Montana Fish, Wildlife & Parks

Fisheries Division
Federal Aid Job Progress Report

Montana Statewide Fisheries Management

Federal Aid Project Number: F-113-R-6
July 1, 2015 – June 30, 2016

Project Title: Montana Statewide Fisheries Management

Job Title: Havre Area Warmwater Fisheries Management

Abstract: Paddlefish tagging was conducted on the Missouri River paddlefish population upstream of Fort Peck Reservoir. Throughout the sampling period paddlefish tagging and harvest records were maintained. A paddlefish creel survey was conducted on a 28-mile stretch of the Missouri River. In addition, young-of-year paddlefish surveys (visual counts) were conducted in the headwaters of Fort Peck Reservoir. Overall harvest on this population has been reduced in recent years (regulation changes occurred in 2007, 2008, and proposed 2016) to offset a decade of severe drought, resulting in poor spawning conditions and recruitment. The average size of adult fish remains stable, and recruitment has been excellent in recent years due to high spring flows and elevated reservoir levels (2008 and 2011).

Standardized gill netting and beach seining surveys were conducted at Fresno, Nelson, Dry Fork, and Beaver Creek Reservoirs. Select ponds were sampled throughout Hill, Blaine, and Phillips 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. A year-round weekend creel survey was conducted at Fresno Reservoir. Results of all other sampling are presented.

OBJECTIVES AND DEGREE OF ATTAINMENT

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

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

Technical Guidance- To review projects by federal, state and local government agencies and private parties that have the potential to affect fisheries resources, and to provide technical advice or decisions to mitigate impacts on these resources. Provide landowners and other private parties with technical advice and information to sustain and enhance fisheries resources. Objective accomplished: (9) 310 and (23) 124 projects were reviewed along with one storm water pipeline review with local agencies; attended five walleye unlimited meetings and helped with four school programs and fishing events related to the "Hooked on Fishing" program.

Angler Education- To enhance the public's understanding, awareness and support of the state's fishery and aquatic resources and to assist young people to develop angling skills and to appreciate the aquatic environment. Objective accomplished through staff participation in the "Hooked on Fishing" programs with local grade school children, planning and conducting of fall and winter fishing trips with area grade school and junior high students. 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 Fort Peck stock was isolated from the Yellowstone-Sakakawea population upon closure of the Fort Peck Dam in June of 1937. Completion of the Fort Peck Dam isolated the Fort Peck stock, but it also created productive rearing habitat, resulting in increased abundance and size of paddlefish, and created a valuable recreational snag fishery in the Upper Missouri River.

The alteration of flows from upstream dams and low water levels on Fort Peck Reservoir are thought to be a reason for poor reproductive success of paddlefish from 1999-2007 (Leslie 2007). Reduced size of adults and fecundity of females in the Upper Missouri River have also been observed and documented (Leslie 2007). In addition, the popularity of the fishery has increased during this time period, bringing into question whether or not natural reproduction and recruitment is adequate for current harvest levels.

The current management strategy is to provide a stable recreational fishery while ensuring a sustainable population size and diverse age structure of the spawning stock exists. To meet this goal, regulations were changed during the 2007-snagging season. These regulations limited harvest to one paddlefish per person and required anglers to choose the area they wanted to fish (Missouri River above Fort Peck Reservoir; Fort Peck Dredge Cuts; lower Yellowstone River/Missouri River below Fort 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 implemented. Additionally, snagging was limited from 6 am to 9 pm to reduce potential illegal take of paddlefish, and make enforcement of the regulations more manageable.

Based on the results of the 2007 season, additional changes were made during the 2008 season. A harvest cap of 500 fish was established, a season was set (May 1st to June 15th), hook size restriction were set, mandatory catch and release and harvest days were eliminated, and immediate release was further defined for paddlefish. Since 2008 the harvest season (number of days to obtain 500 fish harvest cap) has continually decreased (i.e. in 2014 the harvest cap was obtained in four days). The harvest cap regulations have shifted pressure towards the opening weekend and anglers voiced frustrations towards the crowding of people at campsites/facilities and fishing areas. In 2016 the Fish, Wildlife, and Parks (FWP) commission passed new regulations that will implement a lottery draw for up to 750 harvest tags. All paddlefish harvested will also have to mandatorily reported via phone, email, or on-site. Anglers who don't draw a harvest will be able to snag and release.

Data Collection Methods

For more effective management of the Fort Peck stock, a thorough understanding of several key aspects of their life history is necessary. Data collected includes: population estimates, harvest rates, spawning periodicity, age-structure, reproductive success, and recruitment.

Baseline data on the paddlefish population above Fort 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 to collect information on movement patterns and identify spawning sites. To gather this information, sampling occurs in the Upper Missouri River during the spawning period 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 cubic feet per second (cfs). Adult paddlefish are collected using drifted floating gill nets measuring 150 ft long, 8ft deep, with 6 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.

An on-site roving creel survey is conducted on a 28 mile stretch of the Missouri River downstream of the Fred Robinson Bridge. This survey aids in assessing angler pressure, catch and harvest rates of paddlefish, ratio of tagged fish harvested, size, sex, and age of fish harvested. In addition, a phone creel survey has been conducted since 2003 to assess harvest outside of the creel area and as a check on the accuracy of the on-site creel survey.

Beginning in 1996, concern over low flows and recruitment prompted the establishment of visual count surveys in the headwaters of Fort Peck Reservoir as a means of producing an annual index of year-class strength and 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 (YOY, sub-adult, and adult).

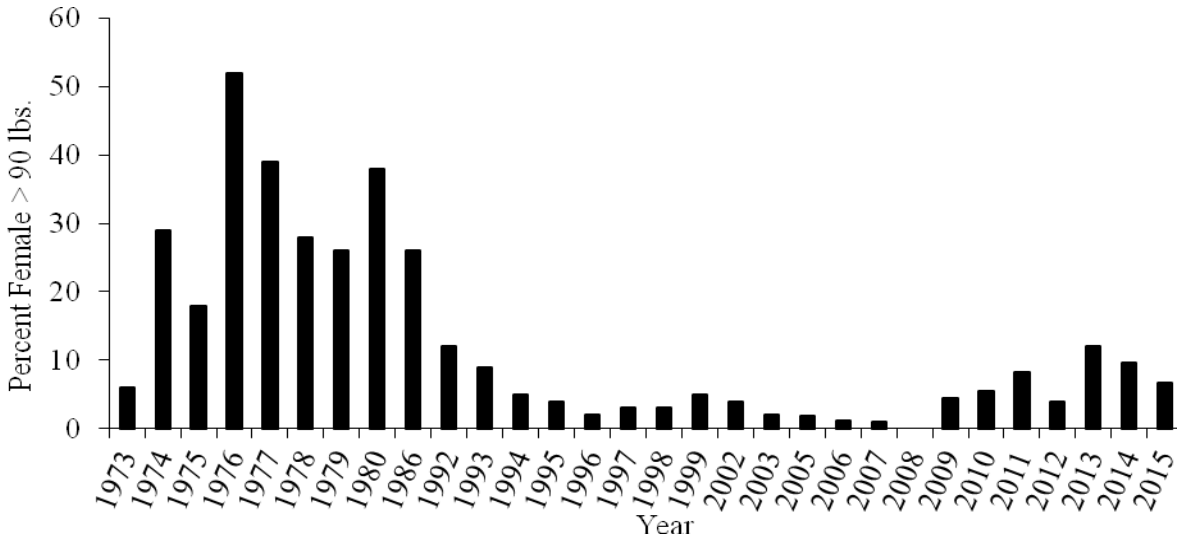
Adult Paddlefish Monitoring and Tagging

In 2015, paddlefish tagging started on April 21st and continued until May 21st, when crews tagged our 285th paddlefish. Since tagging was initiated in 1977, 7,796 paddlefish have been tagged and 889 tagged paddlefish have been recaptured during annual drift netting surveys. On average, approximately 11.4% of the paddlefish captured in our drift nets is comprised of recaptured fish. In 2015, 14.4% of the paddlefish observed during our netting efforts were recaptured fish. Based on the tagging and recapture data, the reproductive periodicity of male paddlefish is one to two years and for females every two to three years. Since 1973, FWP has monitored the number of female paddlefish weighing greater than 90 pounds captured during our tagging efforts (Figure 1). This data has confirmed a long standing hypothesis that as Fort Peck Reservoir aged, the productivity within the reservoir would gradually decrease, resulting in smaller female paddlefish with lower fecundity. However, our data has shown a positive response in paddlefish condition and weight when Fort Peck Reservoir fills after several years of low pool conditions (nutrient plume; Figure 1). In 2015, 6.7% of

all female paddlefish captured during our tagging efforts weighed more than 90 pounds (Figure 1). Females captured in 2015 averaged 70.2 pounds.

Since tagging was initiated in 1977, a total of 950-tagged paddlefish have been reported as harvested, which is about 12.2% of all tagged paddlefish. While paddlefish anglers are encouraged to report catches of tagged fish, reporting rates are low in years when on-site creel surveys are not conducted. In 2015, 28-tagged paddlefish were reported as harvested and 11-tagged paddlefish were reported as snagged and released, anglers harvested 5 paddlefish tagged in 2015.

Figure 1. Percent of female paddlefish captured during adult tagging efforts weighing more than 90 pounds from 1973-2015.



Preliminary Population Estimates

Estimates of population size of the recruited portion of the Fort Peck stock were developed from 1993 through 2015 based on mark recapture sampling associated with gill netting and tagging, conducted prior to and during the paddlefish snagging season. Point estimates and confidence intervals were developed using two approaches for estimate verification purposes: a modified Schnabel estimate and a modified Peterson estimate. Modifications, which allow for multiple years of marking and recapture data were necessary because only a fraction of the recruited paddlefish stock matures and migrates upstream in a any given year.

Population estimates were obtained using mark-recapture data and the Peterson-Lincoln estimator (or Peterson estimator). Four separate estimates were performed. Years with no reported harvest (1997, 1999, 2001, 2003, and 2004) and one year with limited tagging effort (i.e. 2008 with only 22 new fish being tagged) were excluded. In 2015, the four estimates suggest an adult population consisting of approximately 25,000 paddlefish (95% CI 18,000 – 48,000). Questions have been raised about the viability of these estimate models and more research is being conducted on a number of models/methods to estimate the population sizes of all stocks in the future.

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 Fort Peck stock by monitoring flows (Table 1) and movement patterns, and comparing those to year class strength through aging and YOY sampling. Our data suggests the closer flows resemble those postulated by Berg, the more likely we are to observe higher densities of YOY paddlefish during our visual counts. However, when flows are marginal to poor, our data suggests paddlefish in the Upper Missouri are still reproducing, though the year-class is small when compared to high flow years.

During the 1980s and 90s, 12 of the 20 years met the requirements necessary for successful migration and spawning (Figure 2 and 3). From 2000-2007, flows did not meet the minimum flow and duration requirements (Figure 4). However, since 2008, paddlefish jaws aged from harvested fish contained age classes produced from these "poor" flow years. Flow requirements were met from 2008-2011 (Figure 4; Table 1). The historic spring flows experienced in 2011 on the Upper Missouri River were the fifth highest ever recorded at the USGS Landusky gauging station (peak flow > 72,000 cfs; Figure 4).

In 2015, warm winter temperatures and less than ideal snowpack created very marginal spawning conditions for paddlefish. The Missouri River at the Fred Robinson Bridge was free of ice cover by the second week of March. Flows remained low through mid May (flows < 8,000 cfs) and peaked at approximately 17,000 cfs on June 8th. Flows then quickly receded and fell below 8,000 cfs on June 20th. Peak flows met and exceeded trigger flows (14,000 cfs; Berg 1981) for approximately 9 days, 36 days less than the average of 45 consecutive days (USGS 2016).

Hydrograph information (Figure 2, 3, and 4) suggests that good spawning conditions vary among years (Table 1). Poor recruitment due to low river flows and reduced water levels on Fort Peck Reservoir from 2000-2007 has been identified by YOY visual counts, which have been conducted annually since 1997 (Kozfkay & Scarnecchia 2002; Bowersox 2004; Miller 2005; Miller & Scarnecchia 2006). Effort has varied among years due to scheduling conflicts, limited personnel, and pit tagging efforts. Good recruitment of YOY paddlefish was observed in 1997, 1998, 2008, and 2011; when flows exceeded the historical hydrograph and Fort Peck Reservoir levels were high.

In 2015, no YOY or sub-adult paddlefish were observed during the fixed transects between RM 1866.5 and 1881.5 (Table 2). In addition to the standardized counts, we applied a total of 18 hours of random search effort in August (4th, 11th, and 17th) to identify habitats containing YOY paddlefish not sampled during the transect counts (Table 3). These random searches were conducted near the river/reservoir interface and outside of the standard transect area (RM 1865- 1885). Random counts yielded a total of 1 YOY, 19 sub-adult, and 42 adult paddlefish being observed (Table 3).

Table 1. Paddlefish spawning success ratings for the years 1974-2015 using trigger flow (> 14,000 cfs) incidence and duration as the sole criteria. Good rating is defined as trigger flow being met and

exceeded for a minimum 30 consecutive days, marginal rating is trigger flow was met but didn't exceed 30 days, and poor rating is flow did not meet trigger flow requirement.

	Paddlefish Spawning Rating		
Year	Good	Marginal (#days> TF)	Poor
1974	X		
1975	X		
1976	X		
1977			X
1978	X		
1979		X (20)	
1980	X		
1981	X		
1982	X		
1983		X (29)	
1984	X		
1985			X
1986		X (19)	
1987			X
1988			X
1989		X (05)	
1990		X (03)	
1991	X		
1992			X
1993	X		
1994		X (06)	
1995	X		
1996	X		
1997	X		
1998		X (25)	
1999		X (13)	
2000			X
2001			X
2002		X (16)	
2003		X (05)	
2004			X
2005		X (05)	
2006		X (09)	
2007			X
2008	X		
2009	X		
2010	X		
2011	X		
2012		X (15)	
2013		X (15)	
2014	X		
2015		X (09)	

[1]Flows measured at the Landusky Measuring Station

Figure 2. - Historical and observed Missouri River hydrograph at the USGS Landusky, MT gauging station 1980-1989.

