoir. The last complete census was conducted in 1991. Harvest occurs by snagging in the spring as paddlefish migrate upstream from the reservoir. Occasionally, paddlefish are also caught in the summer and fall, but due to the low number taken at these seasons only spring harvest has been determined. Almost all fish are taken within the boundaries of the Charles M. Russell Wildlife Refuge (CMR).

A system of sampling the entire day was utilized and no records on the length of trip (hours) were maintained. The absolute number of fishermen and fish taken could be determined on most days. Previous attempts to gather information on hours fished provided unreliable results. Due to the length of fishing trip and erratic fishing activity, information provided by fishermen was not judged to be accurate. It was found that most fishermen greatly over-exaggerated the actual time spent fishing. Estimates of fishermen and fish taken for non-creel days (usually weekdays with light fishing pressure) were made on the basis of known pressure preceding and following non-creel census days and from interviews with snaggers or refuge personnel present throughout the non-census days.

The creel census commenced March 17, 1992, which was 14 days after ice-out on the river. Based on warden and CMR personnel observations and interviews, 40 man-days of pressure and a harvest of 15 paddlefish was estimated to have occurred during the interim between ice-out and the start of the creel census. These estimates are reflected in the tables. The creel census extended through June 15 at which time fishing effort and success was negligible. An interview card system which provided completed trip data on anglers leaving the area when the creel clerk was "off duty" assisted in gathering completed trip information.

Low flows in the river throughout the spring of 1992 negatively affected paddlefish movement. Berg (1981) noted that significant upstream movement of paddlefish did not occur until flows reached 14,000 cfs at the Virgelle gauging station. Flows at this gauging station did not exceed 7,000 cfs at any time in 1992.

Total fishing pressure was 1,592 angler-days in 1992 (Figure A). Snagging pressure in 1992 was only 54% of the pressure which occurred in 1991. Spring weather conditions and river flows often dictate the amount of use this area receives. The total paddlefish harvest in 1992 was estimated to be 254 fish. This is the lowest harvest on record. However, catch rates were consistent with those experienced in 1991 (Table 3). Snagger interviews indicated fish were released at a rate of 25-30%, which is consistent with the rate observed in 1991. The fish/day (f/d) harvest rate was higher for boat snaggers (0.19 f/d) than bank snaggers (0.13 f/d). This is probably due to the fact that boat snaggers were

