Ref # 87502
Rep #

MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: MONTANA PROJECT TITLE: STATEWIDE FISHERIES INVESTIGATIONS

PROJECT NO.: F-113-R-2 STUDY TITLE: SURVEY AND INVENTORY OF COLDWATER AND WARMWATER ECOSYSTEMS

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

JOB PERIOD: JULY 1, 2001 THROUGH JUNE 30, 2002

ABSTRACT

Paddlefish harvest and tagging records were maintained for the Fort Peck Reservoir/Missouri River Paddlefish population. Two paddlefish were apparently flushed over the Ft.Peck Dam spillway in 1997 and were caught at Intake on the Yellowstone River. Harvest on this population remains low. Gill netting and beach seining were conducted at Fresno and Nelson Reservoirs. Gill netting and beach seining was conducted at Beaver Creek Reservoir. The fishery in Bailey reservoir is improving. Walleye and tiger muskies are doing well in Little Warm Reservoir. Gill netting was conducted in the Fort Peck tailwater and dredge cut areas of the Missouri River.

OBJECTIVES AND DEGREE OF ATTAINMENT

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

Fish Population Management - Objective is 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.

Technical Guidance - To review projects by federal, state and local government agencies and private parties that have the potential to affect fisheries resources, and to provide technical advice or decisions to mitigate impacts on these resources. To provide landowners and other private parties with technical advice and information to sustain and enhance fisheries resources. Objective accomplished: Thirteen 310 projects reviewed and two 124 projects were reviewed with state and local agencies; advised Rocky Boy Indian Tribe on Beaver Creek Management Plan; supplied input to Compact Commission relative to water needs assessment on Rocky Boy Indian Reservation and Fort Belknap Reservation; advised Rocky Boy Reservation on stream enhancement projects; supplied comments to Bureau of Land Management (BLM) relative to development of new fishing reservoirs; Twenty two meetings were attended with schools related to the "Hooked on Fishing" program; other information is presented in data.

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. 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 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

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. In 1993, a project was initiated to tag a relatively large number of paddlefish over six 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, 483 in 1997, 368 in 1998, 380 in 1999,88 in 2000 and 13 in 2001. The 2001 catch consisted of 11 males and 2 females. No ripe females were captured during the tagging period, which encompassed May 22-24. Flows were so exceptionally low that netting was ineffective even in areas of the river where large numbers of fish were seen.

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 in considered to be a "trigger" flow for spawning fish. Trigger flows were never reached in 2001 and flows did not exceed 6,500 cfs during the paddlefish spawning season (Figure A).

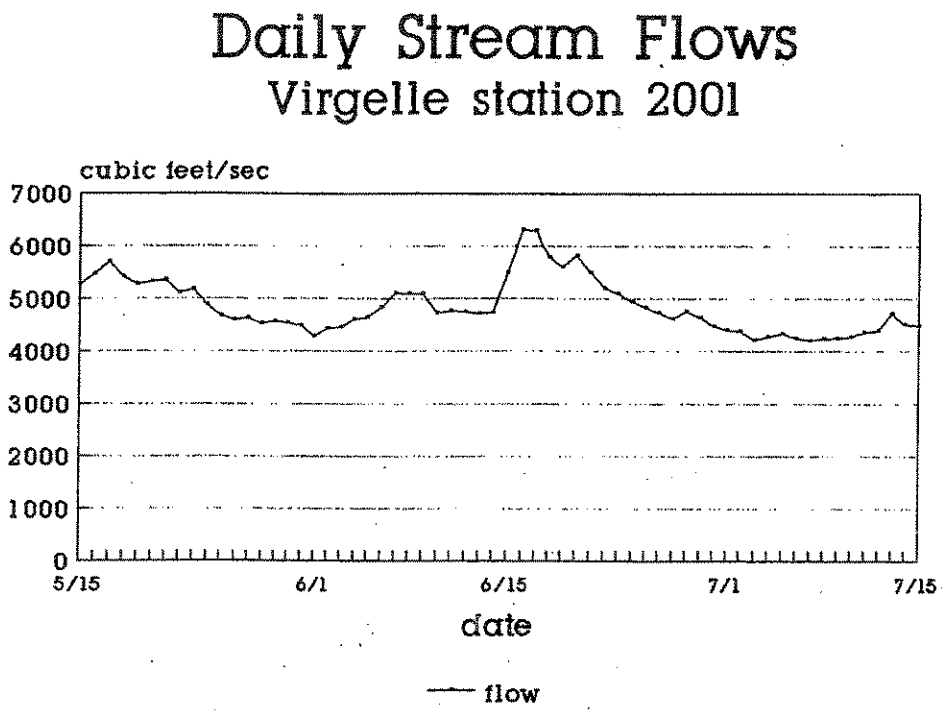

Figure A. Missouri River hydrograph at Virgelle during paddlefish spawning season, 2001.

