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

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PROJECT NO.: F-113-R-4 STUDY TITLE: SURVEY AND INVENTORY OF COLDWATER AND WARMWATER ECOSYSTEMS

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JOB PERIOD: JULY 1, 2006 THROUGH JUNE 30, 2007

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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 first year of a three 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 for the 2007 fishing season. 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 yellow perch and water levels are improving. Walleye, yellow perch, and tiger muskie are exhibiting good growth and survival in Little Warm Reservoir. Results of all other sampling are presented. Gill netting was conducted in the Ft. Peck tail water and dredge cut areas of the Missouri River.

OBJECTIVES AND DEGREE OF ATTAINMENT

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

Fish Population Management – Objective is to implement fish stocking and/or fish eradication actions to maintain fish populations at levels consistent with habitat conditions and other limiting factors. Objective accomplished. Assisted hatcheries in fish stocking, provided stocking requests and maintained planting records.

Technical Guidance - To review projects by federal, state and local government agencies and private parties that have the potential to affect fisheries resources, and to provide technical advice or decisions to mitigate impacts on these resources. To provide landowners and other private parties with technical advice and information to sustain and enhance fisheries resources. The objective was met by reviewing and commenting on seven 310 projects and three 124 projects with state and local agencies; advised Rocky Boy Reservation on habitat enhancement projects at Bonneau Reservoir, Box Elder Creek, East Fork Reservoir, and the east fork of Beaver Creek; supplied comments to Bureau of Land Management (BLM) relative to development of new fishing reservoirs.

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 ice 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 for the 2007 snagging season. New regulations limit harvest to one paddlefish per person and a choice were 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 will be limited to 6 am to 9 pm to help reduce potential illegal take of paddlefish and make enforcement of the regulations more manageable.

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, gather information on the ratio of tagged fish harvested, the size, sex, and age of fish harvested we conduct on-site roving creel surveys are conducted 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 onsite 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 three year telemetry and egg sampling study. This project will continue through 2008. See Miller et al. 2006 for a detailed description of methods and preliminary results for 2006.

Adult Paddlefish Monitoring and Tagging

In 2006, the first paddlefish were caught and harvested April 14th, which is also when the first fisherman started snagging for paddlefish. We started netting, tagging, and implanting transmitters in paddlefish on April 27th and continued tagging until May 24th when we tagged our 500th paddlefish. Since tagging was initiated in 1977, 5,053 paddlefish have been tagged and 501-tagged paddlefish have been recaptured during annual gill netting surveys. Approximately 10 percent of the annual catch is comprised of recaptured fish. Based on the tagging and recapture data, the reproductive periodicity of male paddlefish is 1 to 2 years and for females it is every two to three years.

Since tagging was initiated in 1977, a total of 638-tagged paddlefish have been reported as harvested which is about 13 percent of the 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.

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 angling 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 2006 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). And since 2000, flows have not met the minimum flow and duration requirements (Figure 3). In 2006, flows came up around April 14th and remained relatively stable around 10,000 cfs until the week of May 15th when flows dropped and paddlefish moved down river closer to the reservoir. We caught high numbers of paddlefish around the UL Bend during this time. The following week, flows increased to over 20,000 cfs and triggered an upriver migration. In addition we also caught three females that were running eggs on May 23rd and 24th at the CMR boundary (RM 1933.2), Jones Island (RM 1915.9), and Guardipee Bottoms (RM 1919.6). At this time water temperatures were between 64.3 and 67.7°F.

However, peak flows were only met or exceeded trigger flows (14,000 cfs; Berg 1981) for a relatively short period (seven days) compared to the 71-year average of 45 consecutive days (USGS 2006). Although the magnitude and timing of peak discharge (June 14, 2006) was similar to that of the 71-year average there were only four consecutive days of steadily increasing discharge before the hydrograph peaked.

Controlled releases from Tiber Reservoir on the Marias River in mid-June were in part responsible for the magnitude and timing of peak flow in 2006. This artificial discharge increase may not have adequately mimicked the duration of a traditional June rise. The ascending limb of the hydrograph may not have been long enough to provide a reproductive cue to some fish and thus they ceased upriver migration and returned to the reservoir without spawning.

Hydrograph information (Figure 1, 2, & 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 3).

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.

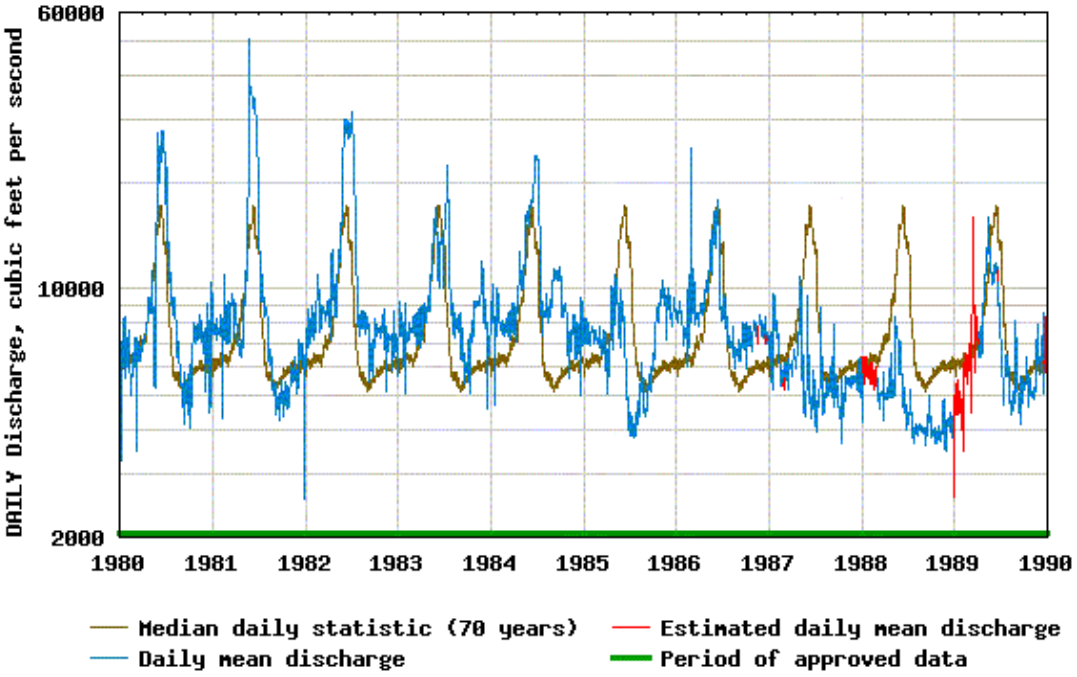


Figure 2. - Historical and observed Missouri River hydrograph at the USGS Virgelle, MT gauging station 1990-1999.

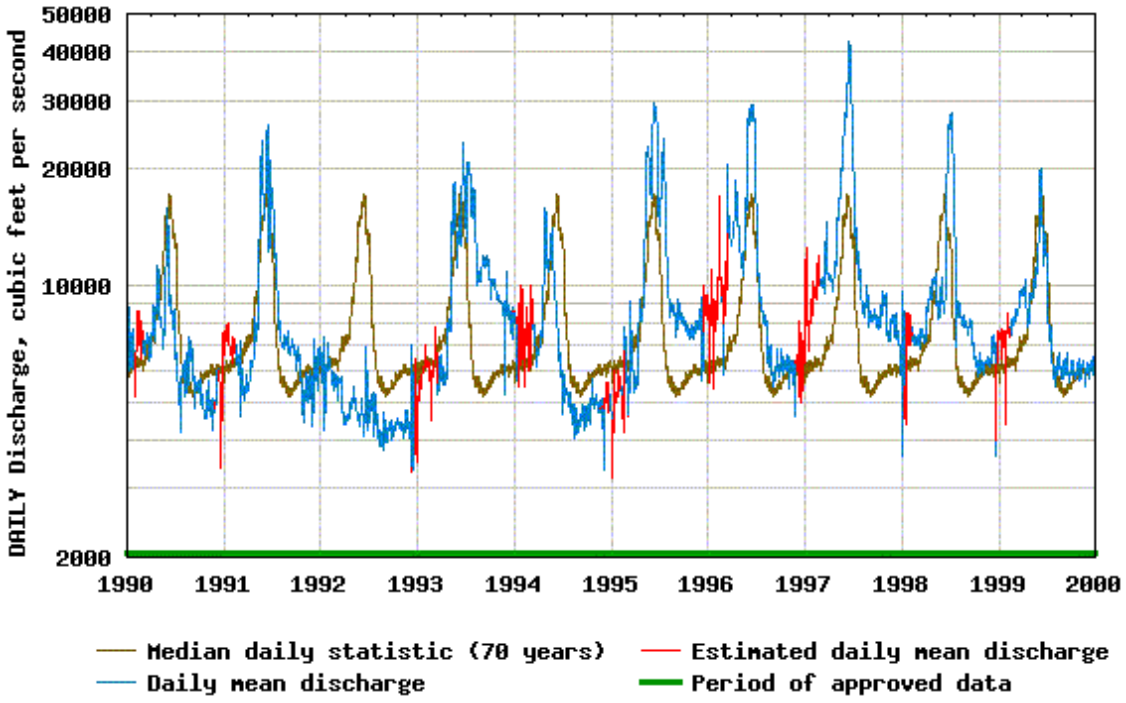


Figure 3. - Historical and observed Missouri River hydrograph at the USGS Virgelle, MT gauging station 2000-2006.

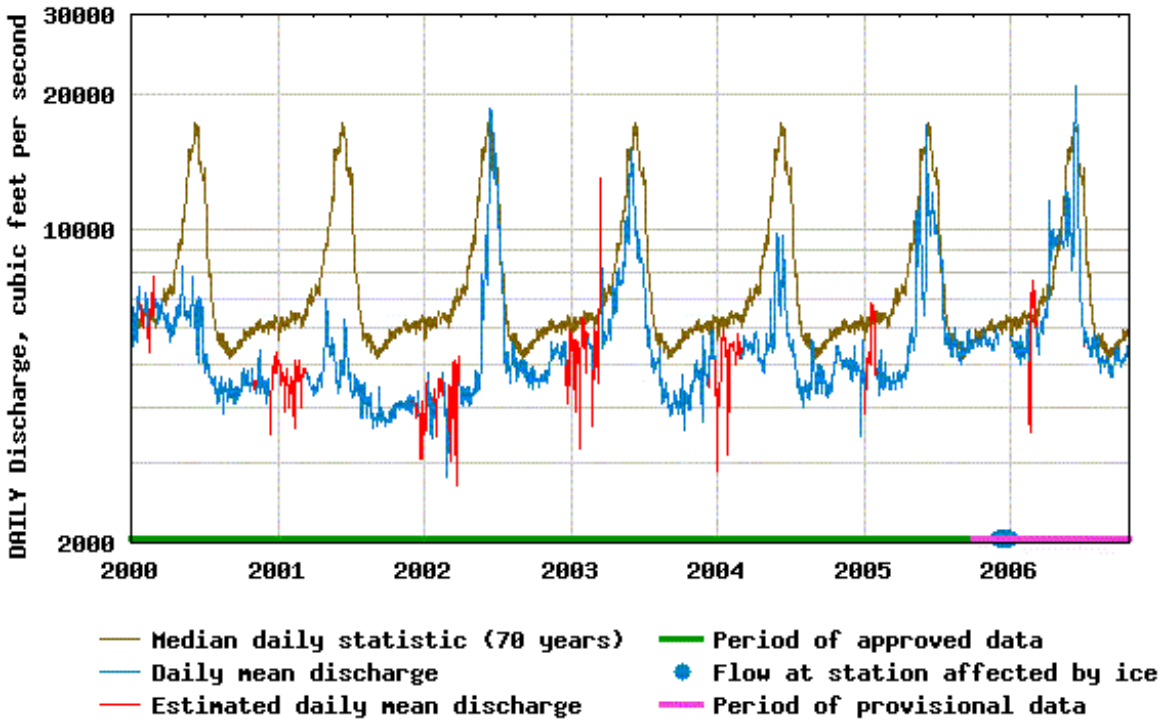


Table 2. - Results of visual count surveys conducted in the upper end of Ft. Peck Reservoir from 1997 to 2006.

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

Harvest: Native Species Creel Survey 2006

Methods

A two-year native species creel survey was conducted in 2005 and 2006. 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.

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.

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 to interview them all, 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.

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, 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. 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 2006, a total of 611 parties from 10 states and 39 of the 56 Montana counties were interviewed from April 3rd to June 18th. In 2005 and 2006 combined, the highest percentage of anglers in Montana came from Yellowstone (21.03%), Cascade (13.41%), Fergus (13.02%), Gallatin (9.32%), and Lewis & Clark (6.47%) Counties. In 2006, the average party contained 4.0 anglers (range = 1 to 35 anglers), 83.8% of which were males. In 2006, the average length of stay was 3.8 day/trip (range = 1 to 14 days).

Effort

In 2006, angler-hours increased to 36,757 (Table 3) and angler days increased to 7,532 (Table 4). In 2005 and 2006, 82% of the angling effort occurred from shore and 51% of the effort occurred on weekdays. In both years 56% 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 2005 and 2006, with paddlefish being the mostly commonly sought fish (77% and 82.1%, respectively), followed by channel catfish (7.2% and 8.9%, respectively), walleye (6.2% and 6.4%, respectively), sauger (4.4% and 0.68% respectively), and shovelnose sturgeon (0.6% and 0.46%, respectively).

Species caught and released

In 2005 and 2006, a total of 17 species were caught and 16 species were harvested from April through June. In 2006, channel catfish, paddlefish, sauger, goldeye, and walleye were the most common species caught by anglers (Tables 5 & 6). Channel catfish, paddlefish, sauger, walleye and freshwater drum were the most common species harvested (Tables 7). Average length, weight, and condition of harvested fish measured by the creel clerks in 2005 and 2006 are presented in Tables 11 and 12 respectively.

Paddlefish

In 2006, a total of 989 paddlefish were caught and reported to creel clerks. Overall, there was an estimated catch of 2,218 paddlefish (Table 5) and the catch rate was 0.056 paddlefish/hour (Table 6). Sixty-five percent of the paddlefish caught were harvested, with an overall estimated harvest of 1,448 paddlefish (Table 7).

In 2005 and 2006, 7.7% of the paddlefish snaggers released paddlefish because they were too big, 18.9% released paddlefish because they were too small, 41.1% released paddlefish because they were catch and release fishing only, and 32.2% released paddlefish for other reasons which were primarily because snaggers did not want to keep paddlefish until the end of their trip.

In 2006, harvested paddlefish ranged in length from 28.1 to 65.0 inches (eye-fork length) and ranged in weight from 15.1 to 112 pounds (Table 8). Fifty-two percent of the harvested paddlefish were males. And 49 (13.2%) of the harvested paddlefish and 11 (4.9%) of the released paddlefish had jaw tags. Harvested paddlefish ranged in age from 9 to 56 years with 43% of the harvested fish being 20 to 27 years old (Table 9). Nineteen percent of the harvested fish were less than 16 years old (new recruits).

