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Region 6
3661

MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: MONTANA PROJECT TITLE: STATEWIDE FISHERIES INVESTIGATIONS

PROJECT NO.: F-78-R-4 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, 1997 THROUGH JUNE 30, 1998

ABSTRACT

Paddlefish harvest and tagging records were maintained for populations in the Dredge Cuts and Missouri River above Fort Peck Reservoir. Harvest on both populations remains low. No creel census was conducted in 1997 on the Fort Peck paddlefish population. Gill netting and beach seining were conducted at Fresno and Nelson Reservoirs with good results. Natural reproduction of walleye was confirmed in Beaver Creek Reservoir for the first time. The fishery in Bailey Reservoir is improving. Walleye and tiger muskies are doing well in Little Warm Reservoir.

OBJECTIVES AND DEGREE OF ATTAINMENT

1) Survey and Inventory - To survey and monitor the characteristics and trends of fish populations, angler harvest and preferences, and to assess habitat conditions in selected waters. Objective accomplished, data presented.

2) Fish Population Management- To implement fish stocking and/or fish eradication actions to maintain fish populations at levels consistent with habitat conditions and other limiting factors. Objective accomplished, data presented.

3) Technical Guidance - To review projects by government agencies and private parties which have the potential to affect fisheries resources, and provide landowners and other private parties with technical advice and information to sustain and enhance fisheries resources. Objective accomplished: twelve 310 projects reviewed and completed with state and local agencies; advised Rocky Boy Indian Tribe on interbasin transfer of biota; supplied input to Compact Commission relative to water needs assessment on Rocky Boy Indian Reservation and Beaver Creek; advised Rocky Boy Reservation on stream enhancement projects; supplied comments to Bureau of Land Management (BLM) relative to development of Kipp Park; other information is presented in data.

4) Aquatic Education - To enhance the public's understanding, awareness and support of the state's fishery and aquatic resources and to assist young people to develop angling skills and to appreciate the aquatic environment. Objective accomplished, 21 meetings relating to aquatic education were held.

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 mesh were fished to acquire information on adult fish populations. Beach seining to determine abundance and reproductive success of sport and forage fishes was conducted in late summer utilizing a 100-x 10-foot seine of 1/4-inch square mesh. A 230 volt pulse DC boom shocking boat was used to collect young-of-the-year (YOY) walleye and adult walleye and bass after dark. Whenever possible, fish were measured for total length (TL) and weighed to the nearest .01 pound. Scales and/or spines were taken from walleye and lower dentaries from paddlefish for aging purposes. Stationary gill nets of 4-inch and 5-inch bar mesh measuring 300 feet long by 8 feet deep were used to capture paddlefish in the headwaters of Fort Peck Reservoir. Six and 8-feet deep by 100-feet long gill nets of 4-inch bar mesh were drifted to capture paddlefish in the Missouri River.

RESULTS AND DISCUSSION

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 1997. 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.

Five tagged paddlefish were harvested by fishermen during 1997. Four fish were taken at Intake on the Yellowstone River. The other was snagged near Wolf Point on the Missouri River. To date, 177 paddlefish tagged in the study area have been harvested; 73 (40%) in the Dredge Cuts and 104 (60%)in the Yellowstone or Missouri River, primarily at Intake Dam. During the past ten years (1988-97), however, over 90% 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 at the relatively new fishery near the confluence in North Dakota. It also suggests a high rate of paddlefish mobility and interchange between the Missouri and Yellowstone Rivers.

The harvest rate for paddlefish in the Dredge Cut area remains low as summarized in Table 1. The average annual percent harvest for 928 fish tagged between 1976-84 varied from 0.4-1.3%. The average annual harvest

rate prior to 1976 was 1.0% (Needham, 1985). Paddlefish tagged in the Missouri River outside the Dredge Cuts experienced the same low exploitation rates as those tagged in the Dredge Cuts.

Table 1. A summary of paddlefish tagging and harvest from the Dredge Cut complex and Missouri River, 1968-97. 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 1997	Total No. Tags Returned	Percent Tags Returned	Avg. Annual % Harvest
1968	12	0	1	8.3	*
1969[1]	94 (92)	0	16	17.4	*
1970	5	0	0	0.0	*
1974[2]	189 (185)	0	35	18.9	0.8
1976[3]	48 (47)	0	10	21.2	1.0
1977	40	0	10	25.0	1.2
1978[4]	162 (156)	2	42[5]	25.9	1.3
1979	151	2	34	22.5	1.2
1979	40 (River)	0	4	10.0	0.5
1980	29 (River)	0	2	6.9	0.4
1981	60 (River)	1	9	15.0	0.9
1982	21 (River)	0	4	19.0	1.2
1984	77	0	10	13.0	0.9
	928	5	177		

*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 beginning in 1987 for dead fish or tag removal.