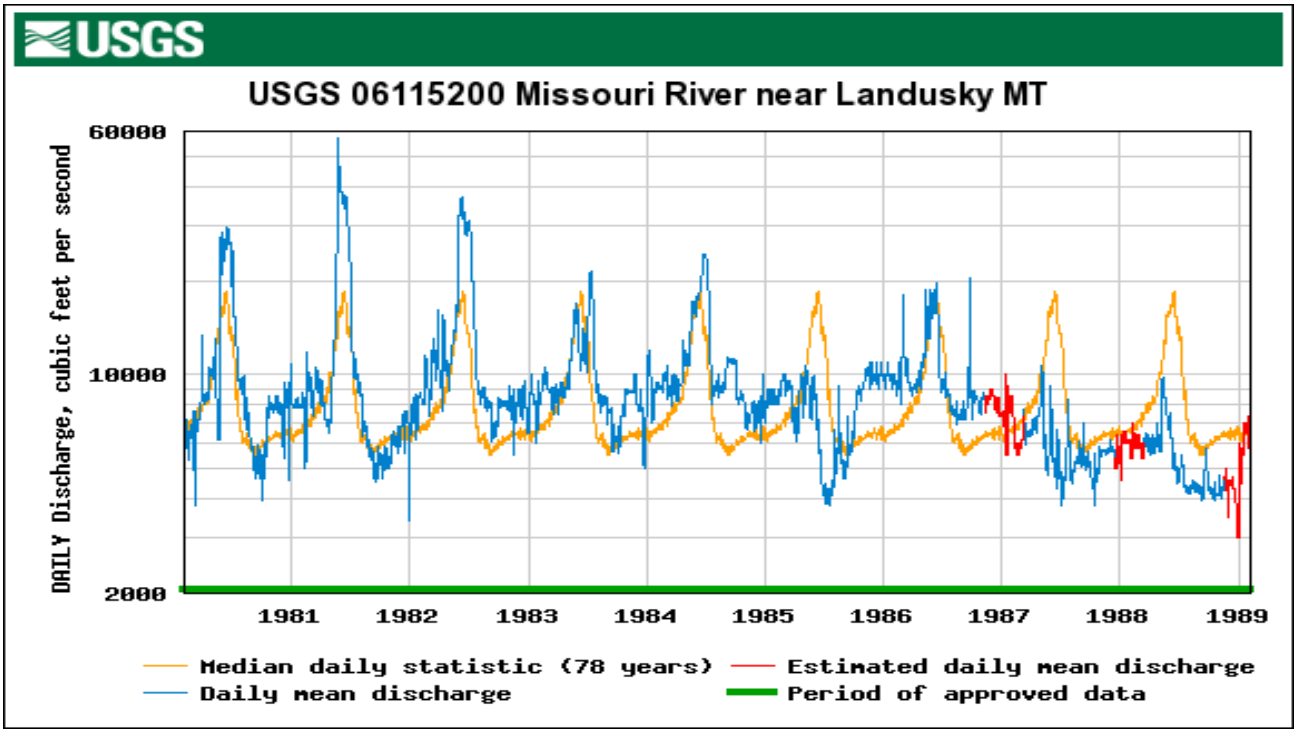


Figure 3. - Historical and observed Missouri River hydrograph at the USGS Landusky, MT gauging station 1990-1999.

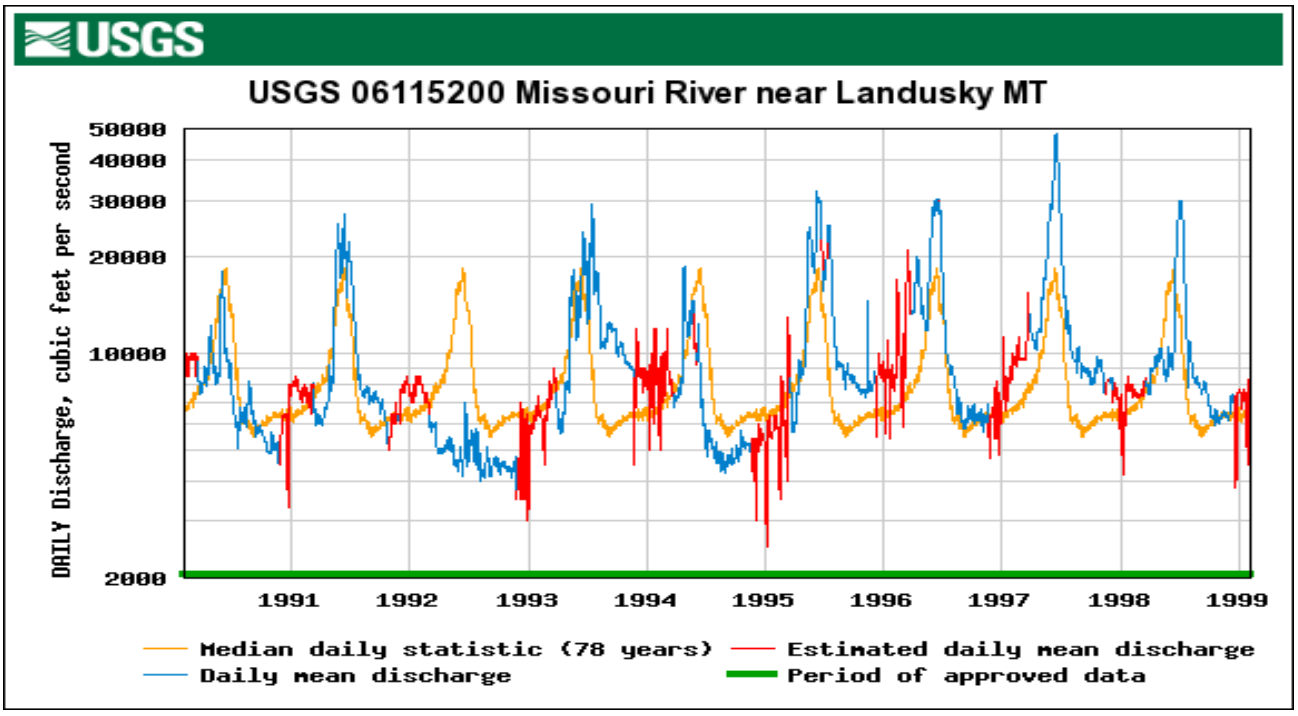


Figure 4. - Historical and observed Missouri River hydrograph at the USGS Landusky, MT gauging station 2000-2015.

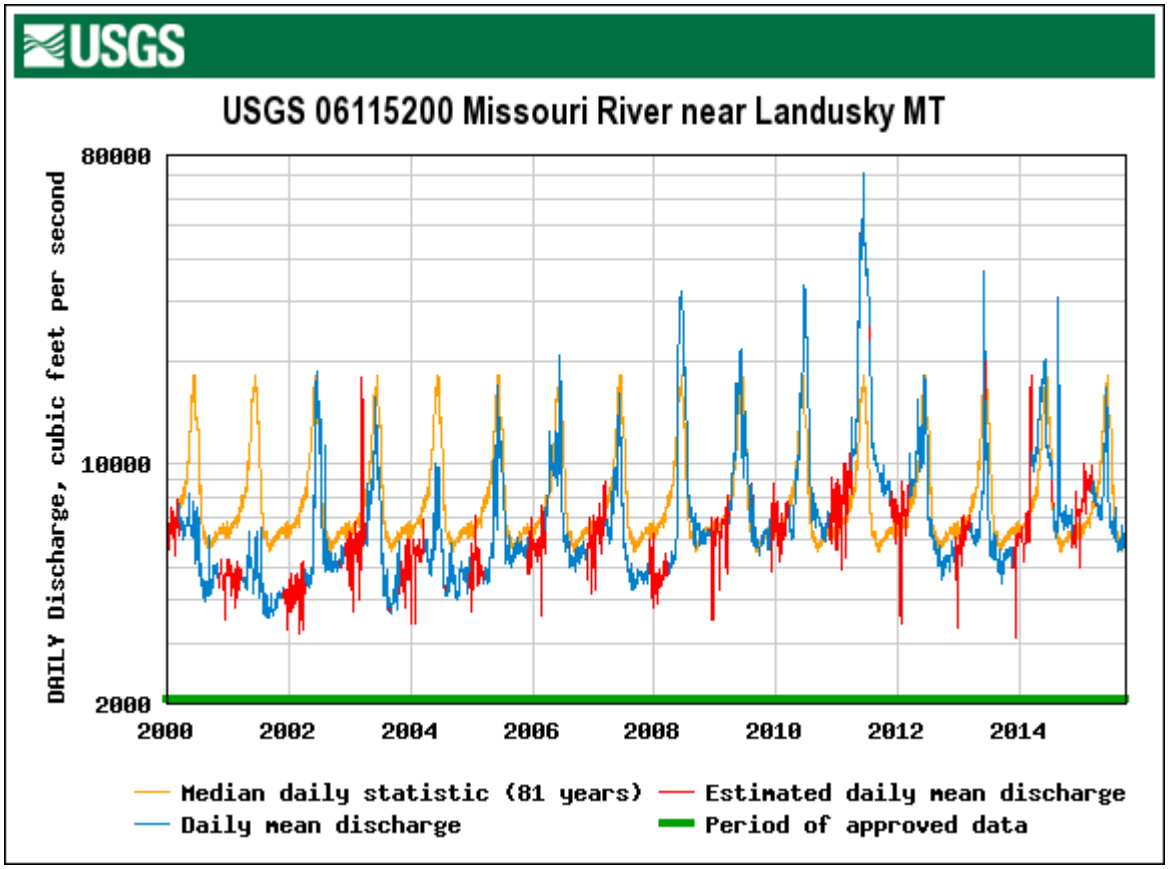


Table 2. - Results of standardized YOY paddlefish visual count surveys conducted in the headwaters of Fort Peck Reservoir from 1997 to 2015.

Year	Transect Dates	# Stations	Station Locations (RM)	# Transects	# YOY	# Sub-Adults	Reservoir Elevation (August)	Collector
1997				69	113	3	2248'	
1998	7/27 to 9/23	8	1888 to 1866	216	97	54	2239'	Kozfkay
1999	8/25 to 9/20	8	1888 to 1866	174	3	10	2236'	Kozfkay
2000				90	0	11	2230'	
2001				90	1	0	2221'	
2002			1862 to 1856 ?				2219'	Bowersox
2003			1862 to 1856 ?	54	2	4	2211'	Bowersox
2004			1853 to 1838	54	0	3	2201'	
2005	8/8 & 8/16	6	1853 to 1838	36	1	0	2202'	Miller
2006	7/24 & 7/30	6	1853 to 1838	36	2	1	2204'	Miller
2007	7/31 & 8/6	6	1854 to 1838	6	0	2	2201'	Miller
2008	8/6 & 8/12	6	1844 to 1858	12	4	3	2209'	Miller
2009	8/11 & 8/17	6	1843 to 1858	12	0	0	2220'	Miller
2010	7/27 & 8/3	6	1863.5 to 1878.5	12	0	0	2236'	Miller
2011	7/28 to 9/1	6	1866.5 to 1881.5	30	61	3	2242'	Hemingway
2012	7/30 & 8/9	6	1863.5 to 1878.5	12	1	3	2234'	Hemingway
2013	8/5 & 8/14	6	1855.5 to 1870.5	12	0	14	2226'	Hemingway
2014	7/28, 8/4, & 8/17	6	1859.5 to 1874.4	18	0	0	2230'	Hemingway
2015	8/3, 8/10, & 8/18	6	1866.5 to 1881.5	18	0	0	2236'	Hemingway

Table 3. - Results of random YOY paddlefish visual count surveys conducted in the headwaters of Fort Peck Reservoir from 2008 to 2015.

Year	Transect Dates	Effort (Hours)	Station Locations (RM)	# YOY	# Sub-Adults	# Adults	Collector
2008	8/6-8/13	24	1859-1861	42	0	--	Miller
2009	8/11-8/17	12	1857-1862	2	3	--	Miller
2010	7/26-9/27	75	1874.5-1884	0	26	--	Miller
2011	7/25-8/8	27	1875-1888	205	2	13	Hemingway
2012	7/31/, 8/9-8/10	14	1869.5-1884.7	1	16	75	Hemingway
2013	8/ (6-7) (14-16) (21-22)	28	1859.5-1886	2	85*	196	Hemingway
2014	7/(29-30), 8/(5-6) (18-19)	27.25	1859-1887	0	7*	54	Hemingway
2015	8/4, 8/11, & 8/17	18	1865-1885	1	19*	42	Hemingway

-- No data collected for observed period of record

* Majority of these fish were classified as sub-adults and most likely age-2 or 3 fish

Harvest: Paddlefish Creel Survey 2015

Methods

A five-year native species creel survey was conducted by FWP Region 6 personnel from 2005-2009 to better understand catch and harvest rates, age structure of harvested fish, angler pressure, and angler demographics from the Fred Robinson Bridge to Peggy's Bottom (Figure 5). Since 2010 the creel has been conducted annually by vehicle and boat from May 1st to June 15th from the Fred Robinson Bridge to Peggy's Bottom and focuses solely on paddlefish and paddlefish anglers.

