

MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: MONTANA PROJECT TITLE: STATEWIDE FISHERIES INVESTIGATIONS
PROJECT NO.: F-78-R-5 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, 1998 THROUGH JUNE 30, 1999

ABSTRACT

Paddlefish harvest and tagging records were maintained for the Ft. Peck Reservoir/Missouri River paddlefish population. Harvest on this population remains low. A creel census conducted in 1998 was the lowest harvest ever recorded. This was due primarily to low flows during the spawning season. 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 Ft. Peck tailwater and dredge cut areas of the Missouri River.

OBJECTIVES AND DEGREE OF ATTAINMENT

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.

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.

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 Ft. Belknap Reservation; 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.

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, 18 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-foot 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, and 483 in 1997. Three hundred sixty-eight paddlefish were tagged in 1998. The catch consisted of 189 males and 179 females. No ripe females were captured during the tagging period which encompassed April 12 through June 11. A single day of sampling was conducted near the Stafford Ferry on July 17. No paddlefish were captured or observed on that date.

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. Trigger flows in 1998 did not occur until June 18 which is towards the end of the spawning season (Figure A). Flows continued to be very high through July.

Missouri River Flows Virgelle Gauge 1998

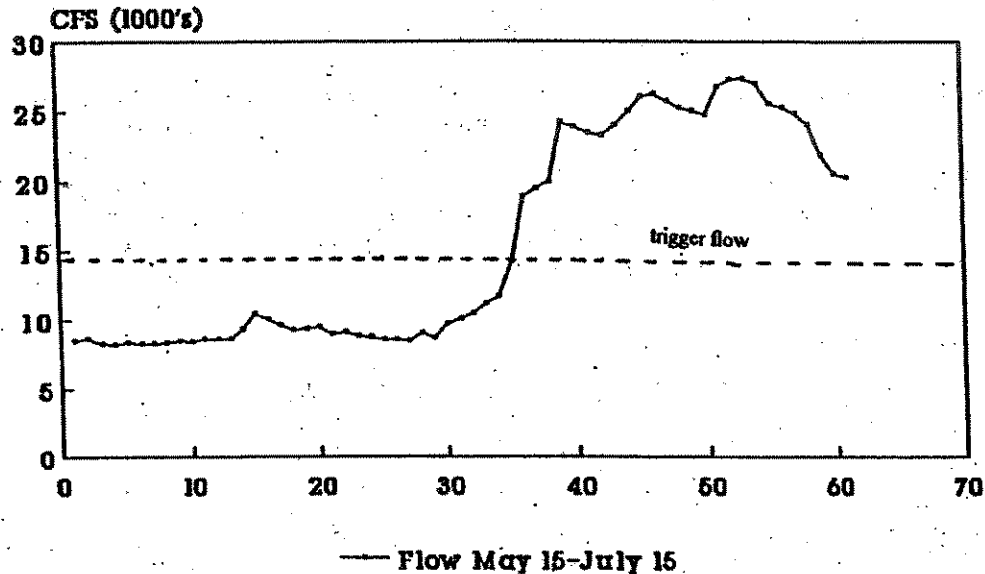


Figure A. Missouri River hydrograph at Virgelle during paddlefish spawning season, 1998.

The number of reported tag returns fell from 43 in 1996 to 12 in 1997, then rebounded to 39 in 1998. No on-site creel census was conducted in 1997. The decline observed in 1997 is believed to be directly related to the lack of personnel on-site. Tag return data from non-creel years should be used with caution.

Of the thirty-nine tagged paddlefish harvested in 1998, eight were from fish tagged in 1998. 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 1976-98 varied from 0.6-3.1%.

Table 1. A summary of paddlefish tagging and harvest data from the Missouri River and Fort Peck Reservoir, 1976-98. Percent harvest was derived by adjusting for previous harvest of tagged fish.