Channel Catfish

In 2006, a total of 904 channel catfish were caught and reported to creel clerks. Overall there was an estimated catch of 4,227 channel catfish (Table 5) and the catch rate was 0.053 channel catfish/angler-hour (Table 6). Seventy-six percent of the channel catfish that were caught were harvested with a total estimated harvest of 3,217 channel catfish (Table 10). In 2005 and 2006, 58.3% of anglers released channel catfish because they were too small, 1.4% released them because they were caught snagging for paddlefish, 20.8% because they were catch and release fishing, and 19.4% released them for other unspecified reasons.

In 2006, harvested channel catfish ranged in length from 7.5 to 35.5 inches and in weight from 0.25 to 20.5 pounds (Table 8). Harvested channel catfish ranged in age from 3 to 15 years old (weight range = 0.6 to 8.85 lbs; Table 10).

Stonecats

In 2006, 105 stonecats were caught and reported to the creel clerks. Overall there was an estimated catch of 481 stonecats (Table 5) and the catch rate was 0.009 stonecats/angler-hour (Table 6). Only 0.8% of the stonecats caught were harvested, with an estimated overall harvest of 4 stonecats (Table 7). In 2006, harvested stonecats ranged in length from 6.7 to 7.6 inches (Table 8) and in age from 5 to 7 years old (n=4; Table 11).

In 2005 and 2006, 27.7% of anglers released stonecats because they were too small, 12.8% released them because they were catch and release fishing, 4.3% released stonecats citing compliance with regulations, and the remaining anglers (55.3%) released their stonecats for other reasons; primarily they did not want the fish.

Sauger

In 2006, a total of 265 sauger were caught and reported to the creel clerks. Overall there was an estimated catch of 2,000 sauger (Table 5) with a catch rate of 0.018 sauger/angler-hour (Table 6). Anglers harvested 34% of the sauger caught, with an estimated overall harvest of 591 sauger (Table 7). In 2006, harvested sauger ranged in length from 12.0 to 27.0 inches and in weight from 0.46 to 7.13 pounds (Table 8). Harvested sauger ranged in length from 4 to 11 years old (TL=16.3-15.75 in.; n=57; Table 12).

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 2006, a total of 154 walleye were caught and reported to the creel clerks. Overall there was an estimated catch of 847 walleye (Table 5) with a catch rate of 0.009 walleye/angler-hour (Table 6). Anglers harvested 57% of the walleye they caught, with an estimated overall harvest of 486 walleye (Table 7). In 2005 and 2006, the primary reason for anglers to release walleye was because they were too small. In 2006, harvested walleye ranged in length from 11.7 to 30.5 inches and in weight from 0.35 to 11.0 pounds (Table 8). Harvested walleye ranged in age from 3 to 14 years old, with 70% being 6 to 8 years old (Table 13).

Pallid Sturgeon

In 2006, 19 pallid sturgeon were caught and reported to the creel clerks. Overall there was an estimated catch of 64 pallid sturgeon (Table 5), with an estimated catch rate of 0.002 pallid sturgeon/angler-hour (Table 6).

Shovelnose Sturgeon

In 2006, a total of 139 shovelnose sturgeon were caught and reported to the creel clerks. Overall there was an estimated catch of 634 shovelnose sturgeon (Table 5), with an estimated overall catch of 0.01 shovelnose sturgeon/angler-hour (Table 6). Anglers harvested 47% of the shovelnose sturgeon caught with an estimated overall harvest of 297 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 2006, harvested shovelnose sturgeon ranged in length from 25.5 to 37.5 inches and in weight from 1.75 to 10 pounds (Table 18). No age samples were collected from shovelnose sturgeon in 2006.

Burbot

In 2006, a total of 13 burbot caught and reported to the creel clerks. Overall there was an estimated catch of 85 burbot (Table 5), with an estimated catch rate of 0.001 burbot/angler-hour (Table 6). Anglers harvested 70% of the burbot caught, with an estimated overall harvest of 60 burbot (Table 7). In 2006, harvested burbot ranged in length from 19.6 to 30 inches and in weight from 1.6 to 4.5 pounds (Table 8). No age samples were collected in 2006.

Freshwater Drum

In 2006 a total of 126 drum were caught and reported to the creel clerks. Overall there was an estimated catch of 551 drum (Table 5), with an estimated catch rate of 0.01 drum/angler-hour (Table 6). Anglers harvested 46% of the drum caught, with an estimated overall harvest of 256 drum (Table 7). In 2006, harvested drum ranged in length from 10.4 to 17.6 inches and in weight from 0.3 to 4.0 pounds (Table 8). Harvested drum ranged in age from 3 to 14 years old (n=13; Table 14).

Goldeye

In 2006 a total of 190 goldeye were caught and reported to the creel clerks. Overall there was an estimated catch of 949 goldeye (Table 5), with an estimated catch rate of 0.016 goldeye/angler-hour (Table 6). Anglers harvested 9.8% of the goldeye caught, with an estimated overall harvest of 93 goldeye (Table 7). In 2006, harvested drum ranged in length from 10.1 to 14.6 (Table 8) and in age from 5 to 13 years old (n=8; Table 15).

Other Species

Other native species caught included, flathead chub, largescale sucker, bigmouth buffalo, smallmouth buffalo, and shorthead redhorse. The majority of these species were released. Other non-native species caught included rainbow trout, northern pike, and common carp. 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, time of week, and angler type for the Missouri River (RM 1899 to 1921), April-June 2006.

	Weekday (angler hours)				Weekend (angler hours)				Overall
	Shore	SE	Boat	SE	Shore	SE	Boat	SE	(angler hours)
April	3,187.69	996.29	904.62	414.77	2,870.00	891.74	875.00	319.41	7,837.31
May	10,920.00	1,464.25	2,475.00	756.75	7,890.00	1,613.76	1,470.00	180.62	22,755.00
June	3,456.00	699.83	384.00	149.61	1,830.00	468.61	495.00	245.65	6,165.00
Overall	17,563.69		3,763.62		12,590.00		2,840.00		36,757.31

Table 4. - Estimated fishing effort (angler days) by month, time of week, and angler type for the Missouri River (RM 1899 to 1921), April-June 2006.

	Weekday (angler days)		Weekend (angler days)		Overall
	Shore	Boat	Shore	Boat	
April	564.61	171.64	366.38	182.90	1,285.54
May	2,123.33	543.70	1,762.57	400.86	2,163.42
June	756.00	99.34	451.48	109.40	1,416.23
Overall	3,443.94	814.69	2,580.43	693.16	7,532.22

Table 5. - Estimated catch by strata of paddlefish (PF), channel catfish (C CAT), stonecat (S CAT), sauger (SGR), walleye (WE), pallid sturgeon (PSTG), shovelnose sturgeon (SSTG), burbot (LING), freshwater drum (DRUM), goldeye (GE), bigmouth buffalo (B BUF), smallmouth buffalo (S BUF), and common carp (CARP) in the Missouri River (RM 1899 to 1921), April-June 2006.

	April				May				June				Overall		
	Weekday		Weekend		Weekday		Weekend		Weekday		Weekend				
	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Overall
PF	220	39	122	70	595	103	401	60	474	42	104	40	1,855	364	2,218
C CAT	20	16	170	59	979	33	1,479	79	1,343	22	104	16	3,959	268	4,227
S CAT	280	21	0	9	115	6	50	10	0	4	0	6	427	54	481
SGR	60	10	0	5	211	9	1,228	22	79	13	104	2	1,924	76	2,000
WE	0	6	0	2	96	9	376	6	158	7	89	1	810	37	847
PSTG	20	1	0	5	38	0	0	3	0	1	0	2	53	12	64
SSTG	0	20	219	1	77	29	100	7	237	1	15	3	569	64	634
LING	0	1	0	1	58	0	0	0	40	1	0	0	81	4	85
GE	0	17	0	2	384	20	451	24	0	5	0	7	859	90	949
DRUM	20	5	24	1	77	4	150	28	237	4	15	3	491	60	551
B BUF	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
S BUF	0	0	0	0	19	0	0	2	0	0	0	0	17	3	20
CARP	20	4	0	4	19	3	50	13	0	2	0	4	94	36	130

Table 6. - Estimated hourly catch rate (fish/angler-hour) by strata for paddlefish (PF), channel catfish (C CAT), stonecat (S CAT), sauger (SGR), walleye (WE), pallid sturgeon (PSTG), shovelnose sturgeon (SSTG), burbot (LING), freshwater drum (DRUM), goldeye (GE), bigmouth buffalo (B BUF), smallmouth buffalo (S BUF), and common carp (CARP) in the Missouri River (RM 1899 to 1921), April-June 2006.

	April								May							
	Weekday				Weekend				Weekday				Weekend			
	Shore	SE	Boat	SE	Shore	SE	Boat	SE	Shore	SE	Boat	SE	Shore	SE	Boat	SE
PF	0.0690	0.0425	0.0424	0.0113	0.0424	0.0258	0.0846	0.0215	0.0545	0.0111	0.0416	0.0075	0.0508	0.0199	0.0411	0.0074
C CAT	0.0063	0.6220	0.0172	0.0056	0.0593	0.0295	0.0593	0.0295	0.0896	0.0410	0.0226	0.0069	0.1874	0.0897	0.0540	0.0119
S CAT	0.0878	0.0610	0.0229	0.0151	0.0000	0.0000	0.0000	0.0000	0.0105	0.0080	0.0043	0.0015	0.0064	0.0067	0.0067	0.0031
SGR	0.0188	0.0187	0.0114	0.0043	0.0000	0.0000	0.0000	0.0000	0.0193	0.0097	0.0059	0.0019	0.1556	0.1130	0.0148	0.0044
WE	0.0000	0.0000	0.0069	0.0039	0.0000	0.0000	0.0000	0.0000	0.0088	0.0056	0.0059	0.0023	0.0476	0.0316	0.0038	0.0015
PSTG	0.0063	0.0068	0.0011	0.0011	0.0000	0.0000	0.0059	0.0037	0.0035	0.0037	0.0002	0.0002	0.0019	0.0012	0.0017	0.0010
SSTG	0.0000	0.0000	0.0080	0.0057	0.0763	0.0442	0.0017	0.0012	0.0070	0.0051	0.0119	0.0047	0.0127	0.0086	0.0134	0.0047
LING	0.0000	0.0000	0.0011	0.0011	0.0000	0.0000	0.0000	0.0000	0.0053	0.0041	0.0002	0.0002	0.0000	0.0000	0.0000	0.0000
GE	0.0000	0.0000	0.0183	0.0103	0.0000	0.0000	0.0000	0.0000	0.0352	0.0366	0.0133	0.0056	0.0572	0.0507	0.0162	0.0052
DRUM	0.0063	0.0068	0.0057	0.0047	0.0085	0.0082	0.0085	0.0082	0.0070	0.0059	0.0026	0.0011	0.0191	0.0178	0.0191	0.0060
B BUF	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
S BUF	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0018	0.0017	0.0000	0.0000	0.0000	0.0000	0.0014	0.0014
CARP	0.0063	0.0068	0.0046	0.0046	0.0000	0.0000	0.0000	0.0000	0.0018	0.0019	0.0024	0.0012	0.0064	0.0048	0.0086	0.0030

Table 6 (cont.). - Estimated hourly catch rate (fish/angler-hour) by strata for paddlefish (PF), channel catfish (C CAT), stonecat (S CAT), sauger (SGR), walleye (WE), pallid sturgeon (PSTG), shovelnose sturgeon (SSTG), burbot (LING), freshwater drum (DRUM), goldeye (GE), bigmouth buffalo (B BUF), smallmouth buffalo (S BUF), and common carp (CARP) in the Missouri River (RM 1899 to 1921), April-June 2006.

	June								Overall					
	Weekday				Weekend									
	Shore	SE	Boat	SE	Shore	SE	Boat	SE	Shore	SE	Boat	SE	Overall	SE
PF	0.1371	0.1257	0.1088	0.0510	1.0000	0.2582	0.9550	0.2856	0.0615	0.0141	0.0551	0.0064	0.0559	0.0059
C CAT	0.3886	0.3578	0.0570	0.0252	0.0569	0.0423	0.0319	1.5521	0.1313	0.0441	0.0405	0.0054	0.0525	0.0075
S CAT	0.0000	0.0000	0.0104	0.0103	0.0000	0.0000	0.0118	0.0087	0.0142	0.0070	0.0081	0.0021	0.0089	0.0020
SGR	0.0229	0.0224	0.0328	0.0105	0.0569	0.0557	0.0050	0.0050	0.0638	0.0352	0.0115	0.0019	0.0184	0.0049
WE	0.0457	0.0452	0.0173	0.0093	0.0487	0.0339	0.0017	0.0017	0.0269	0.0112	0.0057	0.0013	0.0085	0.0019
PSTG	0.0000	0.0000	0.0017	0.0017	0.0000	0.0000	0.0034	0.0034	0.0017	0.0013	0.0018	0.0006	0.0018	0.0006
SSTG	0.0686	0.0678	0.0017	0.0017	0.0081	0.0083	0.0067	0.0041	0.0189	0.0000	0.0098	0.0023	0.0110	0.0022
LING	0.0114	0.0112	0.0035	0.0035	0.0000	0.0000	0.0000	0.0000	0.0027	0.0016	0.0006	0.0003	0.0008	0.0004
GE	0.0000	0.0000	0.0121	0.0066	0.0000	0.0000	0.0151	0.0112	0.0285	0.0193	0.0136	0.0029	0.0156	0.0036
DRUM	0.0686	0.0678	0.0104	0.0063	0.0081	0.0083	0.0067	0.0053	0.0163	0.0084	0.0091	0.0021	0.0100	0.0021
B BUF	0.0000	0.0000	0.0017	0.0017	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0002	0.0001	0.0001
S BUF	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0539	0.0005	0.0005	0.0005	0.0004
CARP	0.0000	0.0000	0.0052	0.0029	0.0000	0.0000	0.0084	0.0035	0.0031	0.0017	0.0055	0.0012	0.0052	0.0010

Table 7. - Estimated harvest by strata for paddlefish (PF), channel catfish (C CAT), stonecat (S CAT), sauger (SGR), walleye (WE), shovelnose sturgeon (SSTG), burbot (LING), freshwater drum (DRUM), goldeye (GE), bigmouth buffalo (B BUF), smallmouth buffalo (S BUF), and common carp (CARP) in the Missouri River (RM 1899 to 1921), April-June 2006.

	April								May							
	Weekday				Weekend				Weekday				Weekend			
	Shore	SE	Boat	SE	Shore	SE	Boat	SE	Shore	SE	Boat	SE	Shore	SE	Boat	SE
PF	80	51.9	27	14.2	97	84.1	44	18.3	384	133.2	61	26.9	376	165.1	49	11.3
C CAT	20	20.8	10	6.4	170	99.9	53	22.9	902	461.8	41	19.6	601	358.0	55	16.8
S CAT	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	1.8	0	0.0	1	1.0
SGR	60	62.4	9	5.7	0	0.0	5	2.8	115	63.6	14	6.2	226	122.5	16	5.7
WE	0	0.0	6	4.5	0	0.0	2	1.8	77	51.3	14	7.0	301	210.6	5	2.2
SSTG	0	0.0	1	1.1	24	24.7	1	0.8	0	0.0	2	1.2	25	26.6	5	2.8
LING	0	0.0	1	1.1	0	0.0	0	0.0	19	19.5	1	0.6	0	0.0	0	0.0
GE	0	0.0	8	9.1	0	0.0	0	0.0	0	0.0	7	5.6	75	79.3	3	1.4
DRUM	0	0.0	5	4.8	24	24.7	1	1.2	0	0.0	2	1.4	50	47.9	11	5.1
B BUF	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
S BUF	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	2.1
CARP	0	0.0	1	1.1	0	0.0	0	0.0	0	0.0	0	0.0	25	26.8	2	1.3

Table 7 (cont.). - Estimated harvest by strata for paddlefish (PF), channel catfish (C CAT), stonecat (S CAT), sauger (SGR), walleye (WE), shovelnose sturgeon (SSTG), burbot (LING), freshwater drum (DRUM), goldeye (GE), bigmouth buffalo (B BUF), smallmouth buffalo (S BUF), and common carp (CARP) in the Missouri River (RM 1899 to 1921), April-June 2006.