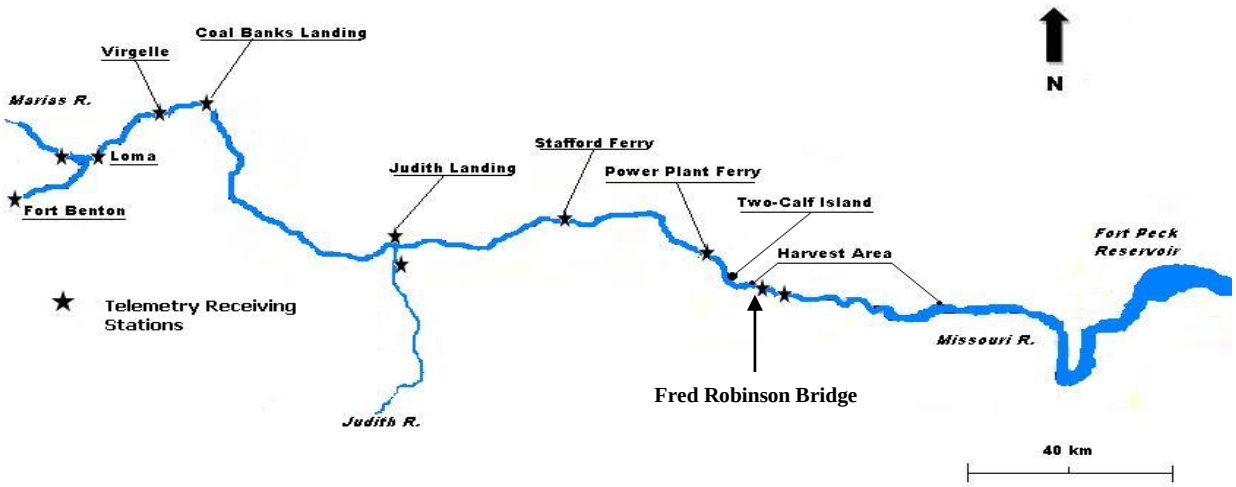
Schedule

A roving creel survey was conducted from May 1st through June 15th from the Fred Robinson Bridge to Peggy's Bottom. Two creel clerks were used to conduct all interviews and pressure counts. Schedules were divided to cover the entire week with overlapping schedules occurring on the weekends when fishing pressure increased.

Effort

Instantaneous pressure counts were performed once a day by vehicle or boat. Starting times were randomly chosen from the fishing day (7:00 to 19:00) to estimate angling pressure from river mile (RM) 1897-1921.

Figure 5. Map of the creel area including locations of fixed telemetry receiving stations in the Upper Missouri River above Fort Peck Reservoir. Harvest area encompasses RM 1897-1921.



Harvest and Catch

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

During interviews one randomly selected angler per party, who was actively fishing, was interviewed. The 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 paddlefish were caught, released/harvested and if any of these fish had jaw tags. If a jaw tag was reported, the type, color, and number on the tag were recorded. When tagged paddlefish were reported, 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, eye-fork (body) length measurements and weight were collected from harvested paddlefish. Jaws were also collected for aging purposes (with anglers consent). These samples were then sent to the University of Idaho for analysis.

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 into two periods (May and June) and by boat or shore fishing. Effort was not broken down by fishing method or by species because all anglers creeled were snagging and targeting paddlefish.

Results

In 2015, a total of 383 parties representing 8 states and 26 of the 56 Montana counties were interviewed from May 1st to June 15th. The highest percentage of anglers in Montana came from

Yellowstone (24.8%), Fergus (12.9%), and Cascade (10.9%), counties. The average party consisted of 4.26 anglers (range= 1 to 25 anglers), 81% of which were male. The average length of stay was 2.5 days/trip (range = 1 to 13 days).

Effort

In 2015, estimated paddlefish snagging effort during May and June totaled 2,834 angler days (Table 4), totaling 16,337 angler hours (Table 5). In 2015, 73% of the angling effort (hours) occurred from shore and 91% of the angling effort occurred in May, which coincides with the peak of the paddlefish spawning migration.

Harvest Statistics- Paddlefish

In 2015, a total of 1,643 paddlefish were caught and reported to creel clerks, 430 of the reported fish were harvested (26.2%). The combined (shore and boat) catch rate was 0.46 paddlefish/day.

In 2015, harvested paddlefish ranged in length from 30.0 to 55.5 inches (eye-fork length) and weight from 16 to 119 pounds (Table 6 and Figure 7). Fifty-six percent of the harvested paddlefish sexed were females and 28/430 (6.5 %) of the harvested paddlefish and 11/1352 (0.8 %) of the released paddlefish creeled had jaw tags. Harvested paddlefish ranged in age from 8 to 59 years with 26% of the harvested females (age 25-45) being classified as "prime spawners" and 4% of the harvested fish classified as new recruits (Figure 6).

Table 4. - Estimated snagging effort (angler-days) by month and angler type for the Upper Missouri River (RM 1897 to 1921), May-June 2015.

	Shore	Boat	Overall
May	2,214.50	553.0	2,767.50
June	46.40	20.60	67.00
Overall	2,260.90	573.6	2,834.50

Table 5. - Estimated snagging effort (angler-hours) and standard error (SE) by month and angler type for the Upper Missouri River (RM 1897 to 1921), May-June 2015.

	Shore	SE	Boat	SE	Overall	SE
May	10,623.50	3,920.00	4,238.70	2,561.7	14,862.20	4,684.71
June	1,300.00	267.22	175.00	175.00	1,475.00	319.42
Overall	11,923.50		4,413.70		16,337.20	

Figure 6. Age structure of harvested male and female paddlefish collected in the Upper Missouri River (RM 1897-1921) during the 2015 paddlefish creel survey.

Figure 7. Frequency histogram for male and female paddlefish age (2015 Fort Peck data).

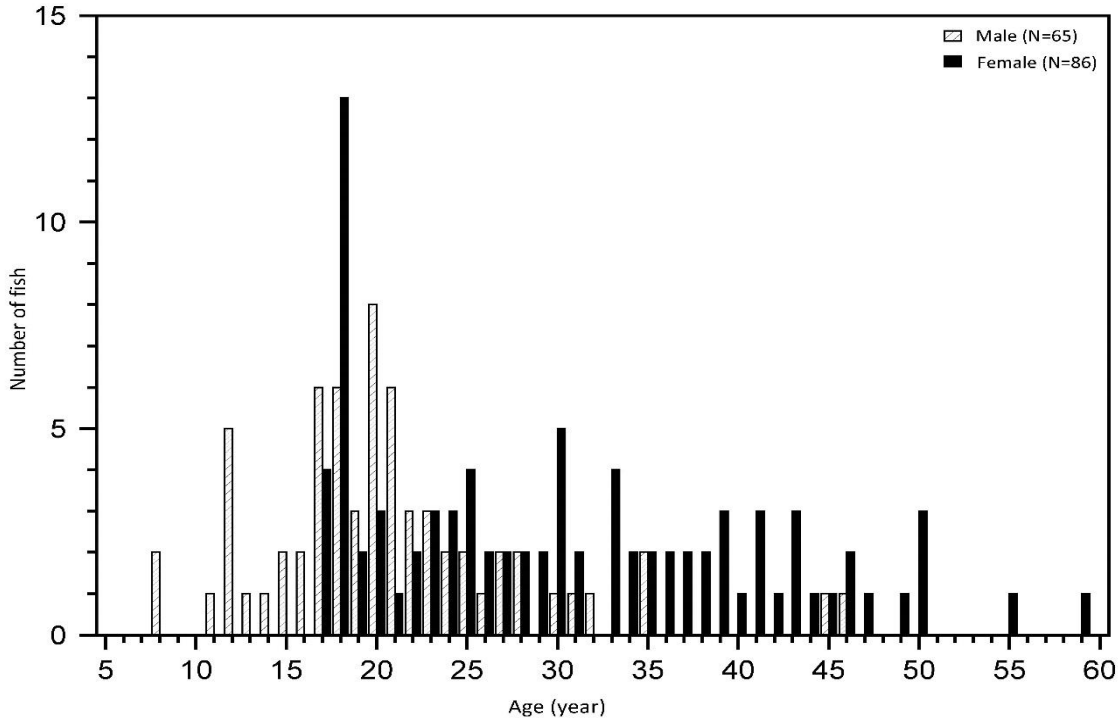


Figure 7. Size structure (weight (kg)) of harvested male and female paddlefish collected in the Upper Missouri River (RM 1897-1921) during the 2015 paddlefish creel survey.

Figure 9. Frequency histogram for male and female paddlefish weight (2015 Fort Peck data).

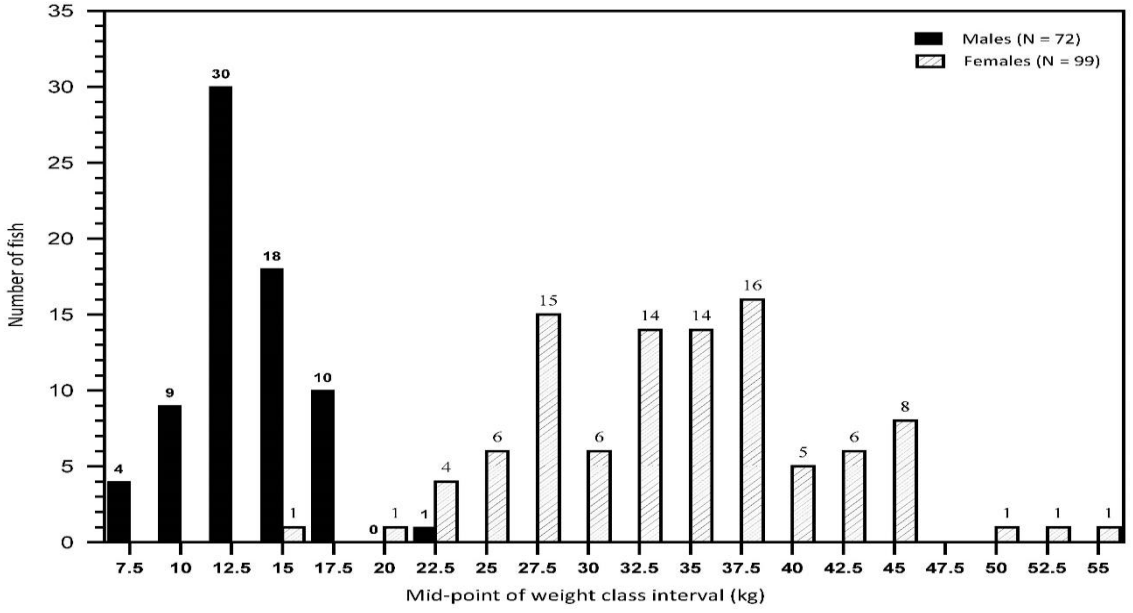


Table 6. – Length, weight, and condition indices of harvested paddlefish from anglers creeled in the Upper Missouri River (RM 1897-1921), May-June 2005-2015.

Species	Year	Sample Size	Length Range (in.)	Length Avg.	Length SD	Weight Range (lbs.)	Weight Avg.	Weight SD
PF	2005	241	33.3-60.5	41.7	1.2	12.0-90.0	40.3	47.6
PF	2006	259	28.1-65.0	42.7	1.3	15.1-112.0	47.0	36.5
PF	2007	179	27.0-72.0	42.3	1.1	24.5-69.0	47.7	97.3
PF	2008	322	26.0-56.8	41.0	5.7	13.0-104.0	43.5	20.8
PF	2009	249	24.0-54	41.7	5.9	16.0-100	47.6	21.2
PF	2010	300	28.0-60.0	42.0	5.5	16.0-115	49.4	21.8
PF	2011	484	32.0-57.0	42.7	5.3	19.0-127.0	50.5	21.4
PF	2012	408	30.0-54.1	42.5	5.2	20.0-119.1	48.8	21.9
PF	2013	255	31.5-54.1	44.0	5.9	20.0-131.1	54.7	22.7
PF	2014	203	23.5-56.5	41.8	4.8	21.0-127.0	46.9	20.2
PF	2015	171	30.0-55.5	44.5	6.0	16.0-119.0	55.6	25.1

Paddlefish Phone Creel (2003-2015)

Vic Riggs and Larry Brooks with the University of North Dakota (Riggs 2005) designed and conducted the paddlefish phone creel survey annually from 2003 to 2005. This survey was continued solely by FWP in 2006. The survey was originally conducted to: (1) determine the harvest of paddlefish at sites other than the Intake Fishing Access Site, (2) check on the accuracy of the Intake creel survey, (3) possibly replace the Intake creel survey, (4) obtain harvest statistics for the Fort Peck population and (5) assess angler support for changes to regulations.

Phone creel statistics have been obtained for the Fort Peck population since 2003 (Table 7). On average approximately 2,381 angler's snag for paddlefish above Fort Peck Reservoir annually, representing approximately 5,401 fishing days. On average approximately 1,633 paddlefish are caught annually above Fort Peck Reservoir with approximately 62% of the paddlefish being released (Table 7).

In 2012, we asked the anglers being phone creeled to answer additional questions relating to a possible lottery tag or mandatory report system being implemented on the Upper Missouri paddlefish season. The same questions were asked again during the 2014 phone survey. Anglers surveyed in 2014 weren't as satisfied (68.7%) with the current paddlefish season structure as they were in 2012 (79.7%). When asked about their recent experience on the river during the paddlefish season 43.4% (67.2% in 2012) said it was a great experience while 61.4% (55.2% in 2012) said their experience was affected by overcrowding or the harvest season closed to early. In 2014, 78.8 % (84.9% in 2012) of the anglers surveyed liked the option to catch and release paddlefish and 83.9% (81.9% in 2012) said they would support mandatory reporting of harvested fish. When asked if they would be in favor of a lottery type draw for paddlefish 38.1% (33.6% in 2012) said yes. When asked if they would still purchase a license to catch and release if they did not draw a harvest tag, 45.8% (64.2%) said yes. When anglers were asked to provide additional comments, the most common responses related to: catch and release fishing, season closes too soon, and increasing the harvest cap.

The additional survey questions asked in 2012 and 2014 aided in FWP's decision to change the regulations to a lottery draw for harvest tags (750 allocated) and mandatory reporting requirements for harvested paddlefish.

Table 7. –Summary of estimates for the Fort Peck paddlefish population from the Montana paddlefish telephone creel survey (2003-2015).