Year	No. Tagged	No. Tags Returned In 1998	Total No. Tags Returned	% Harvest	Avg. Annual % Harvest
1976	23	0	6	26.1	1.5
1977 ¹	60	0	10	16.7	0.9
1978	227 ²	1	44	19.4	1.1
1979	11	0	5	45.5	2.8
1980	33	0	13	39.4	2.6
1983	2	0	1	50.0	4.2
1986	13	0	4	30.8	3.4
1992	29	2	1	3.40	1.1
1993	434 ³	22	13	3.00	1.5
1994	499	11	19	3.80	3.8
1995	456	24	24	5.30	5.3
1997	483	1	6	1.20	0.6
1998	368	8	8	2.10	2.1

	2,916	39	227		

¹Total adjusted for one fish killed by commercial fisherman August, 1981.

²192 tagged in Fort Peck Reservoir from UL Bend to Beauchamp Bay.

³120 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. 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 2). 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 season 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 the 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.

Trigger flows occurred late in the spawning period in 1998 and remained high due to unusually high rainfall in late June. Observations of YOY paddlefish in late summer may reveal if the late discharge allowed for successful reproduction.

Table 2. Paddlefish spawning success ratings for the years 1974-98 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	-----	-
1998	-	x(25)	-

* 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 had 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, fisherman were allowed to harvest only one paddlefish from the Yellowstone and lower Missouri river, while two per year could still be taken from the upper 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 the intake since 1996. No snagging mortality has been observed on the Missouri River. All the mortality previously observed was connected with hygrading of held fish, or from injuries sustained from propellor strikes. Snaggers in the past, would often tie up fish and 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.

On-site creel census

The creel census area consisted of approximately 20 miles of river downstream from FRB, upstream from Fort Peck Reservoir. The last complete census was conducted in 1996. Harvest occurs by snagging in the spring as paddlefish migrate upstream from the reservoir. Some fish apparently reside in the river over the winter as indicated by the high catch rates experienced in the few days following ice-out in most years. For example, on March 26 of 1993, between 50 and 100 paddlefish were caught, and most released, in an area known as the Big Swirl Hole. A large ice jam was present above the hole and the ice free area below was accessible to boat snaggers. The ice did not go out upstream at FRB until the following day. Fish were apparently very concentrated as snaggers reported hooking fish on almost every cast, some snagging vertically below their boats. Both males and large females were taken. On March 27 the ice jam blew out and snaggers reported no further success at that location.

Occasionally, paddlefish are also caught in late summer and fall, but due to the low number taken at these seasons, only spring harvest has been monitored. Almost all fish are taken within the boundaries of the Charles M. Russell Wildlife Refuge (CMR) and at the BLM controlled Kipp Recreation Area.

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 April 1, 1998, which was 13 days after ice-out on the river. Based on warden and CMR personnel observations and interviews, 40 angler-days of pressure was estimated to have occurred during the interim between ice-out and the start of the creel census. Nine paddlefish were estimated to have been harvested during this period. These estimates are reflected in the tables. The creel census extended through June 6 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.

Total fishing pressure was 1,326 angler-days in 1998 (Figure B). Snagging pressure was the lowest recorded to date. This was primarily due to extremely low flows throughout the normal snagging season. Spring weather conditions and river flows often dictate the amount of use this area receives. The total paddlefish harvest in 1998 was estimated to be 236 fish (Table 3). This was the ^{lowest} highest annual harvest ever recorded. Snagger interviews indicated fish were released at a rate of 40-50%. Historical data indicates snaggers are more inclined to release fish as catch rates increase.

Table 3. A summary of fishing pressure, paddlefish harvest, and catch rates during the spring, 1973-98.