[3]Harvest based on 47 fish beginning 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 beginning 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 23, 19, 18 years of fishing pressure and harvest exposure, these groups have exhibited an average annual harvest rate of 0.08-1.3%, and the total harvest rate ranged from 18.9-25.9%.

The Fort Peck Indian Reservation began selling paddlefish tags in 1992. This was initiated in response to increasing interest in paddlefish snagging, particularly in the Frazer pumpsite area downstream from Fort Peck Dam. No data relative to tag sales or harvest has been received as yet from the tribe; however, harvest is not thought to be significant at this time.

Fort Peck Reservoir and Missouri River Upstream

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 29 fish tagged in the reservoir in 1992.

In 1993, a project was initiated to tag a relatively large number of paddlefish over five consecutive years. A total of 434 paddlefish were tagged in 1993. The majority (314) were tagged in the Missouri River during the annual spawning run. An additional 120 fish were netted and tagged in the headwaters of Fort Peck Reservoir prior to trigger flows occurring in the river. An additional 499 fish were tagged in the river in 1994, 456 in 1995, 281 in 1996, and 483 in 1997.

Berg (1981) noted that significant upstream movement of paddlefish did not occur until flows reached 14,000 cubic feet per second (cfs) at the Virgelle gauging station. The 14,000 cfs flow is considered to be a "trigger" flow for spawning fish. Initial trigger flows in 1997 occurred in early May. Drift netting in the lower river area commenced on May 6 and continued through May 20. Two boats with three-man crews worked simultaneously on the river. The intensive effort reduced the sampling time by 2 to 3 weeks. No ripe female paddlefish were captured during the tagging period.

Twelve tagged paddlefish were reported harvested in 1997. Five of those returns were from fish tagged in 1997.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 0.8-3.6%.

Table 2. A summary of paddlefish tagging and harvest data from the Missouri River and Fort Peck Reservoir, 1976-97. Percent harvest was derived by adjusting for previous harvest of tagged fish.

Year	No. Tagged	No. Tags Returned in 1997	Total No. Tags Returned	% Harvest	Avg. Annual Harvest %
1976	23	0	6	26.1	1.2
1977[1]	60	1	10	16.7	0.8
1978	227[2]	0	44	19.4	1.0
1979	11	0	5	45.5	2.5
1980	33	0	14	42.4	2.5
1983	2	0	1	50.0	3.6
1986	13	0	4	30.8	2.8
1992	29	0	4	13.8	2.8
1993	434[3]	0	19	4.4	1.1
1994	499	3	34	6.8	2.3
1995	456	3	29	6.4	3.2
1996	281	0	13	4.6	4.6
1997	483	5	5	1.0	1.0
	2,551	12	230		

[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.
[3]120 tagged in Fort Peck Reservoir near Mickus Coulee.

No on-site creel census was conducted in 1997. The number of reported tag returns fell from 43 in 1996, to 12 in 1997. This is believed to be due to the lack of personnel at the site. The harvest of paddlefish from the Fort Peck Reservoir stock was last determined by on-site creel census in 1996.

As previously mentioned, harvest rates are not believed to be excessive at present. However, the low number of successful spawning runs (based on trigger flows) in recent years warrants additional scrutiny. A female paddlefish was observed in April of 1993, which was in the process of reabsorbing her eggs. This was most likely a fish that was ready to spawn in 1992, but due to low flows was unable to reach a suitable spawning site.

Annual spawning migrations were rated as to their probable success based solely on the fish's ability to ascend the river and reach spawning sites above Fred Robinson Bridge (FRB) (Table 3). As mentioned, trigger flows of 14,000 cfs appear to be necessary to initiate spawning migrations upriver. Ratings of good, marginal and poor were assigned to each of the last twenty spawning seasons. Good years were determined to be those in which trigger flows occurred and the duration of those flows exceeded 30 days during the mid-May to mid-July spawning period. A marginal rating

was assigned to those years in which trigger flows occurred, but the duration during the spawning season was less than 30 days. A poor rating was assigned to those years in which trigger flows were never reached and successful spawning was very unlikely or severely limited. From 1974 to 1983, 7 good years, 2 marginal years, and 1 poor year were experienced. In contrast, 7 of the next 10 years were rated marginal or poor. Low recruitment is anticipated from those years. It is possible that no year-classes were developed within the 6-year span from 1985 to 1990. The potential loss of recruitment will not be evident in the snagging fishery until 1995 and could persist until the year 2005. Aging of harvested fish during that time period may validate spawning success assumptions based on trigger flows.

Table 3. Paddlefish spawning success ratings for the years 1974-97 using trigger flow* (TF) incidence and duration as the sole criteria.