Missouri River Above Fort Peck

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Number of Tags Sold	2,545	2,473	2,329	2,605	2,481	2,284	2,118	2,366	2,460	2,439	2,356	2,087	2,410
Number of Anglers	1,902	2,859	2,705	2,476	--	1,816	1,579	1,729	1,901	1,910	1,911	1,599	2,082
Total Days Fished*	5,757	9,172	8,385	7,565	-	4,426	2,748	5,789	4,816	3,671	4,716	2,924	4,838
Total Hours Fished*	27,433	44,400	42,277	39,800	-	-	-	-	-	-	-	-	-
Number Caught	1,583	1,102	1,516	2,290	-	845	2,342	1,851	1,411	1,460	1,345	2,048	1,802
Number Harvested	868	787	1,028	1,067	634	300	564	575	598	381	292	307	334
Catch Rate (fish/day)	0.151	0.086	0.123	0.141	-	0.068	0.205	0.173	0.096	0.104	0.062	0.47	0.069
Harvest Rate (fish/hour)	0.032	0.018	0.024	0.027	-	-	-	-	-	-	-	-	-
Percent Released	45.17%	28.58%	32.19%	53.42%	-	64.50%	75.90%	68.90%	57.62%	73.90%	78.30%	85.00%	81.50%
Percent Contacted by FWP Creel Clerk						85.71%	62.14%	38.61%	60.00%	78.00%	76.00%	78.80%	83.60%

* Includes hours spent catch and release fishing

Discussion

Recruitment and growth is highly variable among years for this population (Table 2). Annual Fort Peck Reservoir pool elevations and flows in the Missouri River appear to influence the reproductive success, recruitment, and adult growth. Flows in the Missouri River from 1998-2007 were not consistently high enough to produce large year-classes of paddlefish due to prolonged drought conditions (Leslie 2005, 2006). In addition, the average size of adults has decreased over the last 30 years (Bowersox 2004). These declines, especially in growth, were believed to be the result of decreased productivity due to the aging of Fort Peck Reservoir (nursery grounds for paddlefish) and extremely low Fort Peck Reservoir levels from 1999-2007. However, since 2008 flows in the Missouri River have closely mimicked the historical hydrograph and in 2011 the fifth highest flow ever recorded at the Landusky gauge (77 years) was documented. In addition, Fort Peck Reservoir water levels increased in 2008, 2009, 2010, and in 2011 the spillway was running water for the first time since 1997. Successful paddlefish reproduction is evident based on YOY transect data, and adult fish captured during spring tagging efforts are in very good condition.

Upper Missouri River flows in 2015 were below average from March-late May, with a slight increase of flows for a short duration, suggesting marginal spawning conditions for adult paddlefish. YOY transects confirmed marginal spawning success when one YOY paddlefish was observed during our summer visual counts (Table 2 and Table 3). Recent drought conditions and altered reservoir water management along the Missouri River basin have increased the annual variability in pool elevations on Fort Peck. If these conditions persist for an extended period of time, zooplankton production will be reduced and could potentially impact adult condition and recruitment of YOY paddlefish into the existing population.

The combination of prolonged drought conditions affecting the low number of successful spawning years (based on observed trigger flow occurrence and duration; Table 1) and decreased size of adults has been noted and will continue to be monitored (Figure 1). It would be prudent to consider the effects of reduced recruitment and reduced fecundity of the adult population. However, the presence of paddlefish ranging in age from 8-13 that are showing up in the angler harvest, questions the specific flow requirements (velocity, duration, and timing) postulated by Berg (1981). These year-classes were produced under extreme drought conditions and minimal flows. Though they are showing up in the creel in small densities, their presence suggests spawning conditions are favorable to produce year-classes regardless of flows. Currently, YOY visual counts are the best sampling technique to confirm spawning success and have aided in identifying good year-classes (1997, 1998, 2008, and 2011) and year-classes produced under marginal or poor conditions (Table 2).

Anglers are allowed to immediately release a snagged paddlefish if they desire. Based on analysis of the fishery and public support, the fishing limit was reduced in 2007 from two paddlefish to one paddlefish annually. In 2008, the paddlefish season was reduced from a 365-day season to a 46-day season (May 1 to June 15), making monitoring total catch more feasible. Furthermore, an annual harvest cap of 500 paddlefish has been implemented since 2008. These regulation changes have resulted in a shorter season and fewer paddlefish being harvested annually (Table 10). Estimated harvest by our current creel census program is highly variable when compared to the number of paddlefish being reported to our on-site creel clerks (Table 10). However, this variability has decreased since the harvest cap was implemented in 2008.

In 2015 the FWP Commission passed regulations that will change the paddlefish season structure on the Upper Missouri River. With the aid of special creel surveys conducted in 2012 and 2014, on-site observations, on-site paddlefish creel survey, as well as face to face interactions with anglers during the paddlefish season, FWP concluded a change needed to occur to the season structure of this fishery. The harvest season was continually becoming shorter, complaints of over-crowding, not having time to attempt to harvest, and the aesthetic atmosphere associated with this season (from an anglers perspective) was reduced. The season will still run from May1-June 15, however only 750 harvest tags will be available (through a lottery draw) and all harvested paddlefish will now be mandatorily reported within 48-hours of harvest.

The Upper Missouri River paddlefish population continues to function as a self-sustaining fishery. The adult population continues to naturally reproduce and FWP has implemented regulations that reduce the likelihood of overharvest to occur.

Table 8. Summary of data collected during the on-site creel outlining season duration, closure, catch and release days, number reported as caught, number reported as harvested, sex, estimated harvest from creel census, estimated harvest from phone creel, and the three average of estimated harvest by our creel census from 2005-2015.

Year	Season Dates	Tags Sold	Harvest Closure (Date)	# of Catch and Release Days after Harvest Closure	# Reported as Caught to Creel Clerks	# Reported as Harvested to Creel Clerks	Reported Males Harvested	Reported Females Harvested	Phone Creel Est. Harvest	On-site Creel Est. Harvest	3-Year Avg. Est. Harvest (On-Site Creel)
2005	4/1-6/14[-]	2,329	None	--	995	787	152 (64%)	85 (36%)	1,028	576	--
2006	4/1-6/19[-]	2,605	None	--	989	382	160 (61%)	101 (39%)	1,067	1,289	--
2007	4/1-6/19[+]	2,481	None	--	400	249	120 (50%)	121 (50%)	634	477	781
2008	5/1-6/15*	2,284	None	--	421	322	172 (58%)	127 (42%)	300	355	707
2009	5/1-6/15*	2,118	5/22	24	881	249	124 (53%)	112 (47%)	564	594	475
2010	5/1-6/15*	2,366	5/16	30	974	301	140 (55%)	116 (45%)	575	607	519
2011	5/1-6/15*	2,460	5/14	32	854	484	191 (45%)	230 (55%)	598	608	603
2012	5/1-6/15*	2,439	5/10	36	662	403	164 (58%)	119 (42%)	381	475	563
2013	5/1-6/15*	2,356	5/11	35	855	354	100 (41%)	147 (59%)	292	642	575
2014	5/1-6/15*	2,087	5/4	41	1,837	402	170 (65%)	93 (35%)	307	561	559
2015	5/1-6/15*	2,410	5/19	27	1,643	430	92 (44%)	116 (56%)	334	516	573

+ Season open year-round with mandatory harvest on Friday, Saturday, Tuesday, and Wednesday and mandatory catch and release on Sunday, Monday, and Thursday. Creel ran from 4/1-6/19.

- Season open year-round with anglers allowed to harvest two paddlefish.

* Season open from May 1-June 15 with a 500 fish harvest cap.

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 covers approximately 70 surface-acres and has a maximum depth of 28 feet. This reservoir was open to public access by the landowners for over 30 years. In 2012, with the help of Montana Walleyes Unlimited, FWP was able to acquire approximately 108 acres surrounding the reservoir for development of a Fishing Access Site. Initial improvements included: maintenance to access road, improvements to existing fishing pier and shelter, new latrine and concrete boat ramp, designated parking areas, fire rings, and signage. The Fresno Chapter of Walleye Unlimited has donated an additional fishing pier as well.

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. 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. The last rainbow trout stocking occurred in 2005 when 10,000 four-inch rainbow trout were stocked in late fall. Since 2005 Bailey Reservoir has received alternate year stocking of 10,000 walleye fingerlings and several supplemental stocking of pre-spawn adult yellow perch from the Kremlin Water Ponds.

Adult sport fish populations have been monitored since 1990 with two experimental gill net sets. In addition, trap netting and seining occurs periodically. In addition, a voluntary creel box was erected in the summer of 2005 and maintained through 2015 to determine angler use, catch, and satisfaction. Bailey ranked 19th in the region for angler pressure in 2013/2014 (1,572 +/- 680 angler days; MTFWP Fisheries Bureau 2014).

Netting surveys suggest the population of walleye, northern pike, black crappie, and yellow perch are decreasing (Table 9 and Figure 8). From 1990-2002 Bailey Reservoir supported one of the best yellow perch and black crappie fisheries on the Hi-Line (Table 9), Extensive removal of spawning adult yellow perch and black crappie (from 1999-2007) combined with low reservoir levels, high northern pike densities, and less than ideal spawning conditions could be the most likely explanation for low population densities during that time period. Netting conducted in 2015 suggested declines in relative abundance of all sport fishes, with the exception of black crappie. It was the lowest catch observed in five years, yet angler reports from our self-creel cards suggested good catch rates for northern pike, black crappie, and yellow perch throughout the year. Seining surveys conducted in 2015 also suggest a good year-class of yellow perch and black crappie were produced (Table 10).

Table 9. - Catch rate (CPUE (fish/net)), average length (TL, in.), and average weight (lb.) of northern pike, yellow perch, black crappie, rainbow trout, walleye, and white sucker in Bailey Reservoir, 1985-2015.

		Northern pike			Yellow Perch			Black Crappie			Rainbow Trout			Walleye			White Sucker		
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.)	CPUE (#/net)	Len Avg (in.)	Wt Avg (lbs.)
1985	1	17	21.44	1.13	0	--	--	0	--	--	1	12.2	0.9	--	--	--	0	--	--
1990	3	8	18.1	1.23	11.33	7.7	0.26	7	5.7	0.1	0	--	--	--	--	--	0	--	--
1991	2	3.5	24.7	3.21	29	10.1	0.56	2	8.5	0.35	0	--	--	--	--	--	0	--	--
1992	2	3	26.8	4.29	17	8.1	0.29	8	4.7	0.08	0	--	--	--	--	--	0	--	--
1993	2	1	31.8	7.55	10.5	6.6	0.15	63.5	6.7	0.12	0	--	--	--	--	--	0	--	--
1994	2	3.5	20.1	2.59	19	6	0.1	21.5	6.3	0.14	0	--	--	--	--	--	0	--	--
1995										No Netting Conducted									
1996	2	7	23.8	3.54	43	7.2	0.19	7.5	6.8	0.21	0	--	--	--	--	--	0	--	--
1997										No Netting Conducted									
1998	2	1.5	22.2	2.43	66	8	0.26	16	9	0.44	0	--	--	--	--	--	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	1	17.9	2.41
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	--	--	--	--	--	0	--	--
2006	2	16	17.23	1.2	3.5	7.29	0.28	0	--	--	0	--	--	6.5	9.54	0.31	0	--	--
2007	2	5.5	20.8	2.05	0.5	11.3	0.9	0	--	--	0	--	--	3	12.5	0.65	0	--	--
2008										No Netting Conducted									
2009	2	2	20.6	1.97	1	13	1.38	0	--	--	0	--	--	2	18.2	2.28	1	19	3.07
2010	2	0	--	--	0	--	--	0	--	--	0	--	--	0.5	19	2.22	0	--	--
2011	2	2	19.4	1.67	0.5	7.5	0.22	0	--	--	0	--	--	1.5	20.1	2.84	0	--	--
2012	2	3.5	19.5	1.58	7	7.5	0.26	0	--	--	0	--	--	0.5	22	4.16	0	--	--
2013	2	4	19.25	1.78	24	7.78	0.27	0	--	--	0	--	--	2	15.93	1.88	0	--	--
2014	2	0	--	--	1	9.25	0.42	0.5	6.3	0.16	0	--	--	1.5	12.27	0.67	0	--	--
2015	2	0	--	--	0	--	--	0.5	7.9	0.31	0	--	--	0	--	--	0	--	--

Figure 8. Summary of relative abundance for yellow perch, black crappie, northern pike, fathead minnow, walleye, and rainbow trout captured by trap nets in Bailey Reservoir, 1981-2015.

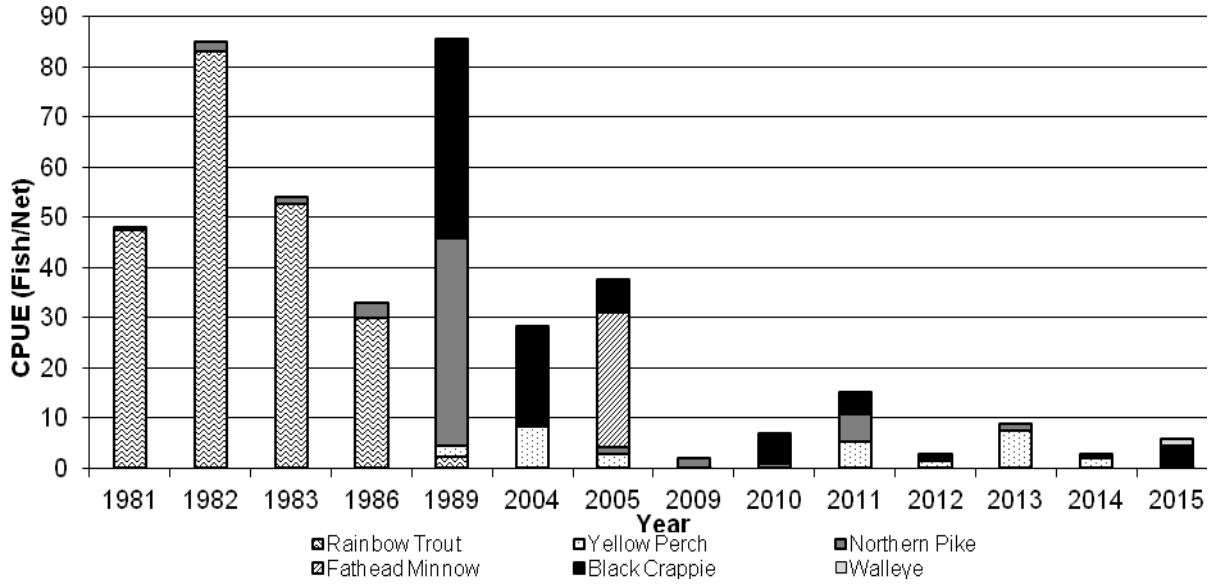


Table 10. Summary of young of year yellow perch (YP), black crappie (BLC), northern pike (NP), fathead minnow (FH MN), largemouth bass (LMB), walleye (WE), and rainbow trout (RB) captured by beach seining in Bailey Reservoir, 1982 to 2015.