Nineteen tagged paddlefish were reported harvested by snaggers in 2001. None of the tags were from fish tagged in 2001. Of particular interest was the harvest of two paddlefish, a female tagged in 1997 and a male tagged in 1993 that were caught at Intake Diversion Dam on the Yellowstone River. It is believed that the fish escaped from Ft.Peck Reservoir during a rare spillway discharge in 1997. This constitutes the only record of paddlefish successfully relocating over the dam. Tag return data reveals a low rate of harvest for this paddlefish population as summarized in Table 1. The average annual rate of harvest over the period 1976-01 has varied from 0.6% to 3.4%.

Table 1. A summary of paddlefish tagging and harvest data from the Missouri River and Fort Peck Reservoir, 1976-01. Percent of harvest was derived by adjusting for previous harvest of tagged fish.

Total	No. Tagged	No. Tags Returned In 2001	Total No. Tags Returned	% Harvest	Avg. Annual % Harvest
1976	23	0	6	26.1	1.0
1977[1]	60	0	10	16.7	0.7
1978	277[2]	1	45	16.2	0.7
1979	11	0	5	45.5	2.0
1980	33	0	13	39.4	1.8
1983	2	0	1	50.0	2.6
1986	13	0	5	38.5	2.4
1992	29	1	4	13.8	1.4
1993	434[3]	2	25	5.8	0.6
1994	499	0	27	5.4	0.7
1995	456	2	34	7.5	1.1
1996	281	2	29	10.3	1.7
1997	483	6	26	5.4	1.1
1998	368	1	20	5.4	1.4
1999	380	3	12	3.2	1.1
2000	88	1	6	6.8	3.4
2001	13	0	0	0.0	0.0

[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

As previously mentioned, harvest rates are not believed to be excessive at present. However, the potentially low number of successful spawning runs (based on observed trigger flow duration) in recent years warrants additional scrutiny on the ability of this sport fishery to recruit sufficient numbers of adults in future years.

Mean weight of female paddlefish has been monitored for many years and was thought to be an indicator of over-harvest. An assumption was made that paddlefish weight was directly related to age. It was believed that if the average size of females decreased significantly, it would indicate an over-harvest of mature, egg bearing fish on which the future of the stock depended. Information gathered from tagged fish, at large as long as 25 years, does not support this assumption however. Aging of harvested fish was not routinely conducted and no age/weight relationships over time had been investigated until recently. It is now generally agreed that the majority of paddlefish growth occurs in the juvenile or early adult stages. After reaching maturity, paddlefish growth is often insignificant. Mean annual weight gain was examined in adult fish to determine if growth after reaching sexual maturity was significant. Mean annual growth was determined from fish tagged and recovered from the Fort Peck/Missouri River stock (Table 2). Thirteen males, at large since initial tagging an average of 13.7 years (range 8-20), provided a basis for analysis. Mean annual weight change for male paddlefish was +0.4 pounds/year (range -0.9 to +1.7). Thirteen females,

at large since initial tagging an average of 13.0 years (range 8-25), had a mean annual weight change of -0.1 pounds/year (range -3.0 to +2.3). Unless there is significant tagging related growth suppression, it would appear that the maximum size achieved by any particular paddlefish is likely due to food availability and habitat conditions present in Fort Peck Reservoir during the fish's early growth period. This period would encompass about the first 10 years for males and the first 15 years for females.

Table 2. Weight differential over time for male and female paddlefish from the Fort Peck/Missouri River stock based on recaptures of tagged fish.