	June								Overall				
	Weekday				Weekend				Weekday		Weekend		Overall
	Shore	SE	Boat	SE	Shore	SE	Boat	SE	Shore	Boat	Shore	Boat	
PF	197	163.5	19	8.8	89	32.6	24	13.2	661	107	562	117	1,448
C CAT	1,303	1,270.2	18	10.1	30	30.1	12	9.4	2,225	69	801	121	3,217
S CAT	0	0.0	0	0.0	0	0.0	0	0.0	0	2	0	1	4
SGR	79	79.2	8	4.6	59	60.2	0	0.0	254	31	285	21	591
WE	0	0.0	6	4.1	74	62.0	1	0.9	77	26	375	8	486
SSTG	237	239.2	1	0.7	0	0.0	2	1.9	237	3	49	7	297
LING	39	39.6	0	0.0	0	0.0	0	0.0	59	2	0	0	60
GE	0	0.0	0	0.0	0	0.0	0	0.0	0	15	75	3	93
DRUM	158	159.5	2	1.7	0	0.0	2	2.8	158	10	74	15	256
B BUF	0	0.0	1	0.7	0	0.0	0	0.0	0	1	0	0	1
S BUF	0	0.0	0	0.0	0	0.0	0	0.0	0	0	0	2	2
CARP	0	0.0	0	0.0	0	0.0	2	1.4	0	1	25	4	30

Table 8. – Length, weight, and condition indices of harvested paddlefish (PF), channel catfish (C CAT), stonecat (S CAT), sauger (SGR), walleye (WE), shovelnose sturgeon (SSTG), burbot (LING), freshwater drum (DRUM), goldeye (GE), common carp (CARP), fathead chub (FH CH), and northern pike (NP) from anglers creeled in the middle Missouri River native species creel, April-June 2006.

Species	Sample Size	Length Range (in.)	Length Avg	Length SD	Weight Range (lbs.)	Weight Avg	Weight SD	Condition Factor Avg	Condition Factor SD	Relative Wt Avg	Relative Wt SD
PF	259	28.1-65.0	42.7	1.3	15.1-112.0	47.0	36.5	57.23	39.71	88.7	61.54
C CAT	182	7.5-35.5	22.8	1.4	0.6-8.9	5.8	7.1	35.80	64.68	98.0	194.07
S CAT	7	6.7-7.6	7.0	0.3	0.1-.02	0.1	0.1	19.70	14.97	0.0	0.00
SGR	62	12.5-27.0	17.0	1.0	0.5-7.1	1.5	0.8	28.31	17.18	78.4	48.08
WE	26	11.7-30.5	16.5	0.7	0.4-11.0	1.9	0.6	28.29	12.55	75.1	33.93
S STG	27	25.5-37.5	32.5	0.6	1.8-10.0	4.8	2.6	13.26	7.21	77.4	42.01
LING	2	19.6-30.0	24.8	0.0	1.6-4.5	3.0	0.0	18.87	0.00	74.1	0.00
DRUM	16	10.4-17.6	13.2	0.6	0.3-4.0	1.1	2.1	43.29	61.21	96.1	132.99
GE	24	10.1-14.6	11.9	0.7	0.3-0.9	0.5	0.3	31.59	17.54	0.0	0.00
CARP	7	17.7-31.8	21.5	0.1	2.7-23.0	6.2	0.5	47.45	7.78	94.9	15.37
FH CH	1	8.50	8.5	0.0	0.2	0.2	0.0	30.94	0.00	0.0	0.00
NP	5	30.7-37.5	34.5	0.0	6.7-10.4	8.7	1.7	21.17	3.15	83.9	12.37

Table 9. - Age, length range (inches), sample size, sex, average length (eye-fork (E-F); inches), length standard deviation (SD), average weight (pounds), weight standard deviation (SD), condition factor, and relative weight of paddlefish from which jaw samples were collected during the middle Missouri River native species creel survey, April –June 2006.

Age Class	E-F Length Range (in)	Nbr Sampled	Sex (% Male)	E-F Length Avg (in)	Length SD	Weight Avg (lbs)	Weight SD	Condition Factor	Condition Factor SD	Relative Wt Avg	Relative Wt SD
9	32.5 - 47.5	4	75.0	36.9	7.1	32.4	19.9	59.83	4.27	94.1	7.23
10	33.0 - 33.8	2	100.0	33.4	0.6	24.3	2.5	64.97	3.34	102.9	5.13
11	33.6 - 39.8	9	100.0	36.2	2.1	28.0	4.5	58.64	4.20	92.2	6.82
12	38.5 - 39.1	2	100.0	38.8	0.4	31.5	6.4	53.77	9.13	84.0	14.18
13	0.0 - 37.8	6	100.0	36.5	14.9	26.4	4.4	54.03	5.13	84.9	7.94
14	32.0 - 44.4	13	76.9	37.7	3.9	32.4	15.8	56.87	10.57	89.1	16.04
15	34.5 - 47.6	12	66.6	40.1	4.2	35.4	12.5	54.21	11.07	84.5	17.26
16	34.0 - 46.3	13	84.6	38.6	3.9	33.7	15.4	55.38	9.75	86.5	14.76
17	34.5 - 42.0	10	90.0	38.1	2.9	29.9	9.7	53.12	8.56	83.2	13.28
18	0.0 - 45.0	5	60.0	41.2	18.8	41.1	14.7	56.63	3.98	88.0	5.39
19	34.5 - 46.0	8	87.5	40.8	3.9	39.6	15.4	55.70	8.00	86.6	11.96
20	35.2 - 45.0	12	83.3	39.9	3.4	35.9	10.0	55.18	5.74	86.0	8.93
21	0.0 - 47.5	29	55.2	41.7	9.0	45.4	16.7	60.87	17.80	94.6	28.81
22	0.0 - 49.3	22	27.3	44.7	10.2	51.4	14.7	56.16	6.89	86.6	10.51
23	0.0 - 50.0	11	45.5	44.4	18.6	54.0	22.6	57.92	13.34	89.4	20.36
24	0.0 - 48.0	8	12.5	46.6	16.5	61.2	9.7	60.69	9.21	93.3	14.24
25	39.0 - 49.7	10	20.0	44.1	3.7	51.6	16.8	57.79	6.12	89.2	8.91
26	36.7 - 48.4	7	28.6	42.9	5.3	46.9	17.9	56.61	8.24	87.7	12.55
27	0.0 - 50.5	10	30.0	45.2	14.7	56.0	15.7	59.52	8.50	91.7	12.99
28	39.9 - 51.0	5	80.0	42.7	4.8	43.9	21.2	53.68	8.17	83.1	12.37
29	0.0 - 47.8	3	33.3	42.8	25.2	46.4	27.7	55.22	7.36	85.5	10.09
30	46.9 - 51.0	6	16.7	48.9	1.4	67.5	8.5	57.40	7.41	87.8	11.44
31	0.0 - 47.0	3	0.0	46.5	26.9	61.3	2.5	60.90	0.32	93.6	0.62
32	0.0 - 55.0	7	42.8	44.9	18.3	58.8	26.4	61.09	13.07	94.3	19.96
33	40.9 - 50.3	3	66.7	45.9	4.7	48.8	27.4	47.74	14.30	73.4	21.54
34	42.0 - 52.5	5	75.0	45.1	4.3	55.6	22.4	57.09	13.69	87.9	21.15
35	0.0 - 42.2	2	50.0	42.2	29.8	73.8	0.0	47.24	0.00	73.2	0.00
36	41.2 - 52.3	4	25.0	47.6	4.7	66.0	17.1	60.07	2.32	92.2	3.91
37	0.0 - 37.0	2	50.0	37.0	26.2	24.0	0.0	47.38	0.00	74.4	0.00
38	43.4 - 53.2	4	25.0	47.8	4.3	67.6	14.7	61.60	7.70	94.5	12.11
39	44.8 - 51.0	3	0.0	47.8	3.1	65.7	18.0	58.99	5.09	90.4	7.30
42	49.7	1	0.0	49.7	0.0	83.0	0.0	67.61	0.00	103.3	0.00
44	49.6 - 50.9	2	0.0	50.3	0.9	80.5	3.6	63.55	6.33	97.0	9.81
45	47.7 - 57.0	2	0.0	52.4	6.6	74.0	15.6	51.97	8.59	79.1	13.98
46	50.3	1	0.0	50.3	0.0	75.9	0.0	59.64	0.00	91.0	0.00
47	51	1	0.0	51.0	0.0	75.0	0.0	56.54	0.00	86.2	0.00
48	51.1	1	0.0	51.1	0.0	81.0	0.0	60.70	0.00	92.5	0.00
50	50.5	1	0.0	50.5	0.0	72.0	0.0	55.91	0.00	85.3	0.00
51	48.3	1	0.0	48.3	0.0	90.0	0.0	80.12	0.00	122.7	0.00
52	46.9	1	100.0	46.9	0.0	50.9	0.0	49.34	0.00	75.8	0.00
56	52.6	1	0.0	52.6	0.0	100.0	0.0	68.71	0.00	104.4	0.00
	Totals:	252		42.4	5.4	46.5	20.2	57.38	10.07	89.0	15.69

Table 10. - Age, length range (inches), sample size, average length (inches), average weight (pounds), and condition factor of channel catfish from which pectoral spines were collected during the middle Missouri River creel survey, April-June 2006.

Age Class	Length Range (in.)	Nbr Sampled	Length Avg (in.)	Length SD	Weight Avg (lbs.)	Weight SD	Condition Factor	Condition Factor SD	Relative Wt Avg	Relative Wt SD
3	11.5	1	11.5	0.0	0.6	0.0	39.45	0.00	129.8	0.00
4	7.5 - 12.0	3	10.3	2.4	1.2	1.2	87.47	54.66	294.8	169.67
5	10.5 - 15.6	25	12.7	1.3	0.6	0.2	29.64	5.31	94.9	17.13
6	13.0 - 25.3	17	15.0	2.8	1.1	1.0	28.38	5.21	86.6	15.69
7	13.5 - 33.0	8	20.1	6.2	3.9	5.4	32.11	9.23	90.1	23.99
8	15.7 - 21.3	4	17.9	2.4	1.8	1.0	29.45	5.96	85.3	17.40
9	16.8 - 31.0	8	24.2	5.7	5.8	3.9	31.18	8.26	81.7	18.49
10	18.1 - 34.0	12	26.0	5.0	6.9	4.4	34.69	5.68	90.1	13.03
11	15.5 - 35.5	22	25.3	5.2	7.2	5.4	38.78	18.68	101.8	51.69
12	20.2 - 33.6	36	27.5	3.6	8.8	4.6	38.57	8.73	98.1	20.15
13	23.5 - 33.7	17	28.5	2.9	9.4	4.5	38.77	9.81	97.7	23.56
14	22.0 - 32.0	10	27.5	3.1	8.0	3.1	36.60	6.82	93.2	16.40
15	27.8 - 28.5	2	28.2	0.5	8.9	2.3	39.43	8.38	99.7	20.66
	Totals:	165	22.5	7.2	5.7	5.1	35.85	13.92	98.4	41.69

Table 11. - Age, length range (inches), sample size, and average length (inches), average weight (pounds), and condition factor of stonecats from which pectoral spines were collected during the middle Missouri River creel survey, April-June 2006

Age Class	Length Range (in.)	Nbr Sampled	Length Avg (in.)	Length SD	Weight Avg (lbs.)	Weight SD	Condition Factor	Condition Factor SD
5	7.8	1	7.8	0.0	0.2	0.0	37.93	0.00
6	6.5 - 6.8	2	6.7	0.2	0.1	0.0	23.73	7.82
7	7.4	1	7.4	0.0	0.1	0.0	27.15	0.00
	Totals:	4	7.1	0.6	0.1	0.1	28.14	8.10

Table 12. - Age, length range (inches), sample size, and average length (inches), average weight (pounds), condition factor, and relative weight of sauger from which otoliths were collected during the middle Missouri River creel survey, April-June 2006.

Age Class	Length Range (in.)	Nbr Sampled	Length Avg (in.)	Length SD	Weight Avg (lbs.)	Weight SD	Condition Factor	Condition Factor SD	Relative Wt Avg	Relative Wt SD
4	12.0 - 19.6	5	16.3	3.1	1.3	0.6	28.64	3.14	80.0	9.36
5	12.7 - 19.0	13	15.7	2.0	1.0	0.4	25.54	3.76	71.8	11.29
6	12.9 - 20.4	7	16.4	2.6	1.7	0.9	31.77	6.79	87.8	17.24
7	13.3 - 21.0	9	17.6	2.9	1.6	0.7	28.50	9.03	78.5	25.81
8	14.5 - 19.5	10	17.5	1.7	1.6	0.5	28.90	1.99	79.4	5.23
9	13.3 - 20.8	9	18.1	2.8	1.6	0.6	27.20	6.39	74.7	19.74
10	16.0 - 27.0	3	20.9	5.6	3.4	3.3	29.06	6.38	77.0	13.00
11	15.8	1	15.8	0.0	1.2	0.0	30.71	0.00	86.0	0.00
	Totals:	57	17.1	2.8	1.5	1.0	28.09	5.65	77.6	15.89

Table 13. - Age, length range (inches), sample size, and average length (inches), average weight (pounds), condition factor, and relative weight of walleye from which otoliths were collected during the middle Missouri River creel survey, April-June 2006.

Age Class	Length Range (in.)	Nbr Sampled	Length Avg (in.)	Length SD	Weight Avg (lbs.)	Weight SD	Condition Factor	Condition Factor SD	Relative Wt Avg	Relative Wt SD
3	13.5	1	13.5	0.0	0.8	0.0	31.66	0.00	86.9	0.00
4	16	1	16.0	0.0	1.4	0.0	34.18	0.00	91.0	0.00
6	13.8 - 17.3	5	15.3	1.4	1.0	0.3	27.72	3.43	74.4	9.20
7	11.7 - 14.0	5	13.0	1.1	0.6	0.1	26.16	1.93	72.4	5.67
8	13.1 - 19.0	4	15.4	2.6	1.2	0.7	31.19	6.30	84.0	18.80
9	14.6	1	14.6	0.0	0.8	0.0	24.74	0.00	67.0	0.00
10	24.5	1	24.5	0.0	5.0	0.0	34.00	0.00	83.8	0.00
11	14.5	1	14.5	0.0	0.9	0.0	29.52	0.00	80.0	0.00
14	27	1	27.0	0.0	6.4	0.0	32.52	0.00	78.8	0.00
	Totals:	20	15.7	3.9	1.4	1.6	28.93	4.04	77.6	10.30

Table 14. - Age, length range (inches), sample size, and average length (inches), average weight (pounds), condition factor, and relative weight of freshwater drum from which otoliths were collected during the middle Missouri River creel survey, April-June 2006.