Date	Year	Sites	YP (yoy)	YP (adult)	NP (yoy)	NP (adult)	WE (yoy)	WE (adult)	BLC (yoy)	BLC (adult)	RB	LMB	FH MN
9/6/1982	1982	3	--	--	--	--	--	--	--	--	3	--	--
8/6/1986	1986	5	--	--	46		--	--	--	--	66	4	45
8/4/1987	1987	4	--	1	--	44	--	--	76	--	25	--	356
8/11/1988	1988	3	38	--	--	2	--	--	12	2	--	24	24
8/7/1990	1990	4	--	1	1	--	--	--	309	21	--	--	--
9/26/1991	1991	5	68	--	--	--	--	--	--	--	--	9	--
9/10/1993	1993	5	1	70	--	--	--	--	60	--	--	--	--
7/27/1996	1996	4	--	1	1	--	--	--	5	--	--	40	--
7/29/2015	2015	4	809	--	2	1	--	--	39	--	--	--	--

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 for a variety of species. Beaver Creek Reservoir ranked 8th in the region for angler pressure in 2013/2014 (4,772 +/- 1,309 angler days; MTFWP Fisheries Bureau 2014).

This reservoir was established as a rainbow trout fishery in 1975. However, the illegal introduction of northern pike (1980s) and yellow perch (1980s) resulted in variable rainbow trout stocking 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.

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 was 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, many anglers have expressed their frustration with this regulation since. In 2016 the trout daily limit will increase from 3/day to 5/day and 10 in possession.

Population Status of Adult and Young-of-Year Fishes

Water levels in September were down approximately 12 feet during our sampling effort due to problems with the dam's outlet infrastructure. Gill netting was conducted over night with three sinking and three floating experimental gill nets. The sinking and floating experimental gill nets were 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 75'- x 9' x ¼" square mesh beach seine. The fish were sorted by species and counted.

Northern pike

Since their illegal introduction in the 1980s, northern pike abundance has remained stable within Beaver Creek Reservoir (Table 11). Northern pike populations are cyclical within Beaver Creek Reservoir due to water operations and variable spring water conditions. Good northern pike

reproduction was documented in 2009, 2012, 2014, and 2015 (Table 10). However, extremely high reservoir pool elevations in 2011 and 2013, resulting in both the overflow and emergency spillways running for an extended period, limited the number of adult northern pike in Beaver Creek Reservoir due to entrainment (Table 11 and 12).

Yellow perch

Yellow perch were illegally introduced into Beaver Creek Reservoir in 1987. Since their introduction, yellow perch have thrived within the reservoir (Table 12). As a result, Beaver Creek Reservoir has become a popular ice fishing destination and has also been utilized as a donor source of yellow perch for kids fishing ponds, such as Home Run Pond in Glasgow.

Beaver Creek Reservoir's yellow perch population peaked in the late 1990s. Recently, yellow perch abundance has trended upward with the highest adult relative abundance recorded in 13 years during 2012 (Table 12). In 2014, yellow perch relative abundance dropped significantly, it's unclear why observed abundances were so low. The current population has increased slightly and consists of quality and preferred size fish (TL > 8 in; Table 12). Summer seining efforts indicate that yellow perch reproductive success in 2012 and 2013 were the highest recorded in 17 years and successful reproduction was observed again in 2015 (Table 11). Stable to slightly rising spring water levels created excellent spawning conditions for yellow perch during these years.

Walleye

Walleye were initially stocked by FWP in 1987 to provide a greater diversity of fishing opportunities within the reservoir. Natural reproduction is limited within the reservoir and as a result, approximately 10,000 fingerling and 5,000 advanced walleye fingerlings are stocked annually.

Walleye within Beaver Creek Reservoir have slow growth rates but the population has remained stable over the years (Table 12). A good forage base consisting of yellow perch and high rainbow stocking rates allow the walleye in Beaver Creek Reservoir to achieve memorable and trophy lengths. Since their initial introduction, high quality walleye have thrived within Beaver Creek Reservoir and below its dam. Consecutive years (2010 and 2011) of high runoff increased adult walleye (> 15 inches) entrainment which might explain the reduced relative abundance of walleye during our fall gillnet surveys in 2011 (Table 12). Since 2011, walleye relative abundance has increased to 4.7 walleye/net, the average length of walleye sampled was 12.72 inches, these fish will continue to grow and contribute to the fishery (Table 12).

Smallmouth bass

Smallmouth bass were first introduced by FWP in 1997 and were stocked annually until 2000. There's now a self-sustaining population of smallmouth bass that exists in Beaver Creek Reservoir. Smallmouth bass have historically had low relative abundance during gill netting surveys due to the selectivity of the gear (Table 12). Catches of 8 to 16 inch bass by anglers are common. In addition, smallmouth bass reproduction has been good in most years due to relatively stable reservoir levels during early summer and good spawning and rearing habitat (Table 11).

Table 11. 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 2015.

Date	Sites	YP (yoy)	YP (adult)	W SU	SP SH	IOWA	FH MN	LMB	SMB (yoy)	SMB (adult)	NP (yoy)	NP (adult)	WE (yoy)	WE (adult)	Other Sp.[1]
Jul-80	5	--		650	--	0	42	--	--		--		--		46
Jul-81	5	--		1,671	--	0	75	12	--		--		--		38
Jul-82	5	--		7	--	0	0	54	--		0		--		0
Jun-83	5	--		46	--	0	0	5	--		5		--		0
Aug-84	7	--		189	--	10	0	4	--		0		--		0
Sep-85	5	--		2,648	--	11	0	33	--		3		--		7
May-86	4	--		1,749	0	2	0	0	--		1		--		24
Jun-86	6	--		3,132	0	2	0	0	--		1		--		1
Aug-86	6	--		134	0	8	0	2	--		9		--		0
Sep-86	6	--		1,111	0	34	29	184	--		6		--		11
Jul-87	6	1,968		2,276	1	24	3	0	--		20		11		3
Aug-87	6	2,315		973	0	59	1	16	--		19		19		5
Jun-88	6	20		17	0	6	0	0	--		1		3		0
Aug-88	6	4,973		62	1	4	0	0	--		1		2		0
Aug-89	6	50		48	603	0	0	0	--		2		4		5
Aug-90	6	42		1	93	2	0	0	--		2		0		1
Aug-91	6	8,642		348	835	0	0	0	--		17		0		4
Aug-92	6	1,888		492	156	4	0	0	--		4		0		0
Aug-93	6	42		0	355	11	0	0	--		27		0		0
Aug-94	6	707		49	181	0	0	0	--		11		0		0
Aug-95	6	7,210		6	1,438	0	0	0	--		13		0		0
Aug-96	6	51		261	248	7	0	0	0		5		7		0
Aug-97	6	17		31	193	6	0	0	8		13		2		0
Aug-98	6	872		0	141	0	0	0	41		6		1		0
Aug-99	6	592		4	87	0	0	0	16		7		2		0
Aug-00	6	402		1	190	0	1	0	12		3		23		0
Aug-01	6	357		10	216	0	0	0	8		0		3		0
Aug-02	6	333		0	592	0	0	0	7		0		93		0
Aug-03	6	557		19	2,355	2	0	0	9		15		1		0
Aug-04	6	1,545		0	0	1	0	0	5		2		2		0
Jul-05	6	185		3	1	0	0	0	0		36		12		0
Aug-06	6	1,154		8	608	0	0	0	12		32		11		0
Jul-07	6	253		0	0	0	0	0	13		4		9		0
Jul-08	6	113		0	0	0	0	0	2		0		0		0
Aug-09	6	1,177	135	0	3	0	0	0	1	1	15	1	63	1	0
Aug-10	6	0	491	0	0	0	0	0	6	0	0	0	2	4	0
Aug-11	6	201	66	629	0	0	0	0	1	0	1	2	0	0	0
Aug-12	6	3,206	24	4	0	0	0	0	5	0	12	1	7	0	0
Aug-13	6	2,712	55	0	0	0	0	0	10	0	2	0	5	0	0
Aug-14	6	392	20	17	6	0	0	0	1	2	8	5	0	0	0
Aug-15	6	1,342	0	4	16	0	0	0	13	0	7	2	1	0	0

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

Table 12. Summary of relative abundance (catch per unit effort (CPUE)), average total length, and relative weights of fishes collected in fall gill netting surveys in Beaver Creek Reservoir, 1974-2015.

			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	1974	3	24.00	10.91	111.26	--	--	--	--	--	--	--	--	--	--	--	--	7.33	10.49	82.33	10.23
Nov-77	1977	3	35.00	10.05	86.31	--	--	--	--	--	--	--	--	--	--	--	--	2.33	9.66	113.00	9.75
Sep-80	1980	3	23.33	10.12	81.04	--	--	--	--	--	--	--	--	--	--	--	--	1.33	6.33	156.00	8.86
Sep-81	1981	3	7.33	10.88	82.77	--	--	--	--	--	--	--	--	--	--	--	--	6.67	8.78	165.33	8.70
Oct-82	1982	3	8.33	11.78	99.67	--	--	--	2.33	15.79	109.67	--	--	--	--	--	--	3.33	9.66	109.67	9.69
Oct-83	1983	3	3.33	11.79	94.66	--	--	--	3.67	25.10	117.07	--	--	--	--	--	--	1.33	--	98.33	--
Sep-84	1984	3	3.00	11.26	95.43	--	--	--	3.67	26.64	111.21	--	--	--	--	--	--	0.67	11.00	58.33	10.50
Sep-86	1986	6	15.00	11.50	98.90	--	--	--	4.17	16.68	109.86	--	--	--	--	--	--	0.00	--	42.00	--
Sep-87	1987	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	1988	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	1989	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	1990	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	1991	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	1992	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	1993	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	1994	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	1995	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	1996	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	1997	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	1998	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	1999	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	2000	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	2001	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	2002	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	2003	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	2004	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	2005	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	2006	6	3.00	13.38	143.90	23.00	7.71	101.30	1.50	26.94	97.10	0.00	--	--	3.00	15.08	98.10	0.00	--	3.00	16.89
Sep-07	2007	6	9.00	11.80	95.70	29.33	7.90	107.00	1.67	27.50	101.50	0.17	9.20	107.20	5.17	12.80	103.80	0.00	--	17.00	17.20
Sep-08	2008	6	10.00	12.05	104.30	26.50	8.01	102.48	1.00	28.10	97.53	0.17	14.00	113.20	2.67	19.80	94.20	0.00	--	1.83	16.89
Sep-09	2009	6	4.00	11.80	100.90	20.00	8.20	100.40	2.33	26.40	95.16	0.17	15.70	124.59	3.67	18.26	104.72	0.00	--	0.83	16.90
Sep-10	2010	6	3.67	12.12	110.10	19.20	7.35	106.30	0.83	24.32	92.23	0.17	10.20	113.73	1.33	14.48	87.10	0.00	--	1.17	16.59
Aug-11	2011	4	3.75	12.93	98.08	26.50	7.76	92.06	1.75	18.10	83.31	0.25	8.20	76.40	0.75	13.63	81.05	0.00	--	6.00	16.07
Sep-12	2012	6	12.33	11.75	105.68	36.33	8.53	157.05	1.00	24.07	106.95	0.33	9.40	111.89	3.83	11.76	99.32	0.00	--	3.20	15.14
Sep-13	2013	6	5.33	11.56	104.79	26.00	8.81	104.64	0.33	22.05	92.04	--	--	-- --	2.50	10.18	87.06	0.00	--	5.33	16.28
Sep-14	2014	6	14.00	12.22	98.22	8.50	8.34	92.12	1.50	25.46	100.97	0.33	13.50	104.83 --	1.83	15.25	83.76	0.00	--	2.66	16.31
Sep-15	2015	6	11.83	12.78	96.40	12.33	8.79	95.82	2.00	24.95	101.28	0.66	11.75	108.10	4.66	12.72	94.03	0.00	--	1.83	16.84

Fresno Reservoir

Fresno Reservoir, located 12 miles northwest of Havre is a main-stem reservoir built in 1939 on the Milk River to function as an irrigation storage facility managed by the Bureau of Reclamation (BOR). Fresno is a highly fluctuating 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 supporting walleye, yellow perch, crappie, largemouth bass, smallmouth bass, Lake Superior whitefish, emerald shiner, and spottail shiners. Over the years, kokanee salmon, brown trout, and rainbow trout have been stocked to supplement the fishery when walleye and northern pike populations were low. Fresno ranked 3rd in the region for angler pressure in 2013/2014 (21,289 +/- 3,300 angler days; MTFWP Fisheries Bureau 2014). Fresno continues to build its reputation as one of the premiere walleye reservoirs in Montana.

The fishery in Fresno has varied over the years due to high fluctuations in reservoir water elevations. On average, water levels in Fresno fluctuate 10-21 feet per year with an annual water retention rate of 4 days (storage capacity (acre-feet)/average annual inflows (acre-feet)). The timing of this fluctuation greatly impacts the reproduction and survival of forage and sport fish.

The fishery was severely impacted 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 the abundance and condition of key sport fishes was at an all time low. As a result, a supplemental stocking of 170,000 pre-spawn adult yellow perch from Lake Mary Ronan was conducted from 2001-2004 to increase population levels. This management action was implemented to increase forage populations when water levels increased. In addition, 100,000 walleye fingerlings were stocked annually from 2003-2011. Since 2011, no walleye fingerlings have been stocked due to high adult relative abundance and the need to decrease the current population to more sustainable levels.

In an effort to maintain a favorable forage base under high predator densities, FWP has conducted five supplemental pre-spawn adult yellow perch stockings. From 2011-2015, 29,184 pre-spawn adult yellow perch were stocked in Fresno because water levels were forecasted to obtain and surpass full pool elevations, creating optimal spawning conditions. Yellow perch reproduction in 2011 and 2014 were the highest recorded in 18 and 25 years respectively (Table 13). Exceptional water conditions and supplemental stocking of pre-spawn adult perch are strongly influencing recent spawning success.

