MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS
FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: MONTANA PROJECT TITLE: STATEWIDE FISHERIES INVESTIGATION

PROJECT NO.: F-113-R-4 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, 2008 THROUGH JUNE 30, 2009

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ABSTRACT

Paddlefish netting and tagging was conducted on the Missouri River paddlefish population upstream of Ft. Peck Reservoir, and tagging and harvest records were maintained. A native species creel survey was conducted on a 28-mile stretch of the Missouri River. The third year of a four-year telemetry study was conducted on paddlefish in the Missouri River and young-of-year paddlefish surveys were conducted in the headwaters of Ft. Peck Reservoir. Overall harvest on this population has increased in recent years, the average size of adult fish continues to decrease, and recruitment has been poor. As a result, regulations were changed in 2007 and were again restructured in 2008. Standardized gill netting and beach seining surveys were conducted at Fresno, Nelson, and Beaver Creek Reservoirs. Select ponds were sampled through Hill, Blaine, Phillips, Daniels, McCone, Richland, Roosevelt, Sheridan, and Valley Counties to assess fish population levels, survival and recruitment. Self-creel boxes were also maintained at select ponds in Hill, Blaine, and Phillips Counties to assess fishing pressure. The fishery in Bailey Reservoir was supplemented with the stocking of 850 yellow perch and water levels are still marginal. Results of all other sampling are presented.

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 programs 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. Provide landowners and other private parties with technical advice and information to sustain and enhance fisheries resources. Objective accomplished: five310 projects were reviewed and four 124 projects were reviewed with state and local agencies; advised the town of Big Sandy on environmental impacts of proposed community development project. Commented on oil and gas development in Hill, Blaine, and Phillips Counties; six meeting, school programs, and fishing events were attended with schools related to the "Hooked on Fishing" program.

Angler 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 through staff participation in the "Hooked on Fishing" programs with local grade school children, planning and conducting of fall and winter fishing trips with area grade school and junior high children. Public presentations were also given on area fisheries in Havre and Malta. Staff also attended Walleye Unlimited meetings in Havre and Malta to provide information.

PROCEDURES, RESULTS, & DISCUSSION

Fort Peck Reservoir and Upper Missouri River Paddlefish Stock

The Ft. Peck stock was isolated from the Yellowstone-Sakakawea population upon closure of the Ft. Peck Dam in June of 1937. Completion of the Ft. Peck Dam isolated the Ft. Peck stock but it also created productive rearing habitat. This resulted in increased numbers and size of paddlefish and in turn created a valuable recreational snag fishery in the Missouri River.

However, the alteration of flows from upstream dams combined with drought conditions in the Upper Missouri River and low reservoir levels have resulted in poor reproductive success of paddlefish over the last 10 to 15 years as well as reduced sizes and thus fecundity of females. In addition, the popularity of the fishery has increased dramatically during this time period bringing into question whether or not natural reproduction and recruitment is adequate for current harvest levels.

The goal of current management is to provide a stable recreational fishery while maintaining the population size and historical age structure of the spawning stock. To meet this goal, regulations were changed during the 2007-snagging season. New regulations limited harvest to one paddlefish per person and a choice where snaggers would fish (Missouri River above Ft. Peck Reservoir; Ft. Peck Dredge Cuts; lower Yellowstone River/Missouri River below Ft. Peck Reservoir). To distribute harvest and reduce size selective harvest, mandatory catch and release days (Sunday, Monday, & Thursday), and mandatory harvest days (Friday, Saturday, Tuesday, & Wednesday) were enacted. Additionally snagging was limited to 6 am to 9 pm to help reduce potential illegal take of paddlefish and make enforcement of the regulations more manageable.

Based on the results of the 2007 season, additional changes were made during the 2008 season. A quota of 500 fish was established, a season was set (May 1st to June 15th), hook size restriction were set, mandatory catch and release and harvest days were eliminated, and immediate release was further defined for paddlefish.

Data Collection Methods

For more effective management of the Ft. Peck paddlefish stock, a thorough understanding of several key aspects of their life history was necessary. Data collected includes population size, harvest rates, spawning periodicity, age-structure, reproductive success, spawning locations, movements, and habitat use of paddlefish during their spawning migrations.

Baseline data on the paddlefish population above Ft. Peck Reservoir has been collected since the early 1970s. In 1993, a standardized monitoring program was established to assess population size, harvest rates, spawning periodicity, and gather baseline data on movement patterns and spawning sites. To gather this information, sampling occurs in the Missouri River during the time when paddlefish are staging around the Fred Robinson Bridge. Sampling typically occurs from April through May on the ascending arm of the hydrograph, typically at or above 8,000 cfs. Adult paddlefish are collected using drifted floating gill nets measuring 100 to 150 ft long, 6ft deep, with 4 inch mesh. Collected paddlefish are weighed, measured (eye-fork length), sexed, and tagged with an individually numbered jaw tag that is either a metal or plastic chicken leg band.

To assess angler pressure, catch and harvest rates of paddlefish, information on the ratio of tagged fish harvested, the size, sex, and age of fish harvested we conduct on-site roving creel surveys on a 28 mile stretch of the Missouri River downstream of the Fred Robinson Bridge. In addition a phone creel survey has been conducted since 2003 to assess harvest outside of the creel areas and as a check on the accuracy of the on-site creel surveys.

Beginning in 1996, concern over low flows and recruitment prompted the establishment of visual count surveys as a means of producing an annual index of recruitment of young of year (YOY) paddlefish. Visual counts have been found to be the most effective means to survey YOY paddlefish.

Counts are conducted from an open bow powerboat using standardized methods and fixed transects. Observed YOY paddlefish are divided into age groups based on estimated length.

To increase our specific knowledge of the spawning locations, movements, and habitat use of paddlefish above Ft. Peck Reservoir, a contract with the University of Idaho was initiated in 2006 to conduct a four-year telemetry and egg sampling study. This project will continue through 2009. See Miller et al. 2006 for a detailed description of methods and preliminary results for 2006.

Adult Paddlefish Monitoring and Tagging

In 2008, paddlefish netting, tagging, and implantation of transmitters in paddlefish started on May 19th. Tagging efforts were continued until June 6th when we tagged our 22nd paddlefish. Since tagging was initiated in 1977, 5,589 paddlefish have been tagged and 586-tagged paddlefish have been recaptured during annual gill netting surveys. Approximately 10 percent of the annual catch is comprised of recaptured fish. In 2008, 14% of the paddlefish captured were recaptured fish. Based on the tagging and recapture data, the reproductive periodicity of male paddlefish is one to two years and for females it is every two to three years.

Since tagging was initiated in 1977, a total of 687-tagged paddlefish have been reported as harvested, which is about 12% of all tagged paddlefish. While snaggers are encouraged to report catches of tagged fish, reporting rates are low in years when on-site creel surveys are not conducted. In 2006, 68-tagged paddlefish were reported as harvested and 16-tagged paddlefish were reported as snagged and released. Twenty-nine percent (20 fish) of the harvested tagged fish were tagged in 2006 and thirty-seven percent (6 fish) of the released tagged fish were tagged in 2006. In 2007, 45-tagged paddlefish were reported as harvested and 3-tagged paddlefish were reported as snagged and released. In 2006, 29% (20 fish) of the harvested tagged fish were tagged in 2006 and 37% (6 fish) of the released tagged fish were tagged in 2006. In 2007, 24% (11) of the harvested tagged fish were tagged in 2007 and 66.7% (2) of the released fish were tagged in 2007. In 2008, 44-tagged paddlefish were reported as harvested and 1-tagged paddlefish was reported as snagged and released. No paddlefish tagged in 2008 were reported harvested or snagged and released.

Preliminary population estimates

Estimates of population size of the recruited portion of the Ft. Peck stock were developed from 1993 through 2006 based on mark recapture sampling associated with gill netting and tagging conducted prior to and during the paddlefish snagging season. Point estimates and confidence intervals were developed using two approaches for estimate verification purposes: a modified Schnabel estimate and a modified Peterson estimate. Modifications, which allow for multiple years of marking and recapture data, were necessary because only a fraction of the recruited paddlefish stock matures and thus migrates upstream in a given year.

While the preliminary estimates were run for the entire tagging period, the most reliable Peterson estimates were developed from 1993 to 1999, when all five succeeding years of net catches could be used to assemble recaptures and high numbers of paddlefish were tagged during those years (Table 1). Based on the Peterson estimates the population size was approximately 20,500 fish from 1993 to 1999. The Schnabel estimate based on tagging over the period of 1993 to 1999 was 17,373 paddlefish with a 95% confidence interval of 15,614 to 20,336 fish. Both estimates indicate that the population size of recruited adult fish is approximately 20,000 fish. The number of adults that migrate in any given year is directly affected by the annual flows, however based on the periodicity of the fish, this means that approximately 11,700 fish migrate up the Missouri River to spawn and are "fishable" per year. As a comparison, the Yellowstone-Sakakawea stock has approximately 28,548 adults that migrate up the Yellowstone & Missouri Rivers (are "fishable") in any given year and their total population size is approximately 53,017 (Scarnecchia 2006).

Table 1. - Population estimates (N-Hat) for paddlefish using the modified Peterson method with Ft. Peck tagging data from 1993 through 2001 where M is the number of new fish marked, C_{t+i} (i=1,2,3,4,5) is the number of marked fish in year t+i, C_R is the number of recaptures in years from t+1 to t+5 with fish tagged in other years, and R is the number of recaptures in years during t+1 and t+5 with fish tagged in year t.

Year	M	C_{t+1}	C_{t+2}	C_{t+3}	C_{t+4}	C_{t+5}	C_R	C_Sum	R	N_Hat	SD	95% Confidence Interval		
1993	405	500	456	281	501	368	56	2,162	46	19,035.00	7.7E-06	14,802.91	to	26,655.76
1994	500	546	280	501	368	355	106	2,156	48	22,458.33	6.4E-06	17,549.21	to	31,180.64
1995	456	281	501	368	355	88	131	1,724	38	20,688.00	7.8E-06	15,739.14	to	30,176.36
1996	281	501	368	355	88	13	121	1,446	15	27,088.40	9.5E-06	18,017.64	to	54,551.91
1997	501	368	355	88	13	221	118	1,163	30	19,422.10	9.3E-06	14,352.72	to	30,027.98
1998	368	355	88	13	221	259	124	1,060	20	19,504.00	1.1E-05	13,600.02	to	34,466.37
1999	355	88	13	221	259	240	106	927	21	15,670.71	1.4E-05	11,013.73	to	27,151.17
2000	88	13	221	259	240	323	114	1,170	4	20,609.60	1.9E-05	11,556.82	to	95,118.72
2001	13	221	259	240	323	500	141	1,684	1	10,952.50	4.6E-05	5,530.75	to	555,703.76

Spawning and Recruitment

The spawning success and recruitment rate of paddlefish is directly influenced by the magnitude, timing, and duration of peak flows. Berg (1981) postulated that a minimum flow of 14,000 cfs maintained for a period of 30 days is required to trigger paddlefish to move out of their staging areas and migrate upriver to spawning locations. This requirement has been observed in the Ft. Peck stock by monitoring flows and movement patterns, and comparing those to year class strength through aging, as well as with YOY sampling.

During the 1980s and 90s only 12 of the 20 years met the requirements necessary for successful migration and spawning (Figure 1 and 2). From 2000-2007, flows have not met the minimum flow and duration requirements (Figure 3). However, in 2008 these requirements were met. Flows increased and fluctuated between 5,000 and 7,000 cfs from the end of April through mid May. Flow increased and peaked at 30,000 cfs at the end of May and declined steadily to 10,000 cfs by mid July. Peak flows met and exceeded trigger flows (14,000 cfs; Berg 1981) for about 50 days, similar to the 71-year average of 45 consecutive days (USGS 2008). The peak flow experienced in 2008 was the highest in over a decade, combine that with the duration at or above trigger flows made 2008 an optimal spawning year for paddlefish.

Hydrograph information (Figure 1, 2, and 3) indicates that good recruitment has not occurred since the late 1990s. Low recruitment has been verified by YOY surveys, which have been conducted annually since 1997 (Kozfkay & Scarnecchia 2002; Bowersox 2004; Miller 2005; Miller & Scarnecchia 2006). Good production of YOY paddlefish was observed in 1997 and 1998 when flows mimicked the historical hydrograph. Since that time less than five YOY paddlefish have been observed annually (Table 2). In 2008, four YOY and three yearling paddlefish were observed during the fixed transects between RM 1856 and 1858 (Table 2). Additional surveys conducted outside of the transect area yielded better results. A total of 44 YOY paddlefish were observed between RM 1859 and 1861, two of these fish were implanted with coded wire tags.

The effects of low flows and reduced recruitment is also starting to show up in the age distribution of harvested fish (Leslie 2006), which indicates that a strong year class has not been formed since the 1980s and early 1990s. However, since male paddlefish do not start spawning migrations until they are 10 and females when they are 15, the low recruitment levels over the last 10 to 15 years has not completely shown up in the harvest and population estimates yet.

Figure 1. - Historical and observed Missouri River hydrograph at the USGS Virgelle, MT gauging station 1980-1989.

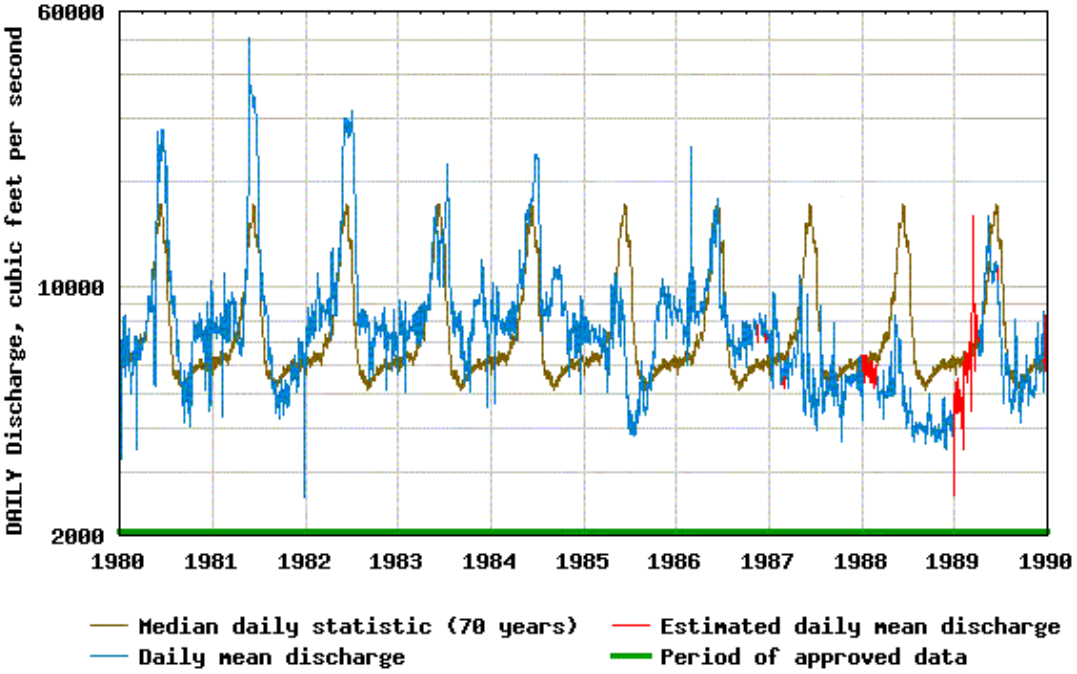


Figure 2. - Historical and observed Missouri River hydrograph at the USGS Virgelle, MT gauging station 1990-1999.

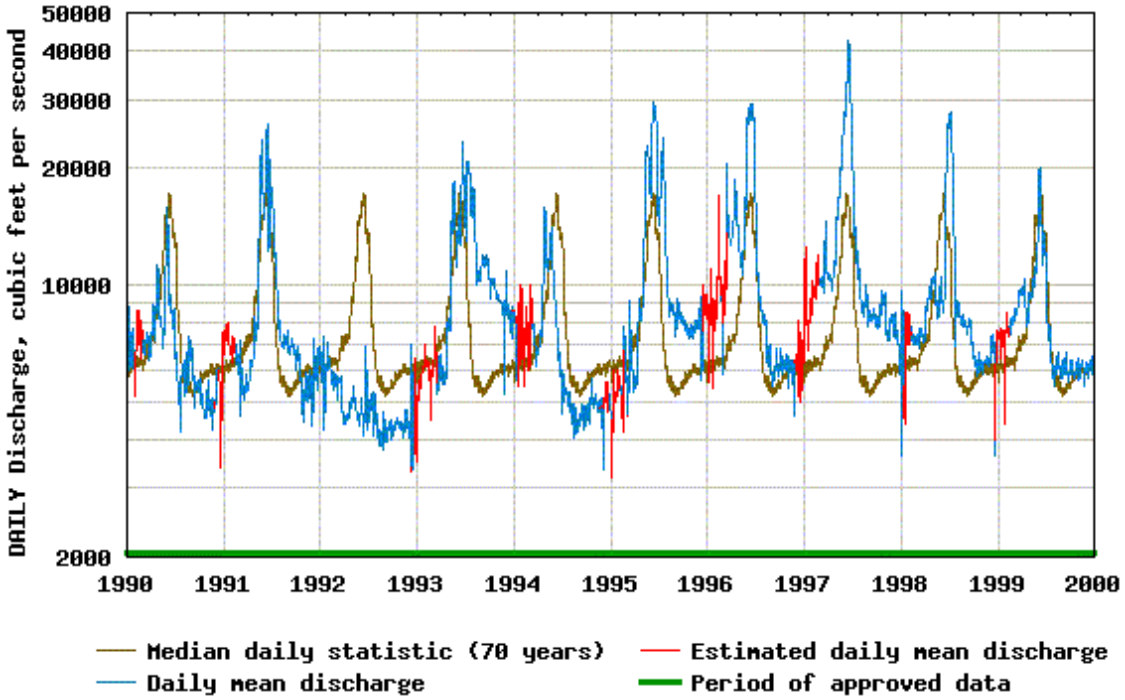


Figure 3. - Historical and observed Missouri River hydrograph at the USGS Virgelle, MT gauging station 2000-2008.