Year	Good	Marginal (# days>TF)	Poor
1974	X	------	-
1975	x	------	-
1976	X	------	-
1977	-	------	X
1978	X	------	-
1979	-	X (20)	-
1980	X	------	-
1981	X	------	-
1982	X	------	-
1983	-	X (29)	-
1984	X	------	-
1985	-	------	X
1986	-	X (19)	-
1987	-	------	X
1988	-	------	X
1989	-	X (05)	-
1990	-	X (03)	-
1991	X	------	-
1992	-	------	X
1993	X	------	-
1994	-	X (06)	-
1995	X	------	-
1996	X	------	-
1997	X	------	-

* Flows measured at the Virgelle Gauging Station

A system of angler tagging of harvested paddlefish was first 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. In 1994, fishermen were allowed to harvest only one paddlefish from the Yellowstone and Lower Missouri River, while two per year could still be taken from the middle Missouri fishery. The only other significant regulation difference between the Yellowstone and Missouri River fisheries is that snaggers may immediately release a snagged fish if they so desire at the middle Missouri River fishery, but any fish snagged on the Yellowstone or lower Missouri River must be immediately tagged. Some limited catch and release has been allowed at Intake since 1996. No snagging mortality has been observed on the Missouri River. All mortality previously observed was connected with hygrading of held fish or from injuries sustained from contact with outboard propellers. Snaggers, in the past, would often "tie up" fish in the river then 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 indicate there is a significant voluntary effort to return large females to the river which would otherwise be harvested under a no-release restriction. There was some concern that restricting the harvest to one fish on the Yellowstone River might cause a mass relocation of fishermen to the Missouri River. Angler interviews, since 1994, indicate this has not occurred.

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 on two consecutive days (12 net-days).

The lake whitefish catch remained constant from 1996 (Table 4). Whitefish continue to comprise a significant portion of the gill-net catch but are rarely caught by fishermen. Whitefish exhibit high growth rates in the reservoir and thereby escape predation from all but the largest walleye and pike. Lake whitefish appear to reproduce successfully in years of good over-winter storage. The role of whitefish in this reservoir, either as a forage fish or competitor, is not understood at this time.

The paucity of adult yellow perch in the gill-net catch, since their introduction in 1968, 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. The 1989 year-class was very strong and provided catches of large perch previously unheard of in

Fresno Reservoir. The catch of large perch is probably short-lived. A decrease in both numbers of perch and average size was observed in both 1995 and 1996.However, in 1997, numbers and average size rebounded to higher levels.

Northern pike are present in large numbers. Ice fishermen consistently take several fish every year weighing over 25 pounds. On August 20,1994, local fishermen were employed to provide hook-and-line caught northern pike to the Department for transplant purposes. Twenty-five two-man teams brought in 810 live northern pike in 3.5 hours. The fish averaged approximately 18 inches long. Handling mortality was estimated to be around 15%. A similar effort in October of 1995 yielded 140 pike in 4 hours. In August of 1996, 280 pike were collected in 6 hours of fishing. No pike were collected for transplanting purposes in 1997.

The walleye gill-net catch remained at high levels. In recent years a positive correlation has been made between over-winter water levels and recruitment of YOY walleye to the population (Needham and Gilge, 1990). The strong showing of the 1995 year-class in connection with good over-winter storage in 1995-96 reinforces this correlation. Good recruitment occurred despite the fact that the YOY beach seining catch was low and 1995 was considered a very poor reproduction year. No correlation has been made between late summer YOY beach seine captures and gill net catches of the same year-class the following year (Figure A).

Table 4. A summary of the catch in overnight sinking experimental gill net sets in Fresno Reservoir, 1965-97. Number of nets used varied from 4 to 12.

Species	Year	No.	Avg. No. Per Net Set	Avg. Length (inches)	Avg. Weight (pounds)	% 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
	1993	38	3.2	16.3	1.78	21.8
	1994	93	7.8	14.9	1.81	37.9
	1995	36	3.0	15.4	1.74	9.9
	1996	54	4.5	---	---	22.2
	1997	53	4.4	11.0	0.36	16.9

Table 4 (Con'd)

Species	Year	No.	Avg. No. Per Net Set	Avg. Length (inches)	Avg. Weight (pounds)	% of Total
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
	1993	12	1.0	9.2	0.43	0.7
	1994	25	2.1	11.2	0.56	5.6
	1995	19	1.6	8.3	0.40	5.2
	1996	6	0.5	7.1	0.19	2.5
	1997	21	1.8	7.0	0.16	6.0
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
	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
	1993	108	9.0	13.3	1.05	62.1
	1994	180	15.0	13.4	1.08	40.4
	1995	219	18.3	14.4	1.29	60.3
	1996	123	10.3	13.7	1.11	50.6
	1997	190	13.8	13.6	1.05	60.9
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

Table 4. (Cont'd)