From 2005 to 2015, water levels have remained high during spring spawning and early summer rearing periods, allowing sport and forage fish populations to obtain densities never before documented. The continued production of this fishery is dependent on maintaining water levels that will allow the successful spawning, recruitment, and overwintering 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 established in 1968. Beach seining was conducted in late summer using a 75- x 9-foot x ¼ inch square mesh beach seine. Fish were sorted by species and counted.

Historically, the abundance of YOY fishes is correlated with the magnitude of spring run-off and annual fluctuations in water levels within Fresno Reservoir. Extreme water draw downs

in Fresno in 2001 and 2002 due to drought conditions, greatly reduced the reproductive success of most fishes (Table 13).

Excellent water conditions have persisted within the reservoir since 2008, water conditions never before documented over a seven-year period. The yellow perch population remains variable from year to year and will continue to mimic these trends based on water management and predator densities.

From 2008-2015, Fresno filled to capacity and flooded a substantial amount of shoreline vegetation, creating prime spawning and rearing habitat. Summer seining efforts revealed walleye, northern pike, yellow perch, spottail shiner, and black crappie, have all benefited from this rise in water levels with excellent reproduction and survival (Table 13). In 2015, spawning conditions were good for all species. Walleye YOY collected was below average, however successful natural reproduction of walleye was observed in 2012, 2013, and 2014. Indicating good spawning habitat exists within the reservoir when water conditions inundate these habitats.

Table 13. – A summary of forage fish and young-of-year forage and sport fish collected using a 100- x 9-foot x ¼ inch square mesh beach seine in Fresno Reservoir, 1968-2015.

Year	Seine Hauls	*Sanders*	Walleye	Sauger	Northern Pike	YP (yoy)	YP (adult)	Emerald Shiner	Crappie Sp.	Spottail Shiner	Sucker sp.[1]	Minnow sp.[2]	Other[3]
1968	12	16	--	--	6	2,909	--	147	552	0	0	161	0
1969	12	4	--	--	6	1,140	--	385	67	0	2	380	0
1970	12	27	--	--	45	10,151	--	521	883	0	1	122	0
1972	12	102	--	--	22	1,005	--	205	379	0	0	72	0
1974	12	13	--	--	59	1,583	--	29	1,355	0	0	25	0
1975	11	10	--	--	32	4,154	--	155	59	0	0	0	0
1978	12	22	--	--	42	10,684	--	12	3	0	0	0	0
1979	12	29	--	--	45	8,516	--	340	127	0	1	0	1
1982	12	102	--	--	70	8,993	--	121	166	0	0	0	3
1983	12	23	--	--	0	2,254	--	448	9	0	1	7	0
1984	12	247	--	--	0	197	--	375	0	2	40	55	0
1985	12	64	--	--	0	379	--	684	3	2	0	9	0
1986	12	0	--	--	23	6,077	--	142	2	20	1	5	1
1987 [+]	12	80	--	--	113	6,233	--	1,979	7	3	0	3	0
1988	12	53	--	--	4	3,122	--	182	0	20	0	1	0
1989 [+]	12	56	--	--	32	24,706	--	22	0	16	2	0	0
1990	12	8	--	--	57	2,033	--	7	465	44	1	2	0
1991[+]	12	8	--	--	36	3,425	--	0	42	53	0	0	0
1992 [+]	12	45	--	--	2	6,550	--	28	0	48	0	1	0
1993[+]	12	24	--	--	9	5,595	--	12	2	162	0	0	0
1994[+]	12	19	--	--	19	2,960	--	3	287	1,421	1	0	0
1995	12	5	--	--	2	1,080	--	0	2	129	0	1	0
1996[+]	12	52	--	--	21	3,576	--	0	1	1,484	42	0	0
1997[+]	12	46	--	--	15	3,006	--	2	1	887	2	0	0
1998[+]	12	44	--	--	1	1,413	--	9	0	1,041	1	3	0
1999	12	50	--	--	7	4,271	--	176	12	182	13	0	0
2000	6	29	--	--	0	1,396	--	2	2	30	2	0	1
2001	6	86*	--	--	0	39[-]	--	3	0	3	3	1	0
2002	12	28*	--	--	2	86[-]	--	128	400	154	4	29	0
2003[+]	12	4	--	--	46	1,871[-]	--	5,539	90	207	0	0	1
2004[+]	12	--	12	2	10	2,898[-]	--	69	48	56	0	2	1
2005[+]	12	--	26	2	19	934	--	39	15	39	0	0	0
2006[+]	12	--	27	0	57	2,283	--	80	5	923	0	0	0
2007[+]	12	--	7	0	13	769	--	68	54	1,106	2	0	0
2008[+]	12	--	65	0	1	2,329	--	5	721	287	11	0	0
2009[+]	12	--	24	0	24	1,427	224	13	25	716	1	0	0
2010[+]	12	--	10	0	7	1,247	4	6	4,517	849	0	0	0
2011[+]	12	--	18	0	4	4,961[-]	6	5	890	499	0	0	0
2012	12	--	27	0	9	661[-]	4	2	43	41	0	0	0
2013	12	--	16	0	4	1,306[-]	0	12	292	816	0	3	0
2014	12	--	47	0	4	6,834[-]	27	0	575	3,011	0	1	0
2015	12	--	12	1	3	926[-]	88	634	332	1,337	0	5	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
[-] Years in which pre-spawn adult yellow perch were supplementally stocked
* Primarily Sauger

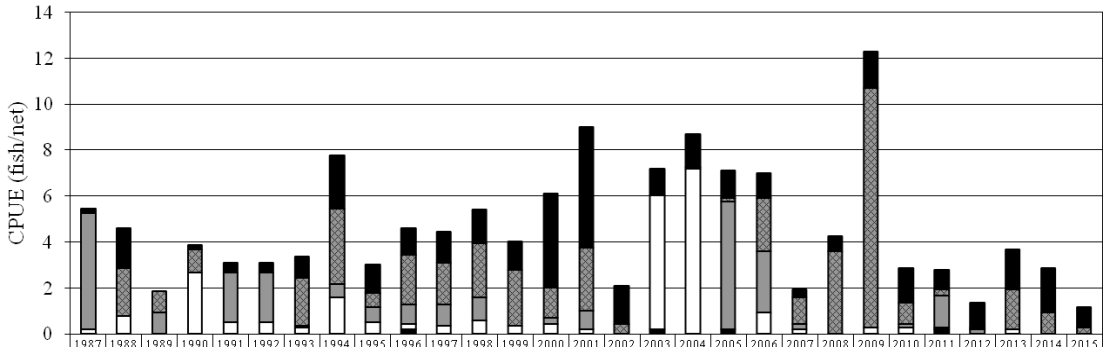
Population Status of Adult Fishes

Adult fish populations were monitored from 1965 to 1974 using systematic gill netting at predetermined sites. Sampling at 12 predetermined sites 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, inches)) and weighed to the nearest 0.01 pound. Prior to 2005, scales were collected from all walleye and sauger for aging purposes. From 2005 to 2015, otoliths were collected from walleye for aging and oxytetracycline (OTC) analysis.

Lake Superior Whitefish

Lake Superior whitefish (whitefish) in Fresno Reservoir have historically comprised a portion of the gill net catch (Figure 9), but are rarely targeted by anglers. Whitefish exhibit fast growth rates in the reservoir and thereby avoid predation from all but the largest walleye and northern pike. Whitefish appear to successfully recruit into the population in years of stable over-winter storage.

Figure 9. - Relative abundance and size structure of lake whitefish collected with sinking experimental gill nets in Fresno Reservoir, 1987-2015.



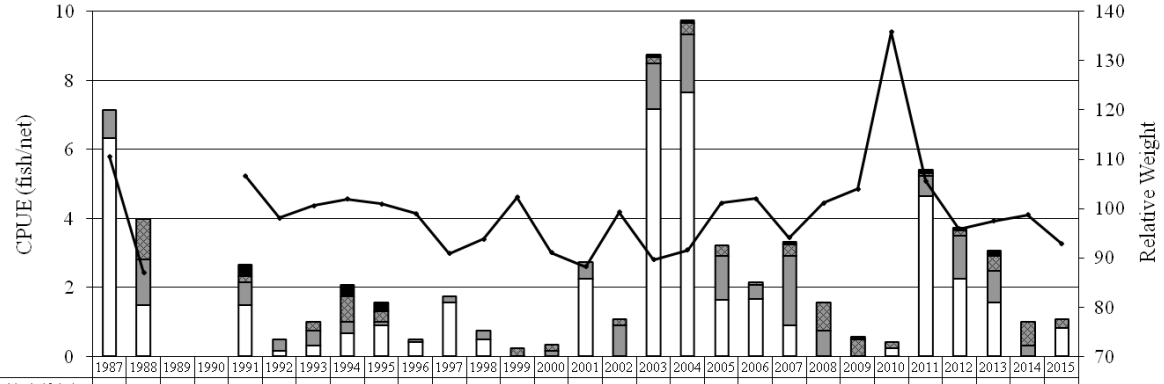
	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Memorable (>18.0 in.)	0.08	1.75	0.00	0.17	0.42	0.42	0.92	2.33	1.25	1.17	1.33	1.50	1.25	4.08	5.25	1.67	1.17	1.42	1.17	1.08	0.333	0.66	1.583	1.5	0.833	1.083	1.75	1.92	0.917
Preferred (14.0-17.9 in.)	0.08	2.08	0.92	1.00	0.00	0.00	2.08	3.25	0.58	2.17	1.83	2.33	2.42	1.33	2.75	0.42	0.00	0.00	0.17	2.33	1.17	3.5	10.42	0.917	0.25	0.083	1.75	0.92	0.167
Quality (11.0-13.9 in.)	5.08	0.00	0.92	0.00	2.17	2.17	0.08	0.58	0.67	0.83	0.92	1.00	0.00	0.25	0.83	0.00	0.00	0.08	5.58	2.66	0.25	0.08	0	0.166	1.42	0.166	0	0	0
Stock (6.0-10.9 in.)	0.08	0.75	0.00	2.67	0.50	0.50	0.25	1.58	0.50	0.25	0.25	0.58	0.33	0.42	0.17	0.00	5.83	7.17	0.00	0.92	0.167	0	0.167	0.25	0.083	0	0.083	0	0.083
Sub Stock (<6.0 in.)	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.08	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.17	0.00	0	0	0.083	0	0.166	0	0.083	0	0

The yellow perch population in Fresno was negatively impacted by drought in the early 2000s due to extreme draw downs in 2001 and 2002. Yellow perch were not able to successfully reproduce (Table 13) and population levels were drastically reduced (Figure 10). To remedy this situation, supplemental stocking of pre-spawn adult yellow perch occurred from 2001 to 2004, to increase population levels approximately 170,000 yellow perch were transferred from Lake Mary Ronan. In 2003 and 2004, water levels increased, flooding shoreline vegetation, and successful spawning and recruitment of forage fish was documented (Table 13). Stocking of pre-spawn perch was discontinued in 2005. From 2011-2015, pre-spawn yellow perch were once again stocked due to excellent spring water conditions. However, high densities of adult walleye (due

to increases in stocking effort) have limited the number of YOY yellow perch that actually recruit into the population, regardless of spawning conditions and success.

As soon as the supplemental stocking of yellow perch was discontinued (2005) in Fresno Reservoir, the abundance of yellow perch started to decrease, and mimicked pre-drought levels (Figure 10). Low water levels throughout the fall and winter months limit good rearing habitat and increases the vulnerability of YOY yellow perch to walleye and northern pike predation. However, eight good water years (2008-2015) have created better overwinter water conditions (average reservoir elevations from October-March have been approximately 10 feet higher than average), inundating littoral habitats and creating refuge areas for YOY yellow perch to successfully recruit into the population (Figure 10). Walleye and northern pike densities remain high (Figure 11 and Figure 12) and correlates with declining relative abundance of yellow perch during exceptional water conditions (Figure 10).

Figure 10. - Relative abundance, size structure, and relative weight of yellow perch collected with sinking experimental gill nets in Fresno Reservoir, 1987-2015.

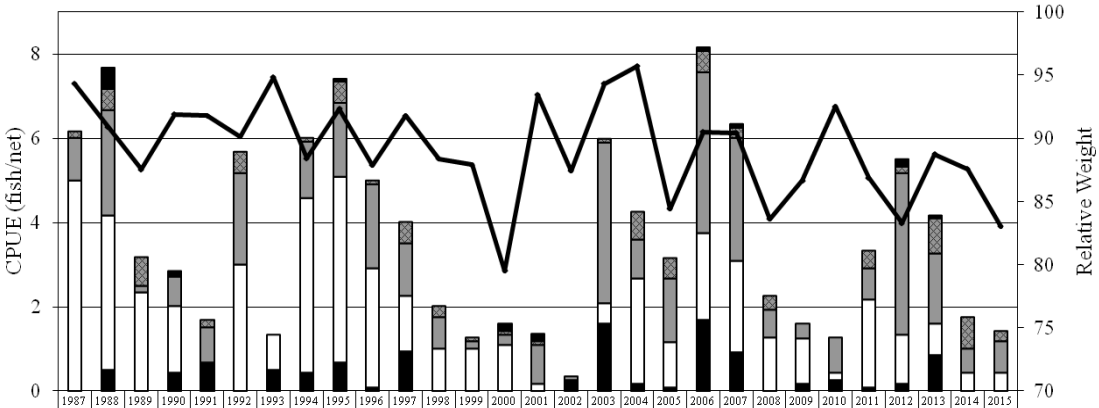


	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Memorable (>12 in.)	0	0	0	0	0.33	0	0	0.33	0.25	0	0	0	0	0	0	0	0.08	0.08	0	0	0.083	0	0.083	0	0.083	0.083	0.166	0	0
Preferred (10-11.9 in.)	0	1.17	0	0	0.17	0	0.25	0.75	0.33	0	0	0	0.17	0.17	0	0.17	0.17	0.33	0.33	0.08	0.333	0.833	0.417	0.167	0.083	0.166	0.417	0.67	0.25
Quality (8-9.9 in.)	0.83	1.33	0	0	0.67	0.33	0.42	0.33	0.08	0.08	0.17	0.25	0.08	0.17	0.5	0.92	1.33	1.67	1.25	0.42	2	0.667	0.083	0	0.583	1.25	0.92	0.33	0
Stock (5-7.9 in.)	6.33	1.5	0	0	1.5	0.17	0.33	0.67	0.92	0.42	1.58	0.5	0	0	2.25	0	7.17	7.67	1.58	1.67	0.917	0.08	0	0.167	4.66	2.25	1.58	0	0.833
Sub Stock (<5 in.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.08	0	0	0	0	0.083	0	0	0	0	0
Relative weight	110.6	86.99			106.6	98.12	100.6	101.9	101	98.99	90.84	93.84	102.3	91.07	88.25	99.3	89.66	91.6	101.1	102.0	94.1	101.1	104	135.8	105.6	95.91	97.48	98.74	92.96

Northern pike

Since the illegal introduction of northern pike in Fresno Reservoir during the 1940s, their population has fluctuated over the years (Figure 11). Extreme drought conditions from 2000 to 2002 reduced the abundance of northern pike. However, the population rebounded in 2003 with increased water levels and inundated shoreline vegetation. Northern pike continue to successfully reproduce, resulting in an increased relative abundance of adults following the record water year in 2011 (Figure 11). Northern pike relative abundance dropped below the long-term average in 2014 and 2015 which may have been influenced by a number of factors: 1) High water levels during fall netting, which may have displaced many adults to habitats normally not found during that time of year 2) Increased angler exploitation due to increased average length of current population.