Tag No.	Date Tagged	Date Caught	No. Yrs. Growth	Initial Weight	Capture Weight	Difference (lbs.)	Mean Annual Weight Change
MALES							
646	5/78	5/01	23	25.0	22.0	- 3.0	-0.1
777	5/78	5/98	20	26.0	30.0	+ 4.0	+0.2
016	5/73	5/93	20	30.5	32.0	+ 1.5	+0.1
661	4/78	5/95	17	21.0	38.0	+17.0	+1.0
711	4/78	4/93	15	27.0	24.5	- 2.5	-0.2
695	4/78	5/92	14	20.0	35.0	+15.0	+1.1
779	5/78	5/91	13	27.0	32.0	+ 5.0	+0.4
789	5/78	5/90	12	17.0	37.0	+20.0	+1.7
033	4/74	4/86	12	13.0	22.0	+ 9.0	+0.8
947	4/80	5/91	11	55.0	45.0	-10.0	-0.9
627	4/78	4/86	8	29.0	36.0	+ 7.0	-0.9
722	4/78	4/86	8	18.0	28.0	+10.0	+1.3
932	5/79	5/86	8	32.0	35.0	+ 3.0	+0.4
1161	4/86	5/90	5	45.0	46.0	+ 1.0	+0.2
1160	4/86	5/90	4	32.0	37.0	+ 5.0	+1.3
FEMALES							
508	5/73	6/98	25	50.0	66.0	+16.0	+0.6
461	4/74	4/94	21	88.0	89.0	+ 1.0	+0.1
756	5/78	5/94	17	52.0	57.0	+ 5.0	+0.3
242	4/78	4/93	15	85.0	79.0	- 6.0	-0.4
181	5/77	5/91	14	50.5	68.5	+18.0	+1.3
639	4/78	5/91	13	84.0	80.0	- 4.0	-0.3
048	4/74	5/86	12	64.0	62.0	- 2.0	-0.2
793	6/78	5/88	10	79.0	80.0	+ 1.0	+0.1
950	5/80	5/89	9	62.0	35.0	-27.0	-3.0
760	5/78	5/87	9	40.0	61.0	+21.0	+2.3
654	4/78	5/86	8	102.0	103.0	+ 1.0	+0.1
649	4/78	5/86	8	92.0	95.0	+ 3.0	+0.4
245	5/78	6/86	8	67.0	60.0	- 7.0	-0.9

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 or poor were assigned to each of the last 25 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 seasoning was less than 30 days. A **Poor** rating was assigned to those years in which trigger flows were not reached and successful spawning was 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 assumption based on trigger flows. Another four consecutive years of poor recruitment has occurred since 1998. Age calculations from dentaries were not complete at the time of this report.

Table 3. Paddlefish spawning success ratings for the years 1974-01 using trigger flows[1] (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	-----	-
1998	-	X(25)	-
1999	-	X(13)	-
2000	-	-	X
2001	-	-	X

[1]Flows measured at the Virgelle Measuring Station

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. Severe drought in 2000 and 2001 reduced the storage volume to 8% of capacity and the reservoir is only 10% of capacity entering the winter. 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).

Whitefish continue to comprise a significant portion of the gill-net catch, but are rarely caught by fisherman (Table 4). 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. Lake whitefish have not been found in stomachs of walleye or northern pike.

Table 4. A summary of the catch in overnight sinking experimental gill net sets in Fresno Reservoir, 1965-01. Number of nets used varied from 4 to 12.

Species	Year	No.	Avg. No. Per Net Set	Avg. Length (ins.)	Avg. Weight (lbs.)
Lake Whitefish	1970	1	0.1	19.9	3.30
	1971	1	0.2	18.7	2.94
	1972	4	0.5	17.8	2.35
	1974	3	0.8	19.5	3.15
	1987	65	10.8	12.2	0.71
	1988	55	9.2	17.5	2.45
	1989	22	3.7	14.4	1.06
	1990	46	7.7	10.0	0.98
	1991	37	6.2	12.7	1.03
	1992	66	11.0	16.0	1.69
	1993	38	3.2	16.3	1.78
	1994	93	7.8	14.9	1.81
	1995	36	3.0	15.4	1.74
	1996	54	4.5	----	-----
	1997	53	4.4	11.0	0.36
	1998	65	5.4	15.7	1.40
	1999	53	4.4	16.5	1.88
	2000	73	6.1	17.7	2.15
	2001	108	9.0	18.4	2.30
Yellow Perch	1969	7	0.9	5.4	0.07
	1970	20	2.5	6.9	0.16
	1971	6	1.5	7.6	0.23

Table 4 (con't)

Species	Year	No.	No. Per Net Set	Avg. Length (ins.)	Avg. Weight (lbs.)
Yellow perch	1972	2	0.3	8.7	0.40
	1974	2	0.5	5.7	0.09
	1987	43	7.2	6.2	0.13
	1988	24	4.0	8.7	0.32
	1989	0	----	----	----
	1990	0	----	----	----
	1991	16	2.7	8.2	0.40
	1992	3	0.5	7.8	0.29
	1993	12	1.0	9.2	0.43
	1994	25	2.1	11.2	0.56
	1995	19	1.6	8.3	0.40
	1996	6	0.5	7.1	0.19
	1997	21	1.8	7.0	0.16
	1998	9	0.8	7.8	0.23
	1999	3	0.3	10.8	0.70
	2000	4	0.3	10.7	0.55
	2001	33	2.8	7.0	0.20
Walleye	1965	14	0.9	12.4	0.80
	1966	14	2.3	11.6	0.62
	1967	11	1.6	12.9	0.88
	1968	29	3.6	12.3	0.64
	1969	24	3.0	12.9	0.92
	1970	95	11.9	14.4	1.16
	1971	28	7.0	13.6	1.08
	1972	34	4.3	16.1	1.44
	1974	22	5.5	15.9	1.35
	1987	37	6.2	16.7	1.99
	1988	67	11.2	15.5	1.97
	1989	32	5.3	14.6	1.14
	1990	28	4.7	15.7	1.74
	1991	88	14.7	13.3	0.88
	1992	102	17.0	15.0	1.40
	1993	108	9.0	13.3	1.05
	1994	180	15.0	13.4	1.08
	1995	219	18.3	14.4	1.29
	1996	123	10.3	13.7	1.11
	1997	190	13.8	13.6	1.05
	1998	253	21.1	13.8	1.03
	1999	140	11.7	13.6	0.91
	2000	141	11.8	13.6	0.80
	2001	80	6.6	14.8	1.01
Northern Pike	1965	23	1.6	18.2	1.23
	1966	6	1.0	20.1	1.68
	1967	7	1.0	20.6	2.50
	1968	9	1.1	17.8	1.66
	1969	9	1.1	19.7	1.88
	1970	12	1.5	16.3	1.33
	1971	30	7.5	17.0	1.12