Species	Year	No.	Avg. No. Per Net Set	Avg. Length (inches)	Avg. Weight (pounds)	% of Total
	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
	1993	16	1.3	16.1	1.06	15.4
	1994	72	6.0	18.2	1.41	16.1
	1995	89	7.4	19.7	2.04	24.6
	1996	60	5.0	20.5	2.01	24.7
	1997	48	4.0	19.9	2.26	15.4

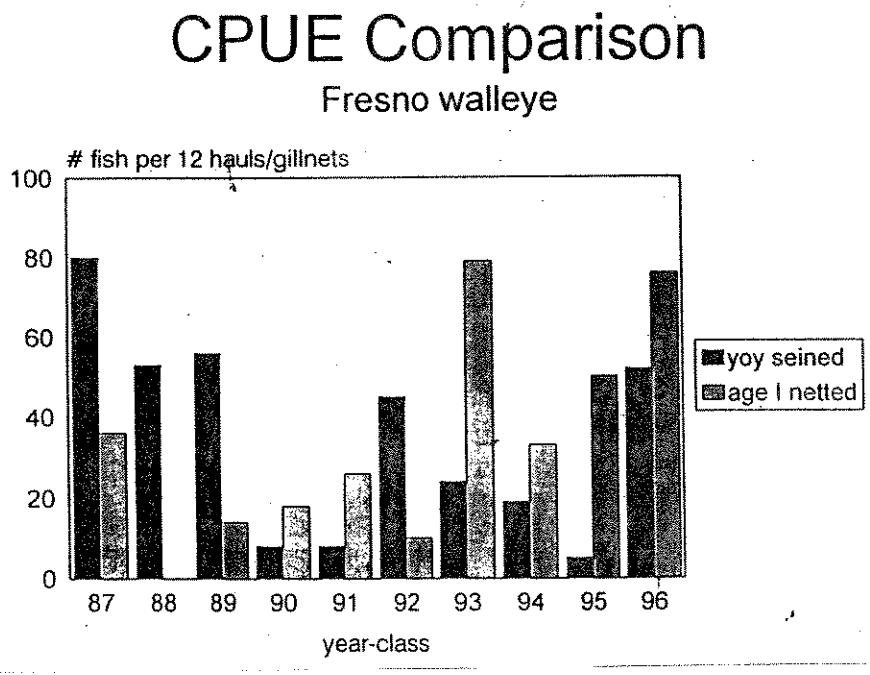

Figure A. Comparison of walleye year-classes seined and gill-netted the following year

Walleye hatchery fingerlings (4-5 in.) were marked and released in Fresno Reservoir in September of 1990, 1992, and 1994. A total of 6,000; 10,500; and 9,300 were stocked respectively. The fish were marked by clipping the tip of the cartilage on either the left or right opercle. This was done to distinguish hatchery fish from wild fish and determine the contribution of hatchery fish to the existing year-class (Table 5).

Table 5. Numbers of hatchery walleye marked and subsequently recaptured in Fresno Reservoir, 1990, 1992, and 1993.

Year Class	Mark Type	Number Marked	Number In Recap Sample	Number Marked In Recap Sample	[1]Estimated Year-Class Strength
1990	R.OP	6,000	634	9	283,000
1992	L.OP	10,500	425	1	[2]N/A
1994	R.OP	9,300	181	4	125,500

[1]Modified Petersen estimate assuming 25% initial handling mortality
[2]Insufficient number of recaptures

Accurate estimates of year-class strength are difficult to produce due to the low numbers of recaptures. Initial handling mortality is also unknown, but is believed to be significant in light of observed gull predation following release and apparent post marking stress. However, even considering high initial mortality (25%), the number of recaptures was very low, indicating good natural reproduction and a limited contribution from hatchery fish.

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 fish abundance. The seining results showed below average numbers of YOY yellow perch (Table 6). High numbers of spottail shiners were observed. Walleye YOY were present in high numbers. Northern pike reproduction appeared average.

Montana State University - Northern embarked on a project in the summer of 1994 to gather baseline water quality data from Fresno Reservoir. This is the first data of this type ever gathered at Fresno. Additional data was collected in 1996 and 1997. Some qualitative and quantitative zooplankton sampling was also conducted with Montana Fish, Wildlife & Parks (MFWP) assistance.

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, 1965-97.

Date		Seine Hauls	Species & 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
August	1993	12	24	9	5,595	12	2	162	0	0	0
August	1994	12	19	19	2,960	3	287	1,421	1	0	0
August	1995	12	5	2	1,080	0	2	129	0	1	0
August	1996	12	52	21	3,576	0	1	1,484	42	0	0
August	1997	12	46	15	3,006	2	1	887	2	0	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.