Age Class	Length Range (in.)	Nbr Sampled	Length Avg (in.)	Length SD	Weight Avg (lbs.)	Weight SD	Condition Factor	Condition Factor SD	Relative Wt Avg	Relative Wt SD
3	10.2	2	10.20	0.00	0.34	0.05	31.57	4.66	73.9	10.91
5	12.1	1	12.10	0.00	0.66	0.00	37.26	0.00	84.2	0.00
6	11.6 - 16.2	2	13.90	3.25	1.26	0.98	40.87	7.06	89.7	11.24
7	10.9	1	10.90	0.00	0.80	0.00	61.77	0.00	142.6	0.00
8	15.3 - 17.6	3	16.07	1.33	1.66	0.45	39.55	6.62	84.4	14.51
9	11.9 - 13.3	2	12.60	0.99	1.23	0.81	57.84	26.41	129.2	57.13
10	13.7	1	13.70	0.00	0.82	0.00	31.89	0.00	70.3	0.00
14	15.5	1	15.50	0.00	4.00	0.00	107.41	0.00	230.8	0.00
	Totals:	13	13.37	2.43	1.30	1.02	47.50	22.36	105.1	48.01

Table 15. - Age, length range (inches), sample size, and average length (inches), average weight (pounds), condition factor, and relative weight of goldeye from which scales were collected during the middle Missouri River creel survey, April-June 2006.

Age Class	Length Range (in.)	Nbr Sampled	Length Avg (in.)	Length SD	Weight Avg (lbs.)	Weight SD	Condition Factor	Condition Factor SD
5	11.1 - 11.7	2	11.4	0.4	0.5	0.0	28.72	0.00
7	12.3	1	12.3	0.0	0.0	0.0	0.00	0.00
8	11.6 - 14.3	2	13.0	1.9	0.9	0.0	29.07	0.00
9	13.3	1	13.3	0.0	0.6	0.0	25.50	0.00
10	11.6	1	11.6	0.0	1.0	0.0	64.07	0.00
13	13.9	1	13.9	0.0	0.7	0.0	27.07	0.00
	Totals:	8	12.5	1.2	0.7	0.0	34.89	0.00

Paddlefish Phone Creel (2003-2006)

Vic Riggs with the Montana Fish, Wildlife & Parks (FWP) and Larry Brooks with the University of North Dakota (Riggs 2005) designed conducted the paddlefish phone creel survey annually from 2003 to 2005. This survey was continued solely by the 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 2006, harvest statistics were obtained for the Fort Peck population (Table 16). 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 2,486 anglers fish for paddlefish above Ft. Peck Reservoir representing approximately 7,720 fishing days. On average approximately 1,623 paddlefish are caught annually above Ft. Peck Reservoir (Table 16). Approximately 39.8% 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.

In 2005 and 2006, snaggers were asked if they supported or opposed the reduction of the two fish limit to one fish per angler, 68.2% supported reducing the limit to one fish, 19.4% did not support or oppose the change, and 11.3% opposed the reduction (Table 17). When asked if they supported or opposed the removal of the snaggers ability to immediately release a snagged paddlefish, 61.3% supported the removal of catch and release, 21.9% did not support or oppose the change, and 16.8% opposed the changed.

Table 16. –Summary of estimates for the Fort Peck paddlefish population from the Montana paddlefish telephone creel survey (2003-2006).

Missouri River Above Fort Peck Reservoir

	2003	2004	2005	2006	Average
Number of Anglers	1,902	2,859	2,705	2,476	2,486
Total Days Fished*	5,757	9,172	8,385	7,565	7,720
Total Hours Fished*	27,433	44,400	42,277	39,800	38,477
Number Caught	1,583	1,102	1,516	2,290	1,623
Number Harvested	868	787	1,028	1,067	937
Harvest Rate (fish/day)	0.151	0.086	0.123	0.141	0.125
Harvest Rate (fish/hour)	0.032	0.018	0.024	0.027	0.025
Percent Released	45.17%	28.58%	32.19%	53.42%	39.84%

* Includes hours spent catch and release fishing

Table 17. - Results of 2005 and 2006 phone creel questionnaire on proposed paddlefish regulation changes for the Fort Peck paddlefish population.

Due to reduced paddlefish reproduction in the Missouri River above Fort Peck Dam over the last nine years, Montana Fish, Wildlife, & Parks is considering reducing the harvest limit from two paddlefish per angler to one paddlefish per angler. Do you

	2005	2006	Average
Oppose	21.1%	1.6%	11.3%
Neutral	22.1%	16.7%	19.4%
Support	54.8%	81.7%	68.2%

To reduce the potential for selective harvest of large females from the Fort Peck paddlefish population, Montana Fish, Wildlife, & Parks is considering removing the ability of fishermen to release paddlefish above Fort Peck Dam. Do you

	2005	2006	Average
Oppose	30.9%	2.7%	16.8%
Neutral	29.4%	14.4%	21.9%
Support	39.7%	82.9%	61.3%

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 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 2006, 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 for the 2007 fishing season from two paddlefish to one paddlefish annually. The ability to catch and release fish was removed with the enactment of mandatory catch and release days and mandatory harvest days.

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. An additional 4,758 pre-spawn yellow perch were transplanted in 2006.

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. In 2005 and 2006, 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 in 2006 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 18). 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 18). 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 (n=, 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).

Table 18. - 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 2006.

		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

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 first 50 fish of each species was measured (TL: inches) and weight to the nearest 0.01 pound. All additional fish of each species were counted.

Northern pike

Since their illegal introduction in the 1980s, northern pike have altered the fishery within Beaver Creek Reservoir, especially the rainbow trout fishery (Table 19). Northern pike populations are cyclical within Beaver Creek Reservoir, and current data indicates that the population is increasing. YOY catch has increased significantly in the last two years and these fish are successfully being recruited into the population (Table 19 & 20). However the adult population still consists primarily of larger adults (TL range = 19.7 to 39.3 in.) and as the YOY fish continue to be recruited into the population the abundance of northern pike will probably peak causing 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 19). As a result Beaver Creek Reservoir is a popular ice fishing destination and is a source of yellow perch for a kids fishing pond, 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 19 & 20). 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 19). Yellow perch experienced higher spawning success in 2004 and 2006 as a result of increased water levels and flooded vegetation, (Table 20). Yellow perch, spottail shiners (stocked in 1988), and white suckers provide the bulk of the forage base for northern pike, walleye, rainbow trout, and smallmouth bass.

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.

Walleye within Beaver Creek Reservoir have high growth rates and relative weights (Table 19) due to abundant forage. And as a result these 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 19). 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.).

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 19), 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 20).

Table 19.- 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, 1974-2006.

		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

Table 20. – 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 2006.

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

[1] Consists of emerald shiners, northern redbelly dace, lake chub, western silvery/plains minnow, brassy 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 2004, water levels increased and flooded shoreline vegetation, allowing the successful spawning and recruitment of forage fishes. In 2005 and 2006, 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. The first 50 fish of each species was measured (TL: inches) and weight to the nearest 0.01 pound. All additional fish of each species were 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 21).

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 21). 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.

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. Northern pike YOY levels have fluctuated throughout the years, however the population appears to be on the upward trend in 2006.

Table 21. – 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, 1968-2006.

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

[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

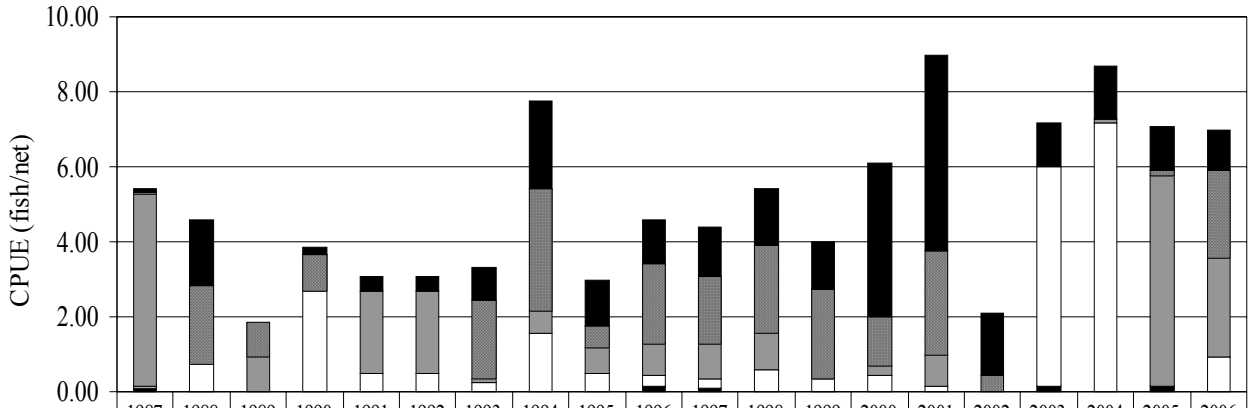
Adult fish populations were monitored from 1965 to 1974, using systematic gill netting at predetermined stations. Sampling at 12 predetermined stations was resumed in 1987 to determine changes in sport fish abundance and species composition. Samples were collected over two days utilizing six sinking 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. In 2005 and 2006, otoliths were collected from walleye for aging and oxytetracycline (OTC) analysis.

Lake Superior Whitefish

Lake Superior whitefish (whitefish) in Fresno Reservoir continue to comprise 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.

Reproduction was very low following the severe draw downs in 2001 and 2002. The strongest year class in the population is a result of reproduction in 2003 and the majority of the fish are 12 to 15 inches (ave TL = 14.25 in.; TL range = 8.9 to 22.6 in.).

Figure 4. - Relative abundance and size structure of lake whitefish collected with sinking experimental gill nets in Fresno Reservoir, 1987-2006.



	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
■ 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
■ 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
■ 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
□ 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
■ 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

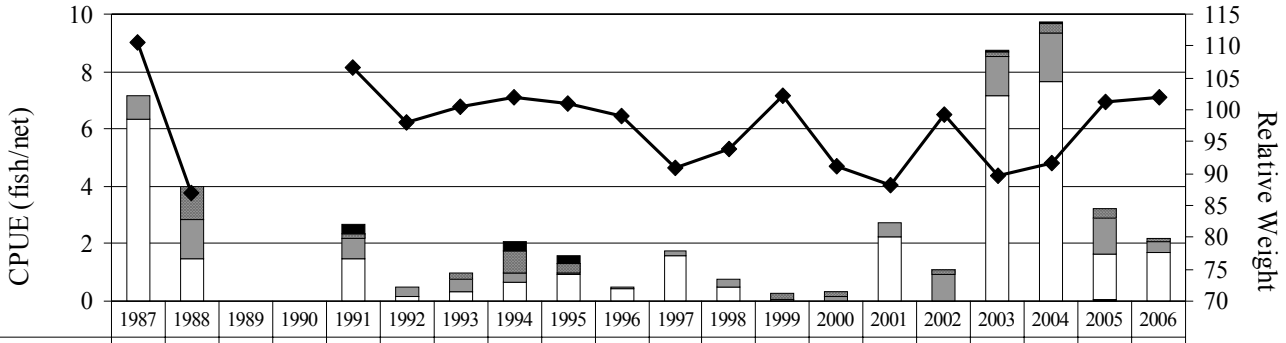
Yellow Perch

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 21) and population levels were drastically reduced (Figure 5). To remedy this situation, 170,000 pre-spawn adult yellow perch were introduced from 2002 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 are successfully recruiting into the population. 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, 1987-2006.

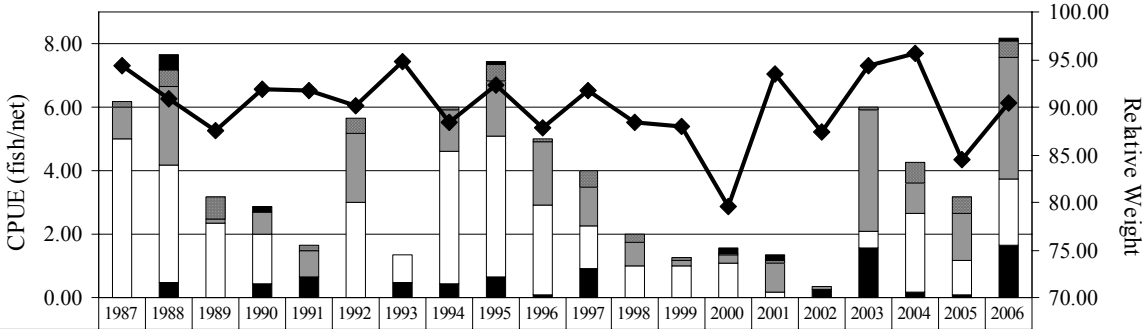


	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Memorable (>12 in.)	0	0	0	0	0.33	0	0	0.33	0.25	0	0	0	0	0	0	0	0.08	0.08	0	0
Preferred (10-11.9 in.)	0	1.17	0	0	0.17	0	0.25	0.75	0.33	0	0	0	0.17	0.17	0	0.17	0.17	0.33	0.33	0.08
Quality (8-9.9 in.)	0.83	1.33	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
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
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
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

Northern pike

Since the illegal introduction of northern pike in Fresno Reservoir in the 1940s, their populations have 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 been steadily increasing with high numbers of YOY being collected during annual beach seining surveys in 2006 (Table 21). The population of adult northern pike significantly increased in 2006. The population is currently well balanced with a high number of stock (14-20.9 in.) and sub-stock (<14 in.) fish as well as high number of quality (21-27.99 in.), preferred (28-33.99 in.), and memorable (>34 in.) size groups. Based on the YOY surveys in 2006, northern pike population will continue to be elevated in 2007 and the proportion of preferred and memorable size northern pike should continue to increase as the population ages.

Figure 6. - Relative abundance, size structure, and relative weight of northern pike collected with sinking experimental gill nets in Fresno Reservoir, 1987-2006.