Table 4 (con't)

Species	Year	No.	No. Per Net Set	Avg. Length (ins.)	Avg. Weight (lbs.)
N. pike	1972	5	0.6	17.3	0.93
	1974	1	0.3	20.6	1.84
	1987	35	5.8	19.1	1.74
	1988	46	7.7	20.6	2.85
	1989	19	3.2	21.6	2.74
	1990	20	3.3	19.2	2.09
	1991	10	1.7	19.3	2.28
	1992	34	5.7	21.1	2.49
	1993	16	1.3	16.1	1.06
	1994	72	6.0	18.2	1.41
	1995	89	7.4	19.7	2.04
	1996	60	5.0	20.5	2.01
	1997	48	4.0	19.9	2.26
	1998	25	2.1	22.4	2.88
	1999	15	1.3	18.8	1.50
	2000	19	1.6	22.5	1.90
	2001	16	1.3	25.4	4.10

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 adult perch are ever captured by gill nets (Table 4). The low catch-per-unit-effort (CPUE) is of concern, as it is far below that of all other north central walleye/perch fisheries. The adult perch catch-rate increased almost 10 fold in 2001 due to a transplant of 37,500 adult perch from local waters and Lake Mary Ronan in April. Plans are to add pre-spawn adult yellow perch to the reservoir in 2002 to take advantage of the massive amount of spawning vegetation developed on dewatered shorelines over the last two drought years. Despite a run-of-the-river situation in the reservoir following planting, many perch remained in the reservoir and did not get flushed downstream as expected (Figure B).

The northern pike population has declined steadily since 1995; however, ice fishermen consistently take several fish over 20 pounds each winter.

The walleye gill-net catch decreased as expected due to the drafting of the reservoir. Relative weight of walleye has declined steadily since 1997. Condition of walleye at present is the worst ever experienced in the reservoir. The failing condition of walleye coincided with supplemental stocking of walleye fingerlings in 1997 (Figure C). It is believed that the stocking of walleye, at a time when walleye populations were at an all time high and forage abundance was low, probably contributed to or precipitated the decline in condition of walleye. Severe drought experienced in both 2000 and 2001 has reduced habitat, increased water temperatures and turbidity and hampered forage fish production. These factors exacerbated the problem but did not cause it.

Fresno
Adult Perch

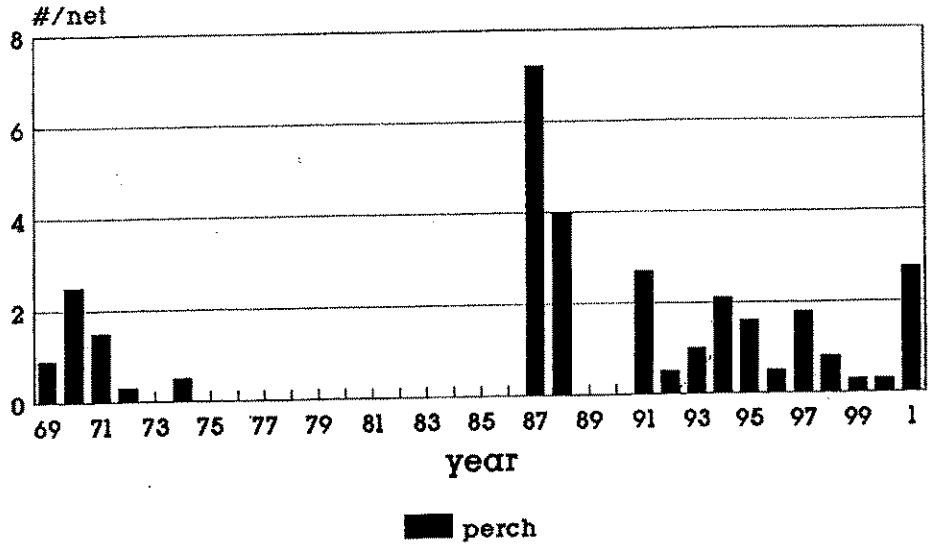

Fig B. Gill net catch-per-unit-effort for yellow perch at Fresno Reservoir, 1969-2001. (Years not netted: '73,'75-'86)