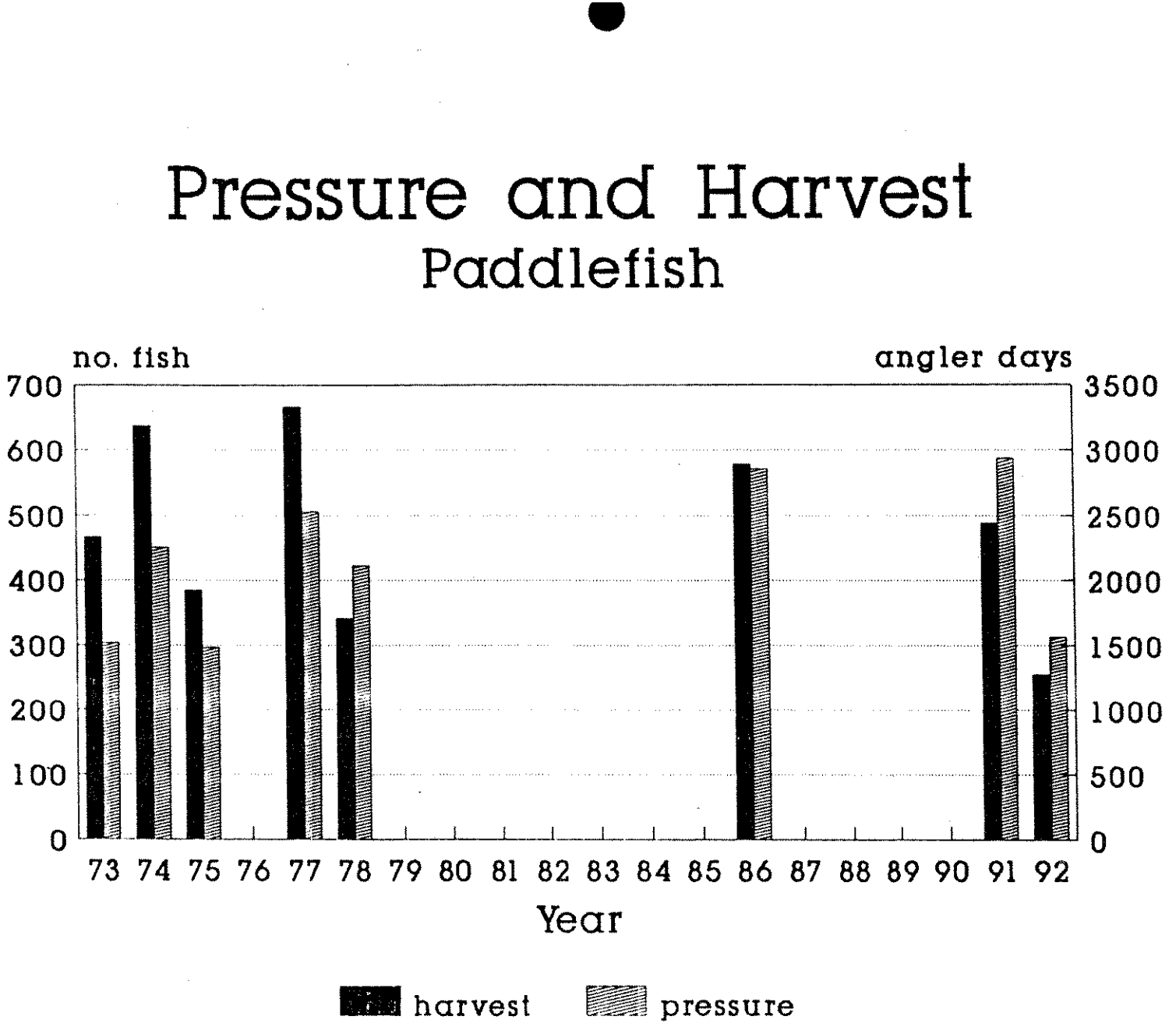

Figure A. Snagging pressure and total harvest as determined by creel census on the Missouri River above Fort Peck Reservoir, 1973-92.

able to reach downstream areas inaccessible by shore snaggers. As was previously noted, the lack of trigger flows appeared to limit movement upstream into the historical snagging area. Though the harvest rate of males was similar between bank and boat snaggers, boat snaggers harvested females at a rate almost twice that of bank snaggers. The mobility of boat fishermen and the increased use of sonar fish locators more than likely contributed to the difference.

Table 3. A summary of fishing pressure, paddlefish harvest, and catch rates during the spring, 1973-92.

Year	Total Fishermen Man-days			Paddlefish Harvested			Harvest/Fisherman/Day		
	Bank	Boat	Total	Bank	Boat	Total	Bank	Boat	Overall
1973	984 (64.9%)	532 (35.1%)	1,516	290 (62.1%)	177 (37.9%)	467	0.29	0.33	0.31
1974	1,422 (63.1%)	831 (36.9%)	2,253	396 (62.2%)	241 (37.8%)	637	0.28	0.29	0.28
1975	916 (61.8%)	566 (38.2%)	1,482	180 (46.7%)	205 (53.3%)	385	0.20	0.36	0.26
1977	1,429 (56.5%)	1,096 (43.4%)	2,526	322 (48.3%)	344 (51.7%)	666	0.23	0.31	0.26
1978	699 (33.1%)	1,413 (66.9%)	2,112	135 (39.6%)	207 (60.4%)	342	0.19	0.15	0.16
1986	1,664 (58.2%)	1,194 (41.8%)	2,858	315 (54.4%)	264 (45.6%)	579	0.19	0.22	0.20
1991	1,645 (56.0%)	1,293 (44.0%)	2,938	260 (53.3%)	228 (46.7%)	488	0.16	0.18	0.17
1992	796 (50.0%)	796 (50.0%)	1,592	102 (40.3%)	152 (59.7%)	254	0.13	0.19	0.16

The period of greatest fishing pressure occurred over the 3-day Memorial Day weekend, which produced 247 snaggers and a harvest of only 21 fish.