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	0.25
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
1993	1,254 (55.7%)	999 (44.3%)	2,253	232 (54.9%)	190 (45.1%)	422	0.19	0.19	0.19
1994	1,780 (49.0%)	1,806 (51.0%)	3,586	313 (56.0%)	248 (44.0%)	561	0.18	0.14	0.16
1995	1,827 (50.1%)	1,820 (49.9%)	3,647	317 (44.5%)	395 (55.5%)	712	0.18	0.22	0.20
1996	1,899 (52.0%)	1,756 (48.0%)	3,655	232 (45.1%)	282 (64.9%)	514	0.12	0.16	0.14
1998	841	485	1,326	136	100	236	0.16	0.21	0.18

Pressure and Harvest Paddlefish

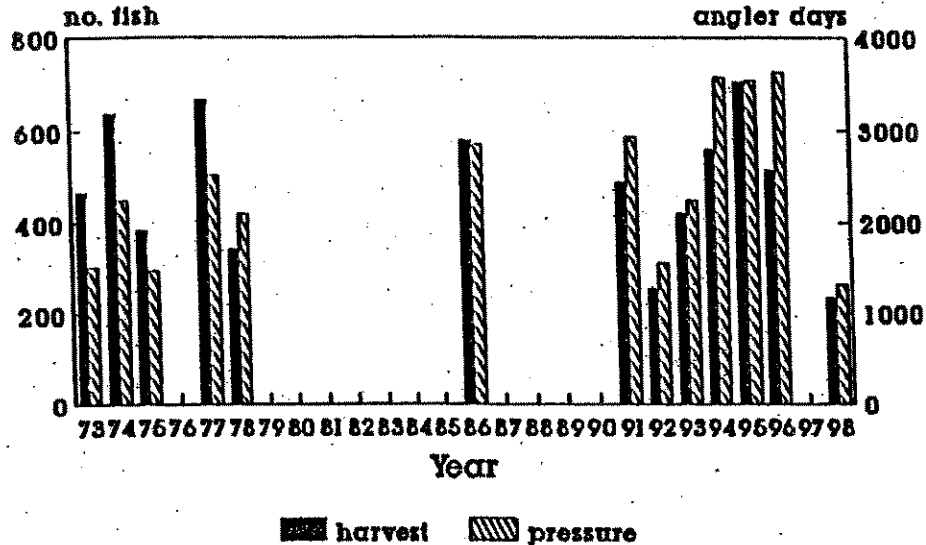


Figure B. Snagging pressure and total harvest as determined by creel census on the Missouri River above Ft. Peck Reservoir, 1973-98/

Paddlefish dentaries were collected from harvested fish to assist in determining the age structure of the Fort Peck Reservoir stock. 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. However, preliminary age data suggests good recruitment and a rather normal age distribution at this time.

Length and weight data was obtained from 208 paddlefish harvested: 86 males and 122 females (Table 4). Total-length measurements are no longer used due to an unacceptable level of accuracy and morphological variation due primarily to tail and paddle erosion or damage. Body-length or eye-fork length is the accepted standard measurement currently used. 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 45% males and 55% females. New fish captured by gill nets (n=368) in 1998 produced a sex ratio of 51% males and 49% females. The large size of females makes them more susceptible to snagging. However, if the random gill netting was a true indicator of the sex ratio present in the run, then some hygrading is probably occurring.

Table 4. A summary of paddlefish size data from harvested fish on the Missouri River above Fort Peck Reservoir, 1965-98.

Year	Females		Males	
	No.	Avg. Weight	No.	Avg. Weight
1965	13	82	21	36
1966	36	74	30	32
1970	7	77	2	44
1971	10	86	1	44
1973	46	76	50	35
1974	58	75	67	33
1975	63	75	56	35
1977	96	78	135	39
1978	58	88	76	38
1986	101	76	167	34
1991	168	60	192	32
1992	124	71	86	35
1993	137	73	199	33
1994	241	69	140	28
1995	204	66	348	31
1996	278	68	161	31
1998	122	68	86	33

Angler residence was obtained for 1,326 fishermen comprised of 1,073 (90%) residents and 153 (12%) nonresidents. Anglers from 39 of Montana's 56 counties utilized the fishery as well as fishermen from 9 other states. Angler use by residence is summarized as follows:

Montana Fishermen (angler-days) by County

1. Yellowstone	234	14. Valley	19	27. Lincoln	5
2. Fergus	216	15. Custer	17	28. Powell	4
3. Cascade	83	16. Choteau	17	29. Rosebud	4
4. Missoula	82	17. Golden Valley	16	30. Fallon	4
5. Gallatin	72	18. Lake	12	31. Wheatland	4
6. Lewis & Clark	68	19. Big Horn	11	32. Silver Bow	3
7. Phillips	67	20. Stillwater	11	33. Ravalli	3
8. Hill	42	21. Glacier	9	34. Teton	3
9. Flathead	41	22. Park	7	35. Sweet Grass	3
10. Boulder	27	23. Broadwater	6	36. Madison	2
11. Blaine	22	24. Roosevelt	5	37. Carter	2
12. Carbon	21	25. Sanders	5	38. Petroleum	2
13. Musselshell	20	26. Judith Basin	5	39. Daniels	1

Nonresident Fishermen (angler-days)

1. Wyoming	87	4. Florida	14	7. Washington	2
2. Idaho	22	5. Wisconsin	8	8. South Dakota	2
3. Minnesota	15	6. Nebraska	2	9. Alaska	1

The average weight of male paddlefish harvested, from past creel census years in which 25 or more fish were weighed, was 33 pounds. Harvested male paddlefish averaged 33 pounds in 1998. The average weight of harvested female paddlefish, from past creel years in which 25 or more fish were weighed, was 73 pounds. In 1998, harvested female paddlefish averaged 68 pounds. The average weight of males taken by gill nets in 1998 was 29 pounds and the average female was 66 pounds. Two (1.6%) of 122 females harvested in 1998 weighed over 100 pounds.

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.

Thirteen males, at large since initial tagging an average of 13.7 years (range 8-20), provided the basis for the analysis. Information analyzed from tagged fish at large as long as 22 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 growth was determined from fish tagged and recovered from the Fort Peck/Missouri River stock (Table 5). 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 5. 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 WT Change
MALES							
777	5/78	5/98	20	26.0	30.0	+ 4.0	+0.2
646	5/78	5/98	20	25.0	27.0	+ 2.0	+0.1
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	-02.5	-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	+05.0	+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	+09.0	+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	+07.0	-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	+03.0	+0.4
1,161	4/86	5/90	5	45.0	46.0	+01.0	+0.2
1,160	4/86	5/90	4	32.0	37.0	+05.0	+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	+01.0	+0.1
756	5/78	5/94	17	52.0	57.0	+05.0	+0.3
242	4/78	4/93	15	85.0	79.0	-06.0	-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	-04.0	-0.3
048	4/74	5/86	12	64.0	62.0	-02.0	-0.2
793	6/78	5/88	10	79.0	80.0	+01.0	+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	+01.0	+0.1
649	4/78	5/86	8	92.0	95.0	+03.0	+0.4
245	5/78	6/86	8	67.0	60.0	-07.0	-0.9

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 increased from 1997 (Table 6). 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.

Table 6. A summary of the catch in overnight sinking experimental gill net sets in Fresno Reservoir, 1965-98. 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
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
	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	.8	7.8	0.23

Table 6. (Cont'd)

Species	Year	No.	Avg. No. Per. Net Set	Avg. Length (ins.)	Avg. Weight (lbs.)
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
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
	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

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 low catch-per-unit effort (CPUE) is of concern as it is far below the CPUE of other north central walleye/perch fisheries. There are few other forage fishes in Fresno Reservoir and the walleye population is increasing.

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 or 1998.

The walleye gill-net catch was the highest ever recorded. 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 C).