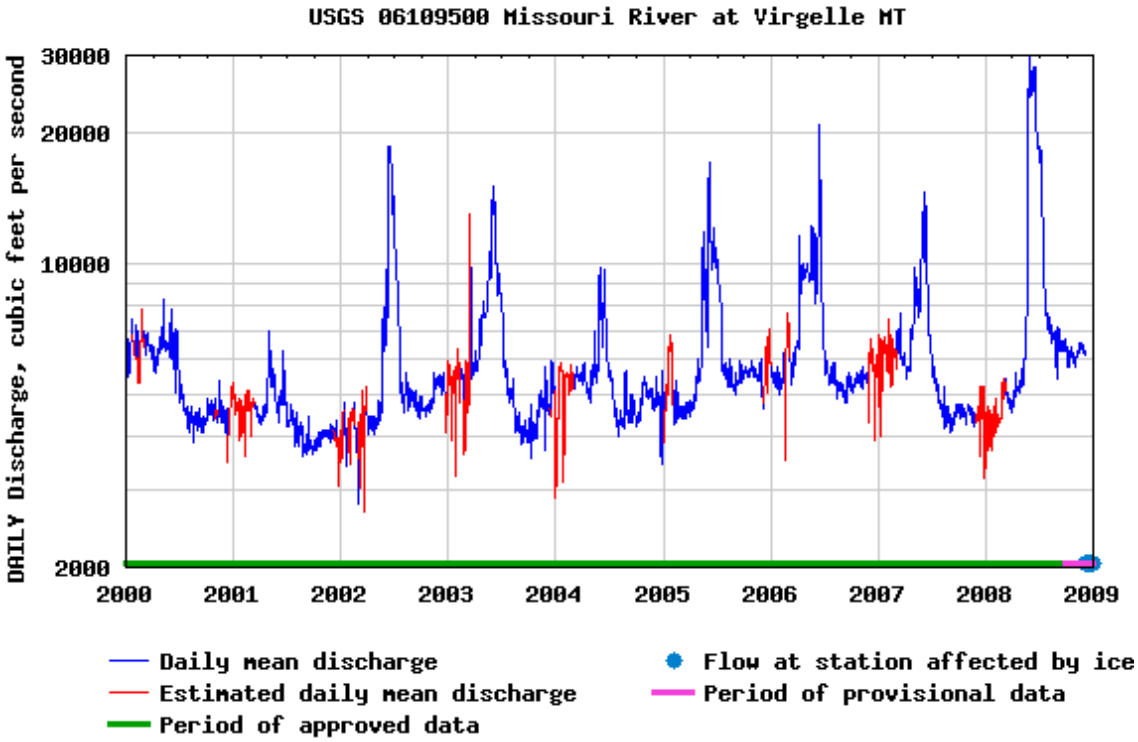


Table 2. - Results of visual count surveys conducted in the upper end of Ft. Peck Reservoir from 1997 to 2008.

	Transect Dates	# Stations	Station Locations (RM)	No. Transects	No. YOY	No. Yearlings	Collector
1997				69	113	3	
1998	7/27 to 9/23	8	1888 to 1866	216	97	54	Kozfkay
1999	8/25 to 9/20	8	1888 to 1866	174	3	10	Kozfkay
2000				90	0	11	
2001				90	1	0	
2002			1862 to 1856 ?				Bowersox ?
2003			1862 to 1856 ?	54	2	4	Bowersox ?
2004			1853 to 1838	54	0	3	
2005	8/8 & 8/16	6	1853 to 1838	36	1	0	Miller
2006	7/24 & 7/30	6	1853 to 1838	36	2	1	Miller
2007	7/31 & 8/6	6	1854 to 1838	6	0	2	Miller
2008	8/6 & 8/12	6	1844 to 1858	12	4	3	Miller

Harvest: Native Species Creel Survey 2008

Methods

A four-year native species creel survey has been ongoing since 2005. In 2005, the roving creel survey was conducted by vehicle from April 1st to June 10th from the Fred Robinson Bridge to Peggy's Bottom. In 2006, the roving creel survey was repeated from April 3rd to June 18th. In 2007,

the roving creel survey was conducted from April 1st to June 19th. In 2008, the creel was conducted by vehicle and boat from April 1st-June 15th.

Schedule

A roving creel survey was conducted from April through June from the Fred Robinson Bridge to Peggy's Bottom. For the first half of April and the last half of June, fishing pressure is lower and one creel clerk was employed. During this time we used a stratified random sampling design to select survey dates from two strata, weekends and weekdays. All weekends were surveyed due to the high fishing pressure and two randomly selected weekdays were surveyed. From mid April to mid June, two creel clerks were employed and all days were surveyed. During high-pressure times, Memorial Day weekend, two extra creel clerks were employed and two teams surveyed anglers.

Effort

Instantaneous pressure counts were performed once a day by vehicle due to travel distance and time. Starting times were randomly chosen from the fishing day (8:00 to 21:00 in 2005 & 2006) and counts were performed from ten pre-determined vantage points and access areas. Counts were performed at all sites except when road conditions prevented travel to some of the sites. In 2006, the accuracy of the vantage point counts were double check on three occasions by conducting simultaneous counts from vantage points and by boat for the entire creel area. In 2007, the creel survey and counts were conducted by boat for the entire creel area. In 2008, the creel survey and counts were conducted by boat and vehicle.

Harvest and Catch

Angler interviews were conducted at all boat ramps and fishing access/camping sites on the north side of the Missouri River between Fred Robinson Bridge (RM 1921) and lower Peggy's Bottom (RM 1987). Interviews were conducted at each site, during each sampling day except when road conditions prevented travel to certain sites. The creel clerks attempted to interview every fisherman on the river each sampling day. When the creel clerk encountered too many anglers at a location, the clerk systematically sub sampled every *k*th fisherman (*k* = interval demanded by the number of fishermen present) to ensure that all locations were sampled. Boat fishermen who launched within the area were interviewed even if they fished out of the study reach. Survey cards were distributed or deposited on windshields of vehicles when boat anglers where not available for interviews.

During interviews one randomly selected actively fishing person per party was interviewed. This individual was asked a series of questions relating to residence, number in party, length of stay, time spent fishing, whether a boat was used, type of gear used, and primary species being sought. Fishermen were asked how many of each species were caught, released and/or kept and if any of these fish had tags and if so the type, color, and number on the tag. When tagged paddlefish were caught, the fisherman was provided with the original tagging location, date, and weight of the fish. In addition, if fishermen released a paddlefish they were asked the reason for the release to determine if size-selective harvest was occurring.

When possible, harvested fish were measured to the nearest 0.1-inch and 0.01-pound. Eye-fork (body) length measurements were taken for paddlefish and fork-length measurements for sturgeon. Age samples consisting of jaws, spines, scales, or otoliths were collected from all harvested fish. These samples were then sent to the University of Idaho for aging.

In 2005 and 2006, the creel clerks also carried Passive Integrated Transponder (PIT) tag readers to identify any previously tagged pallid sturgeon and were prepared to PIT tag any new fish they encountered. Pamphlets and brochures developed for sturgeon, sauger, and paddlefish were distributed freely to fishermen.

Data Analysis

Fishing effort (angler-hours and total effort), catch rates, and harvest estimates were calculated using the Creel Census Program (McFarland and Roche 1987), which was developed using methods outlined in Neuhold and Lu (1957). To reduce error in 2005 and 2006, the creel survey time was broken down into three periods (April, May, and June), divided out by weekend and weekday effort, and by boat or shore fishing. In 2007, the analysis for all species except paddlefish was conducted as in 2005 and 2006. In 2007, paddlefish regulations were changed to include mandatory harvest and mandatory release days. As a result, the creel survey time for paddlefish was broken down into three periods (April, May, and June), divided out by harvest and release day effort, and by boat or shore fishing. In 2008, paddlefish regulations changed again and the creel analysis was conducted similar to 2005 and 2006. Effort was not broken down by fishing method or by species because anglers were usually fishing for more than one species during a day.

Results

In 2008, a total of 834 parties from 13 states and 41 of the 56 Montana counties were interviewed from April 1st to June 15th. In 2008, the highest percentage of anglers in Montana came from Yellowstone (17.3%), Gallatin (14.2%), Cascade (10.5%), and Fergus (10.4%) Counties. In 2008, the average party contained 3.9 anglers (range = 1 to 25 anglers), 83% of which were males. In 2008, the average length of stay was 3.9 day/trip (range = 1 to 31 days).

Effort

In 2008, angler-hours increased to 28,277 (Table 3) and angler days increased to 8,596 (Table 4). In 2008, 74.5% of the angling effort occurred from shore. In 2008, 68.6% of the angling effort occurred in May, which coincides with the peak of the paddlefish spawning migration. This corresponds with the primary target species in 2008, with paddlefish being the mostly commonly sought fish (70.5%), followed by walleye (11%), channel catfish (9.3%), and sauger (7.5%).

Species caught and released

In 2008, a total of 14 species were caught and/or harvested from April through June. In 2008, channel catfish, paddlefish, sauger, walleye, and goldeye were the most common species caught by anglers (Tables 5 & 6). Channel catfish, paddlefish, sauger, walleye and goldeye were the most common species harvested (Table 7). Average length, weight, and condition of harvested fish measured by the creel clerks in 2008 are presented in Table 8 respectively.

Paddlefish

In 2008, a total of 421 paddlefish were caught and reported to creel clerks. Overall, there was an estimated catch of 875 paddlefish (Table 5) and the catch rate was 0.031 paddlefish/hour (Table 6). Eighty-four percent of the paddlefish caught were harvested, with an overall estimated harvest of 701 paddlefish (Table 7).

In 2008, harvested paddlefish ranged in length from 26.0 to 56.8 inches (eye-fork length) and ranged in weight from 17.0 to 104 pounds (Table 8). Fifty-one percent of the harvested paddlefish were males. And 38 (14.1%) of the harvested paddlefish and 3 (4.3%) of the released paddlefish had jaw tags. Harvested paddlefish ranged in age from 9 to 56 years with 57% of the harvested fish being 20 to 56 years old. Twelve percent of the harvested fish were less than 16 years old (new recruits).

Channel Catfish

In 2008, a total of 431 channel catfish were caught and reported to creel clerks. Overall there was an estimated catch of 899 channel catfish (Table 5) and the catch rate was 0.004 channel catfish/angler-hour (Table 6). Seventy-five percent of the channel catfish caught were harvested, with a

total estimated harvest of 688 channel catfish (Table 7). In 2008, harvested channel catfish ranged in length from 11 to 37 inches and in weight from 0.02 to 26 pounds (Table 8). Harvested channel catfish ranged in age from 3 to 19 years old.

Stonecats

In 2008, 46 stonecats were caught and reported to the creel clerks. Overall there was an estimated catch of 93 stonecats (Table 5) and the catch rate was 0.002 stonecats/angler-hour (Table 6). Three stonecats caught by the anglers interviewed were harvested, with an estimated overall harvest of 7 stonecats (Table 7).

Sauger

In 2008, 961 sauger were caught and reported to the creel clerks. Overall there was an estimated catch of 1,908 sauger (Table 5) with a catch rate of 0.084 sauger/angler-hour (Table 6). Anglers harvested 17% of the sauger caught, with an estimated overall harvest of 355 sauger (Table 7). In 2008, harvested sauger ranged in length from 11.5 to 22.0 inches and in weight from 0.11 to 2.9 pounds (Table 8). Harvested sauger ranged in age from 3 to 11 years old. In 2005 and 2006, 41.9% of anglers released their sauger because they were too small, 32.3% because anglers were complying with the regulations, 12.9% because anglers were catch and release fishing, and 11.3% released sauger for other reasons such as the fish was tagged, the angler thought sauger were endangered, or because they were not the species being targeted.

Walleye

In 2008, a total of 217 walleye were caught and reported to the creel clerks. Overall there was an estimated catch of 468 walleye (Table 5) with a catch rate of 0.019 walleye/angler-hour (Table 6). Anglers harvested 67% of the walleye they caught, with an estimated overall harvest of 310 walleye (Table 7). In 2005 and 2006, the primary reason for anglers to release walleye was because they were too small. In 2008, harvested walleye ranged in length from 11.8 to 33 inches and in weight from 0.1 to 13.5 pounds (Table 8). No age samples were collected from walleye in 2008.

Northern Pike

In 2008, a total of 23 northern pike were caught and reported to the creel clerks. Overall there was an estimated catch of 37 northern pike (Table 5) with a catch rate of 0.001 northern pike/angler-hour (Table 6). Anglers harvested 53% of the northern pike they caught, with an estimated overall harvest of 21 (Table 7). Harvested northern pike ranged in length from 33 to 41 inches and in weight from 8 to 13.8 pounds (Table 8). No age samples were collected from northern pike in 2008.

Pallid Sturgeon

In 2008, 38 pallid sturgeon were caught and reported to the creel clerks. Overall there was an estimated catch of 86 pallid sturgeon (Table 5), with an estimated catch rate of 0.003 pallid sturgeon/angler-hour (Table 6).

Shovelnose Sturgeon

In 2008, a total of 30 shovelnose sturgeon were caught and reported to the creel clerks. Overall there was an estimated catch of 62 shovelnose sturgeon (Table 5), with catch rates of 0.002 shovelnose sturgeon/angler-hour (Table 6). Anglers harvested 40% of the shovelnose sturgeon caught with an estimated overall harvest of 29 shovelnose sturgeon (Table 7). In 2005 and 2006, the primary reason for release was compliance with fishing regulations (66.7%), 15.7% of anglers released fish because they were too small, and 17.6% released fish for other unspecified reasons.

In 2008, harvested shovelnose sturgeon ranged in length from 23 to 33 inches and in weight from 3 to 4.3 pounds (Table 18). Harvested shovelnose sturgeon ranged in age from 7 to 11 years old.

Burbot

In 2008, a total of 8 burbot caught and reported to the creel clerks. Overall there was an estimated catch of 20 burbot (Table 5), with an estimated catch rate of 0.0001 burbot/angler-hour (Table 6). Anglers harvested 100% of the burbot caught, with an estimated overall harvest of 19 burbot (Table 7). In 2008, harvested burbot ranged in length from 19 to 31 inches and in weight from 2 to 5.8 pounds (Table 8). No age samples were collected in 2008.

Freshwater Drum

In 2008 a total of 28 drum were caught and reported to the creel clerks. Overall there was an estimated catch of 60 drum (Table 5), with an estimated catch rate of 0.002 drum/angler-hour (Table 6). Anglers harvested 75% of the drum caught, with an estimated overall harvest of 50 drum (Table 7). In 2008, harvested drum ranged in length from 11 to 17 inches and in weight from 0.3 to 2.3 pounds (Table 8). No age samples were collected in 2008.

Goldeye

In 2008, 153 goldeye were caught and reported to the creel clerks. Overall there was an estimated catch of 352 goldeye (Table 5), with an estimated catch rate of 0.012 goldeye/angler-hour (Table 6). Anglers harvested 40% of the goldeye caught, with an estimated overall harvest of 151 goldeye (Table 7). In 2008, harvested goldeye ranged in length from 11 to 14 (Table 8) and no age samples were collected.

Other Species

Other native species caught included, bigmouth buffalo, river carpsucker, and shorthead redhorse. The majority of these species were released however, one shorthead redhorse was harvested and aged at nine years old. Other non-native species caught included rainbow trout. The specific length, weight, and structural indices for these species are reported in Table 8.

Table 3. - Estimated fishing effort (angler-hours) and standard error (SE) by month and angler type for the Missouri River (RM 1899 to 1921), April-June 2008.

	Shore	SE	Boat	SE	Overall
April	2,100.00	550.82	581.54	225.97	2,681.54
May	17,411.31	3,464.95	4,464.00	897.05	21,875.31
June	3,582.86	922.50	137.14	65.19	3,720.00
Overall	23,094.17		5,182.68		28,276.85

Table 4. - Estimated fishing effort (angler days) by month and angler type for the Missouri River (RM 1899 to 1921), April-June 2008.

	Shore	Boat	Overall
April	1,145.45	95.85	1,241.30
May	5,335.72	1,065.3	6,400.99
June	929.34	24.32	953.66
Overall	7,410.51	1,185.4	8,595.95

Table 5. - Estimated catch by strata of channel catfish (C CAT), stonecat (S CAT), sauger (SGR), walleye (WE), pallid sturgeon (PSTG), shovelnose sturgeon (SSTG), burbot (LING), goldeye (GE), freshwater drum (DRUM), northern pike (NP), paddlefish (PF), and common carp (CARP) in the Missouri River (RM 1899 to 1921), April-June 2008.

	April		May		June		Overall		
	Shore	**Boat**	**Shore**	**Boat**	**Shore**	**Boat**	**Shore**	**Boat**	**Combined**
C CAT	67	40	579	252	8	3	622	277	899
S CAT	0	0	71	32	2	0	67	26	93
SGR	243	528	259	780	0	0	536	1,372	1,908
WE	92	108	125	111	0	0	227	241	468
PSTG	8	0	76	6	2	0	81	5	86
SSTG	0	1	49	12	3	0	49	14	62
LING	8	1	7	2	0	0	17	4	20
GE	51	21	269	18	0	0	308	44	352
DRUM	0	0	61	6	0	0	56	5	60
NP	11	0	10	0	12	0	37	0	37
PF	0	0	474	125	229	9	728	148	875
CARP	0	3	59	4	0	0	57	7	64

Table 6. - Estimated hourly catch rate (fish/angler-hour) by strata channel catfish (C CAT), stonecat (S CAT), sauger (SGR), walleye (WE), pallid sturgeon (PSTG), shovelnose sturgeon (SSTG), burbot (LING), goldeye (GE), freshwater drum (DRUM), northern pike (NP), paddlefish (PF), and common carp (CARP) in the Missouri River (RM 1899 to 1921), April-June 2008.