FRESNO WALLEYE
Relative Weight

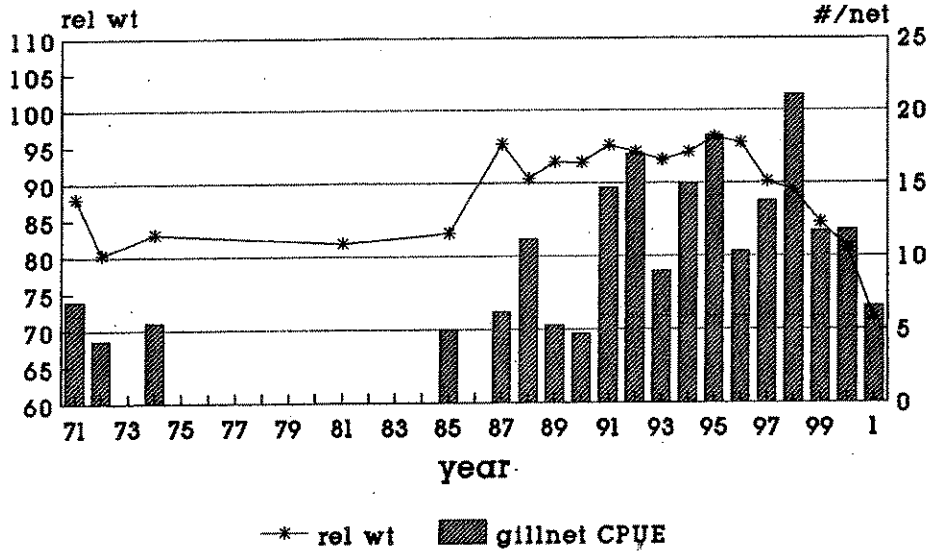

Figure C. Relative weight of Fresno walleye and catch-per-unit- effort in fall gillnets. No comparison netting occurred in'73,'75-84, and '86.

Due to low water conditions, beach seining was conducted at only half of the 12 standard sampling sites around the reservoir in a continuing effort to evaluate reproductive success of sport fishes and assess forage fish abundance. Numerous YOY *Stizostedion* sp. were captured (Table 5). The high catch was not expected due to the rapidly falling water levels that occurred throughout the spawning season. Many of the fish were initially identified as sauger and about 25% of the fish were placed in an aquarium to grow up and assist in positive identification. Only one of the aquarium raised fish turned out to be a walleye. Walleye therefore did not reproduce well, but sauger, hatched in the river above, apparently found the run-of-the river conditions in Fresno very adequate for rearing. Yellow perch production was the lowest ever experienced despite the influx of 37,500 pre-spawn perch. No suitable spawning substrate was inundated during the spawning season. Spottail and emerald shiner production was low or escapement/flushing was high. All the spottail shiners were heavily infested with what appeared to be *Ligula sp.* tapeworms. No YOY pike were captured for the second consecutive year.

The severe drought experienced in 2001 caused the reservoir to be reduced to 8% of its storage volume. It is believed many fish were flushed from the reservoir and those remaining in the reservoir experienced some harsh conditions brought on by high temperatures, turbidity and competition for available food. Two years of dewatering will certainly have a negative effect on the population of *Hexagenia sp.* burrowing mayflies which provide a significant amount of forage for walleye in most years.

Table 5. A summary of forage fish and YOY game and sport fish taken with a 100- x 9-foot x ¼-inch square mesh beach seine in Fresno Reservoir, 1965-01.

			Species & Number								
Date		Seine Hauls	*Stizostedion*	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	465	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
August	1998	12	44	1	1,413	9	0	1,041	1	3	0
August	1999	12	50	7	4,271	176	12	182	13	0	0
August	2000	6	29	0	1,396	2	2	30	2	0	1
August	2001	6	86*	0	39	3	0	3	3	1	0

[1]Consists of white and long nose sucker
[2]Consists of silvery minnows, lake chubs, flathead chubs, and fathead minnows
[3]Consists of burbot, smallmouth bass, and brook sticklebacks
* almost entirely sauger