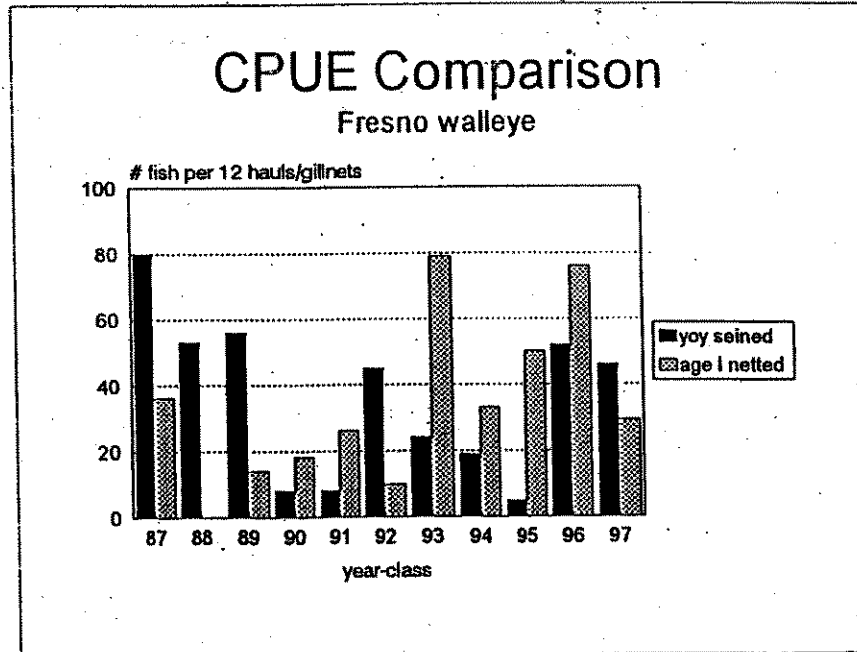


Figure C. Comparison of walleye year-classes seined as YOY and gill netted the following year.

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 7).

Table 7. 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

¹Modified Petersen estimate assuming 25% initial handling mortality

²Insufficient 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 8). High numbers of spottail shiners were observed. Walleye YOY were present in high numbers. Northern pike reproduction was very low.

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, 1997 and 1998. Some qualitative and quantitative zooplankton sampling was also conducted with Montana Fish, Wildlife & Parks (MFWP) assistance.

Table 8. 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, 1965-98.

Date	Seine Hauls	Walleye	No. Pike	Species & Number							Sucker sp. ¹	Minnow sp. ²	Other ³
				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	0	0	
August 1966	6	0	2	0	0	14	0	0	0	0	11	0	
August 1967	10	24	5	0	15	19	0	0	0	0	276	0	
August 1968	12	16	6	2,909	147	552	0	0	0	0	161	0	
August 1969	12	4	6	1,140	385	67	0	0	2	2	380	0	
August 1970	12	27	45	10,151	521	883	0	0	1	1	122	0	
August 1972	12	102	22	1,005	205	379	0	0	0	0	72	0	
August 1974	12	13	59	1,583	29	1,355	0	0	0	0	25	0	
August 1975	11	10	32	4,154	155	59	0	0	0	0	0	0	
August 1978	12	22	42	10,684	12	3	0	0	0	0	0	0	
August 1979	12	29	45	8,516	340	127	0	0	1	0	0	1	
August 1982	12	102	70	8,993	121	166	0	0	0	0	0	3	
August 1983	12	23	0	2,254	448	9	0	0	1	7	0	0	
August 1984	12	247	0	197	375	0	2	2	40	55	0	0	
August 1985	12	64	0	379	684	3	2	2	0	9	5	1	
August 1986	12	0	23	6,077	142	2	20	1	1	5	3	0	
August 1987	12	80	113	6,233	1,979	7	3	0	0	1	0	0	
August 1988	12	53	4	3,122	182	0	20	0	0	1	0	0	
August 1989	12	56	32	24,706	22	0	16	2	2	0	0	0	
August 1990	12	8	57	2,033	7	165	44	1	1	2	0	0	
August 1991	12	8	36	3,425	0	42	53	0	0	0	0	0	
August 1992	12	45	2	6,550	28	0	48	0	0	1	0	0	
August 1993	12	24	9	5,595	12	2	162	0	0	0	0	0	
August 1994	12	19	19	2,960	3	287	1,421	1	1	0	0	0	
August 1995	12	5	2	1,080	0	2	129	0	0	1	0	0	
August 1996	12	52	21	3,576	0	1	1,484	42	2	0	0	0	
August 1997	12	46	15	3,006	2	1	887	2	1	0	0	0	
August 1998	12	44	1	1,413	9	0	1,041	1	1	3	0	0	

¹Consists of white and longnose sucker.