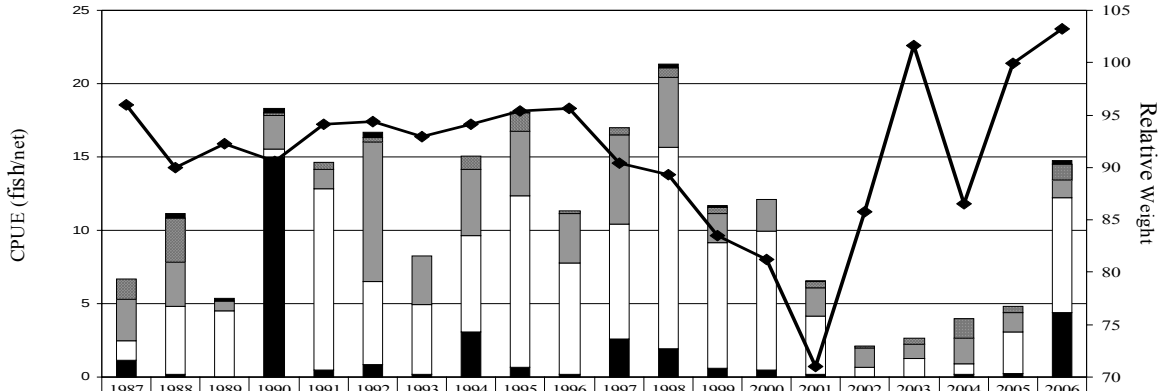


	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Memorable (>34 in.)	0.00	0.50	0.00	0.14	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.17	0.17	0.00	0.00	0.00	0.00	0.08
Preferred (28-33.9 in.)	0.17	0.50	0.67	0.00	0.17	0.50	0.00	0.08	0.50	0.08	0.50	0.25	0.08	0.08	0.08	0.00	0.08	0.67	0.50	0.5
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
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
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
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

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. Since 2003 the abundance of adult walleye has steadily increased and is currently at pre-drought levels (Figure 7). The high abundance of walleye in 2006 (CPUE=14.75 fish/net; Figure 7) indicates excellent survival and recruitment of stocked YOY walleye, especially the 2005-year class. In 2006, 29.9% of the walleye were sub-stock, 53.1% were stock size, and 7.9% were quality size (Figure 7). Walleye sampled ranged in length from 6.6 to 27.3 in. (ave. TL= 11.87 in.) and in weight from 0.1 to 7.0 lbs (ave. wt. = 0.94). Walleye sampled ranged in age from 0 to 11 years old with 77% being age 0 and 1 (Table 22). In addition, walleye continue to exhibit high condition indices, which is attributable to a forage base that is adequate for the existing population levels of predators.

Figure 7. - Relative abundance, size structure, and relative weight of walleye in Fresno Reservoir for the years 1987-2006.



	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
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
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
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
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
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
Relative weight	96	90	92.3	90.6	94.1	94.4	92.9	94.1	95.4	95.6	90.4	89.3	83.5	81.2	71	85.8	101.6	86.5	99.9	103

Table 22. – Age and summary statistics of walleye from Fresno Reservoir, aged by otoliths, 2006.

Age Class	Size Range	Nbr Sampled	Length Avg	Length SD	Weight Avg	Weight SD	Condition Factor	Condition Factor SD	Relative Wt Avg	Relative Wt SD
0	6.3 - 9.6 in	43	7.47	0.60	0.15	0.03	35.49	7.86	108.6	24.73
1	9.9 - 13.0 in	64	11.36	0.72	0.53	0.11	35.57	1.92	100.8	5.50
2	11.4 - 15.3 in	10	14.32	1.22	1.10	0.27	36.45	2.41	99.0	5.80
3	14.3 - 20.1 in	9	17.56	2.00	2.10	0.47	39.15	8.99	103.0	25.74
4	14.1 - 21.0 in	4	19.03	3.30	2.86	1.26	38.84	3.19	100.5	8.63
5	20.9 in	1	20.90	0.00	3.39	0.00	37.13	0.00	94.2	0.00
7	18.0 - 22.7 in	2	20.35	3.32	3.56	1.78	40.32	1.25	102.9	0.16
8	21.8 - 24.3 in	3	22.83	1.31	4.84	0.66	40.57	1.96	101.4	5.69
9	21.0 - 21.2 in	2	21.10	0.14	3.78	0.21	40.22	1.45	101.9	3.55
11	26.7 in	1	26.70	0.00	8.35	0.00	43.87	0.00	106.5	0.00
	Totals:	139	11.69	4.27	0.89	1.24	36.26	5.29	103.2	15.94

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 draw downs resulted in an increase in riverine habitat (Table 21), however no sauger were collected in 2006.

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, however the population of adult black crappie has remained relatively low (CPUE range = 0.17 to 1.33 fish/net; 1999 to 2006).

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.

Butch Reservoir

Butch reservoir is located in south Blaine County and contains a fishery for rainbow trout, largemouth bass, and bluegill. Butch also has a windmill aerator system, which assists in over winter survival of fish. In the summer of 2005, a voluntary creel box was erected at Butch reservoir to determine fishing pressure, angler success, and angler satisfaction. In 2005, anglers reported summer catch rates of rainbow trout as 4.28 fish/hour, catches of bluegills as 1.36 fish/hour, and largemouth bass as 2.47 fish/hour (n=4). Anglers reported fall catch rates of rainbow trout as 1.65 fish/hour, catches of bluegills as 0.04 fish/hour, and largemouth bass as 2.13 fish/hour (n=5). The box was destroyed by cows during the winter of 2005/2006 and not replaced.

Choteau Reservoir

Choteau Reservoir is located in north central Blaine County and contains a rainbow trout and black crappie fishery. Black crappie were originally introduced in 2002 and 1,500 4 inch rainbow trout were stocked in 2003, and 6,000 4 inch rainbow trout were stocked in 2004, and 3,000 in 2005. Choteau also has a windmill aerator system to assist with over winter survival of fish. In 2005, a

voluntary creel box was erected to determine fishing pressure, angler success, and angler satisfaction. The creel box was maintained in 2006. In 2005, five creel cards were filled out and no fish were caught. In 2006, three creel cards were filled out and again no fish were caught.

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. 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 105 angler days and ranked 56th in the region for angler pressure (McFarland 2006).

In 2006, two experimental gill nets and three trap nets were set overnight and beach seining was conducted at six sites. Gill netting surveys indicate that catch rates of walleye have increased since 2005, while the other species have remained relatively stable. The relative weights of walleye continue to remain low (Table 23). Trap netting was conducted in an effort to survey YOY fishes and to assess forage fish abundance. However, trap netting did not result in the capture of many species and is not an effective method of surveying fish within the reservoir (Table 24). As a result, beach seining was conducted in August 2006. A total of six seine hauls were made with the majority of the fish being collected in the upper end of the reservoir where Cow Creek enters the reservoir. A total of 199 fathead minnows, 205 golden shiners, 125 northern redbelly dace, and 18 black crappies were collected. The forage base appears to be adequately reproducing within the reservoir and this is the first documentation of black crappie naturally reproducing.

In 2006, the voluntary creel box was maintained, however angler participation was low (n=15). A mailed creel survey conducted in 2005/2006, estimated that Cow Creek Reservoir received approximately 103 angler days (Region rank=56th; McFarland 2006). Anglers also 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 23. – 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 (1994-2006).

		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	--

Table 24. – Catch rates (fish/net) of fish captured in trap nets in Cow Creek Reservoir (1993-2006).

Date	# Traps	Black crappie	Channel Catfish	Fathead minnow	Golden shinter	Lake chub	Longnose dace	Tiger muskie	White sucker	Walleye	Western silvery / Plains minnow	Yellow perch
Oct-93	3	0	0	125	0	30	10	0	223.33	0	40	0
Apr-01	4	2.25	0	0	0.75	0	0	0.75	15.75	1.25	0	2
May-03	1	1	0	0	0	0	0	1	31	0	0	0
Jul-06	3	0	0.33	1	1	0	0	0	0	0	0	0

Dry Fork Reservoir

Dry Fork Reservoir is a 300 surface acre pond located seven miles north of Chinook. This reservoir has historically been a popular yellow perch and northern pike fishery. In 2001, drought and dam operations resulted in a severe decrease in water levels. As a result the fishery was destroyed and black crappie and northern pike were reintroduced in 2002 when the reservoir re-filled. Rainbow trout were stocked from 2002 to 2005 to supplement the fishery and walleye were re-introduced in 2004. This reservoir had almost fully recovered and angling pressure had increased to 1,028 angler days in 2005 (Regional rank=17th). However, in 2006 water levels were low and may severely impact the fishery again.

In 2006, two experimental gill nets were set within Dry Fork Reservoir and the voluntary creel box was maintained. Results of netting in 2006 indicate good growth and/or recruitment of sport fishes within the reservoir with the highest fish abundance on record (Figure 8).

Approximately 12,000 four-inch rainbow trout have been stocked annually from 2002 thru 2005. In 2006, the average size of rainbow trout captured in gill nets was 21.6 inches (CPUE=3 fish/net). Northern pike were reintroduced with one small stocking in 2002. Since that time northern pike have successfully reproduced and recruited within the reservoir. The average length of northern pike captured in 2006 was 25.9 inches (CPUE= 12 fish/net). Black crappie were reintroduced in 2002 with a plant of 1,000 three-inch fish and followed in 2003 by a plant of 1,800 adult crappie. The average size of black crappie captured in 2005 was 7.29 inches indicating that black crappie are successfully reproducing and recruiting within the reservoir (CPUE= 9 fish/net). From 2004 through 2006, 5,000 walleye fingerlings were planted. While their relative abundance (CPUE=1.5 fish/net) remains low, walleye have exhibited excellent growth since their reintroduction in 2004. In 2006, walleye averaged 20.4 inches TL in the late summer gill netting surveys.

Anglers reported relatively high catch rates of northern pike (Table 25) and had a high level of satisfaction with the size of pike caught. Anglers also had high catch rates for yellow perch, especially during the winter ice fishing season. Catch rates of walleye were relatively low with fish only being caught during ice fishing. Catch rates of rainbow trout were relatively low, however the size of fish caught gave anglers high satisfaction. No catches of black crappie or largemouth bass reported were reported by anglers.

Figure 8. – Catch rates of black crappie, northern pike, rainbow trout, walleye, and yellow perch using gill nets in Dry Fork Reservoir from 1992 to 2006.

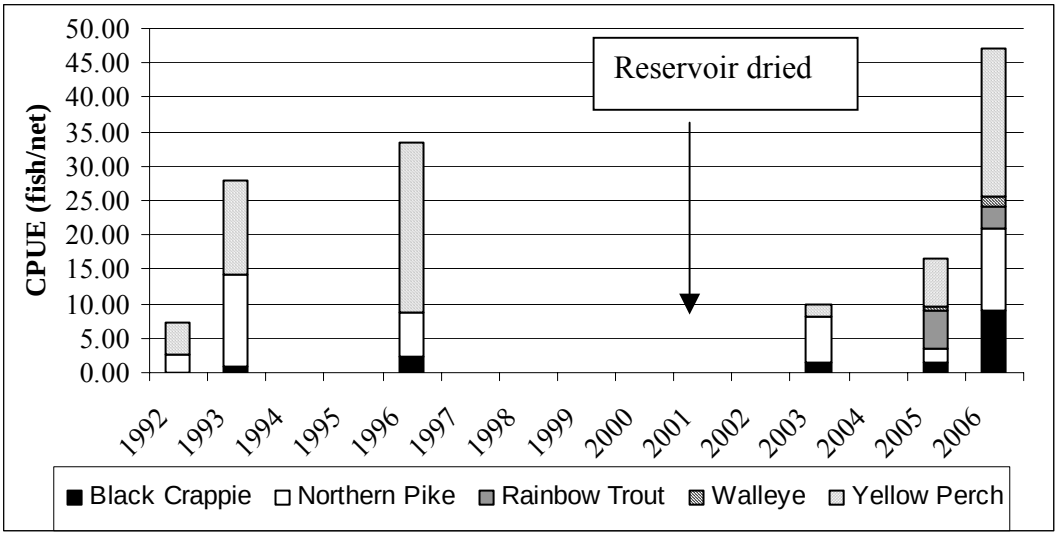


Table 25. - Angler catch rates (fish/hour) of rainbow trout, walleye, northern pike, and yellow perch in Dry Fork Reservoir (2005-2006).

Season & Year	Sample Size	Rainbow Trout	Walleye	Northern Pike	Yellow Perch
Summer 2005	26	0.100	0	0.989	0.043
Fall 2005	4	0	0	1.00	0
Winter 2005/2006	17	0.791	0.054	0.820	1.19
Spring 2006	2	0	0	0.500	0
Summer 2006	9	0.056	0	0.746	0.348
Fall 2006	5	0.208	0	0.069	5.617
Winter 2006	5	0	0	0.207	6.932

Petrie Pond

Petrie pond is a privately owned spring fed 2.5-acre pond north of Turner, which has been managed as a rainbow trout fishery since 1996. In 2003, white suckers were illegally introduced, most likely as a result of illegal bait fishing. Since that time, white suckers have over populated the reservoir and chocked out the rainbow trout fishery. In 2004, bluegill and largemouth bass fishery was established in an attempt to control the white sucker population, however this was unsuccessful. As a result Petrie Pond was drained in 2006 to eliminate the white sucker population. Draining of the pond was completed in July of 2006 and the spring water was re-diverted into Petrie Pond in August. The landowner will decide what type of fishery will be re-established upon filling of the reservoir.

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.

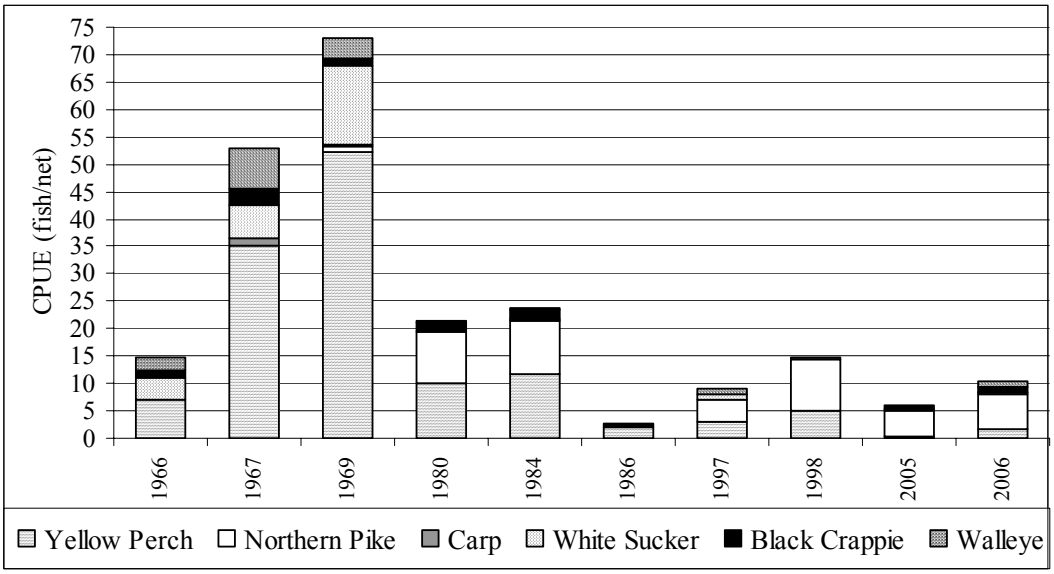
Bison Bone Reservoir

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 muskies were introduced in 2002 and 2004 to control the white sucker population. A gill netting survey in 2005 indicated that tiger muskie have successfully controlled the white sucker population with no suckers being collected. Also yellow perch abundance (2.63 fish/hour) and size were good. The average size of perch collected was 7.68 inches (6.5 to 11.4 in. TL) and 0.22 pounds (0.13 to 0.74 lbs). Water levels were good in 2005 and should remain good with fall and spring rains. Anglers reported poor success rate of catching yellow perch during ice fishing in 2006.

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 (Figure 9). Since the 1980s the fishery has been in decline and water levels have been poor in recent years. 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. Due to reduced fishing opportunities, Ester only received 33 angler days in 2005 and ranked 63rd in the region (McFarland 2006).