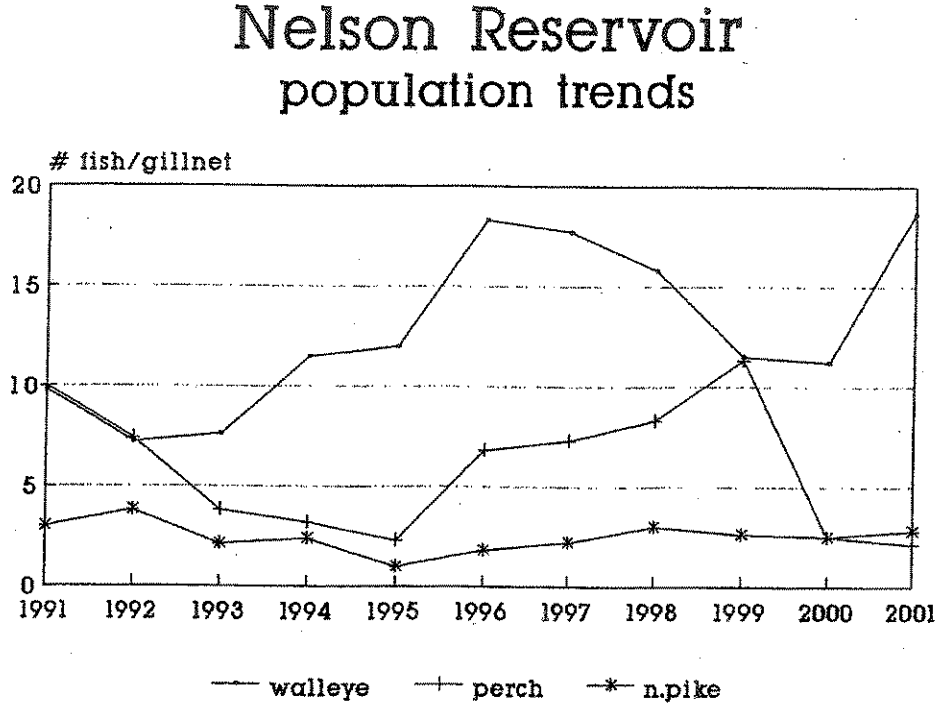

Figure D. Population trends of three key sport fishes in Nelson Reservoir using CPUE of fall gill nets.

The severe droughts experienced in 2000 and 2001 has affected condition and recruitment of sport and forage fish but has not had an immediate effect on adult numbers. The significant reduction in adult perch numbers is believed to be a result of fish lost down irrigation canals.

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 was documented, no recruitment occurred and largemouth bass are no longer found in the reservoir. Soon after bass introductions were made, northern pike were found in the reservoir 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 1998. Some of the initially introduced fish have exceeded 30 pounds in weight. Northern pike are severely reducing rainbow trout numbers despite increased trout stocking rates.

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. 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. Ten white sucker YOY were captured by seining in 2001. A single YOY walleye was captured in 1997. This fish was a result of natural reproduction, as no fry or fingerling were stocked prior to seining. This is the first confirmed natural reproduction in this reservoir since the introduction of walleye in 1987. The reservoir is currently stocked annually with fingerling walleye. Spottail shiners were introduced in 1988 to supplement the forage base. They have become well established, as evidenced by the large numbers captured in the last few years. They are utilized as forage by pike, walleye, perch, trout and smallmouth bass.

Table 8. A summary of sport fish YOY and forage fish taken by beach seining from Beaver Creek Reservoir, 1985-01.

		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	1	0	0	72	0	0	10	-
8-23-89	6	54	4,401	0	0	0	4	0	1	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
8-14-98	6	0	870	0	0	0	0	0	141	6	1
8-16-99	6	0	592	0	0	0	0	0	86	7	2
8-14-00	6	1	402	0	1	0	0	0	190	3	23
8-16-01	6	10	357	0	0	0	0	0	216	0	3

[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. Fry plants appeared to be quite successful in establishing a fishable population. However in later years fry planting has not provided sufficient recruitment. Twenty-seven walleye were captured in the fall gill netting. The walleye averaged 13.9 inches (range 7.0-25.5 in) and 1.41 pounds (range 0.08-6.50 lbs).

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. Water levels in the reservoir have been good to very good over the last decade, which has provided almost optimum growing conditions for sport and forage fish. However, drought in 2000 and 2001 severely reduced storage in the reservoir. 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 spawning white suckers. Beach seining is conducted annually to determine reproductive success of sport and forage fishes. Beach seining was conducted in late July at a number of sites around the reservoir, encompassing 430 feet of shoreline. The sport fish YOY catch consisted of 2 walleye, 1 northern pike, and 72 yellow perch (Table 6). Production of walleye, northern pike and perch was very low. White suckers did well however and may provide the main source of forage in the next year.