²Consists of silvery minnows, lake chubs, flathead chubs, and fathead minnows.

³Consists 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 340 feet of shoreline. The sport fish YOY catch consisted of no walleye, no northern pike, and 126 yellow perch (Table 9). The 1998 beach seining results are not believed to be representative of the YOY fish assemblage due to sampling problems encountered. Extreme winds prevented sampling at most trend sites and the entire south and east shorelines.

Table 9. A summary of walleye, yellow perch, and northern pike young-of-the-year captured by beach seining in Nelson Reservoir, 1974-98.

Year	Shoreline Seined (ft.)	Walleye		Yellow Perch		No. Pike	
		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
1998*	340	0	0.0	126	371	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 CPUE of walleye has increased dramatically since 1993 (Table 10). 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 continues to rise. The northern pike catch increased in 1998. White sucker was the second most common fish captured. Population trends of key sport-fish are exhibited in Figure D.

Table 10. Relative catches of fishes from Nelson Reservoir with experimental sinking gill nets, fall 1991-98.

Year	No. Nets	Walleye		Yellow Perch		No. Pike		Lake Whitefish		White Sucker		Goldeye	
		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
1998	10	158	15.8	83	8.3	30	3.0	12	1.2	86	8.6	38	3.8

Nelson Reservoir population trends

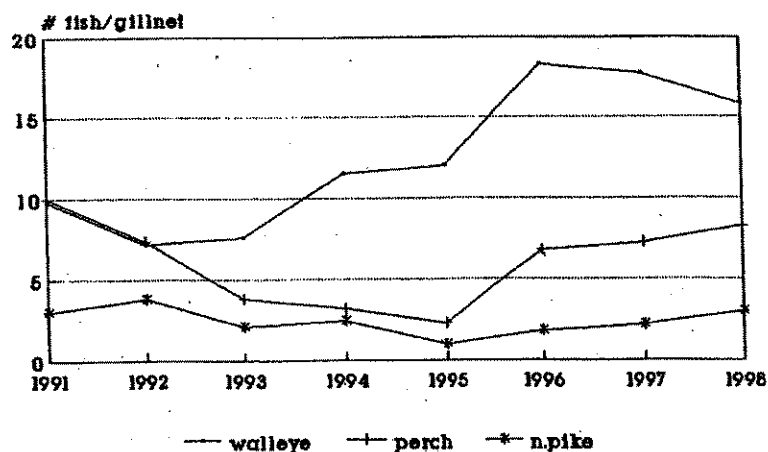


Figure D. Population trends of three key sport fishes in Nelson Reservoir using CPUE of fall gill nets.

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 amounted to only 3% of the estimated year-class.

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 1998. Some of the initially introduced fish have exceeded 30 pounds in weight. Northern pike are severely reducing rainbow trout numbers despite increased 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 11). 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. No sucker YOY were captured by seining in 1998. 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. A single YOY walleye was captured in 1998.

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 11. A summary of sport fish YOY and forage fish taken by beach seining from Beaver Creek Reservoir, 1985-98.

Date	No. Hauls	Species ¹									
		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
8-14-98	6	0	870	0	0	0	0	0	141	6	1

¹WSU/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 three walleye year-classes (Table 12). 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. Twenty-six walleye were captured in the fall gill netting. The walleye averaged 18.0 inches (range 8.8 - 25.5) and 2.66 pounds (range 0.20 - 7.40).

Table 12. Walleye stocking records and estimates of three walleye year-classes at the end of first growing season in Beaver Creek Reservoir.

Year	No. Fish		Planting	No.		
Class	Planted	Mark	Size (in.)	Sample Size	Recap- tures	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			

¹80% confidence interval.