Figure 9. - Relative abundance of yellow perch, northern pike, carp, white sucker, black crappie, and walleye in Ester Lake (periodic sampling 1966 to 2006).



Gull Wing Reservoir

Gull wing is a 17-acre BLM pond located in south Phillips County. This reservoir has a windmill aeration system and good water levels. Black crappie (1,200 8-in.) were introduced into this reservoir in 2003, however this stocking was not successful, as no fish were collected in 2005. High numbers of fathead minnows occur within the reservoir and largemouth bass were introduced in 2006.

Karsten Coulee

Karsten Coulee reservoir is located on BLM land is south Phillips County. Like many ponds on BLM land in south Phillips County, livestock grazing has reduced water quality and eliminated shoreline vegetation. In 2000 an aerator was installed on Karsten Coulee and largemouth bass were

stocked in 1999 and 2004. Prior to restocking in the spring of 2004, a winterkill was reported. Low water levels and poor water quality were most likely responsible. In 2005, a voluntary creel box was installed and in 2006 it was maintained. In 2005, two anglers filled out creel cards however they did not catch any fish. In 2006, cows destroyed the box and no angler cards were collected.

Lark Reservoir

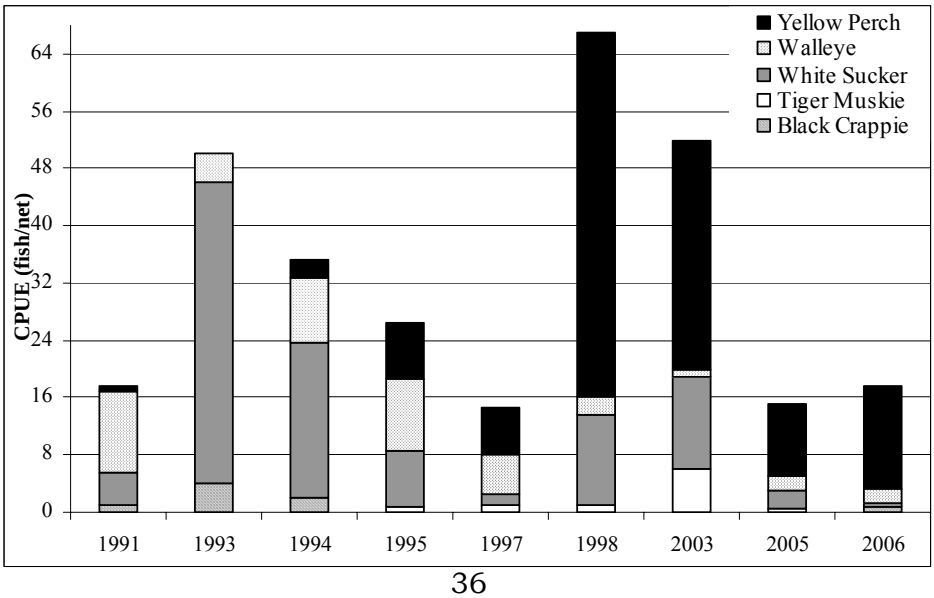
Lark Reservoir is a 6-acre pond located on BLM land in south Phillips County. Lark was managed as a rainbow trout fishery from 1970 to 1994. Since the mid-1990s this reservoir has been managed as a largemouth bass fishery. In 2005, a voluntary creel box was erected and it was maintained in 2006. In 2005, 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).

Little Warm Reservoir

Little Warm Reservoir is a privately owned 25-acre reservoir located in Phillips County. FWP has managed this pond as a warm water fishery since 1989. Since 1989, black crappie, yellow perch, tiger muskie, and walleye have been introduced. The current warm water management plan includes annual stocking of walleye fingerlings and alternate-year tiger musky fingerlings. Tiger musky were introduced to control white sucker populations. Other species present within the reservoir include brook stickleback, Iowa darter, white sucker, shorthead redhorse, golden shiner, black bullhead, and fathead minnow. Little Warm Reservoir ranked 61st in the Region for angler pressure with 69 angler days in 2005/2006 (McFarland 2006).

Like many reservoirs, water levels have been low in Little Warm Reservoir. Spring and summer rains from 2004 to 2006 have increased water levels and forage fish abundance has increased. This reservoir is still low and would benefit from better water levels. In 2006, three over-night sinking gill nets were set in late July. In general forage and sport fish populations have decreased significantly since 1998 and 2003 (Figure 10). In 2006, collected yellow perch ranged in length from 5.8 to 8.1 inches (CPUE=14.33 fish/net). The walleye population consists primarily of quality size adults (TL=21.5 to 23.2 in.). Black crappie are still found in low numbers (CPUE=0.67 fish/net) and average 4.25 inches in length. No tiger musky were collected in 2006, however they still appear to have been effectively controlling the white sucker population (CPUE=0.67 fish/net).

Figure 10. – Relative abundance of black crappie, tiger muskie, white sucker, walleye, and yellow perch in Little Warm Reservoir (1991-2006).



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 2006. During the summer and fall of 2005, anglers reported catch rates of 1.87 bluegill per hour, 0.07 largemouth bass per hour, and 0.07 yellow perch per hour (n=5). Ice fishermen in the winter of 2005/2006, reported catch rates of 2.5 bluegill per hour, 0.19 northern pike/hour, and 0.13 yellow perch per hour (n=2). 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). Anglers also reported a significant decrease in water in December, which resulted in water levels being reduced to a depth of 5 feet at the dam. Over winter survival of the fishery will have to be determined.

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 currently 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 spawning conditions 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.

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. The first 50 fish of each species was measured (TL: inches) and weight to the nearest 0.01 pound. All additional fish of each species were counted.

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 26). 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.

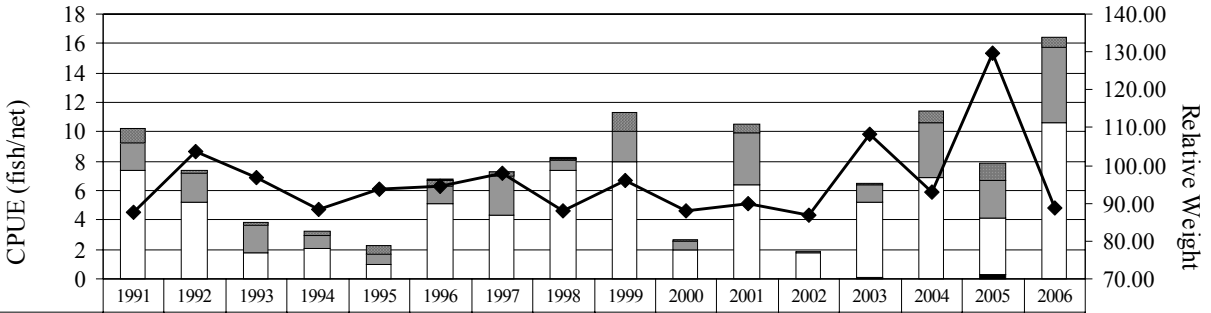
The relative abundance of adult yellow perch doubled in 2004, and remained high in 2005 (Figure 11). In 2006, yellow perch numbers increased to their highest levels since 1991, at 16.4 fish/net. Adult yellow perch exhibit high condition factors and the size structure of yellow perch is well balanced, with 64.6% of the adults being stock size (5-7.9 in.) and 35.4% were in the quality and preferred size groups (8 to 12 inches TL; Figure 11). The high numbers of stock size fish is very encouraging, indicating that the past two years of higher water levels have allowed the population to start to recover.

Table 26. - 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, 1982-2006.

	Shorline Seined (ft)	Walleye	Yellow Perch	Northern Pike	Spottail Shiner	White Sucker	Black Crappie	Goldeye	Bigmouth Buffalo	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

*Years in which walleye fry or fingerlings were stocked

Figure 11. - Relative abundance, size structure, and relative weight of yellow perch collected with sinking experimental gill nets in Nelson Reservoir, 1991-2006.



	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
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
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
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
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
Sub Stock (<5 in.)	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.3	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

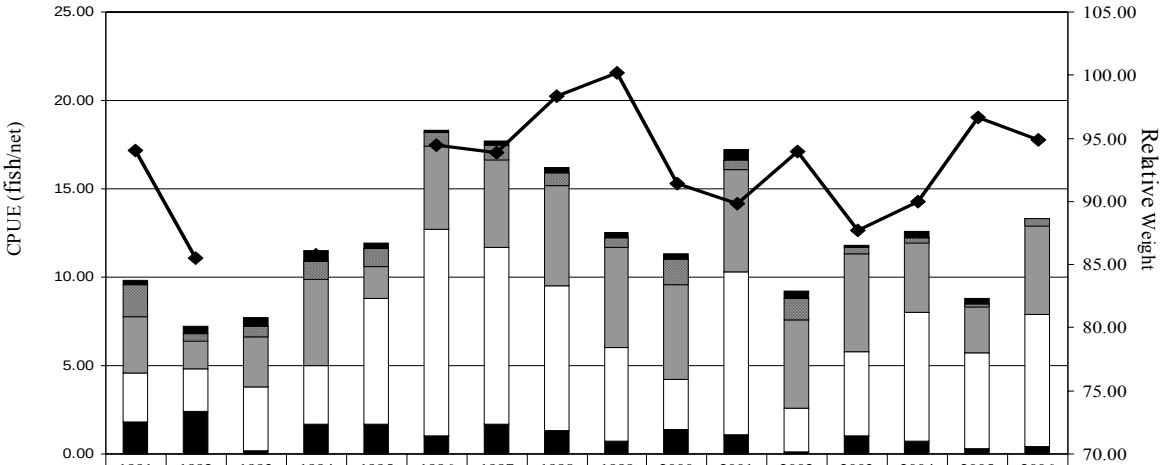
Walleye

Walleye fingerlings have been periodically stocked into Nelson Reservoir to augment natural reproduction (Table 26). From 2002 to 2005, all walleye fingerlings stocked into Nelson Reservoir have been marked with 750 ppm OTC to allow the calculation of survival of 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.

Even with the addition of these fish, catch of YOY walleye during seining surveys remained low when compared to pre-drought levels (Table 26). However, the high proportion of stock size (10-14.9 in.) walleye in the population indicates good survival of stocked YOY walleye from 2003 through 2005 (Figure 12).

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 12). In 2006, walleye numbers increased to 13.3 fish/net (Figure 12). The condition of walleye continues to increase after low water levels in 2002 (Figure 12). These high condition indices are attributable to a forage base that is adequate for the existing population levels of predators (Figure 12). Walleye sampled in 2006 ranged in length from 6.9 to 21.0 in. and weighed 0.6 to 3.8 pounds, with the average being 14.1 inches in length and weighing 1.1 pounds. Fifty-six percent of the walleye were stock size (10-14.9 in.), with 37.6% being in the quality size group (15-19.9 in.), 3.01% being in the preferred size group (20-24.9 in.). Walleye ranged in age from 0 to 7 years old, with 89% of walleye sampled being from the 2003 to 2005 age classes (Table 27).

Figure 12. - Relative abundance, size structure, and relative weight of walleye collected with sinking experimental gill nets in Nelson Reservoir, 1991-2006.



	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
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
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
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
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
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
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

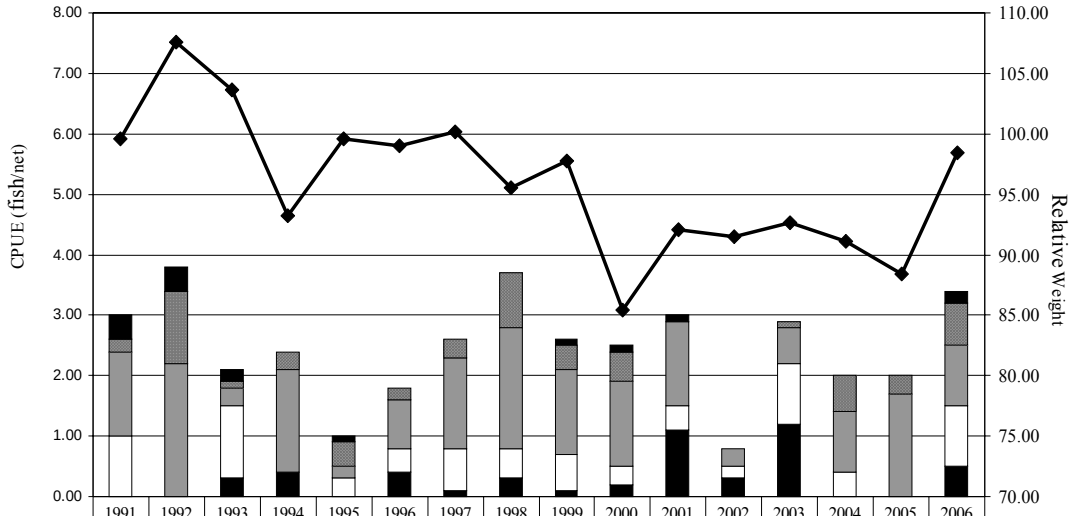
Table 27. - Age summary statistics of walleye from Nelson Reservoir, aged by otoliths, 2006.

Age Class	Size Range	Nbr Sampled	Length Avg	Length SD	Weight Avg	Weight SD	Condition Factor	Condition Factor SD	Relative Wt Avg	Relative Wt SD
0	7.2 - 7.5 in	3	7.37	0.15	0.13	0.01	31.50	4.32	96.2	13.35
1	10.3 - 17.0 in	46	11.87	1.09	0.58	0.22	33.98	3.47	95.6	10.08
2	12.7 - 17.8 in	18	14.87	1.43	1.16	0.40	33.78	2.67	91.1	6.33
3	14.3 - 18.2 in	23	16.67	1.04	1.64	0.33	34.90	2.59	92.3	6.81
4	16.4 - 20.5 in	6	18.12	1.49	2.34	0.53	39.03	3.07	101.7	8.84
7	19.8 - 20.3 in	2	20.05	0.35	2.91	0.46	35.92	3.80	91.8	9.42
	Totals:	98	13.96	2.90	1.09	0.69	34.46	3.33	94.3	8.92

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 13). Northern pike populations were significantly reduced in 2002, however the population was quickly replenished with the recruitment of YOY fishes in 2003 (Figure 13). In 2006, the northern pike population increased again to 3.4 fish/net. The population is currently well balanced with 14.7% being sub-stock (<14 in.), 29.4% being stock size (14-20.9 in.), 29.4% being quality size (21-27.9 in.), and 5.9% being memorable size (>34 in.; Figure 13).

Figure 13. - Relative abundance, size structure, and relative weight of northern pike collected with sinking experimental mesh gill nets in Nelson Reservoir, 1991-2006.