Figure 11. - Relative abundance, size structure, and relative weight of northern pike collected with sinking experimental gill nets in Fresno Reservoir, 1987-2015.



	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Memorable (>34 in.)	0.00	0.50	0.00	0.14	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.17	0.17	0.00	0.00	0.00	0.00	0.08	0.08	0	0	0	0	0.166	0.083	0	0
Preferred (28-33.9 in.)	0.17	0.50	0.67	0.00	0.17	0.50	0.00	0.08	0.50	0.08	0.50	0.25	0.08	0.08	0.08	0.00	0.08	0.67	0.50	0.5	0.25	0.333	0	0	0.416	0.166	0.833	0.75	0.25
Quality (21-27.9 in.)	1	2.5	0.17	0.71	0.83	2.17	0	1.33	1.75	2	1.25	0.75	0.17	0.25	0.92	0.08	3.83	0.92	1.5	3.83	2.917	0.667	0.333	0.833	0.75	3.833	1.67	0.58	0.75
Stock (14-20.9 in.)	5.00	3.67	2.33	1.57	0.00	3.00	0.83	4.17	4.42	2.83	1.33	1.00	1.00	1.08	0.17	0.00	0.50	2.50	1.08	2.08	2.167	1.25	1.08	0.167	2.08	1.166	0.75	0.42	0.42
Sub Stock (<14 in.)	0.00	0.50	0.00	0.43	0.67	0.00	0.50	0.42	0.67	0.08	0.92	0.00	0.00	0.00	0.00	0.25	1.58	0.17	0.08	1.67	0.917	0	0.167	0.25	0.083	0.166	0.833	0	0
Relative weight	94.29	90.89	87.52	91.88	91.77	90.15	94.79	88.41	92.34	87.88	91.78	88.37	87.90	79.51	93.43	87.41	94.29	95.72	84.43	90.50	90.4	83.6	86.65	92.5	86.86	83.27	88.75	87.58	83.04

Walleye

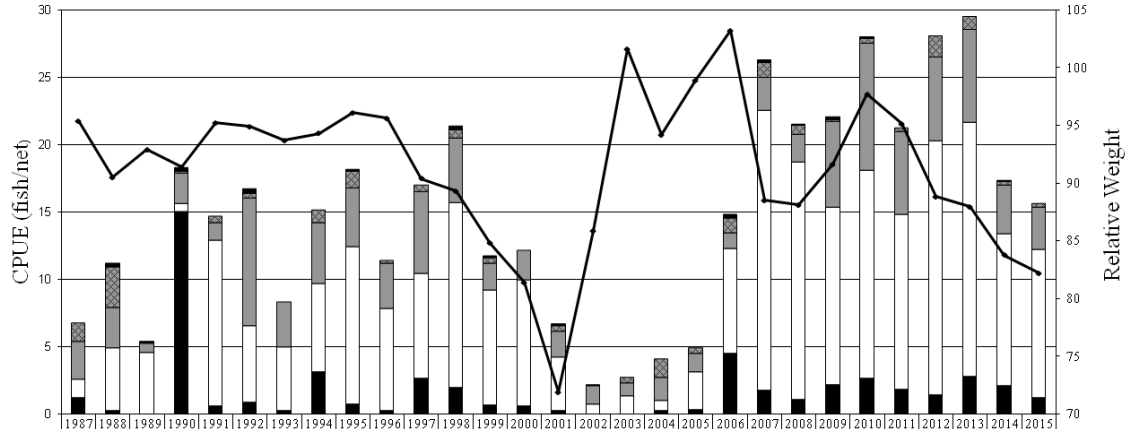
From 2003 to 2011 approximately 100,000 fingerling walleye were stocked annually in Fresno Reservoir. In 2006, 200,000 fingerling walleye were stocked due to unallocated productions at the Fort Peck Hatchery.

Since 1987, seven of the eight highest walleye relative abundances were documented from 2007-2013 (Figure 12). It is evident that stocking walleye fingerlings at a rate of 100,000/year was very successful and based on Oxytetracycline analysis these fish recruited and contributed to the adult population. However, this stocking rate has led to concerns of the sustainability and balance with the forage base. A decrease in abundance levels was observed in 2011 due to increased entrainment of adult walleye over the Fresno spillway, caused by near record spring run-off and precipitation (Figure 12). In 2011, anglers were observed catching numerous walleye below the dam from April-October. In 2013, fall gill net surveys documented the highest walleye relative abundance ever recorded (29.5 walleye/net; Figure 12). No walleye fingerlings have been stocked the last four years in an attempt to decrease adult abundances to a more sustainable level. Summer seining surveys continue to document successful reproduction of walleye, and the population was showing signs of continued growth, regardless of increased fishing pressure and harvest. However, sampling efforts conducted in2015 documented the lowest adult walleye relative abundance (15.6 walleye/net) since 2006, yet current densities remain above the long-term average of 14.9 walleye/net (Figure 12).

Water conditions and operations in Fresno directly benefit/impact this fishery and it's unclear if current walleye densities are favorable for the long-term health of this fishery. Since 2011, no walleye fingerlings were stocked in an effort to observe reproductive success of the current adult population, and to reduce stocking contributions to an already high walleye population. Walleye natural reproduction was observed, indicating good spawning habitat exists when water conditions are favorable (Table 13). Future walleye stocking rates should consider the current spawning adult density and potential of that population to naturally reproduce.

The high abundances observed from 2007-2013coincided with the best water and forage conditions observed since Fresno Dam was built. Our data suggests adult walleye abundances have dropped since the record number recorded in 2013. However, we've observed a continued decline in walleye relative weights since 2010, which continued in 2015, even with reduced walleye abundance (Figure 12). It is unclear at this time what effects might incur to this population (and the entire fish community) once water conditions revert back to a more normal cycle, or worse yet, experience conditions observed in 2001/2002.

Figure 12. - Relative abundance, size structure, and relative weight of walleye in Fresno Reservoir for the years 1987-2015.



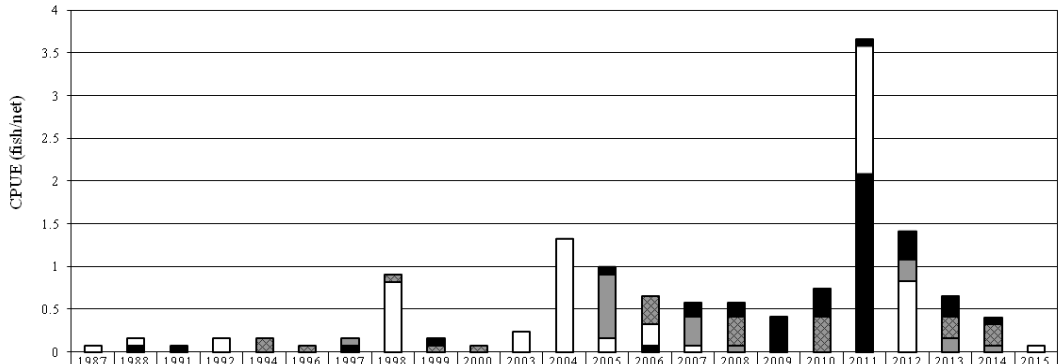
	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Memorable (>25 in.)	0	0.33	0.17	0.29	0	0.33	0	0	0.08	0	0	0.25	0.08	0	0.08	0	0	0	0	0.25	0.17	0.08	0.166	0.166	0	0	0	0.08	0
Preferred (20-24.9 in.)	1.33	3	0	0.14	0.5	0.33	0	0.92	1.25	0.17	0.5	0.67	0.42	0	0.42	0.08	0.42	1.33	0.42	1.08	1.08	0.67	0.166	0.333	0.25	1.583	0.92	0.25	0.25
Quality (15-19.9 in.)	2.83	3	0.67	2.29	1.33	9.5	3.33	4.5	4.42	3.42	6.08	4.75	2	2.17	1.92	1.33	1	1.75	1.33	1.17	2.5	2.08	6.33	9.42	6.2	6.25	6.92	3.67	3.17
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	20.83	17.67	13.25	15.5	13	18.92	18.92	11.3	11
Sub-stock (<10 in.)	1.17	0.17	0	15	0.5	0.83	0.17	3.08	0.67	0.17	2.58	1.92	0.58	0.5	0.17	0	0	0.17	0.25	4.42	1.67	1	2.083	2.58	1.75	1.33	2.7	2	1.17
Relative weight	95.4	90.5	92.9	91.4	95.2	94.9	93.7	94.3	96.1	95.6	90.4	89.3	84.8	81.4	71.9	85.9	101.6	94.2	98.9	103.2	88.5	88.1	91.62	97.71	95.15	88.82	87.96	83.77	82.19

Black Crappie

Black crappie were most likely introduced into Fresno in the 1950s however the first record of stocking by FWP occurred in 1991. Since 1968, YOY crappie numbers have fluctuated greatly (Table 13). In 2010, YOY black crappie abundance was the highest observed since 1974 and good reproduction occurred again in 2011 and 2014 (Table 13). The recent spawning success of black crappie is attributed to good reservoir pool levels during the spawning period (June), with water levels rising or remaining stable during this period. Elevated water levels have also contributed to five good year-classes being obsered (2008, 2010, 2011, 2014 and 2015), with variable success recruiting into the population (Figure 13).

The adult population of black crappie in Fresno Reservoir was at record highs in 2011 and remained good in 2012 (Figure 13). Since 2013 fall surveys suggest the population has slowly decreased to the lowest observed relative abundances observed since 2000; Figure 13). Although successful reproduction and recruitment of black crappie has been documented in recent years, high predator densities have consumed a majority of the smaller black crappie (< 8 inches) and this has resulted in an unbalanced age and size structure on the current black crappie population.

Figure 13. - Relative abundance and size structure of black crappie collected with sinking experimental gill nets in Fresno Reservoir, 1987-2015.



	1987	1988	1991	1992	1994	1996	1997	1998	1999	2000	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Memorable (>12.0 in.)	0	0	0	0	0	0	0	0	0.083	0	0	0	0.083	0	0.166	0.166	0.416	0.333	0.083	0.333	0.25	0.08	0
Preferred (10.0-11.9 in.)	0	0	0	0	0.166	0.083	0	0.083	0.083	0.083	0	0	0	0.333	0	0.333	0	0.417	0	0	0.25	0.25	0
Quality (8.0-9.9 in.)	0	0	0	0	0	0	0.083	0	0	0	0	0	0.75	0	0.333	0.083	0	0	0	0.25	0.166	0.08	0
Stock (5.0-7.9 in.)	0.083	0.083	0	0.166	0	0	0	0.83	0	0	0.25	1.33	0.166	0.25	0.083	0	0	0	1.5	0.833	0	0	0.083
Sub Stock (<5.0 in.)	0	0.083	0.083	0	0	0	0.083	0	0	0	0	0	0	0.083	0	0	0	0	2.08	0	0	0	0

Fresno Angler Creel Survey 2015

In the last decade, several considerable changes have occurred on Fresno Reservoir. The fishery recovered from extreme drought and experienced exceptionally high water conditions. A stocking strategy for walleye was established and implemented from 2005-2011(100,000 walleye fingerling/year). The popularity of the fishery, based on statewide pressure surveys conducted biannually, suggests angling pressure (winter and summer) has hit an all-time high, 21,289 (± 3,431) estimated angler days from March 2013-February 2014.

These changes, along with 19 years passing since the last creel survey, prompted FWP to conduct an on-site angler creel survey at Fresno Reservoir to answer several questions:
1) Compare current angler trends with previous creel surveys conducted on Fresno Reservoir (1990 and 1996) 2) Gain a better understanding of annual fishing pressure (both winter and summer) 3) Better understand the contribution winter fishing pressure has on target species, exploitation, and catch rates for all sport fishes 4) Identify contribution of younger walleye (Age 1 and 2; < 14") to angler catch rates 5) Gauge current satisfaction of the fishery from anglers 6) Gauge angler's thought on key contributions to the overall fishery and what it will take (in their opinion) to maintain a sustainable fishery into the future and 7) Better understand anglers knowledge on the threat from aquatic invasive species.

Methods

The two previous creel surveys conducted on Fresno surveyed anglers during the open water season (May-September) and incorporated both the weekend and some weekdays. The creel survey conducted in 2015 went year-round (December 20, 2014-November 8, 2015) and only incorporated weekends (Saturday and Sunday). Due to limited funding for this survey several weekends weren't surveyed due to weather, ice conditions, or tournament taking place. During the winter the creel clerk was able to utilize an ATV to rove the lake and survey anglers across the entire reservoir. During open water season the creel clerk roved from several public boat ramps and access points throughout the day, all shore anglers contacted were surveyed on-site.

Only one person from each party was interviewed and asked a series of questions related to time spent fishing, # in party, residence, bait type, target species, catch data, and several supplemental questions (Appendix 1). Those parties who classified themselves as pleasure were asked none of the questions related to angling, and discarded from pressure analysis (Appendix 1). Lengths and weights were taken from harvested fish, with permission of the anglers. When anglers harvested a high proportion of one species (i.e. 20+ yellow perch) the creel clerk would take a random sub-sample of 10-15 individuals, to allow more time to interview other parties.