	April				May				June			
	Shore	**SE**	**Boat**	**SE**	**Shore**	**SE**	**Boat**	**SE**	**Shore**	**SE**	**Boat**	**SE**
C CAT	0.0321	0.0116	0.0684	0.0343	0.0333	0.0063	0.0565	0.0124	0.0023	0.0017	0.0223	0.0175
S CAT	0.0000	0.0000	0.0000	0.0000	0.0041	0.0024	0.0071	0.0057	0.0005	0.0005	0.0000	0.0000
SGR	0.1155	0.0261	0.9084	0.0271	0.0149	0.0048	0.1748	0.0592	0.0000	0.0000	0.0000	0.0000
WE	0.0436	0.0132	0.1856	0.0512	0.0072	0.0014	0.0249	0.0056	0.0000	0.0000	0.0000	0.0000
PSTG	0.0038	0.0021	0.0000	0.0000	0.0044	0.0012	0.0013	0.0010	0.0005	0.0005	0.0000	0.0000
SSTG	0.0000	0.0000	0.0024	0.0024	0.0028	0.0007	0.0027	0.0013	0.0009	0.0009	0.0025	0.0026
LING	0.0038	0.0029	0.0024	0.0021	0.0004	0.0003	0.0004	0.0004	0.0000	0.0000	0.0000	0.0000
GE	0.0244	0.0075	0.0366	0.0212	0.0154	0.0035	0.0040	0.0022	0.0000	0.0000	0.0000	0.0000
DRUM	0.0000	0.0000	0.0000	0.0000	0.0035	0.0010	0.0013	0.0008	0.0000	0.0000	0.0000	0.0000
NP	0.0051	0.0027	0.0000	0.0000	0.0006	0.0003	0.0000	0.0000	0.0032	0.0032	0.0000	0.0000
PF	0.0000	0.0000	0.0000	0.0000	0.0272	0.0026	0.0280	0.0049	0.0638	0.0095	0.0620	0.0097
CARP	0.0000	0.0000	0.0049	0.0035	0.0034	0.0018	0.0009	0.0009	0.0000	0.0000	0.0000	0.0000

Table 6 (cont.). - Estimated hourly catch rate (fish/angler-hour) by strata channel catfish (C CAT), stonecat (S CAT), sauger (SGR), walleye (WE), pallid sturgeon (PSTG), shovelnose sturgeon (SSTG), burbot (LING), goldeye (GE), freshwater drum (DRUM), northern pike (NP), paddlefish (PF), and common carp (CARP) in the Missouri River (RM 1899 to 1921), April-June 2008.

	Overall					
	Shore	**SE**	**Boat**	**SE**	**Overall**	**SE**
C CAT	0.0269	0.0045	0.0535	0.0105	0.0337	0.0043
S CAT	0.0029	0.0017	0.0050	0.0040	0.0034	0.0016
SGR	0.0232	0.0044	0.2647	0.0488	0.0844	0.0128
WE	0.0098	0.0018	0.0465	0.0089	0.0191	0.0026
PSTG	0.0035	0.0008	0.0009	0.0007	0.0029	0.0007
SSTG	0.0021	0.0005	0.0026	0.0010	0.0022	0.0005
LING	0.0007	0.0004	0.0007	0.0005	0.0007	0.0003
GE	0.0133	0.0025	0.0085	0.0036	0.0121	0.0021
DRUM	0.0024	0.0007	0.0009	0.0005	0.0020	0.0005
NP	0.0016	0.0007	0.0000	0.0000	0.0012	0.0006
PF	0.0315	0.0026	0.0285	0.0037	0.0308	0.0022
CARP	0.0025	0.0012	0.0014	0.0008	0.0022	0.0010

Table 7. - Estimated harvest by strata for channel catfish (C CAT), stonecat (S CAT), sauger (SGR), walleye (WE), shovelnose sturgeon (SSTG), burbot (LING), freshwater drum (DRUM), goldeye (GE), paddlefish (PF), northern pike (NP), and common carp (CARP) in the Missouri River (RM 1899 to 1921), April-June 2008.

	April				May				June				Overall		
	Shore	**SE**	**Boat**	**SE**	**Shore**	**SE**	**Boat**	**SE**	**Shore**	**SE**	**Boat**	**SE**	**Shore**	**Boat**	**Combined**
C CAT	54	25.3	33	22.8	381	97.0	210	63.1	8	6.5	2	2.6	443	245	688
S CAT	0	0.0	0	0.0	7	5.7	0	0.0	0	0.0	0	0.0	7	0	7
SGR	127	45.1	47	19.5	103	31.5	79	26.0	0	0.0	0	0.0	230	126	355
WE	67	28.8	58	29.8	103	31.1	81	26.6	0	0.0	0	0.0	170	139	310
SSTG	0	0.0	0	0.0	27	10.2	2	2.0	0	0.0	0	0.0	27	2	29
LING	8	6.5	1	1.5	7	5.7	2	2.0	0	0.0	0	0.0	15	3	19
DRUM	0	0.0	0	0.0	46	18.6	4	3.0	0	0.0	0	0.0	46	4	50
GE	32	15.5	1	1.5	115	37.3	2	2.0	0	0.0	0	0.0	147	3	151
PF	0	0.0	0	0.0	408	89.5	105	26.5	181	53.7	7	3.7	589	112	701
NP	11	6.2	0	0.0	10	5.3	0	0.0	0	0.0	0	0.0	21	0	21
CARP	0	0.0	1	1.6	10	5.3	0	0.0	0	0.0	0	0.0	10	1	11

Table 8. – Length, weight, and condition indices of harvested paddlefish (PF), channel catfish (C CAT), rainbow trout (RB), sauger (SGR), walleye (WE), shovelnose sturgeon (SSTG), burbot (LING), freshwater drum (DRUM), goldeye (GE), northern pike (NP), river carpsucker (RCSU), bigmouth buffalo (BMBUF), and shorthead redhorse (SHRH) from anglers creeled in the middle Missouri River native species creel, April-June 2008.

Species	Sample Size	Length Range (in.)	Length Avg	Length SD	Weight Range (lbs.)	Weight Avg	Weight SD
PF	322	26.0-56.8	41.0	5.7	13.0-104.0	43.5	20.8
C CAT	202	11.0-37.0	26.6	6.6	0.02-26.0	9.4	6.4
RB	1	19.30	19.3	0.0	2.0	2.0	0.0
SGR	74	11.5-22.0	17.6	2.2	0.11-2.9	1.4	0.6
WE	71	11.8-33.0	17.0	4.7	0.1-13.5	1.7	2.3
S STG	9	23.0-33.0	29.0	3.5	3.0-4.3	3.9	0.6
LING	6	19.0-31.0	27.8	4.7	2.0-5.8	3.9	1.7
DRUM	13	11.0-17.0	14.0	2.0	0.3-2.3	1.0	0.5
GE	22	11.0-14.0	12.1	0.7	0.09-1.00	0.4	0.2
NP	3	33.0-41.0	37.7	4.2	8.00-13.8	10.9	4.1
RCSU	1	17.00	17.0	0.0	1.5	1.5	0.0
BMBUF	1	35.00	35.0	0.0	30.0	30.0	0.0
SHRH	1	25.80	25.8	0.0	2.0	2.0	0.0

Paddlefish Phone Creel (2003-2008)

Vic Riggs with the Montana Fish, Wildlife & Parks (FWP) and Larry Brooks with the University of North Dakota (Riggs 2005) designed and conducted the paddlefish phone creel survey annually from 2003 to 2005. This survey was continued solely by FWP in 2006. This survey was originally conducted (1) to determine the harvest of paddlefish at sites other than the Intake Fishing Access Site, (2) as a check on the accuracy of the Intake creel survey, (3) as a possible replacement for the Intake creel survey, which would free up technician time for other data collection needs, and (4) to obtain harvest statistics for the Fort Peck population, and in 2005 and 2006, (5) to assess angler support for changes to regulations for the Fort Peck populations.

From 2003 to 2008, harvest statistics were obtained for the Fort Peck population (Table 9). In 2005, two questions were added to determine why anglers were releasing paddlefish, and to determine the support for reducing the snagging limit to one paddlefish and the possible removal of catch and release fishing.

On average approximately 2,274 anglers fish for paddlefish above Ft. Peck Reservoir representing approximately 7,061 fishing days. On average approximately 1,407 paddlefish are caught annually above Ft. Peck Reservoir (Table 9). Approximately 40.9% of the paddlefish caught were released. When anglers where asked why they released their paddlefish, 53% said they were catch and release fishing, either because they did not want to harvest a paddlefish or because they wanted to fish for their entire fishing trip and harvest a fish on one of their last days. Seventeen percent of paddlefish were released because they were too big, indicating that these people were releasing the larger females. Twenty-seven percent of paddlefish were released because they were too small, indicating that these people are high grading for the larger females and are trophy fishing.

Table 9. –Summary of estimates for the Fort Peck paddlefish population from the Montana paddlefish telephone creel survey (2003-2008).

Missouri River Above Fort Peck						
	2003	**2004**	**2005**	**2006**	**2007**	**2008**
Number of Anglers	1,902	2,859	2,705	2,476	-	1,816
Total Days Fished*	5,757	9,172	8,385	7,565	-	4,426
Total Hours Fished*	27,433	44,400	42,277	39,800	-	-
Number Caught	1,583	1,102	1,516	2,290	-	545
Number Harvested	868	787	1,028	1,067	-	300
Harvest Rate (fish/day)	0.151	0.086	0.123	0.141	-	0.068
Harvest Rate (fish/hour)	0.032	0.018	0.024	0.027	-	-
Percent Released	45.17%	28.58%	32.19%	53.42%	-	44.95%

* Includes hours spent catch and release fishing

Discussion

The paddlefish population above Ft. Peck Reservoir has experienced declines in recruitment, growth, and overall size of adults. Flows in the Missouri River have not been consistently high enough to produce large year classes of paddlefish for the past 10 to 15 years (Leslie 2005, 2006). As a result the population consists primarily of 20 to 60 year old fish. In addition, the average size of adults has significantly decreased over the last 30 years (Bowersox 2004). These declines, especially in growth, are believed to be the result of decreased productivity due to the aging of Ft. Peck Reservoir (nursery grounds for paddlefish). Paddlefish are not experiencing as high of growth rates while residing in Ft. Peck Reservoir and as a result sexually mature fish are of a smaller size than they were when Ft. Peck Reservoir was initially formed. In addition, natural mortality and fishing mortality are resulting in the decreased proportion of large fish, specifically females. Fishing pressure has nearly doubled from 1977 to 2008, and high grading allows fishermen to increase their chances of catching a fish of a desirable size. The decreased weight of adult females is of concern because it is directly related to fecundity.

The combination of a low number of successful spawning years (based on observed trigger flow occurrence and duration) and decreased size of adults is of concern. The results of reduced recruitment of YOY paddlefish will not be evident in the spawning population for a few years, however it would be prudent to consider the effects of reduced recruitment and reduced fecundity of the adult population. Since 1992, snaggers have been allowed to harvest two paddlefish per year from the upper Missouri River fishery. Snaggers are also allowed to immediately release a snagged paddlefish if they desire. Based on analysis of the fishery and public support, the fishing limit was reduced in 2007 from two paddlefish to one paddlefish annually. In 2008, the paddlefish season was reduced from a 365-day season to a 45-day season (May 1 to June 15), making monitoring total catch more feasible. Furthermore, an annual harvest cap of 500 paddlefish was also implemented in 2008.

Hill County Fishing Waters

Select waters throughout Hill County were sampled to determine fish abundance using sinking multi-filament experimental gill nets mearching125 feet in length and 6 feet deep, consisting of 25-foot panels of ¾", 1", 1 ¼", 1 ½", and 2" mesh unless otherwise specified. Voluntary creel boxes were maintained at many of the ponds to determine fishing pressure, catch rates, and satisfaction.

Bailey Reservoir

Bailey Reservoir is a privately-owned reservoir that was constructed in the mid-1960s. At full pool, Bailey Reservoir covers approximately 70 surface acres and has a maximum depth of 28 feet. Bailey ranked 52nd in the region for angler pressure in 2005/2006 (123 angler days; McFarland 2006). Bailey was initially managed as a rainbow trout fishery, and rainbow trout thrived within the reservoir until 1980 when northern pike were illegally introduced. In 1984, the remainder of rainbow trout winterkilled due to severe drought. Chemical rehabilitation was considered, but at the request of the landowner a cool/warm water fishery was started. And as a result, yellow perch and black crappie were introduced in 1987, largemouth bass in 1988, and walleye in 1989. Rainbow trout are stocked periodically to supplement the fishery and in 2005, 10,000 four-inch rainbow trout were stocked in late fall. In addition, 10,000 fingerling walleye were stocked in the spring of 2005 and 261 yellow perch were transplanted from the Havre Water District Ponds in Kremlin. In 2006, an additional 4,758 pre-spawn yellow perch were transplanted. Supplement plants of 3,880 and 850 yellow perch occurred in 2007 and 2008.

Adult sport fish populations have been monitored since 1990 with two experimental gill net sets. In addition, trap netting and electrofishing occurs periodically. In 2005, 6 traps nets were set in the spring to capture adult black crappie for transporting to Home Run Pond. From 2005 to 2007, two overnight gillnet sets were also used to monitor adult fish populations. In addition, a voluntary creel box was erected in the summer of 2005 and maintained through 2007 to determine angler use, catch, and satisfaction.

This fishery historically has provided great angling opportunities for black crappie, northern pike, yellow perch, and walleye. However, fish population levels have declined significantly since 2000 due to drought. Water levels have improved; however the reservoir is still not at full pool. During spring trap netting in 2005, only 13 adult black crappie, 18 yellow perch, 8 northern pike, and 161 fathead minnows were captured. As a result no fish were transferred to Home Run Pond. Late summer gill netting also revealed very low abundances of sport fish (Table 10). Fisherman catch and satisfaction was very poor during the spring and summer, picking up in the winter of 2005/2006 during ice fishing. Ice fisherman reported catch rates of 0.01 walleye (WE)/hour, 0.93 northern pike (NP)/hour, and 3.91 yellow perch (YP)/hour (n=15).

In 2006, survival of stocked walleye and yellow perch was observed in summer gillnetting (Table 10). Northern pike population levels also increased which is most likely the reason why no rainbow trout were collected. Black crappie population continues to remain low and re-introductions will be attempted when water levels increase providing suitable spawning substrate. Anglers reported increased catch rates and satisfaction in 2006. Anglers reported spring catch rates of 3.56 northern pike/hour and 1.12 yellow perch/hour (n=5). During the summer anglers reported catch rates of 0.68 northern pike/hour and 0.05 yellow perch/hour, with no other species being caught (n=8). During the fall anglers reported catch rates of 0.5 northern pike/hour (n=1). During the winter ice fishing angler reported catch rates of 0.92 northern pike/hour and 2.17 yellow perch/hour (n=7).

In 2007 the relative abundance of sport fish was reduced during summer gill netting surveys (Table 10). However, angler catch rates were similar to those in 2006. During the winter ice fishing anglers reported catch rates of 1.58 northern pike/hour, 1.59 yellow perch/hour, 0.03 walleye/hour, and 0.01 black crappie/hour (n=14). Anglers reported spring catch rates of 0.88 northern pike/hour, 0.10 yellow perch/hour, and 0.02 black crappie/hour (n=7). During the summer anglers reported catch rates of 0.35 northern pike/hour, 0.03 rainbow trout/hour, 0.03 walleye/hour, and 0.02 black crappie/hour (n=17). No sampling surveys were conducted in 2008, however the creel box was maintained. Winter anglers reported catch rates of 0.45 northern pike/hour, 1.1 yellow perch/hour, and 0.03 black crappie/hour (n=6). Anglers in the spring of 2008 reported catch rates of 0.54 northern

pike/hour and 0.08 walleye/hour (n=2). Summer anglers reported catch rates of 0.53 northern pike/hour, 0.06 yellow perch/hour, and 0.35 walleye/hour (n=6).

Table 10. - Catch rate (CPUE (fish/net)), average length (TL, in.), and average weight (lb.) of northern pike, yellow perch, black crappie, rainbow trout, and walleye in Bailey Reservoir, 1985 to 2007.

		Northern pike			Yellow Perch			Black Crappie			Rainbow Trout			Walleye		
Year	Nets	CPUE (#/net)	Len Avg (in.)	Wt Avg (lbs.)	CPUE (#/net)	Len Avg (in.)	Wt Avg (lbs.)	CPUE (#/net)	Len Avg (in.)	Wt Avg (lbs.)	CPUE (#/net)	Len Avg (in.)	Wt Avg (lbs.)	CPUE (#/net)	Len Avg (in.)	Wt Avg (lbs.)
1985	1	17	21.44	1.13	0	--	--	0	--	--	1	12.2	0.9	--	--	--
1990	3	8	18.1	1.23	11.33	7.7	0.26	7	5.7	0.1	0	--	--	--	--	--
1991	2	3.5	24.7	3.21	29	10.1	0.56	2	8.5	0.35	0	--	--	--	--	--
1992	2	3	26.8	4.29	17	8.1	0.29	8	4.7	0.08	0	--	--	--	--	--
1993	2	1	31.8	7.55	10.5	6.6	0.15	63.5	6.7	0.12	0	--	--	--	--	--
1994	2	3.5	20.1	2.59	19	6	0.1	21.5	6.3	0.14	0	--	--	--	--	--
1995								No Netting Conducted								
1996	2	7	23.8	3.54	43	7.2	0.19	7.5	6.8	0.21	0	--	--	--	--	--
1997								No Netting Conducted								
1998	2	1.5	22.2	2.43	66	8	0.26	16	9	0.44	0	--	--	--	--	--
1999								No Netting Conducted								
2000								No Netting Conducted								
2001								No Netting Conducted								
2002	2	0	0	0	16	9.9	0.49	15.5	11.2	0.82	0	--	--	1	25.7	6.79
2003								No Netting Conducted								
2004								No Netting Conducted								
2005	2	3.5	17.44	1.56	1.5	9.2	0.39	1	4.05	0.03	0	--	--	--	--	--
2006	2	16	17.23	1.2	3.5	7.29	0.28	0	--	--	0	--	--	6.5	9.54	0.31
2007	2	5.5	20.8	2.05	0.5	11.3	0.9	0	--	--	0	--	--	3	12.5	0.65

Beaver Creek Reservoir

Beaver Creek Reservoir, located south of Havre, is a 200-acre reservoir, which has a maximum depth of 90 feet. Its proximity to the city of Havre makes this reservoir a valuable local resource and it has been managed intensively in recent years for a variety of species. The statewide fishing pressure survey for 2005/2006 indicated it was the fifth most fished reservoir in Region Six (McFarland 2006).