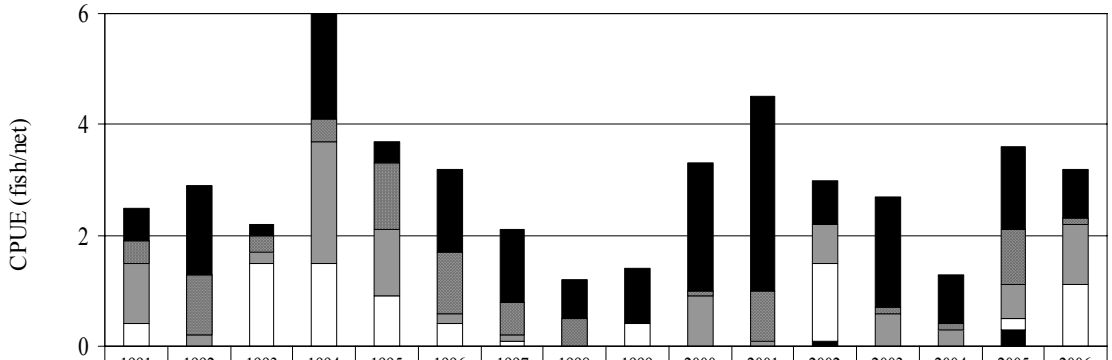


	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Memorable (>34 in.)	0.40	0.40	0.20	0.00	0.10	0.00	0.00	0.00	0.10	0.10	0.10	0.00	0.00	0.00	0.00	0.20
Preferred (28-33.9 in.)	0.20	1.20	0.10	0.30	0.40	0.20	0.30	0.90	0.40	0.50	0.00	0.00	0.10	0.60	0.30	0.70
Quality (21-27.9 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
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
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
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

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 14). In 2005 and 2006, lake whitefish had successful recruitment of YOY fish into the population, which has resulted in a recovery of the fishery since 2004. The population currently consists of 25.6% stock size (6-10.9 in.), 25.6% quality size (11-13.9 in.), 2.3% preferred size (14-17.9%), and 20.9% memorable size fish (>18 in.). The lake whitefish collected in 2006 had an average total length of 13.8 inches and an average weight of 1.98 pounds.

Figure 14. - Relative abundance, size structure, and relative weight of lake whitefish collected with sinking experimental mesh gill nets in Nelson Reservoir, 1991-2006.

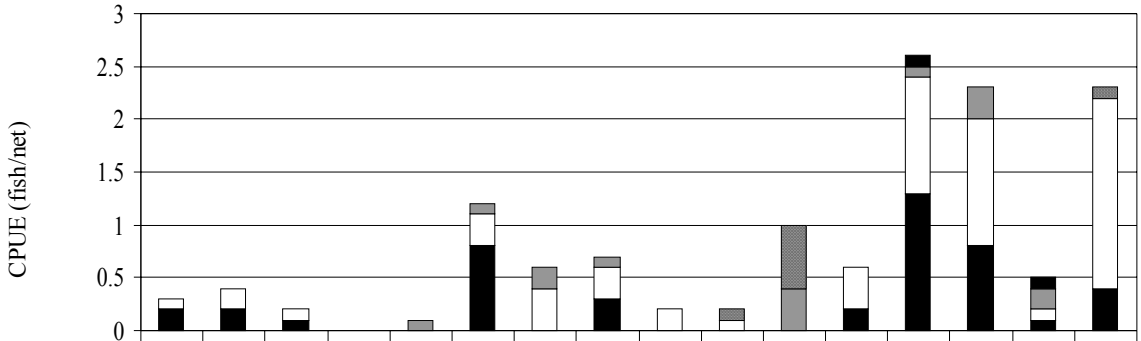


	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Memorable (>18.0 in.)	0.6	1.6	0.2	1.9	0.4	1.5	1.3	0.7	1	2.3	3.5	0.8	2	0.9	1.5	0.9
Preferred (14.0-17.9 in.)	0.4	1.1	0.3	0.4	1.2	1.1	0.6	0.5	0	0.1	0.9	0	0.1	0.1	1	0.1
Quality (11.0-13.9 in.)	1.1	0.2	0.2	2.2	1.2	0.2	0.1	0	0	0.9	0.1	0.7	0.6	0.3	0.6	1.1
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
Sub Stock (<6.0 in.)	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0.3	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 26) and recruitment of YOY crappie into the population resulted in a high abundance of adult black crappie (Figure 15). The abundance of adult crappie was reduced in 2005 but had increased to 2.3 fish/net in 2006. In 2006, the population consisted of a high number of stock (78.4%; 5.0-7.9 in.) and sub-stock size crappie (17.4%; <5.0 in.). Additionally 4.3% of the population was in the preferred size category (10-11.9 in.; Figure 15). The high proportion of young fish in the population combined indicates that the conditions within Nelson Reservoir have been favorable for black crappie, and if conditions remain stable the population will continue to remain at elevated levels. As stock sized fish continue to mature, there should be elevated number of preferred and memorable size fish.

Figure 15. - Relative abundance, size structure, and relative weight of black crappie collected with sinking experimental gill nets in Nelson Reservoir, 1991-2006.



	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
■ Memorable (>12.0 in.)	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1	0
▒ 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
▒ 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
□ 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
■ 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

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, 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 be present in high numbers within the annual seining surveys (Table 26). White suckers and goldeye also serve as a forage base to a limited degree and have had high population levels in recent years (14.7 fish/net and 9.6 fish/net respectively in 2006).

PR 018

PR 018 is a 6-acre pond located on BLM land in south Phillips County. PR 018 has a windmill aeration system and was historically a warm water fishery consisting primarily of largemouth bass. In 2004, a winterkill occurred and unallocated rainbow trout were stocked in the spring of 2004. In 2005 a voluntary creel box was erected and one angler reported fishing for 2.5 hours, however did not catching any fish.

PR 054

PR 054 is a 7.6-acre BLM pond located 3-miles south of the Canadian border. This pond is managed as a largemouth bass fishery and was last stocked with largemouth bass in 2003. Water levels have been marginal at this reservoir and a windmill aerator was installed in 2001. In 2005 water levels were five feet below the spillway and the pond received heavy grazing pressure. In 2005, a voluntary creel box was erected and a gillnetting survey was conducted. Two creel cards were returned and one angler reported catching 3 largemouth bass in 15 minutes of fishing. In 2006, one angler filled out a creel card reporting a catch rate of 1 largemouth bass/hour.

Largemouth bass are doing very well in PR 054 and it receives a very minimal amount of fishing pressure. Due to the low fishing pressure and the costs associated with maintaining the windmill aerator, the aerator will be removed in 2007. The fishery will be monitored and if a winterkill occurs, largemouth bass will be reintroduced when conditions are more favorable. This reservoir and the surrounding prairie would benefit from decreased grazing pressure.

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 2006. 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 per hour (n=3) with catches of two-pound bluegill.

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 2006. 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.

Daniels County Ponds

Ponds throughout Daniels County were sampled to determine fish species composition and abundance using a combination of trap nets and gill nets. Trap nets measured 3' x 4' with ¼" mesh. The floating and sinking gill nets used measured 125 feet in length and 6 feet deep consisting of 25-foot panels of ¾", 1", 1 ¼", 1 ½", and 2" mesh. All nets were fished for at least 12 hours and fish were measured for total length (TL: inches) and weighed to the nearest 0.01 pound (lb).

Killenbeck Reservoir

Killenbeck Reservoir is located on private land and has been managed as a multi-species fishery since 1951. Largemouth bass were introduced in 1951, followed by northern pike in 1954, brook stickleback and fathead minnows in 1967, black bullheads in 1985, and rainbow trout in 1993. Rainbow trout were last stocked in 1999. In 2006, one trap net and one gill net were each set for approximately 16 hours. The gill net captured five white suckers (CPUE = 0.313 fish/hr; $\bar{x}$ TL = 13.5 in.; $\bar{x}$ wt = 1.04 lbs.). The trap net collected a total of 1,256 fathead minnows (CPUE = 78.5 fish/hr).

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 and one gill net were each set for approximately 17 hours. A total of one yellow perch (CPUE = 0.06 fish/hr; TL = 12.0 in.; wt = 1.02 lbs.) and one northern pike (CPUE = 0.06 fish/hr; TL = 19.3 in.; wt = 1.6 lbs.) were collected in the trap net. The gill net contained a total of 18 northern pike (CPUE = 1.06 fish/hr; $\bar{x}$ TL = 17.2 in.; $\bar{x}$ wt = 1.2 lbs.).

McCone County Ponds

Ponds throughout McCone County were sampled to determine fish species composition and abundance using a combination of trap and gill nets in each pond. Trap nets measured 2' x 3' with ⅛" mesh, 3' x 4' with ¼" mesh, and 4' x 6' with ¼" mesh. The floating and sinking 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. All nets were fished for at least 12 hours and fish were measured for total length (TL: inches) and weighed to the nearest 0.01 pound (lb).

Flat Lake

Flat Lake has been managed as a multi-species fishery since 1973. Walleye were first introduced in 1979 followed by largemouth bass in 1981, and northern pike in 1990. This reservoir is currently maintained with annual stocks of 2,000 catchable sized rainbow trout. In 2006 two traps were set for approximately 15 hours each. A total of one spottail shiner (CPUE = 0.03 fish/hr; TL = 4.0 in.) and one northern pike (CPUE = 0.03 fish/hr; TL = 6.0 in.) were collected. No rainbow trout were collected, even though 2,000 catchable rainbow trout were stocked two months prior to sampling.

Richland County Ponds

Ponds throughout Richland County were sampled to determine fish species composition and abundance using a combination of trap nets and gill nets. Trap nets measured 3' x 4' with ¼" mesh. The floating and sinking 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. All nets were fished for at least 12 hours and fish were measured for total length (TL: inches) and weighed to the nearest 0.01 pound (lb).

Kuester Reservoir

Kuester Reservoir is located on private land and has been managed as a fishery since 1960. Rainbow trout were planted from 1960 to 1967, followed by northern pike from 1969 to 1979. Largemouth bass were first introduced in 1971, and yellow perch were first stocked in 1975. In 2006, one trap net was set for 20 hours, and two sinking gill nets were each fished for approximately 19 hours. A total of 458 fathead minnows (CPUE = 22.9 fish/hr), one yellow perch (TL = 9.2 in.; wt = 0.52 lbs.), and two painted turtles were collected in the trap. The gill nets captured one northern pike (TL = 27.0 in.; wt 5.75 lbs.) and 103 yellow perch (CPUE = 2.71 fish/hr; $\bar{x}$ TL = 8.98 in.; $\bar{x}$ wt = 0.45 lbs.).

Roosevelt County Ponds

Reservoirs throughout Roosevelt County were sampled to determine fish species composition and abundance using a combination of trap nets and gill nets. Trap nets measured 3' x 4' with ¼"

mesh. The floating and/or sinking 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. All nets were fished for at least 12 hours and fish were measured for total length (TL: inches) and weighed to the nearest 0.01 pound (lb).

Big Muddy Reservoir

Big Muddy Reservoir is located on private land and has been managed as a rainbow trout fishery since 1969. The rainbow trout fishery is maintained with annual plants of 2,500 fingerlings. In 2006, one sinking gill net was fished for 16 hours. No fish were caught in the net. The landowner thought the reservoir was going to dry up. Trap nets were not set because 10,000 largemouth bass were planted on the day of sampling (7/11/2006).

Bainville Railroad Pond #1

Bainville RR Pond #1 is located on private land and has been managed as a warm water fishery since 1936. Bullheads were stocked in 1936, followed by bluegill, black crappie, and largemouth bass in 1944. Walleye were first planted in 1964, and yellow perch were stocked the following year. Northern pike were planted annually from 1991 to 1996. In 2006, one trap was set for 12 hours and one sinking gill net was set for 11 hours. The gill net captured a total of eight northern pike (CPUE = 0.73 fish/hr; $\bar{x}$ TL = 23.78 in.; $\bar{x}$ wt = 2.13 lbs.) and eight yellow perch (CPUE = 0.73 fish/hr; $\bar{x}$ TL = 7.18 in.; $\bar{x}$ wt = 0.22 lbs.). Six yellow perch (CPUE = 0.5 fish/hr; $\bar{x}$ TL = 2.75 in.; $\bar{x}$ wt = 0.045 lbs.), 142 fathead minnows (CPUE = 11.83 fish/hour), and one brook stickleback were caught in the trap.

Bainville Railroad Pond #2

Bainville RR Pond #2 is located on private land and has been managed as a warm water fishery since 1936. Bullheads were stocked in 1936, followed by bluegill, black crappie, and largemouth bass in 1944. Walleye were first planted in 1964, and yellow perch were stocked the following year. Northern pike were planted annually from 1991 to 1996. In 2006, one sinking gill net was fished for 12 hours. A total of six northern pike (CPUE = 0.5 fish/hr; $\bar{x}$ TL = 19.45 in.; $\bar{x}$ wt = 1.58 lbs.), one yellow perch (TL = 5.7 in.; wt = 0.07 lbs.), and one common carp (TL = 24.8 in.; wt = 5.9 lbs.) were captured in the gill net.

Sheridan County Ponds

Ponds throughout Sheridan County were sampled to determine fish species composition and abundance using a combination of trap nets and gill nets. Trap nets measured 2' x 3' with ⅛" mesh, 3' x 4' with ¼" mesh, and 4' x 6' with ¼" mesh. The floating and/or sinking 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. All nets were fished for at least 12 hours and fish were measured for total length (TL: inches) and weighed to the nearest 0.01 pound (lb).

Box Elder Creek Reservoir

Box Elder Creek 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 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 (CPUE = 0.17 fish/hr; $\bar{x}$ 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 trap contained two crayfish as well. The gill nets captured 22 white suckers (CPUE = 0.96 fish/hr; $\bar{x}$ TL = 12.77 in.; $\bar{x}$ wt = 1.16

lbs.), nine walleye (CPUE = 0.39 fish/hr; 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.) was in the gill net as well.

Engstrom (Dave) Pond

Engstrom (Dave) Pond is located on private land and has been managed as a fishery since 1995. Rainbow trout were planted in 1995, 1996, and 2002. Largemouth bass were introduced in 2004. In 2006, one trap was set for 17 hours and one sinking gill net was set for 16 hours. A total of 125 fathead minnows (CPUE = 7.35 fish/hr), three brook sticklebacks (CPUE = 0.18 fish/hr), and two frog tadpoles were collected in the trap. No fish were captured in the gill net.

Engstrom Pond (water code 165071)

Engstrom Pond is located on private land and has been managed as a fishery since 1969. During the first two years of management, northern pike, largemouth bass, and bluegill were stocked. In 1972, brook sticklebacks and fathead minnows were planted. Yellow perch were introduced in 1976, tiger muskie in 1987, and Yellowstone cutthroat trout in 1997. In 2006, one trap and one sinking gill net were fished for approximately 17 hours. A total of 258 fathead minnows were collected from the trap (CPUE = 15.18 fish/hr) along with one white sucker (TL = 13.3 in.; wt = 0.96 lbs.). The trap also contained 11 painted turtles. There were no fish in the gill net.

Raymond Dam

Raymond Dam is owned by the town of Raymond and has been managed as a multi-species fishery since 1944. Largemouth bass were planted that year, followed by bullheads in 1948. Northern pike were first stocked in 1955, and black crappie were planted in 1966 and 1986. Rainbow trout were first planted in 1971, followed by yellow perch in 1979. Yellow perch were last stocked in 1997. In 2006, one trap and one sinking gill net were fished for approximately 17 hours. The gill net contained only one northern pike (TL = 31.5 in.; wt = 7.75 lbs.). In the trap, 236 fathead minnows (CPUE = 13.88 fish/hr) and 16 brook sticklebacks (CPUE = 0.94 fish/hr) were collected.