Length and weight data was obtained from 210 paddlefish harvested; 86 males and 124 females (Table 4). Both total length (TL) and body length (BL) measurements were taken. Body length is defined as the distance between the anterior portion of the eye and the caudal fin fork. Paddlefish were selected at random and by availability for measuring. Paddlefish examined during the creel census period produced a sex ratio of 41% males and 59% females. The average weight of male paddlefish, from past creel years in which 25 or more fish were weighed, was 34.7 pounds. Male paddlefish averaged 34.6 pounds (range 20-63 pounds) in 1992. The average weight of female paddlefish, from past creel years in which 25 or more fish were weighed, was 75.3 pounds. In 1992, female paddlefish averaged 70.7 pounds (range 45-109 pounds). Only two (1.6 percent) of 124 females observed in 1992 weighed over 100 pounds.

Table 4. A summary of paddlefish size data from the Missouri River above Fort Peck Reservoir, 1965-92.

	Females				Males			
Year	No.	Avg. TL	Avg. BL	Avg. Weight	No.	Avg. TL	Avg. BL	Avg. Weight
1965	13	67.0	----	81.5	21	55.4	----	36.4[1]
1966	36	64.0	----	74.4	30	53.3	----	32.1
1970	7	70.2	----	77.0	2	58.5	----	44.0
1971	10	66.7	----	85.7	1	57.0	----	44.0
1973	46	66.2	----	76.1	50	54.9	----	35.0
1974	58	65.3	----	74.5	67	55.0	----	32.8
1975	63	65.7	----	74.8	56	55.9	----	34.6
1977	96	66.5	----	78.3	135	56.9	----	39.4
1978	58	67.7	----	87.9	76	55.3	----	38.2
1986	101	65.6	47.3	76.3	167	54.1	37.5	33.5
1991	168	59.1	45.0	59.7	192	50.8	37.8	32.2
1992	124	66.9	47.7	70.7	86	54.5	38.9	34.6

[1]Based on 24 fish.

Paddlefish dentaries were collected from harvested fish to assist in determining the age structure of the Fort Peck Reservoir stock. A total of 137 jaw sections were collected and sent to the University of Idaho for sectioning and aging. Results of the aging will be presented in a later report.

Angler residence was obtained for 1,242 fishermen, comprised of 1,023 (82%) residents and 219 (18%) nonresidents. Anglers from 29 of Montana's 56 counties utilized the fishery, as well as fishermen from 10 states and the province of British Columbia. Angler residence is summarized as follows:

Resident Angler-Days by County

1.	Cascade	181	16.	Carbon	15
2.	Yellowstone	163	17.	Choteau	14
3.	Lewis & Clark	129	18.	Lake	12
4.	Gallatin	77	19.	Phillips	11
5.	Hill	68	20.	Granite	10
6.	Flathead	48	21.	Glacier	7
7.	Missoula	48	22.	McCone	7
8.	Powell	37	23.	Sanders	6
9.	Fergus	33	24.	Custer	4
10.	Stillwater	32	25.	Sweet Grass	4
11.	Silver Bow	25	26.	Wheatland	4
12.	Lincoln	24	27.	Meager	2
13.	Musselshell	20	28.	Jefferson	2
14.	Park	20	29.	Judith Basin	1
15.	Blaine	19			

Nonresident Angler-Days

1.	Wyoming	142	7.	South Dakota	4
2.	Arkansas	18	8.	California	3
3.	Colorado	14	9.	Nevada	2
4.	Idaho	12	10.	Oregon	2
5.	Minnesota	12	11.	British Columbia	1
6.	Washington	9			

A system of tagging harvested paddlefish was implemented on the Missouri River in 1992. This system has been used successfully for a number of years on the Yellowstone River. A 2-fish per year limit was imposed statewide in 1992. The only significant regulation difference between the Yellowstone and Missouri River fisheries is that snaggers may immediately release a snagged fish if they so desire on the Missouri River, but any fish snagged on the Yellowstone must be immediately tagged. Little post-release mortality has been observed on the Missouri River. All mortality previously observed was connected with hygrading of held fish. Snaggers would "tie up" fish in the river than release them later if a larger fish was caught. The new tagging regulation eliminates this type of mortality. The "must keep" regulation on the Yellowstone River fishery is primarily designed to help reduce sociological conflicts associated with severe crowding. This situation does not occur on the Missouri River as the fishery is spread over many miles. Observations and discussions with veteran snaggers over many years indicates there is a significant voluntary effort to return large females to the river which would otherwise be harvested under a no-release restriction.