This reservoir was established as a rainbow trout fishery in 1975. However, the illegal introduction of northern pike (1980s) and yellow perch (1980s) has resulted in the rainbow trout fishery having varying success. As a result, the fisheries management plan was expanded to include other warm water species, which were introduced to control undesirable species and enhance the fishing opportunity within the reservoir. Currently this reservoir receives annual plants of 70,000 catchable size Eagle Lake, Erwin and Arlee rainbow trout.

In an effort to maintain the balance between the rainbow trout fishery and the warm water fishery, the use of live minnows for bait has been allowed since March of 2000. The regulation is intended to increase harvest of northern pike and perhaps open up a winter fishery for walleye. Though fishermen use live minnows regularly, a winter fishery for walleye has not developed. The trout daily limit was reduced from 5/day to 3/day in March of 2002 due to increasing fishing pressure.

Population Status of Adult and Young-of-Year Fishes

Adult fish populations were monitored at six fixed experimental gillnetting stations, which were established in 1986. Gillnetting was conducted over night utilizing three sinking and three floating experimental gill nets (6 net-days). The sinking and floating experimental gill nets measured 125 feet in length and 6 feet deep consisting of 25-foot panels of ¾", 1", 1 ¼", 1 ½", and 2" mesh. Fish were measured for total length (TL: inches)

and weighed to the nearest 0.01 pound (lb). Prior to 1986, adult fish populations were monitored, however sampling was neither uniform, nor consistent enough to develop useful trend data on game fish population size, or composition. As a result this data was excluded from analysis and is only included within the tables for reference to the illegal introduction of northern pike and yellow perch.

The abundance and reproductive success of sport and forage fishes were monitored at six predetermined stations. Beach seining was conducted in early August using a 100- x 9-foot x ¼ inch square mesh beach seine. The fish were sorted by species and counted.

Northern pike

Since their illegal introduction in the 1980s, northern pike abundance has maintained manageable levels within Beaver Creek Reservoir (Table 11). Northern pike populations are cyclical within Beaver Creek Reservoir, YOY catch had increased significantly in 2005 and 2006 and these fish have successfully been recruited into the population (Table 11 & 12). In 2007, the YOY catch was greatly reduced and no YOY northern pike were observed in 2008. The adult population consists primarily of larger adults (TL range = 22.1 to 35.2 in.) capable of producing strong year classes (similar to 2005 and 2006) with the potential to cause marked declines in the abundance of stocked rainbow trout and forage fish.

Yellow perch

Yellow perch were illegally introduced into Beaver Creek Reservoir in 1987. Since their introduction, yellow perch have thrived within the reservoir (Table 11). As a result Beaver Creek Reservoir is a popular ice fishing destination and has historically been a source of yellow perch for kids fishing ponds, such as Home Run Pond, in Glasgow.

Beaver Creek Reservoir's yellow perch population peaked in the late 1990s and while the relative abundance is good, it is currently at half the late 1990 levels due to drought and reduced spawning success (Table 11 & 12). While yellow perch populations remain low compared to 1990 levels they are steadily increasing. The population still consists of numerous quality and preferred size fish (TL > 8 in.; Table 11). Yellow perch experienced higher spawning success in 2004 and 2006 as a result of increased water levels and flooded vegetation, (Table 12). Spawning success was reduced in 2007 and 2008 (Table 12) however the population of adult fish continues to sustain a high density (Table 11). In the summer of 2007, there was a partial kill of yellow perch, however based on fall gill netting there were no negative impacts to the population.

Walleye

Walleye were initially stocked in 1987 to provide a greater diversity of fishing opportunities within the reservoir. Natural reproduction is very limited within the reservoir and as a result, approximately 10,000 1.4-inch and 5,000 3-inch walleye fingerlings are stocked annually. In 2008, 7,000 4-inch walleye fingerlings were stocked.

Walleye within Beaver Creek Reservoir have high growth rates and relative weights (Table 11) due to abundant forage. As a result, walleye can be hard to catch and elude all but the best walleye fishermen. Since their initial introduction, high quality walleye have thrived within Beaver Creek Reservoir. The average size of walleye in 2006 was 15.08 in. with high condition factors (Table 11). In 2006, 61% of the walleye sampled were greater than quality size (TL > 15.0 in.). Overall, 44.4% were quality size (TL=15-19 in.), 5.55 % were preferred size (20-25 in.), and 11.1% of the walleye sampled were memorable (TL >25 in.). In 2007, 29% of the walleye sampled were greater than quality size (TL > 15.0 in.). Overall, 12.9% were quality size (TL=15-19 in.), 6.45 % were preferred size (20-25 in.), and 9.67% of the walleye sampled were memorable (TL >25 in.). In 2008, 87.5% of the walleye sampled were greater than quality size (TL > 15.0 in.). Overall, 43.75% were quality size (TL=15-19 in.), 25% were preferred size (20-25 in.), and 18.75% of the walleye sampled were memorable (TL >25 in.).

Smallmouth bass

Smallmouth bass were first introduced in 1997 and were stocked annually until 2000. As a result of these efforts there is now a self-sustaining population of smallmouth bass in Beaver Creek Reservoir. While smallmouth bass had a low relative abundance during gill netting surveys (Table 11), due to selectivity of the gear, catches of 8 to 10 inch bass by anglers are common. In addition, several YOY were collected during summer seining surveys (Table 12).

Table 11.- Summary of relative abundance (catch per unit effort (CPUE)), average total length, and relative weights of fishes collected in fall gillnetting surveys in Beaver Creek Reservoir, 1974-2008.

		Rainbow Trout			Yellow Perch			Northern Pike			Smallmouth bass			Walleye			Longnose sucker		White sucker	
Date	Nets	CPUE (fish/net)	Ave TL (in.)	Rel Wt	CPUE (fish/net)	Ave TL (in.)	Rel Wt	CPUE (fish/net)	Ave TL (in.)	Rel Wt	CPUE (fish/net)	Ave TL (in.)	Rel Wt	CPUE (fish/net)	Ave TL (in.)	Rel Wt	CPUE (fish/net)	Ave TL (in.)	CPUE (fish/net)	Ave TL (in.)
Sep-74	3	24.00	10.91	111.26	--	--	--	--	--	--	--	--	--	--	--	--	7.33	10.49	82.33	10.23
Nov-77	3	35.00	10.05	86.31	--	--	--	--	--	--	--	--	--	--	--	--	2.33	9.66	113.00	9.75
Sep-80	3	23.33	10.12	81.04	--	--	--	--	--	--	--	--	--	--	--	--	1.33	6.33	156.00	8.86
Sep-81	3	7.33	10.88	82.77	--	--	--	--	--	--	--	--	--	--	--	--	6.67	8.78	165.33	8.70
Oct-82	3	8.33	11.78	99.67	--	--	--	2.33	15.79	109.67	--	--	--	--	--	--	3.33	9.66	109.67	9.69
Oct-83	3	3.33	11.79	94.66	--	--	--	3.67	25.10	117.07	--	--	--	--	--	--	1.33	--	98.33	--
Sep-84	3	3.00	11.26	95.43	--	--	--	3.67	26.64	111.21	--	--	--	--	--	--	0.67	11.00	58.33	10.50
Sep-86	6	15.00	11.50	98.90	--	--	--	4.17	16.68	109.86	--	--	--	--	--	--	0.00	--	42.00	--
Sep-87	6	11.33	13.61	92.06	0.33	6.30	--	5.17	22.43	91.71	--	--	--	0.00	--	--	0.00	--	18.00	--
Sep-88	6	9.67	14.74	90.40	8.17	5.93	105.50	3.00	27.55	123.61	--	--	--	0.67	10.58	86.48	4.00	--	14.00	--
Sep-89	6	10.67	13.15	93.45	9.17	7.59	96.04	1.17	30.31	94.56	--	--	--	0.00	--	--	2.50	--	14.33	4.13
Sep-90	6	18.50	11.96	88.66	4.00	8.51	95.13	0.67	20.95	100.49	--	--	--	2.67	13.69	81.72	9.17	8.04	9.67	14.12
Sep-91	6	15.50	12.78	93.26	12.00	7.39	103.98	2.33	16.57	95.37	--	--	--	5.67	13.98	90.24	2.83	--	8.17	--
Sep-92	6	13.67	13.74	93.42	6.00	6.37	91.54	3.33	25.64	113.39	--	--	--	2.33	17.84	94.80	1.33	--	7.67	--
Sep-93	6	3.17	16.43	94.48	12.33	7.20	109.06	2.00	27.49	100.01	--	--	--	3.33	16.75	95.36	0.00	--	8.67	--
Sep-94	6	27.67	11.73	99.87	23.83	7.65	101.80	2.83	25.52	114.54	--	--	--	1.67	17.39	103.33	0.00	--	6.00	--
Sep-95	6	20.17	13.42	96.73	20.00	7.71	102.97	3.50	21.66	96.62	--	--	--	2.50	17.96	90.90	0.00	--	12.83	--
Sep-96	6	7.83	12.56	96.59	38.00	7.58	105.79	2.83	24.86	103.02	0.17	10.10	119.26	3.33	16.68	96.53	0.00	--	11.00	3.75
Sep-97	6	6.83	13.00	91.31	39.50	7.22	94.54	4.17	21.70	99.11	0.00	--	--	2.17	17.65	96.90	0.00	--	6.17	--
Sep-98	6	4.50	15.53	86.75	47.17	7.55	93.84	4.83	24.43	94.79	0.33	11.65	114.91	4.33	18.04	96.05	0.00	--	10.17	13.74
Sep-99	5	4.20	12.26	104.04	40.60	8.39	93.18	2.20	24.17	105.00	0.80	8.95	119.90	4.40	15.24	95.74	0.20	17.30	4.60	13.39
Sep-00	6	1.00	15.07	93.40	25.00	7.52	96.67	2.50	25.33	99.20	0.50	7.80	104.56	4.67	16.66	96.31	0.00	--	4.17	0.00
Sep-01	6	14.50	12.09	92.76	30.67	7.39	100.86	1.00	27.73	96.81	0.17	10.40	108.60	4.50	13.93	93.62	0.17	17.10	8.67	14.72
Sep-02	6	3.33	11.98	96.85	21.67	7.98	100.11	1.17	25.76	96.31	0.50	9.43	99.04	7.67	14.90	89.57	0.17	--	5.33	--
Sep-03	5	15.80	11.46	102.26	12.20	7.94	125.10	2.00	13.90	108.18	0.20	10.40	96.53	3.60	14.74	101.16	0.00	--	2.60	--
Sep-04	6	12.83	11.62	93.09	16.17	8.34	99.43	0.67	23.90	103.89	0.33	8.20	103.42	2.50	15.32	68.68	0.17	19.20	5.17	15.99
Sep-05	6	5.50	13.63	97.00	12.33	8.35	102.88	0.50	29.23	104.05	0.00	--	--	3.33	15.29	96.82	0.00	--	6.00	16.57
Sep-06	6	3.00	13.38	143.90	23.00	7.71	101.30	1.50	26.94	97.10	0.00	--	--	3.00	15.08	98.10	0.00	--	3.00	16.89
Sep-07	6	9.00	11.80	95.70	29.33	7.90	107.00	1.67	27.50	101.50	0.17	9.20	107.20	5.17	12.80	103.80	0.00	--	17.00	17.20
Sep-08	6	10.00	12.05	104.30	26.50	8.01	102.48	1.00	28.10	97.53	0.17	14.00	113.20	2.67	19.80	94.20	0.00	--	1.83	16.89

Table 12. – Summary of young of year yellow perch (YP), white sucker (W SU), spottail shiner (SP SH), Iowa Darter (IOWA), fathead minnow (FH MN), largemouth bass (LMB), northern pike (NP), walleye (WE), and other fishes captured by beach seining in Beaver Creek Reservoir, 1980 to 2008.

Date	Sites	YP	W SU	SP SH	IOWA	FH MN	LMB	SMB	NP	WE	Other Sp.[1]
Jul-80	5	--	650	--	0	42	--	--	--	--	46
Jul-81	5	--	1,671	--	0	75	12	--	--	--	38
Jul-82	5	--	7	--	0	0	54	--	0	--	0
Jun-83	5	--	46	--	0	0	5	--	5	--	0
Aug-84	7	--	189	--	10	0	4	--	0	--	0
Sep-85	5	--	2,648	--	11	0	33	--	3	--	7
May-86	4	--	1,749	0	2	0	0	--	1	--	24
Jun-86	6	--	3,132	0	2	0	0	--	1	--	1
Aug-86	6	--	134	0	8	0	2	--	9	--	0
Sep-86	6	--	1,111	0	34	29	184	--	6	--	11
Jul-87	6	1,968	2,276	1	24	3	0	--	20	11	3
Aug-87	6	2,315	973	0	59	1	16	--	19	19	5
Jun-88	6	20	17	0	6	0	0	--	1	3	0
Aug-88	6	4,973	62	1	4	0	0	--	1	2	0
Aug-89	6	50	48	603	0	0	0	--	2	4	5
Aug-90	6	42	1	93	2	0	0	--	2	0	1
Aug-91	6	8,642	348	835	0	0	0	--	17	0	4
Aug-92	6	1,888	492	156	4	0	0	--	4	0	0
Aug-93	6	42	0	355	11	0	0	--	27	0	0
Aug-94	6	707	49	181	0	0	0	--	11	0	0
Aug-95	6	7,210	6	1,438	0	0	0	--	13	0	0
Aug-96	6	51	261	248	7	0	0	0	5	7	0
Aug-97	6	17	31	193	6	0	0	8	13	2	0
Aug-98	6	872	0	141	0	0	0	41	6	1	0
Aug-99	6	592	4	87	0	0	0	16	7	2	0
Aug-00	6	402	1	190	0	1	0	12	3	23	0
Aug-01	6	357	10	216	0	0	0	8	0	3	0
Aug-02	6	333	0	592	0	0	0	7	0	93	0
Aug-03	6	557	19	2,355	2	0	0	9	15	1	0
Aug-04	6	1,545	0	0	1	0	0	5	2	2	0
Jul-05	6	185	3	1	0	0	0	0	36	12	0
Aug-06	6	1,154	8	608	0	0	0	12	32	11	0
Jul-07	6	253	0	0	0	0	0	13	4	9	0
Jul-08	6	113	0	0	0	0	0	2	0	0	0

[1] Consists of emerald shiners, northern redbelly dace, lake chub, western silvery/plains minnow, b minnow, and longnose dace

Fresno Reservoir

Fresno Reservoir, located 12 miles northwest of Havre, was built in 1939 for irrigation purposes along the Milk River. Fresno is a highly fluctuating mainstem reservoir of 5,757 surface acres with a mean depth of 27 feet, and a maximum depth of 48 feet. Fresno was initially developed as a rainbow trout fishery in the 1940's and 50's, however an illegal introduction of northern pike in the 1940's resulted in a severe decline in the rainbow trout fishery. As a result, Fresno was developed as a warm-water fishery and walleye, yellow perch, crappie, largemouth bass, smallmouth bass, Lake Superior whitefish, emerald shiner, and spottail shiners were introduced. Over the years, kokanee salmon, brown trout, and rainbow trout have been introduced to supplement the fishery when walleye and northern pike populations were low.

The fishery in Fresno has fluctuated throughout the years due to high fluctuations in water levels. On average, water levels in Fresno fluctuate 21.1 feet per year. The timing of this fluctuation greatly impacts the reproduction and survival of forage and sport fish. The fishery in Fresno was severely decreased in 2001 and 2002 when severe drought reduced the reservoir to 8% and 4% of storage capacity, respectively. Forage fish populations were drastically reduced and abundance and condition of key sport fish was at an all time low. As a result, 170,000 pre-spawn adult yellow perch were introduced to increase population levels so that when water levels increased, forage fish populations could rebound. In addition, 100,000 walleye fingerlings were stocked in 2003 and 2004, and 101,500 were stocked in 2005. In 2006, 5,486 4-inch perch were transferred from the Hill County water district ponds in Kremlin and 1,493 adult white suckers were transferred from Bear Paw Lake. Additionally, 200,000 walleye fingerlings were stocked. In 2007, 100,000 fingerling walleye were stocked and 1,155 adult white suckers were transferred from Bear Paw Lake. In 2008, 100,000 were stocked and 560 adult white suckers were transferred from Bear Paw Lake.

In 2004, water levels increased and flooded shoreline vegetation, allowing the successful spawning and recruitment of forage fishes. From 2005 to 2008, water levels remained high during spring spawning and early summer rearing allowing sport and forage fish populations to rebound. The continued recovery of the fishery is dependent of maintaining water levels that will allow the successful spawning and recruitment of forage and sport fishes.

Population Status of Young-of-Year Fishes

The abundance and reproductive success of sport and forage fishes were monitored at 12 fixed sites, which were established in 1968. Beach seining was conducted in late summer using a 100- x 9-foot x ¼ inch square mesh beach seine. Fish were sorted by species and counted.

Historically, the abundance of YOY fishes has been dictated by the annual fluctuations in water levels within Fresno Reservoir. On average, water levels in Fresno fluctuate 21.1 feet per year. The timing of this fluctuation greatly impacts the reproduction and survival of forage and sport fish. The extreme draw down of Fresno in 2001 and 2002 greatly reduced the population levels of most fishes in Fresno except for sauger, which took advantage of the increased riverine habitat (Table 13).