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. Spottail shiners were initially introduced to the reservoir in 1984 to supplement the existing walleye forage base. Three artificial walleye spawning shoals were constructed in 1993, and were immediately utilized by spawning walleye, as well as white suckers. Beach seining is conducted annually to determine reproductive success of sport and forage fishes. Beach seining was conducted in July at a number of sites on the reservoir, encompassing 890 feet of shoreline. The sport fish YOY catch consisted of 53 walleye, no northern pike, and 2,205 yellow perch (Table 7). The walleye YOY catch was the largest in 20 years . The yellow perch catch was below historical averages. Northern pike production was poor.

Table 7. A summary of walleye, yellow perch, and northern pike young-of-the-year captured by beach seining in Nelson Reservoir, 1974-97.

		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	4,445	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
1993*	520	3	5.8	8,287	15,937	1	1.9
1994*	830	6	7.2	1,802	2,171	10	12.0
1995*	760	36	47.4	232	305	0	0.0
1996*	870	25	28.7	4,521	5,197	13	14.9
1997*	890	53	59.5	2,205	2,478	0	0.0

*Years in which walleye fry or fingerlings were stocked.

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. In 1993, five additional stations were added to increase sample size and reservoir coverage. Since 1993, all 10 stations have been utilized. The catch per unit effort (CPUE) of walleye has increased steadily since 1992 (Table 8). Walleye year- class strength, as observed in the gill-net catch, appears to correlate more strongly with years of supplemental stocking than with beach seining results. Yellow perch CPUE declined steadily since 1991, but increased to a higher level in both 1996 and 1997. The northern pike catch increased in 1997. White sucker was the second most common fish captured. Population trends of key sport-fish are exhibited in Figure B.

Table 8. Relative catches of fishes from Nelson Reservoir with experimental sinking gill nets, fall 1991-97.

				Yellow				Lake		White			
	No.	Walleye		Perch		No. Pike		Whitefish		Sucker		Goldeye	
Year	Nets	n	CPUE	n	CPUE	n	CPUE	n	CPUE	n	CPUE	n	CPUE
1991	5	49	9.8	51	10.0	15	3.0	25	5.0	18	3.6	24	4.8
1992	5	36	7.2	37	7.4	19	3.8	29	5.8	26	5.2	2	0.4
1993	10	76	7.6	38	3.8	21	2.1	22	2.2	182	18.2	11	1.1
1994	10	115	11.5	32	3.2	24	2.4	60	6.0	82	8.2	3	0.3
1995	10	120	12.0	23	2.3	10	1.0	37	3.7	113	11.3	16	1.6
1996	10	183	18.3	68	6.8	18	1.8	32	3.2	135	13.5	22	2.2
1997	10	175	17.5	73	7.3	26	2.6	21	2.1	91	9.1	16	1.6