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 though maximum depth is only 48 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 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 5). Lake whitefish continue to comprise a significant portion of the gill-net catch, but are rarely caught by fishermen. Though undocumented, it is assumed that they are utilized by northern pike and walleye as forage when young. Whitefish grow fast in this reservoir and adults escape predation from all but the biggest walleye and pike. Lake whitefish appear to reproduce successfully in years of good overwinter storage. Low storage during the winter of 1992-93 has exposed all rocky areas of the reservoir. Several whitefish stomachs were examined in April. The contents consisted of filamentous algae, many small snails, several beetles and a considerable number of walleye or perch eggs.

The paucity of adult yellow perch in the gill-net catch, since their introduction in 1986, can only be explained as the result of consistent heavy predation. Reproduction appears to be significant in most years, but few adults are ever captured by gill nets. However, the adult yellow perch population does appear to be building up slowly following two years at very low levels.

Northern pike are quite numerous and compete intensely with walleye for available forage fishes and crayfish.

The walleye gill-net catch was exceptional. The CPUE was the highest recorded in 15 years of netting. The 1991 year-class was also well represented. In recent years a positive correlation has been made between overwinter water levels and recruitment of YOY walleye to the population (Needham and Gilge, 1990). The strong showing of the 1991 year-class in connection with the excellent overwinter storage in 1990-91 reinforces this correlation. During 1992 gill netting, an adult sauger was netted for the first time. Canadian researchers have noted significant numbers of sauger in the Milk River about 50 miles north of Fresno Reservoir which makes this find long overdue.

In September of 1990, 6,000 walleye fingerlings, averaging 4.7 inches in length, were marked by clipping the right opercle and planted in mid-reservoir. A total of 94 walleye from this year-class have been collected with various sampling gear to date. Only four of those fish exhibited marks. Using the Peterson estimator, the 1990 year class was estimated to be 108,319 ± 55,179 fish as of fall 1990. The results indicate a strong year-class was produced through natural reproduction in 1990 and stocked fingerlings comprised less than 10% of the year-class. A similar stocking of 10,500 marked fingerling walleye was made in the fall of 1992. Overwinter reservoir storage in 1992-93 was lower than in 1990-91, which should allow for evaluation of this stocking under different water conditions.

Eight adult longnose suckers and seven black crappie were the only other species netted.

Table 5. A summary of the catch in overnight sinking experimental gill net sets in Fresno Reservoir, 1965-92. Number of nets used varied from four to eight.

Species	Year	No.	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
	1990	46	7.7	10.0	0.98	48.9
	1991	37	6.2	12.7	1.03	24.5
	1992	66	11.0	16.0	1.69	32.2
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
	1990	0	----	----	----	0.0
	1991	16	2.7	8.2	0.40	10.6
	1992	3	0.5	7.8	0.29	1.5
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
	1989	32	5.3	14.6	1.14	43.8
	1990	28	4.7	15.7	1.74	29.9
	1991	88	14.7	13.3	0.88	58.3
	1992	102	17.0	15.0	1.40	49.8

Table 5. Continued.

Species	Year	No.	Average No. Per Net Set	Average Length (inches)	Average Weight (pounds)	Percent of Total
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
	1990	20	3.3	19.2	2.09	21.2
	1991	10	1.7	19.3	2.28	6.6
	1992	34	5.7	21.1	2.49	16.5

Night electrofishing, which is normally conducted in the fall, was postponed until 1993 due to low water and associated turbidity.

Beach seining was conducted at 12 standard sampling sites around the reservoir in a continuing effort to evaluate reproductive success of sport fishes and assess forage abundance. The seining results indicated high numbers of YOY walleye, low numbers of YOY northern pike, and average reproductive success for yellow perch (Table 6). Other fish found in low numbers were: spottail shiners, emerald shiners and a fathead minnow.