Since 2002, YOY forage and sport fish populations have been increasing and hopefully will continue to recover. While the reservoir levels were reduced, vegetation regenerated along the shoreline and provided spawning habitat for forage and sport fish when water levels increased in 2003. As a result, forage fish such as yellow perch, emerald shiners, and spottail shiners as well as black crappie and northern pike successfully spawned (Table 13). In 2004, crappie, emerald shiner, and spottail shiner numbers were significantly lower than in 2003, however these counts were most likely inaccurate as a result of passage of shiners through the ¼ inch mesh. Spawning may have been delayed as a result of the delayed rise in water levels thus resulting in reduced size of shiners at the time of seining. In 2005, water levels were higher than normal during seining surveys and the abundance of shoreline vegetation reduced the effectiveness of the gear.

In 2006, a high number of adult emerald and spottail shiners were collected during seining surveys indicating a recovery of the forage fish base. As a result of the high numbers of adult shiners, 407 spottail shiners and 29 emerald shiners were transferred by the USFWS to Bonneau Reservoir on the Rocky Boy Indian Reservation to establish a forage base for a walleye fishery. In 2007, high numbers of spottail shiners were collected, the highest level since 1999.

High numbers of yellow perch and northern pike were also collected in 2006. The yellow perch population is recovering and will continue to increase if water levels are maintained during spawning and rearing stages. In 2007, fewer yellow perch were collected however the yellow perch and spottail shiners were small enough to pass through the ¼ inch mesh of the seine. Northern pike YOY levels have fluctuated throughout the years, however the population appears to be on the upward trend in 2006. In 2008, Fresno filled to capacity and flooded a substantial amount of shoreline vegetation creating prime spawning and rearing habitat. Summer seining efforts revealed walleye, yellow perch, and black crappie, all benefited from this rise in water levels with excellent reproduction and survival (Table 13). Spottail and emerald shiner numbers were lower in 2008 as a result of cooler spring weather which reduced the size of shiners at the time of seining, resulting in inaccurate estimates due to passage of shiners through the ¼ inch mesh.

Table 13. – A summary of forage fish and young-of-year forage and sport fish collected using a 100- x 9-foot x ¼ inch square mesh beach seine in Fresno Reservoir, 1968-2008.

Year	Seine Hauls	*Sanders*	Walleye	Sauger	Northern Pike	Yellow Perch	Emerald Shiner	Crappie Sp.	Spottail Shiner	Sucker sp.[1]	Minnow sp.[2]	Other[3]
1968	12	16	--	--	6	2,909	147	552	0	0	161	0
1969	12	4	--	--	6	1,140	385	67	0	2	380	0
1970	12	27	--	--	45	10,151	521	883	0	1	122	0
1972	12	102	--	--	22	1,005	205	379	0	0	72	0
1974	12	13	--	--	59	1,583	29	1,355	0	0	25	0
1975	11	10	--	--	32	4,154	155	59	0	0	0	0
1978	12	22	--	--	42	10,684	12	3	0	0	0	0
1979	12	29	--	--	45	8,516	340	127	0	1	0	1
1982	12	102	--	--	70	8,993	121	166	0	0	0	3
1983	12	23	--	--	0	2,254	448	9	0	1	7	0
1984	12	247	--	--	0	197	375	0	2	40	55	0
1985	12	64	--	--	0	379	684	3	2	0	9	0
1986	12	0	--	--	23	6,077	142	2	20	1	5	1
1987[+]	12	80	--	--	113	6,233	1,979	7	3	0	3	0
1988	12	53	--	--	4	3,122	182	0	20	0	1	0
1989[+]	12	56	--	--	32	24,706	22	0	16	2	0	0
1990	12	8	--	--	57	2,033	7	465	44	1	2	0
1991[+]	12	8	--	--	36	3,425	0	42	53	0	0	0
1992[+]	12	45	--	--	2	6,550	28	0	48	0	1	0
1993[+]	12	24	--	--	9	5,595	12	2	162	0	0	0
1994[+]	12	19	--	--	19	2,960	3	287	1,421	1	0	0
1995	12	5	--	--	2	1,080	0	2	129	0	1	0
1996[+]	12	52	--	--	21	3,576	0	1	1,484	42	0	0
1997[+]	12	46	--	--	15	3,006	2	1	887	2	0	0
1998[+]	12	44	--	--	1	1,413	9	0	1,041	1	3	0
1999	12	50	--	--	7	4,271	176	12	182	13	0	0
2000	6	29	--	--	0	1,396	2	2	30	2	0	1
2001	6	86*	--	--	0	39	3	0	3	3	1	0
2002	12	28*	--	--	2	86	128	400	154	4	29	0
2003[+]	12	4	--	--	46	1,871	5,539	90	207	0	0	1
2004[+]	12	--	12	2	10	2,898	69	48	56	0	2	1
2005[+]	12	--	26	2	19	934	39	15	39	0	0	0
2006[+]	12	--	27	0	57	2,283	80	5	923	0	0	0
2007[+]	12	--	7	0	13	769	68	54	1,106	2	0	0
2008[+]	12	--	65	0	1	2,329	5	721	287	11	0	0

[1]Consists of white and longnose sucker

[2]Consists of silvery minnows, lake chubs, flathead chubs, and fathead minnows

[3]Consists of burbot, smallmouth bass, pumpkinseed sunfish, and brook sticklebacks

[+] Years in which walleye fry or fingerling were stocked

* Primarily Sauger

Population Status of Adult Fishes

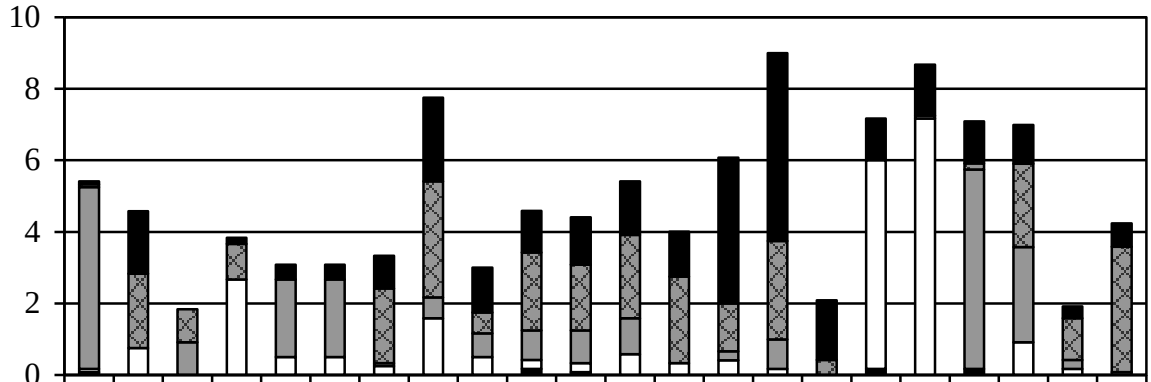
Adult fish populations were monitored from 1965 to 1974, using systematic gill netting at predetermined stations. Sampling at 12 predetermined stations was resumed in 1987 to determine changes in sport fish abundance and species composition. Samples were collected over two days utilizing six sinking multi-filament experimental gill nets each day (12 net-days). The sinking multi-filament experimental gill nets measuring 125 feet in length and 6 feet deep consisting of 25-foot panels of ¾", 1", 1 ¼", 1 ½", and 2" mesh. Fish were measured for total length (TL) to the inch and weighed to the nearest 0.01 pound. Prior to 2005, scales were collected for aging from all walleye and sauger. From 2005 to 2008, otoliths were collected from walleye for aging and oxytetracycline (OTC) analysis.

Lake Superior Whitefish

Lake Superior whitefish (whitefish) in Fresno Reservoir historically have comprised a significant portion of the gill net catch (Figure 4), but are rarely utilized by anglers. Whitefish exhibit high growth rates in the reservoir, and thereby escape predation from all but the largest walleye and northern pike. Whitefish appear to reproduce successfully in years of stable over-winter storage.

In 2007, there were reports of partial summer kills of lake whitefish in Fresno. The extent of the summer kill was unknown, however based fall gill netting surveys indicate a significant kill of lake whitefish. Lake whitefish collected in 2007 ranged in length from 9.2 to 20.9 inches ($\bar{x}$ =15.4 in.). Relative abundance increased in 2008 but remain below abundances observed in years prior.

Figure 4. - Relative abundance and size structure of lake whitefish collected with sinking experimental gill nets in Fresno Reservoir, 1987-2008.



	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Memorable (>18.0 in.)	0.08	1.75	0.00	0.17	0.42	0.42	0.92	2.33	1.25	1.17	1.33	1.50	1.25	4.08	5.25	1.67	1.17	1.42	1.17	1.08	0.33	0.66
Preferred (14.0-17.9 in.)	0.08	2.08	0.92	1.00	0.00	0.00	2.08	3.25	0.58	2.17	1.83	2.33	2.42	1.33	2.75	0.42	0.00	0.00	0.17	2.33	1.17	3.5
Quality (11.0-13.9 in.)	5.08	0.00	0.92	0.00	2.17	2.17	0.08	0.58	0.67	0.83	0.92	1.00	0.00	0.25	0.83	0.00	0.00	0.08	5.58	2.66	0.25	0.08
Stock (6.0-10.9 in.)	0.08	0.75	0.00	2.67	0.50	0.50	0.25	1.58	0.50	0.25	0.25	0.58	0.33	0.42	0.17	0.00	5.83	7.17	0.00	0.92	0.17	0
Sub Stock (<6.0 in.)	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.08	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.17	0.00	0	0

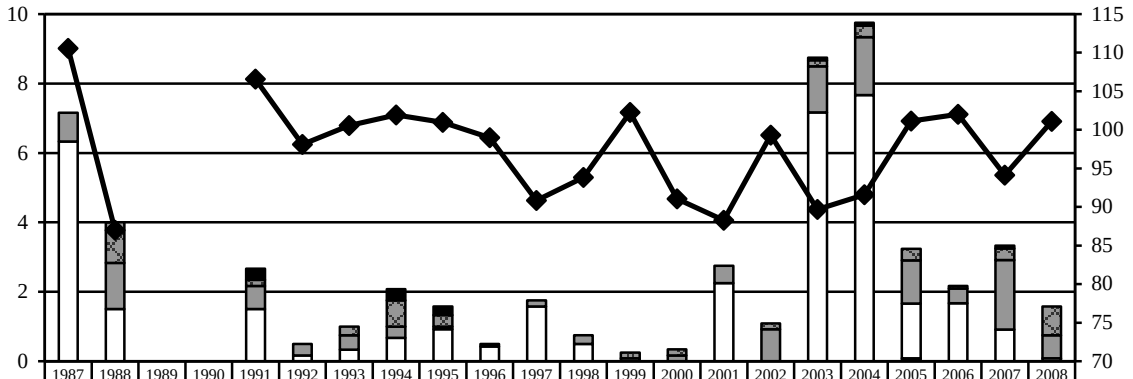
Yellow Perch

The yellow perch fishery in Fresno has been negatively impacted by drought over the last seven years. As a result of extreme draw downs in 2001 and 2002, yellow perch were not able to successfully spawn (Table 13) and population levels were drastically reduced (Figure 5). To remedy

this situation, 170,000 pre-spawn adult yellow perch were introduced from 2001 through 2004 to increase population levels so when water levels increased these forage fish populations might rebound. In 2003 and 2004, water levels increased, flooding shoreline vegetation, and allowing the successful spawning and recruitment of forage fish, as a result stocking of pre-spawn perch was discontinued in 2005. In 2006, an additional 5,486 stunted yellow perch were salvaged from the Hill County Water Ponds in Kremlin and transferred into Fresno Reservoir.

Since stocking of adult yellow perch was discontinued in Fresno Reservoir, the abundance of adult yellow perch has decreased, however the abundance levels remain higher than most pre-drought levels (Figure 5). In addition, the proportion of stock size fish in the population indicates that YOY fish have successfully recruited into the population. However, this number continues to decline since stocking of adult yellow perch ceased in 2005. The continued recovery of the fishery is dependent of maintaining water levels that will allow the successful spawning and recruitment of forage and sport fishes.

Figure 5. - Relative abundance, size structure, and relative weight of yellow perch collected with sinking experimental gill nets in Fresno Reservoir, 1987-2008.

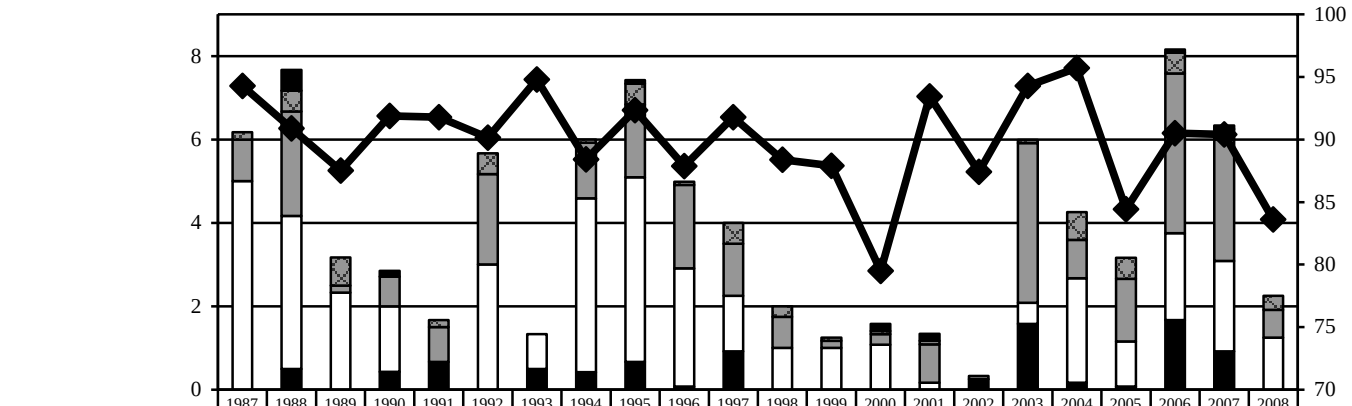


	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Memorable (>12 in.)	0	0	0	0	0.33	0	0	0.33	0.25	0	0	0	0	0	0	0	0.08	0.08	0	0	0.083	0
Preferred (10-11.9 in.)	0	1.17	0	0	0.17	0	0.25	0.75	0.33	0	0	0	0.17	0.17	0	0.17	0.17	0.33	0.33	0.08	0.333	0.833
Quality (8-9.9 in.)	0.83	1.33	0	0	0.67	0.33	0.42	0.33	0.08	0.08	0.17	0.25	0.08	0.17	0.5	0.92	1.33	1.67	1.25	0.42	2	0.667
Stock (5-7.9 in.)	6.33	1.5	0	0	1.5	0.17	0.33	0.67	0.92	0.42	1.58	0.5	0	0	2.25	0	7.17	7.67	1.58	1.67	0.917	0.08
Sub Stock (<5 in.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.08	0	0	0
Relative weight	110.6	86.99			106.6	98.12	100.6	101.9	101	98.99	90.84	93.84	102.3	91.07	88.25	99.3	89.66	91.6	101.1	102.00	94.1	101.1

Northern pike

Since the illegal introduction of northern pike in Fresno Reservoir in the 1940s, their population has fluctuated over the years (Figure 6). Extreme drought from 2000 to 2002 reduced the abundance of northern pike however, the population rebounded in 2003 with increased water levels and flooding of shoreline vegetation. Since 2003, reproduction has steadily increased with high numbers of YOY being collected during annual beach seining surveys. However, northern pike recruitment was significantly reduced in 2008 (Table 13). The population of adult northern pike decreased slightly in 2007 and this decline continued in 2008, falling to similar levels observed from 1998-2002.

Figure 6. - Relative abundance, size structure, and relative weight of northern pike collected with sinking experimental gill nets in Fresno Reservoir, 1987-2008.



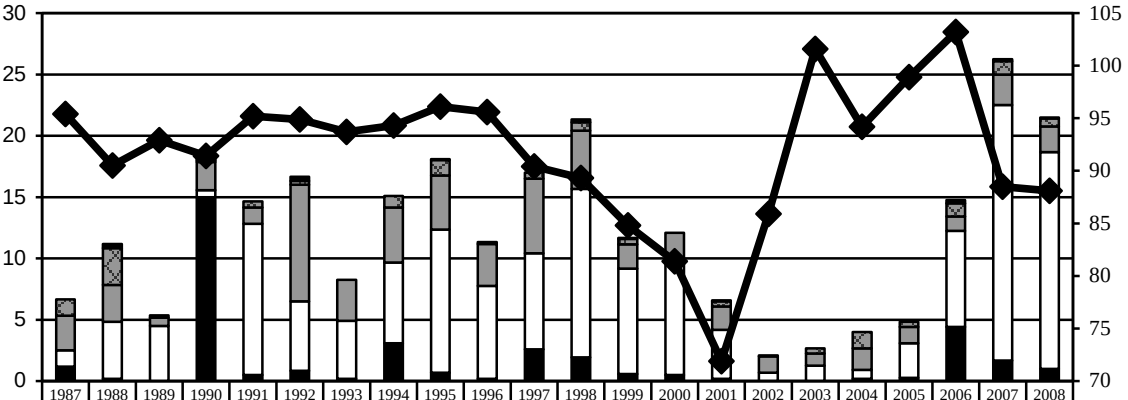
	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Memorable (>34 in.)	0.00	0.50	0.00	0.14	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.17	0.17	0.00	0.00	0.00	0.00	0.08	0.08	0
Preferred (28-33.9 in.)	0.17	0.50	0.67	0.00	0.17	0.50	0.00	0.08	0.50	0.08	0.50	0.25	0.08	0.08	0.08	0.00	0.08	0.67	0.50	0.5	0.25	0.3333
Quality (21-27.9 in.)	1	2.5	0.17	0.71	0.83	2.17	0	1.33	1.75	2	1.25	0.75	0.17	0.25	0.92	0.08	3.83	0.92	1.5	3.83	2.917	0.6667
Stock (14-20.9 in.)	5.00	3.67	2.33	1.57	0.00	3.00	0.83	4.17	4.42	2.83	1.33	1.00	1.00	1.08	0.17	0.00	0.50	2.50	1.08	2.08	2.167	1.25
Sub Stock (<14 in.)	0.00	0.50	0.00	0.43	0.67	0.00	0.50	0.42	0.67	0.08	0.92	0.00	0.00	0.00	0.00	0.25	1.58	0.17	0.08	1.67	0.9167	0
Relative weight	94.29	90.89	87.52	91.88	91.77	90.15	94.79	88.41	92.34	87.88	91.78	88.37	87.90	79.51	93.43	87.41	94.29	95.72	84.43	90.50	90.4	83.6

Walleye

From 2003 to 2005 approximately 100,000 fingerlings were stocked annually in Fresno Reservoir. In 2006, 200,000 fingerling walleye were stocked due to unallocated productions at the Ft. Peck fish hatchery. In 2007 and 2008, 100,000 fingerling walleye were stocked.