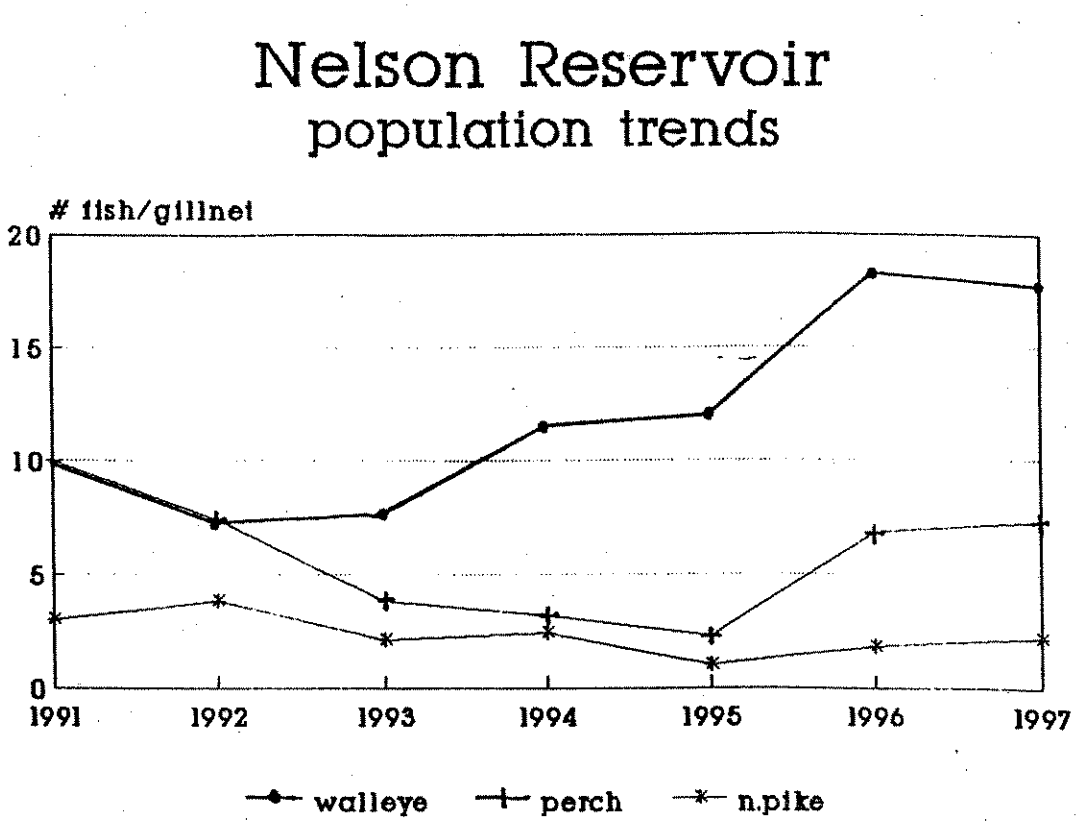

Figure B. Population trends of three key sport fish in Nelson Reservoir using CPUE of fall gillnetting.

In September of 1995, 9,500 4-inch walleye fingerlings from the Miles City Hatchery were opercle clipped and released to assist in estimating the numbers of fish in the 1995 year-class. Marking also helped determine the contribution of hatchery fish to the cohort. A total of 262 fish of that year-class have been captured to date by electrofishing and gill net. Only seven in the recapture sample were marked. Assuming 25% initial handling mortality, the number of YOY walleye as of September 1995 was estimated to be approximately 235,000 fish. The contribution of stocked walleye to the year class amounted to 3%. Sampling will continue over several years to improve the size of the recapture sample.

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 northern pike natural reproduction was documented in 1985,

1988, 1989, or 1992. However, the northern pike YOY catch in 1993 was the highest recorded to date. Reproductive success of pike was good in 1997. Some of the initially introduced fish have exceeded 30 pounds in weight.

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 9). A large year-class of perch was produced in 1991, and was followed by another good production year in 1992. An exceptional perch production year occurred in 1995. No reproduction was evident in 1993 and very little in 1996 and 1997. Yellow perch, spottail shiners and suckers provide most of the forage base. For the first time in almost a decade, no sucker YOY were captured by seining in 1993. Walleye YOY were captured by beach seining for the first time in 1996. This could be indicative of good survival of hatchery fish or successful natural reproduction. A single YOY walleye was captured in 1997. This fish was a result of natural reproduction as no fry or fingerlings were stocked prior to seining. This is the first confirmed natural reproduction in this reservoir since the introduction of walleye in 1987.

Spottail shiners were introduced in 1988 to supplement the forage base. They have become well established as evidenced by the large numbers captured in 1995.

Table 9. A summary of sport fish YOY and forage fish taken by beach seining from Beaver Creek Reservoir, 1985-97.

			Species[1]								
Date	No. Hauls	WSU/ LSU	YP	LK CH	FTHD MIN	S/P MIN	ID	EM SH	SP SH	NP	WE
9-04-85	5	2,535	0	7	0	0	11	0	0	0	-
6-16-86	4	3,110	0	1	0	0	2	0	0	9	-
8-19-87	6	969	2,281	2	1	2	72	1	0	10	-
8-23-88	6	54	4,401	0	0	0	4	0	1	0	-
8-21-89	6	45	29	2	0	0	0	3	602	0	-
8-21-90	6	1	42	0	0	0	2	1	93	2	0
8-13-91	6	348	8,615	0	0	2	0	2	835	12	0
8-10-92	6	492	1,938	0	0	0	4	0	156	0	0
8-18-93	6	0	0	0	0	0	11	0	455	27	0
8-08-94	6	49	707	0	0	0	0	0	181	11	0
8-19-95	6	6	7,210	0	0	0	0	0	1,438	13	0
8-12-96	6	261	5	0	0	0	7	0	247	5	7
8-15-97	6	31	17	0	0	0	6	0	193	13	1

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

Walleye were stocked in 1987 due to local demand. The walleye management plan included 3 consecutive years of stocking, followed by 2 non-stocking years to evaluate natural reproduction. Fish of each year-class were marked for future identification. Sufficient numbers of marked walleye were collected by 1992, to estimate all 3 walleye year-classes (Table 10). 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. Thirteen walleye were captured in the fall gill netting. The walleye averaged 17.7 inches (range 9.4-22.9) and 2.42 pounds (range 0.28-4.80).

Table 10. 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	Recapture Size (in.)	No. Sample Size	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.

Walleye stomach analysis indicates yellow perch and spottail shiners are heavily utilized. Growth and condition of walleye exceeds that of other local populations.

No walleye were stocked in 1990 or 1991. Beach seining and electrofishing were utilized to sample YOY walleye in the event limited natural reproduction had occurred. Natural reproduction of walleye was documented for the first time in 1997. Efforts to confirm natural reproduction will continue in non-stocking years. Alternate-year plants of 200,000 fry began in 1992. Annual plants of 300,000 fry began in 1996.