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. Beach seining is conducted annually to determine reproductive success of sport and forage fishes. Beach seining was conducted in July at nine sites on the reservoir, encompassing 635 feet of shoreline. The sport fish YOY catch consisted of 21 walleye, 6 northern pike, and 140 yellow perch (Table 7). Reproductive success of northern pike was low and yellow perch production was poor. However, the CPUE for YOY walleye was the highest recorded since 1981. A relatively high YOY walleye catch was recorded in 1991, also, but supplemental

Table 6. 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, 1965-92.

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	6,077	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
August	1990	12	8	57	2,033	7	165	44	1	2	0
August	1991	12	8	36	3,425	0	42	53	0	0	0
August	1992	12	45	2	6,550	28	0	48	0	1	0

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

stocking of walleye fingerlings may have contributed to the catch. No stocking occurred in 1992. The natural reproduction which occurred is very encouraging in light of the poor reproductive success observed throughout the last decade. Other forage species sampled in decreasing order of abundance were spottail shiner, white sucker, crappie sp., and longnose dace. No carp, buffalo sp., or goldeye were captured which is quite unusual. Night electrofishing is usually conducted in mid-September, but was postponed until 1993 due to low water, weeds, and poor visibility.

Table 7. A summary of walleye, yellow perch, and northern pike young-of-year captured by beach seining in Nelson Reservoir, 1974-92.

		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
1990	1,320	7	5.3	2,631	1,993	1	0.8
1991	660	8	12.1	77	117	1	1.5
1992	635	21	33.0	140	220	6	9.0

Sporadic gill netting has been attempted at Nelson Reservoir in the past, but sampling was neither uniform nor consistent enough to develop useful trend data on game fish population size or composition. In the fall of 1991, five experimental gill net stations were established and sampled for the first time. Netting at these stations was continued in 1992. Though several more years of

netting will be required for viable trend analysis, the netting did confirm the strong walleye year-class produced in 1991.

A cooperative walleye spawning shoal construction project was completed in the winter of 1992-93. Cooperators included the Malta Chapter of Walleyes Unlimited, U.S. Bureau of Reclamation, Montana Department of Fish, Wildlife and Parks, U.S. Fish and Wildlife Service, Phillips County and the Fish America Foundation. Three shoals were constructed, each consisting of 400-500 cubic yards of rock and covering 15,000 square feet of beach. Use of the shoals by walleye will be evaluated in the spring of 1993.

H. C. 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 1980'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 of 1987 at a rate of 55/acre. Adult crappie were planted simutaneously at a rate of 8/acre. Both species have spawned successfully since 1987. 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. A sterile predator, 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 reproduction of other predators, such as northern pike. 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 exhibited 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 muskies from this plant were taken by gill net, traps or seines and only seven tiger muskies ranging from 10.6-12.8 inches were taken from the rearing pond in the fall.

The reservoir opened in May of 1990 for the first time with a tiger musky creel limit of one fish per day over 30 inches. Interest in the trophy fishery was high and at least seven muskies were known to have been caught, three of which were legal size. Only one legal fish was recorded and was subsequently entered as a state record. The fish measured 30.9 inches and 7.70 pounds. However, fishery personnel netted and released a 12-pound musky in 1990. In 1992 a new hook and line record was entered with a fish weighing 11.88 pounds.

Due to concern over the high post-stocking mortality of muskies, plans were made to intensively rear tiger muskies in the hatchery in 1990 to 8-10 inches and stock in the fall. Water temperature fluctuations in the hatchery and a parasite infestation caused a complete loss of the fingerlings at the hatchery, therefore, no fish were planted in 1990. In 1991, pure strain musky sperm was secured from the Spooner State Fish Hatchery in Wisconsin. The milt was packaged in Erdahl's extender and transferred to Fort Peck Reservoir where eggs from northern pike were fertilized. In May 1991, 1,500 2-inch fingerlings hatched from these eggs were stocked. This was followed with an August planting of 300 fingerlings averaging 6.4 inches. In late September, 149 8.5-inch muskies were fin clipped and added to the reservoir.

Seining in July captured a single musky measuring 4.8 inches. This indicated that at least some muskies from the earliest stocking in 1991 survived. Stomach content examination revealed it had eaten several damselfly naiads and a YOY crappie. Gill netting conducted the following spring confirmed survival of individuals from the May or August plants. A plant of 300 7-inch tiger muskies was made in the fall of 1992.