Walleye stomach analysis indicates yellow perch and spottail shiners are heavily utilized. No predation on trout has been documented to date. 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 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 13). 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. Large numbers of small perch dominate the fishery at present, and catches of large perch have declined.

Table 13. Total catch from two experimental gill net sets at Bailey Reservoir, 1990-98.

Date	Northern Pike			Yellow Perch			Black Crappie		
	No.	X L (in.)	X WT (lbs.)	No.	X L (in.)	X WT (lbs.)	No.	X L (in.)	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 -----								
9-17-98	3	22.2	2.43	132	8.0	0.26	32	9.0	0.44

Though no largemouth bass were taken by gill netting, 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 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 of 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 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. 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 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. Two tiger muskies from the 1997 plant were netted in 1998. They measured 12.3 and 14.2 inches. 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 September, 1998. During both of these months, ten 125- x 6-foot multifilament experimental and four 100- x 8-foot, 1/2-inch bar mesh monofilament gill nets were set overnight. Nets were fished for an average of 18.6 hours each. 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 1998 was 94 (Table 14), compared to 73 in 1997. The catch of smelt continued to be low in 1998, with only 7 smelt captured, (Table 15). 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 1998 was 256, this is up significantly from previous year's catch of 64.

A combined total of 88 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 14. Summary of 1998 June and September combined standard experimental gill netting with 371.1 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	24.78 ²	2.47	88	0.24	4.40
GE	12.61	0.62	175	0.47	8.75
LW	17.66	1.91	7	0.02	0.35
CI	9.57	0.28	255	0.69	12.75
CHS	0	0	0	0	0
RBT	0	0	0	0	0
RBS	5.98	----	7	0.02	0.35
NP	21.41	3.36	23	0.06	1.15
CP	14.80	1.50	1	*	0.05
RC	16.58	2.32	25	0.07	1.25
BS	26.40	5.70	1	*	0.05
SMB	17.70	1.95	1	*	0.05
BMB	0	0	0	0	0
SHR	14.49	1.28	12	0.03	0.60
LNS	16.50	16.50	1	*	0.05
WS	13.95	1.44	46	0.12	2.30
CC	15.57	1.13	71	0.19	3.55
BUR	0	0	0	0	0
YP	6.86	0.17	8	0.02	0.40
SG	15.77	1.24	39	0.11	1.95
WE	17.53	2.08	55	0.15	2.75
Total			815	2.20	40.75

¹SNS-Shovelnose Sturg.

GE-Goldeye

LW-Lake Whitefish

CI-Cisco

CHS-Chinook Salmon

RBT-Rainbow Trout

RBS-Rainbow Smelt

²Fork Length

*less than 0.01 fish/hour

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

Table 15. Summary of 1998 June and September combined standard smelt netting with 152.03 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	13.58	0.77	6	0.04	0.75
CI	4.50	----	1	*	0.13
RBS	6.24	0.10	7	0.05	0.88
STS	4.06	----	5	0.03	0.63
W/P	0	0	0	0	0
NP	28.80	5.30	1	*	0.13
LNS	0	0	0	0	0
WS	3.30	----	1	*	0.13
CC	0	0	0	0	0
YP	0	0	0	0	0
SG	0	0	0	0	0
WE	0	0	0	0	0
Total			21	0.14	2.63

¹ SNS-Shovelnose Sturgeon

GE-Goldeye

CI-Cisco

RBS-Rainbow Smelt

STS-Spottail Shiner

W/P-Western or Plains Silvery Minnow

²Fork Length

*less than 0.01 fish/hour

NP-Northern Pike

LNS-Longnose Sucker

WS- White Sucker

CC-Channel Catfish

YP-Yellow Perch

SG-Sauger

WE-Walleye

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 names of anglers who purchased tags. Attempts should be made to tag 500+ paddlefish each year for the next several 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. 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. A creel census similar to the one conducted in 1984, is scheduled for summer 1999.

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. A northern pike suppression effort should be undertaken.

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

Key words or fish species:

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Prepared by: Kent W. Gilge and James Liebelt
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