Spawning walleye were sampled at night with a DC boom electrofishing boat. Seven female walleye were taken at the creek mouth on April 25. These fish ranged in weight from 4.60-8.30 pounds. None of the fish were ripe. One female weighing 7.30 pounds, was captured on the dam face and was running eggs. Six males were also captured on the dam. The males averaged 2.80

pounds. Numerous large northern pike were observed near the creek mouth. A ripe female exceeding 25 pounds was captured.

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 management of the MFWP. 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 winter-killed, 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 MFWP 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 department introduced fish has been good in most years.

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 11). No netting was conducted in 1997. Yellow perch, black crappie and northern pike have grown exceptionally fast in this productive reservoir. Large catches of perch exceeding 0.50 pounds were commonly taken 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 11. Total catch from two experimental gill net sets at Bailey Reservoir, 1990-97.

	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
9-10-93	2	31.8	7.55	21	6.6	0.15	127	6.7	0.12
9-19-94	7	20.1	2.59	38	6.0	0.10	43	6.3	0.14
9-12-96	14	23.8	3.54	86	7.2	0.19	15	6.8	0.21
1997	---------- No netting ----------								

Though no largemouth bass were taken by gill netting, fishermen report regular catches of yearling bass and occasional fish up to 3 pounds. Black crappie are being taken in good numbers and 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 adult pike since that winter has declined noticeably. The gill-net catch and poor fishermen success are suggestive of a low pike population at present. Good northern pike reproduction was last observed in 1990. A plant of 5,000 northern pike fingerlings was made in 1993 to supplement expected natural reproduction. Though high water levels in 1993 were conducive to spawning, no sign of naturally produced fish or hatchery fish was found by late summer. A transplant of 710 18-inch pike was made in August of 1994. These were fish that were "hook-and-lined" from nearby Fresno Reservoir. An additional 140 22-inch pike were transplanted from Fresno Reservoir in October of 1995. Some YOY pike were observed in 1996, indicating at least some natural production occurred. Though no netting was conducted in 1995, fishermen reported good catches of pike throughout the winter of 1995-96. Several walleye in excess of 8 pounds have recently been caught by fishermen. These fish were apparently survivors from a single plant made in 1989.

Little Warm Reservoir

Little Warm Reservoir provided good fishing for northern pike and yellow perch until the dam washed out by flooding in 1986. The reservoir was subsequently drained for repair and refilled in 1988. The reservoir is privately owned and utilized for stock water and irrigation. The MFWP manages the fishery which is open to the public. The reservoir was stocked with 100,000 walleye fry in 1989, 1990, 1992, and 1994. Walleye fry plants were increased to 200,000 fry in 1996. Sixty-eight ripe adult crappie were introduced in 1989. Two experimental sinking gill nets were fished overnight in April to assess survival and growth of stocked fish. A total of 11 walleye were sampled representing most year classes. The walleye ranged from 12.0 to 21.6 inches.

No adult crappie were captured. Other species found in the reservoir are brook sticklebacks, Iowa darters, white suckers, golden shiners, yellow perch, black bullhead and fathead minnows. Most of these fish are common to the drainage and probably were introduced from upstream sanctuaries. A total of 24 adult white suckers were netted in 1993, compared with 9 in 1991, and 124 in 1994. Only three large suckers were netted in 1997. Yellow perch are increasing in number and size.

Because of the large increase in white suckers, an additional piscivore was considered for introduction. The tiger muskie was chosen and 429 7-inch fingerlings were introduced in the fall of 1993. Another 2,500 2-inch fingerlings were planted in 1997. Two tiger muskies were netted in 1997, weighing 4.80 and 4.58 pounds. Reports of larger muskies were received.

Management plans include alternate-year stocking of walleye fry and tiger muskie fingerlings, to maintain fishable populations.

Fort Peck Dredge Cuts and Tailwater

Fish population sampling was continued in the Fort Peck Dredge Cuts and tailwater complex during June and October 1997. During both of these months, ten 125-x-6-foot multifilament experimental and four 100-x-8-foot, one-half inch bar mesh monofilament gill nets were set overnight. Nets were fished for an average of 19 hours each, as in previous year. 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 regulation 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.

The combined catch for walleye/sauger, the most popular sport fish in the area, was the highest in 1980 when 94 were netted. This was believed to be associated with an abundance of rainbow smelt in the area originating from a migration of smelt out of Lake Sakakawea, ND. The combined walleye/sauger catch in 1997 was 73 (Table 12), compared to 62 in 1996. The catch of smelt continued to be low in 1997, with only 15 smelt captured, (Table 13). The highest catch of smelt(70) was recorded in 1993, this was the highest catch recorded since netting began in 1979.

Cisco appeared in the experimental net catch for the first time in 1985 and have become a significant forage source for piscivorous fish in the area. The presence of cisco correlates with introductions, beginning in 1984, into Fort Peck Reservoir. Dead and injured cisco continue to be observed in the Fort Peck tailpool periodically through the year. The combined cisco catch in 1997 was 64, this is down significantly from previous year's catch of 132.