In light of poor tiger musky survival, fingerling walleye have been 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/acre. Walleye fingerling stocking was initiated on an alternate year basis beginning in 1992 with a plant of 400 4-inch walleye fingerlings.

Reproductive success of perch in 1991 and 1992 was poor, as no YOY were captured by seining. The poor perch reproduction in those years may assist in reducing overpopulation and subsequent stunting of panfish in the reservoir. Several strong year-classes of perch have developed in the absence of adequate predator numbers. Black crappie showed limited reproductive success until 1991 when large numbers of YOY were found. Suckers and minnows of forage size have dramatically declined or been eliminated from the reservoir by predation. The smallest sucker captured in 1992 was 12.9 inches.

Growth and condition of tiger muskies declined as the main forage base of suckers and minnows was replaced by spiny-rayed panfish. The tiger muskies in this reservoir exhibit an interesting behavior. At times, the larger fish (>25 inches) swim at the surface with most of their head out of the water. The fish often do this with mouths open as if skimming invisible objects off the water's surface. They will typically surface for a distance of 3-50 feet before submerging. Occasionally several can be seen "skimming" at the same time.

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 increased steadily and peaked in 1987. No natural reproduction was documented in 1988 or 1989. Yellow perch were first found in the reservoir in 1986. Beach seining indicated good initial reproduction in 1987, but low YOY perch numbers were observed in 1989 and 1990 (Table 8). A large year-class of perch was produced in 1991 and was followed by another good production year in 1992. Yellow perch and spottail shiners provide much of the forage base as juvenile sucker numbers have declined steadily since 1986. However, due to the abundant alternate forage and a depressed northern pike population, white sucker YOY numbers increased in 1991 and 1992.

Table 8. A summary of forage fish taken by beach seining from Beaver Creek Reservoir, 1985-92.

		Species[1]							
Date	No. Hauls	WSU/LSU	YP	LK CH	FTHD MIN	S/P MIN	ID	EM SH	SP SH
9-04-85	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
8-21-90	6	1	42	0	0	0	2	1	93
8-13-91	6	348	8,615	0	0	2	0	2	835
8-10-92	6	492	1,938	0	0	0	4	0	156

[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

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. Some fish of each year-class were marked for future identification. Sufficient numbers of marked walleye were made in 1991 and 1992 to estimate all three walleye year-classes (Table 9). The estimates reflect cohort size at the end of their first growing season. It appears that fry plants have been quite successful in establishing a fishable population.

Fourteen walleye were captured in the fall gill netting. The walleye averaged 17.8 inches (range 15.5-22.1) and 2.15 pounds (range 1.30-3.73). Eighty walleye were captured in a single frame trap set off the east edge of the dam in early April. With the exception of one green female, all the fish were ripe males.

None of the other three traps around the reservoir captured walleye. This would indicate a prespawning concentration at this location.

Table 9. Walleye stocking records and estimates of three walleye year-classes at the end of first growing season in Beaver Creek Reservoir.

Year Class	No. Fish Planted	Mark	Size (in.)	Recapture Sample Size	No. Recaptures	Estimate of Year Class[1]
1987	50,000	none	fry	55	12	1,391 ± 418
	322	right opercle	6.0			
1988	100,000	none	fry	33	3	1,649 ± 888
	193	left ventral	3.7			
1989	300,000	none	fry	103	23	3,722 ± 954
	858	right ventral	4.5			

[1]80% confidence interval.

Growth of walleye to date is consistent with other regional populations. Condition factors of Beaver Creek Reservoir were slightly below those of walleye sampled from nearby Fresno Reservoir.

No walleye were stocked in 1990 or 1991. Beach seining and electrofishing were utilized to sample YOY walleye in the event limited natural reproduction occurred. No natural reproduction has been documented to date. Efforts to confirm natural reproduction will continue in non-stocking years. Alternate-year plants of 200,000 fry began in 1992.