Valley County Ponds

Ponds throughout Valley County were sampled to determine fish species composition and abundance using a combination of trap nets and gill nets in each pond. Trap nets measured 2' x 3' with ⅛" mesh, 3' x 4' with ¼" mesh, and 4' x 6' with ¼" mesh. The floating and/or sinking 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. All nets were fished for at least 12 hours and fish were measured for total length (TL: inches) and weighed to the nearest 0.01 pound (lb).

Atlas Reservoir

Atlas Reservoir is located on BLM land and has been managed as a largemouth bass fishery since 1987. Since their initial introduction, largemouth bass and fathead minnows were stocked until 1990 when both species became established. In 2006, two traps were fished for approximately 23 hours. A total of two largemouth bass (CPUE =0.04 fish/hr; $\bar{x}$ TL = 1.0 in.) and 2,088 fathead minnows (CPUE = 45.39 fish/hr) were collected.

Big Reservoir

Big Reservoir is located on BLM land and has been managed as a fishery since 1986. Black crappie and yellow perch were both introduced in 1986 and have been naturally reproducing in this reservoir since then. In 2006, two trap nets were set for approximately 22 hours. A total of 27 dead fathead minnows (CPUE = 0.62 fish/hr), which had been eaten by painted turtles, were collected.

Additionally a total of 58 black crappie (CPUE = 1.32 fish/hr) were collected, ranging in length from 5.0 to 9.0 inches ($\bar{x}$ TL = 5.3 in.).

Fort Peck Dredge Cuts and Tailwater

Fort Peck Dredge Cuts and tail water complex fish population sampling continued in June and September of 2006. For both months, ten 125- x 6-foot multifilament experimental gill nets and four 100- x 8-foot ½ bar mesh monofilament gill nets were set overnight. Nets were set for an average of 19.5 hours each. This sampling effort, initiated in 1979, was to obtain information on the overall fish population due to potential impacts associated with proposed construction of a re-regulation dam below Fort Peck Dam. Another objective is to evaluate the abundance of game fish in relation to cisco and rainbow smelt. Thousands of fish have been tagged in the dredge cut and Milk River area since 1994. A report of tag returns, fish growth, and movement should be expected in future reports. This year all the various tag data sets are being compiled and prepared for review.

The walleye sauger combined catch was the highest in the area was in 1980 and again in 1998 when 94 were netted. In 2006, 76 were netted (Table 28) of which 61 were sauger and 15 were walleye. Sauger were the fourth most abundant fish captured in the nets and the second most abundant game fish following channel catfish. The sauger average length and weight was 370 mm and 388 grams with an average relative weight of 74. Walleye average length and weight was 421 mm and 768 grams with an average relative weight of 85. Sauger and walleye catch rates per hour and net-night were 0.16 per hour or 3.1 per night and 0.04 per hour or 0.8 per night, respectively. One sauger was captured with a tag from previous studies.

Channel catfish were the most abundant game species caught in the multifilament netting and the second most abundant fish caught overall in 2006. Catfish averaged 417 mm and 646 grams with an average relative weight of 87. All of the catfish were between stock (280 mm) and quality size (410 mm). The catch rate was .23 per hour or 4.6 per net. Two catfish had tags in them from previous studies.

Smelt were documented in both net types in 2006 with 2 in the multifilament nets and 5 in the monofilament nets (Tables 28 and 29). Average length was 156 mm and 144 mm in the monofilament and multifilament nets, respectively.

Cisco remain abundant in the sampling with 74 and 23 being caught in the multifilament and monofilament nets respectively. Cisco were the third most abundant 3.7 per night and most abundant 2.9 per night in the multifilament and monofilament nets, respectively.

Fifty shovelnose sturgeon were captured in 2006, 7 had tags from previous studies. Shovelnose average size was 615 mm and 851 grams. Catch rates were 0.13 per hour or 2.5 per net.
Goldeye were the most abundant species captured in 2006 in multifilament nets with 181 individuals. Catch rates were 0.47 per hour or 9.1 per net. Goldeye were identified to sex with 116 and 64 being female and male, respectively. One goldeye wasn't identified and was likely a juvenile.

Table 28. - Summary of 2006 June and September combined standard experimental gill netting with 389.2 hours and 20 nets in the Fort Peck Dredge Cuts. Relative weights calculations and length category totals follow standards in Fisheries Techniques.

	Average	Average		Relative	CPUE	CPUE	Length Categories					
Species[1]	Length	Weight	Count	Weight	Per Hr.	Per Net	Substock	Stock	Quality	Preferred	Memorable	Trophy
BMBF	434	1000	1		0.00	0.1	NA[3]					
CARP	483	1404	7		0.02	0.4	-	-	6	1	-	-
CNCF	417	646	91	87	0.23	4.6	-	52	39	-	-	-
CNSM	198	50	1		0.00	0.1	1	-	-	-	-	-
CSCO	274	156	74		0.19	3.7	NA					
GDEY	307	226	181		0.47	9.1	NA					
♀	312	241	116		0.30	5.8						
♂	298	202	64		0.16	3.2						
LKWF	472	969	8		0.02	0.4	NA					
LNSK	283	345	5		0.01	0.3	NA					
NTPK	702	2325	2	93	0.01	0.1	-	-	1	1	-	-
RBST	144	18	2		0.01	0.1	NA					
RVCS	425	1019	17		0.04	0.9	NA					
SGER	370	388	61	74	0.16	3.1	-	3	32	26	-	-
SHRH	406	833	3		0.01	0.2	NA					
SMBF	436	1638	2		0.01	0.1	NA					
SNSG[2]	615	851	50		0.13	2.5	NA					
WLYE	421	768	15	85	0.04	0.8	-	5	8	2	-	-
WTCP	153	50	1	115	0.00	0.1	-	1	-	-	-	-
WTSK	343	561	28		0.07	1.4	NA					
YWPH	182	100	4		0.01	0.2	-	3	1	-	-	-
Total			553		1.42	27.7						

[1]BMBF-Bigmouth Buffalo CARP-Common Carp CNCF-Channel Catfish CNSM-Chinook Salmon CSCO-Cisco
GDEY-Goldeye LKWF-Lake Whitefish LNSK-Longnose Sucker NTPK-Northern Pike RBST-Rainbow Smelt
RVCS-River Carpsucker SGER-Sauger SHRH-Shorthead Redhorse SMBF-Smallmouth Buffalo SNSG-Shovelnose Sturgeon
WLYE-Walleye WTCP-White Crappie WTSK-White Sucker YWPH-Yellow Perch

[2]SNSG measured by fork length.

[3]NA Species not broken into length categories

Table 29. - Summary of 2006 June and September combined standard monofilament smelt netting with 156.2 hours and 8 nets in the Fort Peck Dredge Cuts. Relative weights calculations and length category totals follow standards in Fisheries Techniques.

Species[1]	Average Length	Average Weight	Count	Relative Weight	CPUE Per Hr.	CPUE Per Net	Substock	Length Categories: Stock	Quality	Preferred	Memorable	Trophy
CSCO	138	250	23		0.1	2.9	NA[2]					
GDEY	306	213	14		0.1	1.8	NA					
♀	318	253	7		0.0	0.9	NA					
♂	295	171	7		0.0	0.9	NA					
HBNS	113	---	18		0.1	2.3	NA					
NTPK	177	---	1	--	0.0	0.1	1	-	-	-	-	-
RBST	156	25	5		0.0	0.6	NA					
SHRH	114	---	1		0.0	0.1	NA					
STSN	114	---	1		0.0	0.1	NA					
WSMW	112	---	3		0.0	0.4	NA					
WTSK	117	---	6		0.0	0.8	NA					
Total			86		0.6	10.8						

[1]CSCO-Cisco GDEY-Goldeye HBNS-Hybognathus spp. NTPK-Northern Pike
RBST-Rainbow Smelt SHRH-Shorthead Redhorse STSN-Spottail Shiner WSMW-Western silvery Minnow
WTSK-White Sucker

[2]NA Species not broken into length categories

Glasgow Air Force Base Pond

Base pond is located on both private and state land and has been maintained as a fishery since 1961. Rainbow trout were introduced in 1961, followed by common carp and bluegills in 1969, largemouth bass in 1971, and yellow perch in 1985. In 2006, three trap nets were each set for approximately 22 hours. A total of 46 yellow perch (CPUE = 0.69 fish/hr) were collected, ranging in length from 4.0 to 7.0 inches ($\bar{x}$ TL = 5.28 in.). Additionally one rainbow trout (TL = 8.0 in.; wt = 0.20 lbs.) was collected.

Helen Reservoir

Helen Reservoir is located on BLM land and has been managed as a fishery since 1982. Largemouth bass were introduced in 1982 and re-stocked in 1994. In 2006, one trap net and one floating gill net were set for approximately 18 hours each. No fish were netted. The water level was low and aquatic vegetation extended approximately eight feet out into the reservoir. Depth measurements were taken and the deepest point was in the middle at 16.9 feet. The shallowest depth was along the north side, 3.2 feet. Five painted turtles and one muskrat were also observed.

Langen Reservoir (Vr-061)

Langen is located on BLM land and has been managed as a fishery since 1937. Bullheads were introduced in 1937 followed by bluegill and largemouth bass in 1944, and brook stickleback in 1968. Largemouth bass were last stocked in 1992. In 2006, three trap nets were each set for approximately 17 hours. A total of 6,976 fathead minnows (CPUE = 136.78 fish/hr) were collected. Additionally a total of 14 painted turtles were collected in the traps. The water quality at this pond was questionable.

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 (CPUE = 2.71 fish/hr), 251 black crappie (CPUE = 11.95 fish/hr; $\bar{x}$ TL = 1.0 in.), and one black crappie measuring 10.5 inches and weighing 0.70 pounds were collected in the trap net. The trap also contained 11 painted turtles and five tiger salamanders. There were no fish in the gill nets however there were 60 tiger salamanders collected.

Paulo Reservoir

Paulo Reservoir is located on BLM land and has been managed as a largemouth bass and bluegill fishery. Largemouth bass were introduced in 1993 and bluegill were introduced in 2004. In June of 2006, two trap nets were each set for approximately 20 hours. A total of 270 fathead minnows (CPUE = 6.75 fish/hr) and two bluegills ($\bar{x}$ TL = 6.0 in.) were collected. Additionally 18 painted turtles were captured. In July 2006, four trap nets and two gill nets were each set for approximately 17 hours to recheck species composition. A total of 2,915 fathead minnows (CPUE = 182.2 fish/hr), 24 bluegill (CPUE = 0.059 fish/hr; $\bar{x}$ TL = 6.7 in.; $\bar{x}$ wt = 0.40 lbs.), two largemouth bass (CPUE = 0.03 fish/hr; $\bar{x}$ TL = 3.25 in.), and one common carp (CPUE = 0.02 fish/hr; $\bar{x}$ TL = 10.5 in.; $\bar{x}$ wt = 0.65 lbs.) were captured in the trap nets. One largemouth bass (CPUE = 0.03 fish/hr; $\bar{x}$ TL = 12.5 in.; $\bar{x}$ wt = 1.60 lbs.) and four bluegills (CPUE = 0.019 fish/hr; $\bar{x}$ TL = 6.9 in.; $\bar{x}$ wt = 0.35 lbs.) were collected in the gill nets.

Valley Reservoir

Valley Reservoir is privately owned and has been open to the public as a multi-species fishery since 1972. Rainbow trout were introduced in 1972 and stocking was discontinued in 1986 when yellow perch and largemouth bass were stocked followed by walleye in 1989. In 2006, two trap nets

were each set for approximately 18 hours and a floating gill net was set for approximately 20 hours. A total of two yellow perch (CPUE = 0.06 fish/hr; $\bar{x}$ TL = 5.5; $\bar{x}$ wt = 0.10) were collected using the trap nets. The gill net captured a total of 83 yellow perch (CPUE = 4.15 fish/hr), ranging in length from 5.5 to 10.5 inches ($\bar{x}$ TL = 6.1 in.; $\bar{x}$ wt = 0.11 lbs.). Heavy vegetation was observed around the edges of the reservoir.

Wards Dam (VR-082)

Wards Dam is located on BLM land has been managed a multi-species fishery since 1940. Bass, crappie, and bullheads were introduced in 1940, followed by bluegill and largemouth bass in 1944, rainbow trout in 1963, northern pike in 1970, black bullheads in 1974, and fathead minnows in 1989. In 2006 two gill nets were set for approximately 17 hours each. No fish were captured in the gill nets.

Winter Harbor Pond

Winter Harbor is located on BLM land and has been maintained as a fishery since 1997. Largemouth bass were introduced in 1997 and bluegills were introduced in 2004. In 2006, two trap nets were set for approximately 24 hours. A total of 25 largemouth bass (CPUE = 0.52 fish/hr), ranging in length from 2.0 to 8.0 inches ($\bar{x}$ TL = 5.5 in.) and six yellow perch (CPUE = 0.13 fish/hr), ranging in length from 5.0 to 6.5 inches ($\bar{x}$ TL = 5.1 in.) were collected.

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 2007 due to 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 2007, using database of anglers who purchased tags to assess angler harvest of paddlefish. Telemetry study should be continued in 2007 with egg and larval sampling being added. Additionally harvest rates should be closely monitored and a harvest cap should be considered.

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 2007 to establish a strong year-class. 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, Dry Fork Reservoir, Littlewarm Reservoir, and Cow Creek Reservoir. Fish population levels should be assessed at Ester Reservoir and additional fish should be stocked depending on water levels. Stocking of walleye fingerlings should be discontinued in Ester Lake until water levels improve. All other ponds should be sampled every three years to assess adult fish populations, growth, and recruitment. In addition self-creel survey boxes maintained at ponds 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.

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Water Codes of Waters Referred To

154532	Atlas Reservoir	166200	Killenbeck Reservoir
154535	Bailey Reservoir	166420	Kuester Reservoir
164365	Bainville RR Pond #1	156025	Langer (VR61) Reservoir
164370	Bainville RR Pond #2	166495	Lark Reservoir
154570	Beaver Creek Reservoir	156105	Little Warm Reservoir
164465	Big Muddy Reservoir	166921	McChesney Reservoir
154590	Big Reservoir	156230	McNab Reservoir
164466	Bison Bone Reservoir	162500	Missouri River Sec. 05
164495	Box Elder Creek Reservoir	162520	Missouri River Sec. 06
164575	Butch Reservoir	156480	Nelson Reservoir
150920	Choteau Reservoir	156598	Paulo Reservoir
155083	Dry Fork Reservoir	156605	Petrie Pond
165072	Engstrom (Dave) Pond	157040	PR 018 Reservoir
165071	Engstrom Pond	157600	PR 054 Reservoir
155120	Ester Lake	167740	Raymond Dam
165140	Fort Peck Reservoir	168047	Sagebrush Reservoir
162500	Fort Peck Dredge Cuts	168475	Taint Reservoir
155240	Fresno Reservoir	159505	Valley Reservoir
155340	Glasgow Air Force Base Ponds	158240	Wards Dam (VR 082)
165385	Gull Wing Reservoir	168860	Whitetail Reservoir
155660	Helen Reservoir	168975	Winter Harbor
166155	Karsten Coulee 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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