Since 2003 the abundance of adult walleye has steadily increased and is currently at pre-drought levels (Figure 7). In 2007, walleye were at their highest abundance levels on record (CPUE=26.25 fish/net; Figure 7) indicates excellent survival and recruitment of stocked YOY walleye, especially the 2005 and 2006-year class. In 2007, 6.7% of the walleye were sub-stock (TL<10 in.), 79.4% were stock size (TL=10-14.9 in.), and 9.5% were quality size (TL=15-19.9 in.). Walleye sampled ranged in length from 6.8 to 26.3 in. ($\bar{x}$ TL= 13.0 in.) and in weight from 0.1 to 6.95 lbs ($\bar{x}$ wt. = 0.94). In 2008, walleye abundance decreased slightly (CPUE=21.5 fish/net; Figure 7), but remain well above abundances observed in the late 1990s and early 2000s. In 2008, sampled walleye ranged in length from 9.3 to 28.5 in. ($\bar{x}$ TL= 13.4 in.) and in weight from 0.2 to 8.8 lbs ($\bar{x}$ wt. = 0.87).

Figure 7. - Relative abundance, size structure, and relative weight of walleye in Fresno Reservoir for the years 1987-2008.



	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Memorable (>25 in.)	0	0.33	0.17	0.29	0	0.33	0	0	0.08	0	0	0.25	0.08	0	0.08	0	0	0	0	0.25	0.17	0.08
Preferred (20-24.9 in.)	1.33	3	0	0.14	0.5	0.33	0	0.92	1.25	0.17	0.5	0.67	0.42	0	0.42	0.08	0.42	1.33	0.42	1.08	1.08	0.67
Quality (15-19.9 in.)	2.83	3	0.67	2.29	1.33	9.5	3.33	4.5	4.42	3.42	6.08	4.75	2	2.17	1.92	1.33	1	1.75	1.33	1.17	2.5	2.08
Stock (10-14.9 in.)	1.33	4.67	4.5	0.57	12.33	5.67	4.75	6.58	11.67	7.58	7.83	13.75	8.58	9.42	4	0.67	1.25	0.75	2.83	7.83	20.83	17.67
Sub-stock (<10 in.)	1.17	0.17	0	15	0.5	0.83	0.17	3.08	0.67	0.17	2.58	1.92	0.58	0.5	0.17	0	0	0.17	0.25	4.42	1.67	1
Relative weight	95.4	90.5	92.9	91.4	95.2	94.9	93.7	94.3	96.1	95.6	90.4	89.3	84.8	81.4	71.9	85.9	101.6	94.2	98.9	103.2	88.5	88.1

Sauger

Sauger populations have been relatively low in Fresno Reservoir since the construction of the Fresno Dam. Sauger have been captured periodically primarily in the upper reservoir where the Milk River enters Fresno Reservoir. Sauger populations increased in 2001 and 2002 when drought and extreme drawdowns resulted in an increase in riverine habitat (Table 13), however no sauger were collected in 2008.

Black Crappie

Black and/or white crappies were most likely introduced into Fresno in the 1950s however the first record of stocking occurred in 1991. Since 1968, YOY crappie numbers have fluctuated. In 2008, YOY black crappie abundance was the highest on record since 1974 (Table 13). However the population of adult black crappie has remained relatively low (CPUE range = 0.17 to 0.58 fish/net; 1999 to 2008) and may be misconstrued due to sampling gear bias.

Blaine County Ponds

Select waters throughout Blaine County were sampled to determine fish abundance using sinking multi-filament experimental gill nets measuring125 feet in length and 6 feet deep consisting of 25-foot panels of ¾", 1", 1 ¼", 1 ½", and 2" mesh unless otherwise specified. Voluntary creel boxes were maintained at many of the ponds to determine fishing pressure, catch rates, and satisfaction.

Cow Creek Reservoir

Cow Creek Reservoir is a privately owned 65-acre pond located in the Bears Paw Mountains. Cow Creek Reservoir has been managed as a warm water fishery since 1994. Since 1994, walleye, channel catfish, black crappie, and tiger muskie have been stocked and yellow perch were illegally introduced in 2001. In 2007, 5,000 walleye, 3,000 channel catfish, and 820 7 inch tiger musky were stocked into Cow Creek Reservoir. Starting in 2008, 5,000 walleye and 1,000 channel catfish will be

stocked in alternate years. Tiger Musky will be stocked on an as need basis. The primary food sources for these sport fish are white suckers, fathead minnows, golden shiners, and northern red belly dace. In 2005, this reservoir received 103 angler days and ranked 56th in the region for angler pressure (McFarland 2006).

In 2008, two experimental gill nets and two trap nets were set overnight. Gill net catch rates of walleye, channel catfish, yellow perch, and white suckers have been declining since 2003. However, overall condition and relative weights for channel catfish have increased (Table 14). Trap nets sampled three walleye (CPUE = 1.5 fish/net) and one channel catfish (CPUE = 0.5 fish/net).

In 2007, the voluntary creel box was maintained, however angler participation was low (n=3). Anglers reported summer catch rates of 0.133 tiger muskie/hour, 0.60 walleye/hour, and 0.08 channel catfish/hour (n=3). In 2006, anglers reported summer and fall catch rates of 0.029 tiger muskie/hour, 0.64 walleye/hour, 0.04 channel catfish/hour, and 0.02 yellow perch/hour (n=15).

Table 14. – Catch rate (CPUE (fish/net)) and average length of yellow perch, channel catfish, white sucker, walleye, and tiger muskie using gill nets in Cow Creek Reservoir (1994-2008).

		Yellow Perch		Channel Catfish			White Sucker		Walleye			Tiger Muskie	
Date	Nets	CPUE	Ave. Length	CPUE	Ave. Length	Rel. Weight	CPUE	Ave. Length	CPUE	Ave. Length	Rel. Weight	CPUE	Ave. Length
Aug-94	2.0		--	0.0	--		2.0	--	23.5	7.2		0.0	--
Sep-95	1.0	0.0	--	0.0	--		2.0	--	15.0	10.0	82.5	0.0	--
Sep-96	2.0	0.0	--	5.0	9.1	116.1	1.0	--	48.0	11.1	82.3	0.0	--
Sep-97	2.0	0.0	--	9.5	10.5	118.1	1.0	--	30.5	11.9	86.9	0.0	--
Sep-98	3.0	0.0	--	6.3	13.9	107.7	7.0	14.6	11.3	13.2	87.1	0.0	--
Sep-01	2.0	0.5	5.6	4.5	17.0	103.7	0.5	--	12.5	13.3	94.7	0.5	15.7
May-03	2.0	0.0	--	11.0	19.5	115.7	8.0	15.9	1.0	13.0	97.0	1.5	19.4
Jul-05	2.0	1.0	9.8	9.0	21.3	104.3	6.0	17.6	8.0	14.7	85.5	0.0	--
Jul-06	2.0	1.5	9.6	9.5	21.5	108.4	7.0	17.6	12.0	13.0	87.1	0.0	--
Jul-07	2.0	0.5	10.3	7.0	23.5	118.8	0.0	--	7.5	11.8	92.2	1.5	21.5
Jul-08	2.0	0.0	0.0	6.0	14.4	120.4	2.5	18.1	4.5	9.3	90.5	0.0	0.0

Dons Reservoir

Dons Reservoir is a 5-acre pond located on BLM land in north Blain County. Don's was established as fishery in 1976 with the introduction of rainbow trout. Bluegill were introduced in 2001 and largemouth bass sometime later. It has been managed as self-sustaining warm water fishery ever since. This reservoir has experienced very low water levels since 2003 and an aeration system was installed to minimize summer and winterkill of the fish community.

Since their introduction bluegill have reproduced and maintained high population densities resulting in stunting of adult fish. Since 2004, approximately 1,500 bluegill have been trap and transferred from this reservoir to surrounding lakes and ponds. In 2004, 500 adult bluegill were moved to Petrie pond. In 2005 three trap nets soaking for two days captured 274 bluegill (CPUE=45.7 fish/net night; $\bar{x}$ =4.4 in.). These fish were transferred to Saddlebrooke pond.

In 2008, two trap nets set overnight captured 218 bluegill (CPUE=109 fish/net night; $\bar{x}$ =5.7 in.). Due to low water levels and a high density of adult bluegill, approximately 750 bluegill were transferred to other lakes in 2008: 350-Doll Pond, 170-Floyd Flynn, and 225-Br12.

Floyd Flynn (Br 06)

Floyd Flynn reservoir is a small pond located on BLM land north of Chinook. This pond is designated by the BLM as a "kid's fishery" and has been managed as such since 2003. In 2003, bluegill, rainbow trout and channel catfish were introduced. In 2004 and 2005, 500 catchable size rainbow trout were stocked.

In 2005, rainbow trout (CPUE=0.21 fish/net hour; $\bar{x}$ TL=15.67 in.), bluegill (CPUE= 0.14 fish/net; $\bar{x}$ =4.0 in.), and channel catfish (0.07 fish/net; $\bar{x}$ =7.4 in.) were collected. Water levels have been marginal the last three years and stocking has since ceased. In 2008, gill netting sampled a total of 10 golden shiners (CPUE=10 fish/net) and one trap net sampled 1,160 golden shiners and one bluegill (TL=6.3 in.).

In 2008, the voluntary creel box was maintained, however angler participation was low (n=1) and reported spring catch rates of 0.33 bluegill/hour.

Phillips County Fishing Waters

Select waters throughout Phillips County were sampled to determine fish abundance using sinking multi-filament experimental gill nets measuring 125 feet in length and 6 feet deep consisting of 25-foot panels of ¾", 1", 1 ¼", 1 ½", and 2" mesh. Voluntary creel boxes were maintained at many of the ponds to determine fishing pressure, catch rates, and satisfaction.

Bison Bone Reservoir

Bison Bone Reservoir is a 26-acre pond located on BLM land in south Phillips County. Bison Bone was established as a fishery in 1984 with the introduction of yellow perch. Tiger musky were introduced in 2002 and 2004 to control the white sucker population. A gill netting survey in 2005 indicated tiger muskie have successfully controlled the white sucker population with no suckers being collected. Furthermore, yellow perch abundance (CPUE = 49 fish/net) and size were good. The average size of perch collected was 7.68 inches (6.5 to 11.4 in. TL) and average weight was 0.22 pounds (0.13 to 0.74 lbs). In 2008, no fish were captured in a single gill net set overnight. However, one trap net was fished overnight and captured 470 yellow perch (TL = 3.0-10.4 in; $\bar{x}$ TL = 4.5 in.; $\bar{x}$ wt = 0.10 lbs.), two white suckers ($\bar{x}$ TL = 18.1 in.; $\bar{x}$ wt = 2.81 lbs.), and 54 fathead minnows.

Doll Pond

Doll pond is a 2-acre pond located on private property. Doll pond has been managed as a warm water fishery since largemouth bass and bluegill were introduced in 2006. In 2008, one gill net and one trap net were set overnight. The trap net contained four bluegill ranging in length from 2.5 to 6.1 inches and in weight from 0.02 to 0.27 pounds ($\bar{x}$ TL = 4.2 in.; $\bar{x}$ wt = 0.13 lbs.); the gill net captured no fish. Doll pond received a supplement planting of 350 adult bluegill (transferred from Don's Reservoir) and 500-1,000 fingerling largemouth bass in 2008.

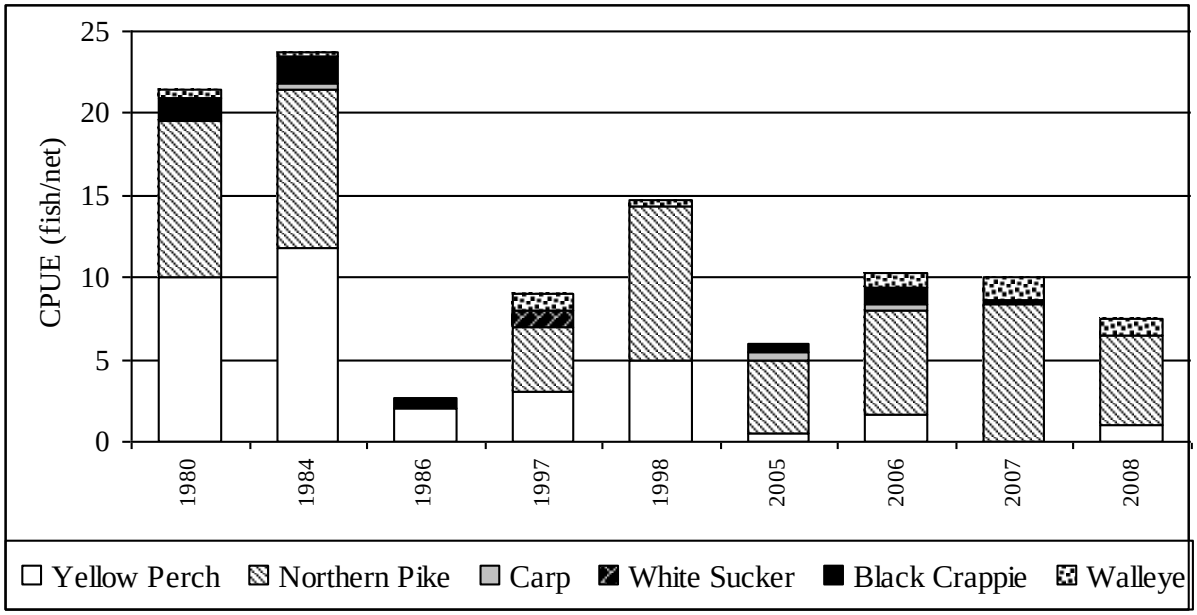
Ester Lake

Ester Lake is a 139-acre pond located on state land and has been managed as a fishery since the 1950s. In the 1960's Ester was a productive fishery with high numbers of yellow perch, black crappie, and walleye. Since the 1980s the fishery has been in decline and water levels have been marginal in recent years. Due to reduced fishing opportunities, Ester only received 33 angler days in 2005 and ranked 63rd in the region (McFarland 2006).

In 2006, the catch consisted primarily of northern pike (CPUE=6.33 fish/net), yellow perch (CPUE=1.67 fish/net), black crappie (1 fish/net), and walleye (CPUE=1 fish/net). Water levels were still low in 2006, and walleye fingerling stocking was cancelled. In 2007, water levels had improved

and 4,000 walleye fingerlings were stocked. Gill netting surveys indicated a decline in the forage base and an increase in the number of northern pike (CPUE=8.3 fish/net). In 2008, northern pike abundance remained at good levels (CPUE = 5.5 fish/net; $\bar{x}$ TL = 13.8 in.; $\bar{x}$ wt = 0.60 lbs.) and walleye catch rates were similar to the long-term average (CPUE = 1 fish/net; $\bar{x}$ TL = 21.8 in.; $\bar{x}$ wt = 3.68 lbs.; Figure 9). The forage base remains low (yellow perch CPUE = 0.5 fish/net; $\bar{x}$ TL = 8.8 in.; $\bar{x}$ wt = 0.38 lbs.) and a supplement stocking in 2009 is scheduled.

Figure 9. - Relative abundance of yellow perch, northern pike, carp, white sucker, black crappie, and walleye in Ester Lake (periodic sampling 1980 to 2008).



Lark Reservoir

Lark Reservoir is a 6-acre pond located on BLM land in south Phillips County. Lark was managed as a rainbow trout fishery from 1970 to 1994. Since the mid-1990s this reservoir has been managed as a largemouth bass fishery. In 2007, a gill netting survey resulted in catch rates of 8 largemouth bass per net (TL=7.5 to 14.0 in.; $\bar{x}$ TL=11.6 in.).

In 2005, a voluntary creel box was erected and it was maintained in 2008. In 2005, two anglers participated however they did not catch any fish. In 2006, anglers reported spring catch rates of 1.5 largemouth bass/hour (n=3) and summer catch rates of 2.89 rainbow trout per hour (n=2). In 2007, anglers reported a spring catch rate of 1.0 largemouth bass/hour (n=1) and one angler reported no fish in the fall.

McChesney Reservoir

McChesney Reservoir is a privately owned reservoir in south Phillips County. This reservoir has been managed as a northern pike, yellow perch, and black crappie fishery since the 1960s. There were also stockings of bluegill, however stocking records are not complete. In 2005, this reservoir received 187 angler days and ranked 42nd in Region 6 for fishing pressure (McFarland 2006).

In 2005, we erected a voluntary creel box to assess fishing pressure and the creel box was maintained in 2008. During the spring of 2006, anglers reported catch rates of 4.95 bluegill per hour, 0.07 largemouth bass per hour, and 0.15 yellow perch per hour. While no anglers recorded catches of

black crappie, there were several reports of high catch rates of black crappie during the summer of 2006. During the winter of 2006, anglers reported catch rates of 1.13 bluegill/hour (n=2) and 5 yellow perch/hour (n=2). In 2007, anglers reported winter catch rates of 9.24 bluegill/hour, 0.05 northern pike/hour, and 1.61 yellow perch/hour (n=2). During the spring of 2007, anglers reported catch rats of 0.24 black crappie/hour, 2.73 bluegill/hour, 0.45 northern pike/hour, and 0.67 yellow perch/hour (n=5). In the summer of 2007, anglers reported catch rates of 0.86 black crappie/hour, 4.34 bluegill/hour, 0.06 largemouth bass/hour, 0.24 northern pike/hour, and 0.43 yellow perch/hour (n=8). During the fall of 2007, anglers reported catch rates of 0.09 black crappie/hour, 5.33 bluegill/hour, 0.07 largemouth bass/hour, 0.33 northern pike/hour, and 0.44 yellow perch/hour (n=8). In 2008, winter anglers reported catch rates of 0.56 black crappie/hour, 20.4 bluegill/hour, 0.16 largemouth bass/hour, 0.32 northern pike/hour, and 1.28 yellow perch/hour (n=3). During the summer of 2008, anglers reported catch rates of 1 bluegill/hour, 0.2 northern pike/hour, and 0.2 yellow perch/hour (n=2).