Table 6. A summary of walleye, yellow perch, and northern pike YOY captured by beach seining in Nelson Reservoir, 1974-01.

		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	0.7	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	651	31	50.6	8859	14,300	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

Table 6 (Con't)

Year	Shoreline Seined (ft.)	Walleye No.	Walleye No./ 1,000 (ft.)	Yellow Perch No.	Yellow Perch No./ 1,000 (ft.)	No. Pike No.	No. Pike No./ 1,000 (ft.)
1996*	870	25	28.7	4,521	5,197	13	14.9
1997*	890	53	59.5	2,205	2,478	0	0.0
1998*	340	0	0.0	126	371	0	0.0
1999	750	11	14.7	1,489	1.895	2	2.7
2000*	440	4	9.0	449	1,020	2	4.5
2001	430	2	4.7	72	167	1	2.3

*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 CPUE of walleye increased to an all time high in 1996, steadily declined every year until 2001 and then returned to high levels (Table 7). Yellow perch CPUE was on the rise until the droughts experienced in 2000 and 2001. The northern pike catch has remained quite stable since 1997. The white sucker population continues to increase. Population trends of key sport fish are exhibited in Figure D.

Table 7. Relative catches of fishes from Nelson Reservoir with experimental sinking gill nets, fall 1991-01.

Year	No. Nets	Walleye n	Walleye CPUE	Yellow Perch n	Yellow Perch CPUE	Northern Pike n	Northern Pike CPUE	Lake Whitefish n	Lake Whitefish CPUE	White Sucker n	White Sucker CPUE	Goldeye n	Goldeye 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
1998	10	158	15.8	83	8.3	30	3.0	12	1.2	86	8.6	38	3.8
1999	10	115	11.5	113	11.3	26	2.6	14	1.4	95	9.5	11	1.1
2000	10	112	11.2	25	2.5	25	2.5	33	3.3	116	11.6	51	5.1
2001	10	186	18.6	21	2.1	28	2.8	45	4.5	175	17.5	52	5.2

Walleye stomach analysis indicates yellow perch and spottail shiners are heavily utilized. Predation on trout by larger walleye has been documented, but it is not felt to be a major source of trout mortality at this time. Growth and condition of walleye exceeds that of other local populations.

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 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 MFWP began 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 9). 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. Fishermen report that the average perch size is increasing.

Table 9. Total catch from two experimental gill net sets at Bailey Reservoir, 1990-01.

	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	.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----------								
9-17-98	3	22.2	2.43	132	8.0	0.26	32	9.0	0.44
1999	----------No netting----------								
2000	----------No netting----------								
2001	----------No netting----------								

A 5.5 pound largemouth bass was captured by electrofishing in 2000 and fishermen report regular catches of yearling bass and occasional fish up to three 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 suggest 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 were 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. Alternate year stocking of walleye was initiated in 1999 in order to provide an additional sport fish and utilize the abundant yellow perch population. No netting occurred in 2000 and 2001 due to county-wide fire danger closures.

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 in 1996. Sixty-eight ripe adult crappie were introduced in 1989. Two experimental sinking gill nets were fished overnight in April 1998 to assess survival and growth of stocked fish. A total of five walleye were sampled representing three year-classes. The walleye ranged from 8.9 to 17.7 inches.

No adult crappie were captured. Other species found in the reservoir are brook stickleback, Iowa darter, white sucker, golden shiner, yellow perch, black bullhead and fathead minnow. Most of these fish are common to the drainage and probably were introduced from upstream sanctuaries. Twenty-two white suckers were netted in 1998. 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 musky 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 are common. Two tiger muskies from the 1997 plant were netted in 1998. They measured 12.3 and 14.2 inches.

No netting was done in 2000 due to temporary closure by landowner. Five frame traps fished in mid-April, 2001 captured 11 walleye ranging from 2.55 pounds to 5.55 pounds. A 27.5 tiger musky was captured as well as thousands of yearling yellow perch. Five black crappie ranging in size from 7.5 to 11.3 inches were also captured.

Water levels were extremely low throughout the year and remain low. A metal boat ramp was installed while water levels were low. Management plans include alternative-year stocking of walleye fry and tiger musky fingerlings, to maintain fishable populations.

Fort Peck Dredge Cuts and Tailwater

Fort Peck Dredge Cuts and tailwater complex fish population sampling continued in June and September, 2001. For both months, ten 125- x 6-foot multifilament experimental gill nets and four 100- x 8-foot 1/2-inch bar mesh monofilament gill nets, were set overnight. Nets were set for an average of 18.6 hours each. This sampling effort, initiated in 1979, was to obtain information on the overall fish population due to potential impacts associated with proposed construction of re-regulation dam below Fort Peck Dam. Another objective is to evaluate the abundance of game fish in relation to cisco and rainbow smelt.