Bailey Reservoir

This reservoir floods approximately 70 surface acres at full pool and has a maximum depth of 28 feet. It was constructed in the mid-1970's primarily for use as a fishing reservoir. Though privately owned, it has been under the management of the Montana Department of Fish, Wildlife and Parks (MDFWP). Initial introductions of rainbow trout provided an excellent fishery. Northern pike were illegally introduced about 1980. No other fish were present in the reservoir and predation on trout soon became excessive. During a severe drought in 1984, the remaining trout winterkilled, but the northern pike survived. Larger trout were planted to reduce the level of predation, but without success. Chemical rehabilitation was considered, but at the request of the landowner the MDFWP began to develop a cool/warm water fishery. Trout stocking was discontinued.

Yellow perch and black crappie were introduced in 1987, followed by largemouth bass in 1988. Reproductive success of all introduced fish has been good.

Monitoring of adult sport fish by gill netting was initiated in 1990. Two overnight experimental sinking gill-net sets were utilized in the sampling (Table 10). Yellow perch, black crappie and northern pike have grown exceptionally fast in this productive reservoir. Large catches of perch exceeding 0.50 pound were common throughout the summer of 1991 and the following winter. A party of three fishermen remarked that they had taken home 93 pounds of perch fillets in a single weekend of ice fishing. The strong year classes produced in 1991 and 1992 dominate the perch population at present and catches of large perch have declined significantly.

Table 10. Total catch from two experimental gill net sets at Bailey Reservoir, 1990-92.

	Northern Pike			Yellow Perch			Black Crappie		
Date	No.	$\bar{X}$ L (in.)	$\bar{X}$ WT (lbs.)	No.	$\bar{X}$ L (in.)	$\bar{X}$ WT (lbs.)	No.	$\bar{X}$ L (in.)	$\bar{X}$ WT (lbs.)
8-08-90	24	18.1	1.23	34	7.7	0.26	21	5.7	0.10
9-27-91	7	24.7	3.21	58	10.1	0.56	4	8.5	0.35
9-11-92	6	26.8	4.29	34	8.1	0.29	16	4.7	0.08

Though no largemouth bass were taken by gill netting, fishermen report regular catches of yearling bass and occasional fish up to two pounds. Black crappie are being taken in low numbers though the population appears to be quite healthy. Fishing pressure on northern pike is occasionally heavy. During the winter of 1989-90, as many as 32 spearing houses were on the reservoir on any given day. Dozens of large pike (>10 pounds) were reportedly harvested that same winter. The catch of large pike since that winter has declined noticeably. The gill-net catch and poor fishermen success are suggestive of a low pike population at present. Successful northern pike reproduction was last observed in 1990.

RECOMMENDATIONS

Netting surveys in the Fort Peck Dredge Cuts should continue to maintain data on the overall fish population.

The 2-paddlefish annual limit, utilizing tags, should be continued on the Missouri River. The ability to immediately release a paddlefish should be retained. Annual collections of paddlefish jaws should be made to assist in determining the age structure of the Fort Peck Reservoir paddlefish stock. An annual mail/phone

survey should be conducted using names of anglers who purchased tags. Attempts should be made to tag 150-200 paddlefish each year for the next five years. On-site creel census should be conducted as often as possible. This information would be invaluable in determining harvest rates and total harvest.

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 walleye year-class strength and winter reservoir water levels. Attempts should be made to quantify the walleye population and determine the potential for supplying eggs. The revised walleye stocking plan developed in 1991 should be implemented.

Walleye reproduction is still considered to be below optimum at Nelson Reservoir, but appears to be improving. Alternate years of walleye fingerling stocking should be continued. Monitoring of reproductive success of sport and forage fish should be continued. Newly constructed spawning shoals should be evaluated as to their usefulness to spawning walleye. A creel census similar to one conducted in 1984 should be initiated after several good water years have been experienced.

Beach seining and gill netting should be continued at Beaver Creek Reservoir to monitor growth and survival of stocked walleye. Alternate year walleye fry plants should be continued.

Stocking of 8- to 10-inch muskies should continue in H. C. Kuhr Reservoir until survival and recruitment can be fully evaluated. Occasional walleye stocking will be necessary to increase predation on the expanding panfish populations.

Sampling of adult sportfish at Bailey Reservoir should continue to establish trend data and monitor growth and recruitment. Supplemental plants of northern pike fingerlings should be made in 1993.

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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
15-4535 Bailey Reservoir

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