Nelson Reservoir

Nelson Reservoir, located 19 miles east of Malta, is an off-channel storage reservoir constructed in 1915 for irrigation purposes. At full storage capacity, Nelson covers approximately 4,320 surface acres, has a mean depth of 14.2 feet, and a maximum depth of 50 feet. Nelson is a relatively stable reservoir, which is not affected by drought as drastically as some reservoirs in the region with an average annual fluctuation of 8.36 feet.

Nelson was established as a fishery in the 1930s & 40s with the introduction of largemouth bass, crappie, bullheads, and rainbow trout. Commercial fishing for carp, buffalo, and goldeye was conducted in the 1920s, 30s, and in the mid 60s. Nelson has approximately 26 fish species and is managed primarily as a walleye fishery. Walleye reproduce naturally in Nelson; however walleye fry are occasionally stocked to augment natural reproduction. Spawning shoals were constructed in 1993 at three locations within the reservoir to improve the spawning habitat for walleye.

Since 1997, drought has reduced the active conservation pool of Nelson and may be the limiting factor in the successful recruitment of walleye. To augment the population, walleye fry and/or fingerlings have been stocked periodically since 1986. In 2006, 200,000 fingerlings and 100,000 advanced fingerlings were stocked. In 2007, Nelson received 100,000 fingerling walleye and this number increased to 119,000 fingerlings in 2008.

Population Status of Adult and Young-of-Year Fishes

Since 1993, adult fish populations were monitored at 10 fixed experimental gill netting stations. Gill netting was conducted over a two-day period utilizing five sinking experimental gill nets each day (10 net-days). The sinking multi-filament experimental gill nets measured 125 feet in length and 6 feet deep consisting of 25-foot panels of ¾", 1", 1 ¼", 1 ½", and 2" mesh. Fish were measured for total length (TL: inches) and weighed to the nearest 0.01 pound (lb). Otoliths were collected from walleye for aging and oxytetracycline (OTC) analysis.

Prior to 1991, adult fish populations were monitored, however sampling was neither uniform, nor consistent enough to develop useful trend data on game fish population size, or composition. As a result this data was excluded from all analysis.

The abundance and reproductive success of sport and forage fishes were monitored at nine predetermined stations. Beach seining was conducted in late July using a 100- x 9-foot x ¼ inch square mesh beach seine. Fish were sorted by species and counted.

Table 15. - A summary of forage fish and young-of-year forage and sport fish collected conducted at nine fixed sites using a 100- x 9-foot x ¼ inch square mesh beach seine in Nelson Reservoir, 1982-2008.

	Shorline Seined (ft)	Walleye	Yellow Perch	Northern Pike	Spottail Shiner	White Sucker	Black Crappie	Goldeye	Buffalo sp[1]	Smallmouth Bass
1982	660	0	4,553	3	0	202	245	0	0	0
1983	1,420	4	138	18	0	543	238	0	0	0
1984	1,530	0	133	0	0	0	0	0	0	0
1985	510	3	2,272	16	1	16	67	1	0	0
1986*	700	0	3	7	0	10	232	0	0	0
1987*	495	5	1,987	0	4	45	10	7	0	0
1988*	520	0	783	0	1	0	35	0	0	0
1989*	910	10	736	4	43	1,503	135	0	0	0
1990	1,320	7	2,631	1	56	181	21	0	0	0
1991*	660	8	77	1	54	33	26	0	0	0
1992	635	21	140	6	387	175	18	0	4	0
1993*	520	3	8,287	1	520	2,688	62	0	0	0
1994*	830	6	1,802	10	621	697	49	0	0	0
1995*	760	36	232	0	3,780	180	163	0	0	0
1996*	870	25	4,521	13	21	101	0	0	0	0
1997*	890	53	2,205	0	159	534	1	0	0	0
1998*	340	0	126	0	33	235	4	0	0	0
1999	750	11	1,489	2	222	497	1	0	0	0
2000*	440	4	449	2	189	258	5	6	0	0
2001	430	2	72	1	27	800	88	0	0	0
2002*	415	2	19	4	8	38	482	21	62	0
2003	530	3	361	33	49	235	6,597	0	0	3
2004*	443	10	1,781	0	19	195	5	1	0	10
2005*	754	5	423	2	34	155	278	23	5	1
2006*	831	3	773	8	66	319	89	0	3	1
2007*	489	6	586	2	75	596	5	0	12	9
2008*	500	10	62	0	8	272	1,237	11	94	11

*Years in which walleye fry or fingerlings were stocked

[1] Consists of bigmouth buffalo and smallmouth buffalo

Yellow Perch

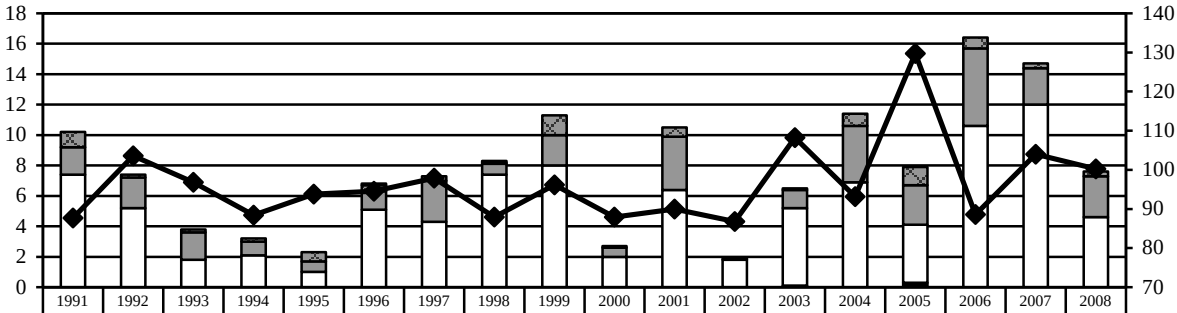
The yellow perch fishery in Nelson Reservoir has been cyclic over the last 14 years due to drought and water fluctuations. In the early 1990s and in 2000 and 2002 the relative abundance of yellow perch was significantly reduced. However, since 2003 spring and summer rains and water retention improvements by the Bureau of Reclamation (BOR) have allowed water levels to flood shoreline vegetation and remain stable during crucial spawning and rearing periods.

The abundance of flooded vegetation created ideal spawning conditions for yellow perch, resulting in a five-fold increase in YOY yellow perch in 2004 (Table 15). In 2005, water levels were

higher than normal during seining surveys and the abundance of shoreline vegetation reduced the effectiveness of the gear. This resulted in reduced captures of YOY yellow perch and the accuracy of our counts were reduced. In 2007, the abundance of YOY yellow perch decreased slightly and was significantly reduced in 2008 (Table 15), however water levels were favorable for spawning and recruitment of perch in both years.

The relative abundance of adult yellow perch doubled in 2004, and remained high in 2005 (Figure 10). In 2006, yellow perch numbers increased to their highest levels since 1991, at 16.4 fish/net. In 2007, the abundance of yellow perch remained steady at 14.7 fish/net and fell to 7.6 fish/net in 2008 (Figure 10). Currently, the population of adult yellow perch consists mostly of stock (5-7.9 in.) and quality (8.0-9.9 in.) sized fish. The high number of stock size fish is encouraging, indicating that the past two years of higher water levels have allowed the population to start to recover.

Figure 10. - Relative abundance, size structure, and relative weight of yellow perch collected with sinking experimental gill nets in Nelson Reservoir, 1991-2008.



	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Memorable (>12 in.)	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
Preferred (10-11.9 in.)	1.00	0.20	0.20	0.20	0.60	0.40	0.30	0.10	1.30	0.10	0.60	0.00	0.10	0.80	1.20	0.70	0.3	0.3
Quality (8-9.9 in.)	1.80	2.00	1.80	0.90	0.70	1.20	2.70	0.70	2.00	0.60	3.50	0.10	1.20	3.70	2.60	5.10	2.4	2.7
Stock (5-7.9 in.)	7.40	5.20	1.80	2.10	1.00	5.10	4.30	7.40	8.00	2.00	6.40	1.80	5.10	6.90	3.80	10.60	12	4.6
Sub Stock (<5 in.)	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.3	0	0	0
Relative weight	87.70	103.58	96.83	88.45	93.77	94.56	97.87	87.94	96.13	87.97	89.95	86.76	108.25	93.10	129.76	88.60	104	100.23

Walleye

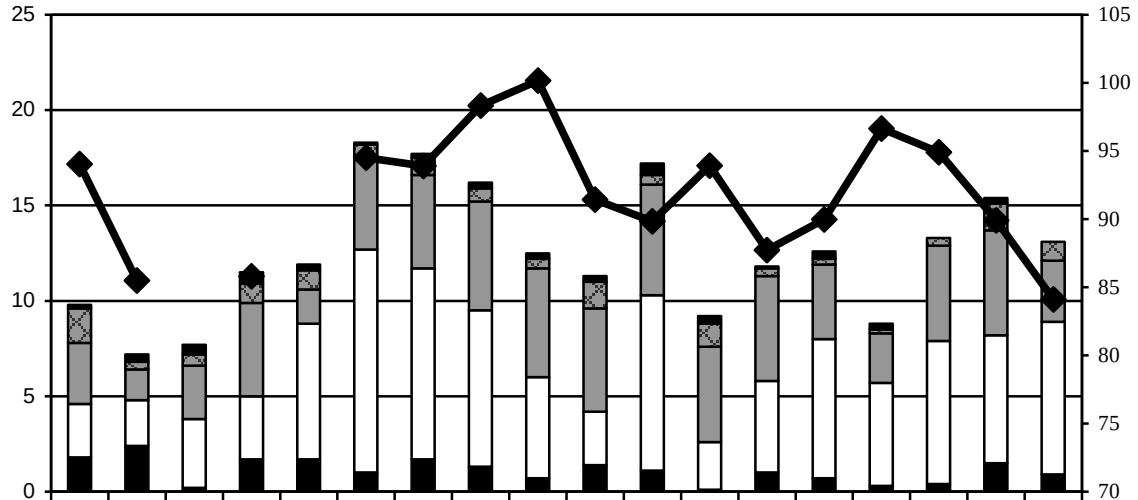
Walleye fingerlings have been periodically stocked into Nelson Reservoir to augment natural reproduction (Table 15). From 2002 to 2008 (with the exception to 2006), all walleye fingerlings stocked into Nelson Reservoir have been marked with 750 ppm OTC to allow the calculation of survival on stocked fish and to distinguish stocked fish from naturally reproduced fish. In 2006, only half of the walleye stocked were marked with OTC due to problems with reaction of the walleye to the chemicals. In 2002, 20,000 marked fingerling were stocked, 100,250 marked fingerlings in 2004, and 100,000 marked fingerlings in 2005. In 2006, 100,000 marked and 100,000 unmarked fingerlings were stocked, and an additional 8,000 unmarked advanced fingerlings were stocked. In 2007, 100,000 walleye fingerlings were stocked and this number increased to 119,000 fingerlings in 2008.

Even with the addition of these fish, catch of YOY walleye during seining surveys remained low when compared to pre-drought levels (Table 15). However, the high proportion of stock (10-14.9 in.) and quality size (15.0-19.9 in.) walleye in the population indicates good survival of stocked YOY walleye from 2003 through 2007 (Figure 11).

The relative abundance of adult walleye has remained relatively stable over the last five years with a minor decrease in catch rates in 2005 (8.8 fish/net; Figure 11). In 2006, walleye numbers increased to 13.3 fish/net (Figure 11). In 2007, walleye numbers increased to 16.1 fish/net and falling

slightly in 2008 to 13.1 fish/net (Figure 11). The condition of walleye increased after low water levels in 2002 (Figure 12). However, since 2005 walleye condition indices have exhibited a downward trend (Figure 11). Walleye sampled in 2008 ranged in length from 8.8 to 24.2 in. and weighed 0.2 to 4.93 pounds, with the average being 14.1 inches in length and weighing 1.04 pounds. Seven percent of the walleye were sub-stock (< 10 in.), 61% stock size (10-14.9 in.), 24% being in the quality size group (15-19.9 in.), and 8% in the preferred size group (20-24.9 in.).

Figure 11. - Relative abundance, size structure, and relative weight of walleye collected with sinking experimental gill nets in Nelson Reservoir, 1991-2008.

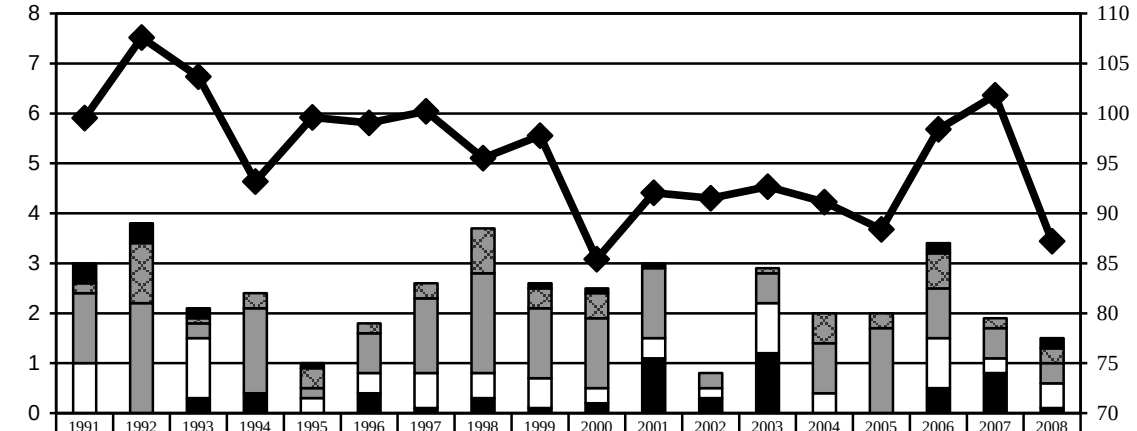


	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Memorable (>25 in.)	0.20	0.40	0.50	0.60	0.30	0.10	0.20	0.30	0.30	0.30	0.60	0.40	0.10	0.40	0.30	0.00	0.3	0
Preferred (20-24.9 in.)	1.80	0.40	0.60	1.00	1.00	0.80	0.90	0.70	0.50	1.40	0.50	1.20	0.40	0.30	0.20	0.40	1.4	1
Quality (15-19.9 in.)	3.20	1.60	2.80	4.90	1.80	4.70	4.90	5.70	5.70	5.40	5.80	5.00	5.50	3.90	2.60	5.00	5.5	3.2
Stock (10-14.9 in.)	2.80	2.40	3.60	3.30	7.10	11.70	10.00	8.20	5.30	2.80	9.20	2.50	4.80	7.30	5.40	7.50	6.7	8
Sub-stock (<10 in.)	1.80	2.40	0.20	1.70	1.70	1.00	1.70	1.30	0.70	1.40	1.10	0.10	1.00	0.70	0.30	0.40	1.5	0.9
Relative weight	94.03	85.50		85.80		94.50	93.90	98.33	100.18	91.43	89.83	93.93	87.71	89.98	96.65	94.90	89.9	84.1

Northern pike

Historically, the abundance of adult northern pike has remained relatively low and stable consisting of a high proportion of quality, preferred, and memorable size fish (Figure 12). Northern pike populations were significantly reduced in 2002, however the population was quickly replenished with the recruitment of YOY fishes in 2003 (Figure 12). In 2006, the northern pike population increased to 3.4 fish/net and has since decreased, both in 2007 (1.9 fish/net) and 2008 (1.5 fish/net; Figure 12). However, this population has a good balance of size and year classes. The current population is comprised of 7% being sub-stock (<14 in.), 33% being stock size (14-20.9 in.), 27% being quality size (21-27.9 in.), 20% being preferred size (28-33.9 in.) and 13% falling in the memorable size range (> 34 in.; Figure 12).

Figure 12. - Relative abundance, size structure, and relative weight of northern pike collected with sinking experimental mesh gill nets in Nelson Reservoir, 1991-2008.

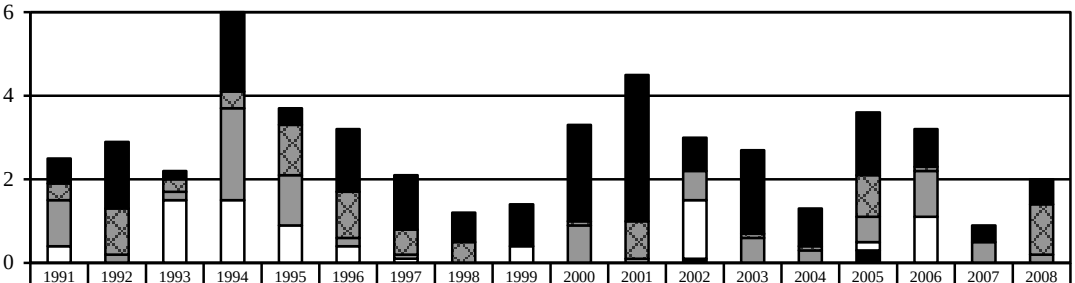


	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Memorable (>34 in.)	0.40	0.40	0.20	0.00	0.10	0.00	0.00	0.00	0.10	0.10	0.10	0.00	0.00	0.00	0.00	0.20	0	0.2
Preferred (28-33.9 in.)	0.20	1.20	0.10	0.30	0.40	0.20	0.30	0.90	0.40	0.50	0.00	0.00	0.10	0.60	0.30	0.70	0.2	0.3
Quality (21-27.9 in.)	1.40	2.20	0.30	1.70	0.20	0.80	1.50	2.00	1.40	1.40	1.40	0.30	0.60	1.00	1.70	1.00	0.6	0.4
Stock (14-20.9 in.)	1.00	0.00	1.20	0.00	0.30	0.40	0.70	0.50	0.60	0.30	0.40	0.20	1.00	0.40	0.00	1.00	0.3	0.5
Sub Stock (<14 in.)	0.00	0.00	0.30	0.40	0.00	0.40	0.10	0.30	0.10	0.20	1.10	0.30	1.20	0.00	0.00	0.50	0.8	0.1
Relative weight	99.55	107.59	103.68	93.18	99.59	99.04	100.20	95.52	97.76	85.42	92.05	91.52	92.65	91.13	88.38	98.40	101.8	87.2

Lake whitefish

Lake whitefish populations have fluctuated since 1991 due to fluctuations in water levels and temperature, which have reduced recruitment of YOY fish to the population (Figure 13). In 2007, there was a massive summer kill of lake whitefish and fall gill netting surveys indicated a drastic decrease in the abundance of lake whitefish (CPUE = 0.8 fish/net; Figure 13). Gill netting surveys conducted in 2008 reveals the population is recovering (CPUE = 2 fish/net; Figure 13).