The walleye/sauger combined catch was the highest in the area in 1980-(94 were netted). This is believed to have been associated with the migration of large numbers of rainbow smelt from lake Sakakawea, ND. However, the combined walleye/sauger catch in 1998 was also 94, and was not accompanied by a large number of rainbow smelt being present (only 7 captured). In 2001, only 46 walleye/sauger were netted (Table 13), with only 3 rainbow smelt taken (Tables 13 and 14).

The combined cisco experimental net catch in 2001 was 55. Cisco first appeared in this sampling in 1985, one year after they were introduced into Fort Peck Reservoir. Since then, they have become a significant forage fish in the area immediately below Fort Peck Dam.

A combined total of 72 shovelnose sturgeon were captured in standard experimental gill nets in 2001, down from 99 in 2000. Standard fork length and standard length measurements were taken and numbered spaghetti tags were inserted through the base of the dorsal fin on all shovelnose. This was done to augment on-going shovelnose and pallid sturgeon research in the lower Missouri and Yellowstone Rivers.

Goldeye were the most common fish captured in the standard experimental gill net sampling, and were slightly more abundant than in 2000, when 133 were taken.

Channel cat numbers were significantly up, with 116 captured, compared to 44 sampled by standard experimental gill netting in 2000.

Table 13. Summary of 2001 June and September combined standard experimental gill netting with 385.0 hrs. and 20 nets in the Fort Peck Dredge pools.

Species[1]	Average Length (ins.)	Average Weight (lbs.)	Number	CPUE Per Hr.	CPUE Per Net
SNS	25.2[2]	2.00	72	0.19	3.6
SNG	24.8	1.70	1	*	0.1
GE	11.9	.54	149	0.40	7.5
LW	17.4	2.10	9	0.02	0.5
CI	10.7	0.41	55	0.15	2.8
RBS	6.5	0.10	2	*	0.1
NP	23.7	3.41	24	0.06	1.2
CP	20.7	4.30	2	*	0.1
RC	16.4	2.15	25	0.07	1.3
SMB	19.6	3.90	6	0.02	0.3
BMB	28.9	14.05	2	*	0.1
SHR	14.2	1.27	13	0.03	0.7
WS	14.6	1.54	30	0.08	1.5
CC	16.2	1.39	116	0.31	5.8
YP	6.8	0.15	2	*	0.1
SG	14.5	0.94	12	0.03	0.6
FWD	14.5	1.40	1	*	0.1
WE	16.6	1.61	34	0.09	1.7
TOTAL			555	1.49	27.8

[1]SNS-Shovelnose Sturgeon
SNG-Shortnose gar
GE-Goldeye
LW-Lake Whitefish
CI-Cisco
RBS-Rainbow Smelt
NP-Northern Pike
CP-Carp
RC-River Carpsucker
SMB-Smallmouth Buffalo
BMB-Bigmouth Buffalo
SHR-Shorthead Redhorse
WS-White Sucker
CC-Channel catfish
YP-Yellow Perch
SG-Sauger
FWD-Freshwater drum
WE-Walleye

[2]Fork Length
*less than 0.01 fish/hour

Table 14. Summary of 2001 June and October combined standard Smelt netting with 155.9 hrs and 8 nets in the Fort Peck dredge pools.

Species[1]	Average Length (ins.)	Average Weight (lbs.)	Number	CPUE per hour	CPUE per net
GE	11.5	0.47	6	0.03	0.8
CI	4.8	0.01	7	0.05	0.9
RBS	6.2	0.05	1	<0.01	0.1
STS	4.0	0.02	1	<0.01	0.1
YP	3.9	0.03	4	0.03	0.5
Total			19	0.12	2.4

GE-Goldeye
CI-Cisco
RBS-Rainbow Smelt
STS-Spottail Shiner
YP-Yellow Perch

RECOMMENDATIONS

The 2-paddlefish annual limit, utilizing fishermen 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 database of anglers who purchased tags. Attempts should be made to tag 300+ paddlefish each year. On-site creel census should be conducted at least 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. Transplanting of adult perch to the reservoir should continue until a catch rate of 3.0 perch/net is attained.

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.

Beach seining and gill netting should be continued at Beaver Creek Reservoir to monitor growth and survival of stocked walleye. Continue spring fingerling plant and fall advanced fingerling walleye plants.

Sampling of adult sport fish at Bailey Reservoir should continue to establish trend data and monitor growth and recruitment. Occasional supplemental stocking of northern pike should continue until the 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 trend data on the overall fish populations.

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Waters referred to:

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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

Key words or fish species:

Paddlefish, harvest, walleye, water levels, creel census, population estimates, recruitment, tiger musky, stocking, cisco, smelt

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Date: June 30, 2002