A combined total of 119 shovelnose sturgeon were captured in standard experimental gill nets. Standard fork length and standard length measurements were taken and numbered spaghetti tags were inserted through the base of the dorsal fin on all fish. This was done to augment ongoing shovelnose and pallid sturgeon research in the lower Missouri and Yellowstone Rivers.

Table 12. Summary of 1997 June and October combined standard smelt netting with 154.3 hours and 8 nets in the Fort Peck Dredge Cuts.

Species[1]	Average Length (in.)	Average Weight (lbs.)	Number	CPUE Per Hr.	CPUE Per Net
SNS	0[2]	0	0	0	0
GE	13.3	0.70	4	0.03	0.50
CI	0	0	0	0	0
RBS	6.2	0.06	15	0.10	1.90
STS	4.4	0.06	2	0.01	0.25
W/P	0	0	0	0	0
LNS	0	0	0	0	0
WS	0	0	0	0	0
CC	17.0	1.54	3	0.02	0.40
YP	0	0	0	0	0
SG	0	0	0	0	0
WE	13.9	1.38	3	0.02	0.40
Total			27	0.17	3.38

[1] SNS-Shovelnose Sturgeon
GE-Goldeye
CI-Cisco
RBS-Rainbow Smelt
STS-Spottail Shiner
W/P-Western or Plains Silvery Minnow
LNS-Longnose Sucker
WS-White Sucker
CC-Channel Catfish
YP-Yellow Perch
SG-Sauger
WE-walleye

[2] Fork Length

Table 13. Summary of 1997 June and October combined standard experimental gill netting with 377.1 hrs and 20 nets in the Fort Peck Dredge Cuts.

Species[1]	Average Length (ins.)	Average Weight (lbs.)	Number	CPUE Per Hr.	CPUE Per Net
SNS	23.3[2]	2.20	119	0.32	5.95
GE	12.8	0.63	81	0.22	4.05
LW	16.4	1.97	7	0.02	0.35
CI	11.1	0.50	64	0.17	3.20
CHS	0	0	0	0	0
RBT	0	0	0	0	0
RBS	6.0	0.10	7	0.02	0.35
NP	22.0	3.28	26	0.07	1.30
CP	16.9	2.37	2	*	0.10
RC	16.2	2.32	20	0.05	1.00
BS	0	0	0	0	0
SMB	20.3	4.19	5	0.01	0.25
BMB	14.8	1.87	1	*	0.05
SHR	16.6	1.98	2	*	0.10
LNS	8.5	0.22	1	*	0.05
WS	12.6	1.02	46	0.12	2.30
CC	16.5	1.43	72	0.19	3.60
BUR	0	0	0	0	0
YP	6.9	0.15	5	0.01	0.25
SG	16.8	1.47	15	0.04	0.75
WE	18.6	2.39	58	0.15	2.90
Total			531	1.41	26.55

[1]SNS-Shovelnose Sturg.
GE-Goldeye
LW-Lake Whitefish
CI-Cisco
CHS-Chinook Salmon
RBT-Rainbow Trout
RBS-Rainbow Smelt
NP-Northern Pike
CP-Carp
RC-River Carpsucker
BS-Blue Sucker
SMB-Smallmouth Buffalo
BMB-Bigmouth Buffalo
SHR-Shorthd Redhorse Sucker
LNS-Longnose Sucker
WS-White Sucker
CC-Channel Catfish
BUR-Burbot
YP-Yellow Perch
SG-Sauger
WE-Walleye
[2]Fork Length
*less than 0.01 fish/hour

RECOMMENDATIONS

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. A mail/phone survey should be conducted periodically using names

of anglers who purchased tags. Attempts should be made to tag 500+ paddlefish each year for the next three years. On-site creel census should be conducted every other year. This information is invaluable in determining harvest rates and total harvest and pressure. Enforcement activities should be logged so a record of monitoring can be established.

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. Efforts should be made to increase perch production through habitat improvement and an additional forage fish should be considered for introduction. Fishing regulations tailored to protection of smaller walleye should be investigated.

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 continue. Newly constructed spawning shoals should be evaluated as to their usefulness to spawning walleye. A creel census similar to the one conducted in 1984 should be considered 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. Consider annual walleye fry plants and alternate large fingerling plants.

Sampling of adult sport fish at Bailey Reservoir should continue to establish trend data and monitor growth and recruitment. Supplemental stocking of northern pike should continue until population is strengthened.

Continue alternate year stocking of walleye and tiger musky in Little Warm Reservoir. Evaluate annually by gill netting.

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

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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
15-4570	Beaver Creek Reservoir
15-4535	Bailey Reservoir
15-6105	Little Warm Reservoir

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