Figure 13. - Relative abundance, size structure, and relative weight of lake whitefish collected with sinking experimental mesh gill nets in Nelson Reservoir, 1991-2008.



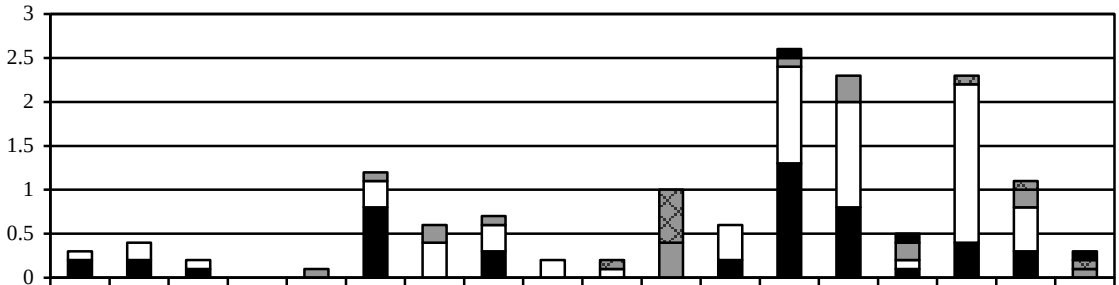
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Memorable (>18.0 in.)	0.6	1.6	0.2	1.9	0.4	1.5	1.3	0.7	1	2.3	3.5	0.8	2	0.9	1.5	0.9	0.4	0.6
Preferred (14.0-17.9 in.)	0.4	1.1	0.3	0.4	1.2	1.1	0.6	0.5	0	0.1	0.9	0	0.1	0.1	1	0.1	0	1.2
Quality (11.0-13.9 in.)	1.1	0.2	0.2	2.2	1.2	0.2	0.1	0	0	0.9	0.1	0.7	0.6	0.3	0.6	1.1	0.5	0.2
Stock (6.0-10.9 in.)	0.4	0	1.5	1.5	0.9	0.4	0.1	0	0.4	0	0	1.4	0	0	0.2	1.1	0	0
Sub Stock (<6.0 in.)	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0.3	0	0	0

Black Crappie

Historically there has been a low abundance of black crappie in Nelson Reservoir. In 2003, black crappie reproduction was the highest on record (Table 15) and recruitment of YOY crappie into

the population resulted in a high abundance of adult black crappie (Figure 14). The abundance of adult crappie was reduced in 2005 but increased to 2.3 fish/net in 2006. In 2007 and 2008, abundance of adults has decreased to 1.1 fish/net and 0.3 fish/net, respectively (Figure 14). The current population is comprised of larger adults (8-12 in.) and in 2008 these fish reproduced successfully, producing the second highest YOY abundance on record (Table 15). High reproductive success over the last seven years indicates the conditions within Nelson Reservoir have been favorable for black crappie, and if conditions remain stable the population will continue to remain at marginal levels.

Figure 14. - Relative abundance, size structure, and relative weight of black crappie collected with sinking experimental gill nets in Nelson Reservoir, 1991-2008.



	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Memorable (>12.0 in.)	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1	0	0	0.1
Preferred (10.0-11.9 in.)	0	0	0	0	0	0	0	0	0	0.1	0.6	0	0	0	0	0.1	0.1	0.1
Quality (8.0-9.9 in.)	0	0	0	0	0.1	0.1	0.2	0.1	0	0	0.4	0	0.1	0.3	0.2	0	0.2	0.1
Stock (5.0-7.9 in.)	0.1	0.2	0.1	0	0	0.3	0.4	0.3	0.2	0.1	0	0.4	1.1	1.2	0.1	1.8	0.5	0
Sub Stock (<5.0 in.)	0.2	0.2	0.1	0	0	0.8	0	0.3	0	0	0	0.2	1.3	0.8	0.1	0.4	0.3	0

Other fishes

A variety of other fishes are found within Nelson Reservoir, however they are rarely utilized as a sport fishery due to low abundances or their non-game status. Channel catfish, stonecats, bigmouth buffalo, smallmouth buffalo, and smallmouth bass are all present at low levels within Nelson Reservoir. Spottail shiners are also present and provide an important forage base, however in recent years their populations have been reduced and adult spottail shiners have not been present in high numbers within the annual seining surveys (Table 15). White suckers and goldeye also serve as a forage base to a limited degree and have had high population levels in recent years (7.7 fish/net and 3.7 fish/net respectively in 2008).

Pr 161

PR 161 is an 87-acre reservoir located on BLM land in south Phillips County. PR 161 was first stocked by FWP in 1937 with the introduction of largemouth bass and black bullheads. Northern pike were stocked in 1969 and have provided a self-sustaining fishery ever since. In 2008, PR 161 was sampled for the first time on record. Two sinking gill nets and one trap net were set for approximately 21 hours. The gill net contained one northern pike (TL = 23.5 in.); the trap contained one northern pike (TL = 19.4 in.) and 237 fathead minnows. This reservoir will receive plants of 500 fingerling northern in 2009 and 2010.

Sagebrush

Sagebrush reservoir is a 5.2-acre BLM pond located in south Phillips County. Sagebrush was historically managed as a rainbow trout fishery until largemouth bass were introduced in 1989, followed by bluegill in 2001 and channel catfish in 2001. Rainbow trout are stocked periodically, with

the last stocking occurring in 2002. A windmill aerator system was installed in 2000 or 2001 and this reservoir is currently full. Bluegill and largemouth bass populations are self-sustaining and rainbow trout have exhibited excellent growth and survival. In 2005, a voluntary creel box was erected and was maintained in 2008. In 2005, one angler from North Dakota participated in the creel survey and reported a catch rate of 0.67 rainbow trout per hour with high satisfaction based on the size of fish caught. In 2006, anglers reported a catch rate of 19 bluegill/hour (n=3) with catches of two-pound bluegill. In 2007, anglers reported fall catch rates of 0.57 bluegill/hour and catch rates of 0.75 bluegill/hour in the spring of 2008. This reservoir will need a supplemental stocking of rainbow trout in the future to augment several years of no stocking.

Taint Reservoir

Taint reservoir is a 5.7-acre reservoir located on BLM land in south Phillips County. This reservoir is a popular bluegill fishery with high catch rates and good lengths of fish. Taint reservoir has had good water levels and was full in 2005. In 2005, a voluntary creel box was erected and was maintained in 2008. During the summer and fall of 2005, anglers reported catch rates of 10.0 bluegill per hour and 3.16 largemouth bass per hour (n=4). In 2006, one angler from Wyoming reported a catch rate of 12.33 bluegill per hour and five largemouth bass per hour. In 2008, anglers put in six hours of effort and reported catching no fish (n=4). Summer catch rates improved, with anglers reporting catch rates of 3.14 largemouth bass/hour and 3.29 bluegill/hour (n=4).

Wild Horse Reservoir

Wild Horse is a mid-sized reservoir (150+ acres) located on state and BLM land in south Phillips County. No fish plants or sampling data exists for this reservoir. However, local anglers informed me of a good northern pike population that existed prior to the extensive drought experienced across the region. In 2008, spring rains filled Wild Horse to full capacity and two gill nets and one trap net were set overnight to assess the entire fish community. Gill net catch consisted entirely of common carp (CPUE = 42 fish/net) ranging in length from 5 to 19.8 inches and weight from 0.2 to 3.62 pounds ($\bar{x}$ TL = 9.2 in.; $\bar{x}$ wt = 0.60 lbs.). The trap net contained 305 fathead minnows.

In the summer of 2008, 1,350 adult yellow perch were trap and transferred from Bison Bone to establish a fishery and forage base in Wild Horse. In 2009, a supplement planting of yellow perch is recommended to establish a forage base. In 2009 and 2010 5,000 fingerling northern pike will be stocked to re-establish a sport fishery.

Daniels County Fishing Waters

Select waters throughout Daniels County were sampled to determine fish abundance using sinking multi-filament experimental gill nets measuring 125 feet in length and 6 feet deep consisting of 25-foot panels of ¾", 1", 1 ¼", 1 ½", and 2" mesh.

Whitetail Reservoir

Whitetail Reservoir is located on both private and state land and has been maintained as multi-species fishery since 1946. Largemouth bass were introduced in 1946, followed by northern pike in 1955, rainbow trout in 1962, yellow perch in 1975, walleye in 1979, black crappie in 1997, and fathead minnows in 2002. Yellow perch were last stocked in 2004. In 2006, one trap net collected one yellow perch (TL = 12.0 in.; wt = 1.02 lbs.) and one northern pike (TL = 19.3 in.; wt = 1.6 lbs.). The gill net contained a total of 18 northern pike ($\bar{x}$ TL = 17.2 in.; $\bar{x}$ wt = 1.2 lbs.). In 2008, one trap net collected three northern pike ($\bar{x}$ TL = 21.5 in.; $\bar{x}$ wt = 2.6 lbs.). The gill net contained 2 northern pike ($\bar{x}$ TL = 21.9 in.; $\bar{x}$ wt = 2.3 lbs.) and 10 yellow perch ($\bar{x}$ TL = 6.5 in.; $\bar{x}$ wt = 0.39 lbs.).

Sheridan County Fishing Waters

Select waters throughout Sheridan County were sampled to determine fish abundance using sinking multi-filament experimental gill nets measuring 125 feet in length and 6 feet deep consisting of 25-foot panels of ¾", 1", 1 ¼", 1 ½", and 2" mesh.

Box Elder Reservoir

Box Elder Reservoir is located on state land and has been managed as a fishery since 1964. For the first 20 years of management, rainbow trout were stocked almost every year. Walleye were first planted in the fall of 1984, and have been stocked nearly every year since. Black crappie were stocked in 1985, 1986, and 1997. In 2008, Box Elder received a supplement stocking of 2,500 pre-spawn yellow perch. In 2006, one trap and one sinking gill net were fished for approximately 12 hours each. Additionally, one floating gill net was set for 11 hours. A total of two yellow bullheads ($\bar{x}$ TL = 5.8 in.; $\bar{x}$ wt = 0.15 lbs.), one walleye (TL = 2.3 in.), and one goldfish (TL = 7.8 in.; wt = 0.28 lbs.) were caught in the trap. The gill nets captured 22 white suckers (CPUE = 11 fish/net; $\bar{x}$ TL = 12.77 in.; $\bar{x}$ wt = 1.16 lbs.), nine walleye (CPUE = 4.5 fish/net; TL = 10.0 to 22.5 in.; $\bar{x}$ TL = 16.44 in.; $\bar{x}$ wt = 1.89 lbs.), and one goldfish (TL = 7.8 in.; wt = 0.21 lbs.).

In 2008, two trap and two sinking gill nets were fished for approximately 11 hours each. A total of five black bullheads (CPUE = 2.5 fish/net; $\bar{x}$ TL = 9.5 in.; $\bar{x}$ wt = 0.50 lbs.), two walleye (CPUE = 1 fish/net; $\bar{x}$ TL = 15.6 in.; $\bar{x}$ wt = 2.12 lbs.), nine common carp (CPUE = 4.5 fish/net; $\bar{x}$ TL = 17.6 in.; $\bar{x}$ wt = 3.27 lbs.), and four white suckers (CPUE = 2 fish/net; $\bar{x}$ TL = 15.5 in.; $\bar{x}$ wt = 1.47 lbs.) were captured in the trap. Gill nets captured 17 white suckers (CPUE = 8.5 fish/net; $\bar{x}$ TL = 16.39 in.; $\bar{x}$ wt = 1.99 lbs.), six walleye (CPUE = 3 fish/net; TL = 7.5 to 29 in.; $\bar{x}$ TL = 22.1in.; $\bar{x}$ wt = 4.55 lbs.), two black bullhead (CPUE = 1 fish/net; $\bar{x}$ TL = 11.25 in.; $\bar{x}$ wt = 82 lbs.), one northern pike (CPUE = 0.5 fish/net; TL = 24.7 in.; wt = 3.71 lbs.), one common carp (CPUE = 0.5 fish/net; TL = 17.6 in.; wt = 3.12 lbs.), and one yellow perch (CPUE = 0.5 fish/net; TL = 8.5 in.; wt = 0.32 lbs.).

Valley County Fishing Waters

Select waters throughout Valley County were sampled to determine fish abundance using sinking multi-filament experimental gill nets measuring 125 feet in length and 6 feet deep consisting of 25-foot panels of ¾", 1", 1 ¼", 1 ½", and 2" mesh.

McNab Reservoir

McNab Reservoir is privately owned pond that is open to public fishing. In 2006, one trap net and two sinking gill nets were each set for approximately 21 hours. A total of 57 fathead minnows, 251 YOY black crappie ($\bar{x}$ TL = 1.0 in.), and one adult black crappie measuring 10.5 inches and weighing 0.70 pounds were collected in the trap net. There were no fish in the gill nets. In 2008, two trap nets and one sinking gill net were set for approximately 24.5 hours. A total of two fathead minnows (CPUE = 1 fish/net), 17 black crappie (CPUE = 8.5 fish/net; TL = 3.7 to 12.8 in.; $\bar{x}$ TL = 5.6 in.; $\bar{x}$ wt = 0.23 lbs.), and four YOY black crappie (CPUE = 2 fish/net; TL < 30mm) were collected in the traps. The gill net captured one black crappie (TL = 12.5 in.; wt = 1.11 lbs.). Furthermore, the windmill aeration system was removed from this reservoir in 2008 and was salvaged for parts.

RECOMMENDATIONS

Paddlefish: Fort Peck Stock

Annual tagging efforts should continue with over 300 paddlefish being tagged annually. An on-site creel survey should be conducted in 2009 due to recent changes in harvest regulations. Annual collections of paddlefish jaws should continue to assist in determining the age structure of the Fort Peck Reservoir paddlefish stock. A phone survey should be conducted in 2009, using database of anglers who purchased tags to assess angler harvest of paddlefish. Telemetry study will be continued in 2009 with egg and larval sampling being added. Additionally, harvest rates should be closely monitored and the harvest cap will be implemented.

Fresno and Nelson Reservoir

Standardized late-summer seining should continue to assess sport fish reproduction and forage fish abundance in Fresno and Nelson Reservoirs. Standardized sampling of adult sport fishes should be continued utilizing fall gill netting to gather recruitment information relating to walleye and other key sport and forage fish year-class strength and winter reservoir water levels. Walleye reproduction is still considered to be below optimum at Fresno and Nelson Reservoirs. Walleye fingerling should be stocked in Fresno and Nelson in 2009 to establish strong year-classes. Stocked fingerling should be marked with Oxytetracycline **(**OTC) so that recruitment of stocked walleye and natural reproduction can be determined.

Beaver Creek Reservoir

Standardized late-summer seining should continue to assess sport fish reproduction and forage fish abundance at Beaver Creek Reservoir. Standardized sampling of adult sport fishes should be continued utilizing fall gill netting to gather recruitment information relating to sport and forage fish year-class strength and to monitor growth and survival of stocked walleye, rainbow trout, and forage availability. Spring and fall plants of walleye fingerlings and advanced fingerlings should be continued.

Hill, Blaine & Phillips Co. Ponds

Sampling of adult sport fish populations should continue annually at Bailey Reservoir, Ester Reservoir, and Cow Creek Reservoir. All other ponds should be sampled every two to three years to assess adult fish populations, growth, and recruitment. In addition self-creel survey boxes will be maintained to assess the fishing pressure at these ponds. This information will allow us to tailor our management and stocking efforts to meet the needs of the public. Yellow perch should be collected from the Kremlin Water District Ponds and transferred to Bailey's, Ester, homerun pond, and Wild Horse in the spring of 2009. Northern pike will be stocked in Wild Horse. Bluegill will be available to trap from Olson Pond and could be transferred to Saddlebrook Pond, Floyd Flynn, Br 12, and several largemouth bass lakes in south Phillips County.

Daniels, Sheridan, and Valley Co. Ponds

Sampling of adult sport fish populations should continue annually at Box Elder Reservoir. All other ponds should be sampled every two to three years to assess adult fish populations, growth, and recruitment.

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Water Codes of Waters Referred To

154535	Bailey Reservoir	166921	McChesney Reservoir
154570	Beaver Creek Reservoir	156230	McNab Reservoir
164466	Bison Bone Reservoir	162500	Missouri River Sec. 05
164495	Box Elder Reservoir	162520	Missouri River Sec. 06
164789	Cow Creek Reservoir	156480	Nelson Reservoir
156573	Doll Pond	158760	Pr 161
155030	Don Reservoir	168047	Sagebrush Reservoir
155120	Ester Lake	168475	Taint Reservoir
156740	Floyd Flynn Reservoir	168860	Whitetail Reservoir
165140	Fort Peck Reservoir	159770	Wild Horse Reservoir
155240	Fresno Reservoir		

Key words:

Paddlefish, harvest, walleye, Lake Superior whitefish, northern pike, black crappie, yellow perch, goldeye, channel catfish, sauger, shovelnose sturgeon, pallid sturgeon, burbot, smallmouth buffalo, largemouth buffalo, age, water levels, creel census, population estimates, recruitment, tiger musky, stocking, Cisco, smelt

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