Appendix 1. Interview sheet used during the 2015 Fresno Creel Survey.

Fresno Reservoir Creel Survey

Interview #: FR-_____ Date: ____/____/____

Reservoir Pool Elevation: _____ ft Time of Interview: ____:____ AM / PM

Angler Type: Shore / Boat / Ice / Pleasure

Anglers in Party: _____ Time Started Fishing: ____:____ AM / PM

Done Fishing for the Day?- 1= Yes / 2= No Time Stopped Fishing: ____:____ AM / PM

Total Angler Hours: ____:____

→ Fill in if party stopped fishing prior to time of interview

→ (Total angler hours = # anglers x hours per angler. Subtract hours not fished. Calculate to nearest ¼ hour.)

On average, how many days per year do you fish Fresno Reservoir? _____

Angler Origins: (Record county, state, or province for each angler in party)

_____, _____, _____,

_____, _____, _____

Total # of Attended Lines Used: _____

Bait Type: 1= Lures/Artificial 2= Bait (worms, leeches, dead minnows) 3= Lures and Bait 4= Other _____

Target Species:

1= Walleye 2= Northern Pike 3= Yellow Perch 4= Black Crappie

5= Lake Whitefish 6= Walleye & Pike 7= Walleye, Pike, Perch 8= Any Fish

9= Other: _____

Catch Data:

	Walleye	Pike	Perch	Crappie	Other:	Other:
# Kept						
# Released						
Total						
# of WE caught < 14"		----------	----------	----------	----------	----------

Q1. Were you satisfied with the number of fish caught today? (No) 1 2 3 4 5 (Yes)

Q2. Were you satisfied with the average size of fish caught today? (No) 1 2 3 4 5 (Yes)

Q3. In your opinion, what is the single most important factor influencing the overall fishery on Fresno Reservoir.

Q4. Are you aware of the threat to Montana waters from aquatic invasive species such as zebra mussels and Eurasian water milfoil? Yes No

Results

A total of 669 angler interviews were conducted during the year-long creel survey, comprising 1,358 anglers. Of the 669 interviews conducted, (6.6%) were shore anglers, 122 (18.2%) were ice fishing, and 452 (67.6%) were fishing from a boat. Additionally, another 295 pleasure boaters (32%) were interviewed, totaling 1,158 people (46%). Anglers and pleasure boaters surveyed represented 49 of 56 Montana counties, 12 states, and three countries. The highest proportion of people came from Hill (73%), Cascade (9.7%), Blaine (4.7%), and Choteau counties (2.3%). Reservoir pool elevations stayed close to full pool (2570') throughout the creel period, with decreasing pool elevations throughout the summer months (Table 14). Historically,

Fresno Reservoir pool elevations fluctuate approximately 10-20 feet per year. The number of monthly interviews conducted was somewhat low during the winter months (December-March). Warm temperatures didn't create optimal ice fishing conditions until January. Warmer than average temperatures had the ice disappearing approximately one month earlier than normal and few interviews were conducted at this time (Table 14). Interviews then abruptly increased, peaking in June and slowly decreasing thereafter (Table 14).

The average party size was 2.1 people/trip (range=1-6) with the largest parties being interviewed during the winter months (Table 14). Average lines used per party was 4/trip (range=1-25), with winter anglers using on average more lines (7.8 lines/party) than open water anglers (2.7 lines/party). This was expected as winter regulations allow anglers 6 lines/person compared to open water regulations, which allow 2 lines/person. On average, anglers reported they fished Fresno Reservoir approximately 19.7 days/year (range=1-100; Table 14). Of the anglers surveyed during the winter, 57% reported using some sort of live/dead bait (dead minnows, wax worms, etc.), 8.3% used a spear, 0.8% used artificial, and 33.9% used a combination of live bait and artificial. During the open water season, 14.2% of anglers reported using some sort of live/dead bait (dead minnows, worms, leeches, etc.), 3.8% used artificial, and 82.1% used a combination of live/dead bait and artificial.

Table 14. Breakdown (by month) of average reservoir pool elevations, anglers interviewed, and party characteristics during the 2015 Fresno creel survey.

Month	Avg. Pool Elevation	# Interviewed	Total Anglers	Avg. Party Size	Avg. Lines Used/Party	Reported Days Fished Annually (Avg.)
December	2569.45	28	60	2.1	7.4	22.9
January	2569.53	68	170	2.5	9.4	16.7
February	2571.54	21	38	1.9	8	12.5
March	2573.55	13	27	2.1	6.5	15.2
April	2575.3	34	72	2.1	3	24.5
May	2573.33	118	239	2.1	2.8	22.5
June	2571.37	152	242	2.2	3.1	18
July	2567.75	57	133	2.3	2.9	16.8
August	2565.7	108	237	2.2	2.8	19.6
September	2567.6	41	84	2.1	2.7	22.4
October	2567.6	22	43	1.9	2.3	22
November	2567.4	7	13	1.8	2.1	23.9
Total	**2570**	**669**	**1,358**	**2.1**	**4**	**19.7**

Effort

Angling effort recorded during the survey totaled 6,523.75 hours, with the peak winter effort occurring in January and peak open water effort occurring in June (Table 15). However, the highest catch rates were observed in the fall during the lowest angling effort (Table 15). During the winter months, anglers reported targeting a more diverse range of species (walleye, pike, perch, and any fish) when compared to those surveyed during the open water months (only walleye; Table 16). This difference could be attributed to more lines being allowed during the winter months, covering multiple depths with various set-ups to target multiple species. Anglers may also have a more opportunistic attitude during the ice fishing season as well.

Catch Rates and Harvest Data

Walleye

Walleye catch rates were low during the winter months (mean= 0.19 walleye/hour) when compared to the open water months (mean= 0.79 walleye/hour). The average annual catch rate recorded was 0.60 walleye/hour (Table 15). Nationally, walleye catch rates ≥ 0.25 walleye/hour are considered very good (Colby et. al 1979). Based on this survey, the majority of fishing effort specifically targeting walleye occurs during the open water season (May-November), with 77% of anglers surveyed during these months reporting walleye as their target species (Table 16). Although most of the effort targeting walleye occurred during the open water months, the highest percentages of harvest occurred during the winter/spring months (Table 17). On average, anglers harvested 49% of all walleye caught during the winter/spring, compared to just 33% during the summer/fall (Table 17). Harvested walleye averaged 15.73 inches and 1.19 pounds (Table 18). Based on length data collected, the highest proportion of walleye harvested ranged in age from 2-5 years old (Figure 14).

An additional question to anglers was "How many walleye < 14" did you catch today?" The question was asked to identify the contributions of younger aged walleye to the overall catch. Anglers reported catching a high percentage of these fish and they comprised 48.4% of the overall walleye catch (Table 19). The highest proportion of these fish were caught during the summer months (May-August), with the lowest proportions being reported during the spawning period (April) and late fall (October and November; Table 19). Walleye < 14" in Fresno range from 1 to 2 years old with an estimated 14% harvest rate on these age classes (based on length data collected from the creel). No walleye have been stocked since 2011, indicating that natural reproduction has been the sole contributor to this proportion.

Northern Pike

Northern pike catch rates remained consistent throughout the survey period, with the exception of high catch rates observed in October and November. Catch rates averaged 0.11 pike/hour (range= 0.04-0.85 pike/hour; Table 15). Based on this survey, the majority of fishing effort specifically targeting northern pike occurs during the winter and early spring period (December-May; Table 16). The highest percentages of harvest occurred during the winter months (Table 17). On average, anglers harvested 73% of all northern pike caught during the winter, compared to just 13% during the open water months (Table 17). Harvested pike averaged 23.36 inches and 3.02 pounds (Table 20).

Yellow Perch

Yellow perch catch rates were low throughout the creel survey (mean= 0.01 perch/hour), with highest catch rates being observed in early winter (Table 15). Based on this survey, the majority of fishing effort specifically targeting yellow perch occurs during the winter months (December-March), with 5% of anglers surveyed in December and January reporting yellow perch as their target species (Table 16). The highest percentages of harvest correlated with the highest percentage of anglers targeting yellow perch, winter months (Table 17). On average, anglers harvested 93.2% of all yellow perch caught during the winter, compared to just 42.5% during the open water months (Table 17). Harvested perch averaged 11.56 inches and 0.83 pounds (Table 21).

Black Crappie

Black crappie catch rates, though low, remained consistent throughout the survey period, averaging 0.01 crappie/hour (range= 0-0.09 crappie/hour; Table 15). Based on this survey, the majority of fishing effort didn't specifically target black crappie (Table 16). Rather, crappies were a species utilized by anglers as by-catch while targeting other species (yellow perch during the winter). Although anglers reported catching black crappie the least of any species during this survey, black crappie were the highest species reported as harvested (73%; Table 20). Harvested black crappie averaged 11.56 inches and 0.83 pounds (Table 22).

Other species

Other species reported as caught during this survey included sauger and lake whitefish. Both of these species were reported in low quantities and didn't make up a large proportion of the total catch (7/4785 or 0.15%).

Table 15. Monthly breakdown of angling effort, species caught and harvested, and catch rates during the 2015 Fresno creel survey.

Month	Total Effort (Hours)	Total Caught				Harvested					Catch Rates				Total Caught	Catch Rate (All species)
		WE	NP	YP	BL CR	WE	NP	YP	BL CR		WE	NP	YP	BL CR		
December	255.75	67	26	39	23	21	12	38	22		0.262	0.102	0.152	0.090	155	0.606
January	872.75	87	41	4	9	62	35	2	9		0.100	0.047	0.005	0.010	141	0.162
February	120.75	35	8	2	4	9	5	2	4		0.290	0.066	0.017	0.033	49	0.406
March	172.25	17	18	0	0	7	16	0	0		0.099	0.104	0.000	0.000	35	0.203
April	332.25	87	12	1	1	66	2	1	1		0.262	0.036	0.003	0.003	101	0.304
May	1191	903	89	5	4	360	5	1	3		0.758	0.075	0.004	0.003	1001	0.840
June	1339.25	1135	149	12	10	227	12	2	0		0.847	0.111	0.009	0.007	1307	0.976
July	550.75	380	50	4	7	139	8	1	4		0.690	0.091	0.007	0.013	441	0.801
August	1136	862	89	18	13	262	12	13	7		0.759	0.078	0.016	0.011	985	0.867
September	353	148	63	6	1	38	11	2	0		0.419	0.178	0.017	0.003	218	0.618
October	168.25	131	118	1	14	47	26	0	13		0.779	0.701	0.006	0.083	290	1.724
November	31.75	58	27	0	0	24	0	0	0		1.827	0.850	0.000	0.000	95	2.992
Total	**6,523.75**	**3,910**	**690**	**92**	**86**	**1,262**	**144**	**62**	**63**		**0.599**	**0.106**	**0.014**	**0.013**	**4,818**	**0.739**

Table 16. Monthly breakdown of species (WE-walleye, NP- northern pike, YP- yellow perch, BLC-black crappie, and LWF- lake whitefish) targeted by anglers (%) on Fresno Reservoir in 2015.

Month	WE	NP	YP	BLCR	LWF	WE & NP	WE,NP,YP	ANY FISH
December (n=31)	10%	3%	6%	3%	--	45%	3%	30%
January (n=69)	2%	2%	3%	2%	--	45%	2%	45%
February (n=21)	--	--	--	--	--	48%	--	52%
March (n=13)	38%	15%	--	--	--	32%	--	15%
April (n=34)	67%	--	--	--	--	15%	--	18%
May (n=118)	75%	2%	--	--	--	5%	--	18%
June (n=152)	73%	2%	--	--	--	10%	--	15%
July (n=57)	81%	--	--	--	--	5%	--	14%
August (n=108)	84%	2%	--	--	--	3%	--	11%
September (n=41)	73%	--	--	--	--	--	--	27%
October (n=23)	66%	4%	--	4%	--	4%	--	22%
November (n=7)	86%	--	--	--	--	14%	--	--

Table 17. Monthly breakdown of species harvested by anglers on Fresno Reservoir in 2015.

Month	% Harvested			
	WE	NP	YP	BL CR
December	31.3%	46.2%	97.4%	95.7%
January	71.3%	85.4%	50.0%	100.0%
February	25.7%	62.5%	100.0%	100.0%
March	41.2%	88.9%	0.0%	0.0%
April	75.9%	16.7%	100.0%	100.0%
May	39.9%	5.6%	20.0%	75.0%
June	20.0%	8.1%	16.7%	0.0%
July	36.6%	16.0%	25.0%	57.1%
August	30.4%	13.5%	72.2%	53.8%
September	25.7%	17.5%	33.3%	0.0%
October	35.9%	22.0%	0.0%	92.9%
November	41.4%	0.0%	0.0%	0.0%
Total	**32.3%**	**20.9%**	**67.4%**	**73.3%**

Table 18. Length and weight data collected from harvested walleye during the 2015 Fresno creel survey.

Month	Sample Size	Length Range	Length Average	Weight Range	Weight Average
December	22	9.0-26.0	17	0.25-4.75	1.65
January	42	10.5-23.25	17.08	0.25-4.25	1.7
February	9	11.0-18.5	15.33	0.25-1.75	1.06
March	6	19.5-26.5	21.83	2.0-5.25	3.13
April	65	13.0-22.0	16.75	0.5-3.0	1.33
May	326	9.8-20.5	15.2	0.26-2.5	1.05
June	164	10.0-20.5	15.66	0.23-2.41	1.15
July	96	10-21.1	15.48	0.33-2.32	1.09
August	200	8.5-22.7	15.07	0.25-4.1	1.07
September	35	14-19.5	17.07	0.82-2.21	1.51
October	42	14.2-21.4	17.75	0.71-2.84	1.66
November	19	15.1-18.6	17.22	1.04-1.82	1.52
Total	**1,026**	**8.5-26.5**	**15.73**	**0.23-5.25**	**1.19**

Figure 14. Walleye estimated age at harvest based on length data collected during the 2015 Fresno creel survey.

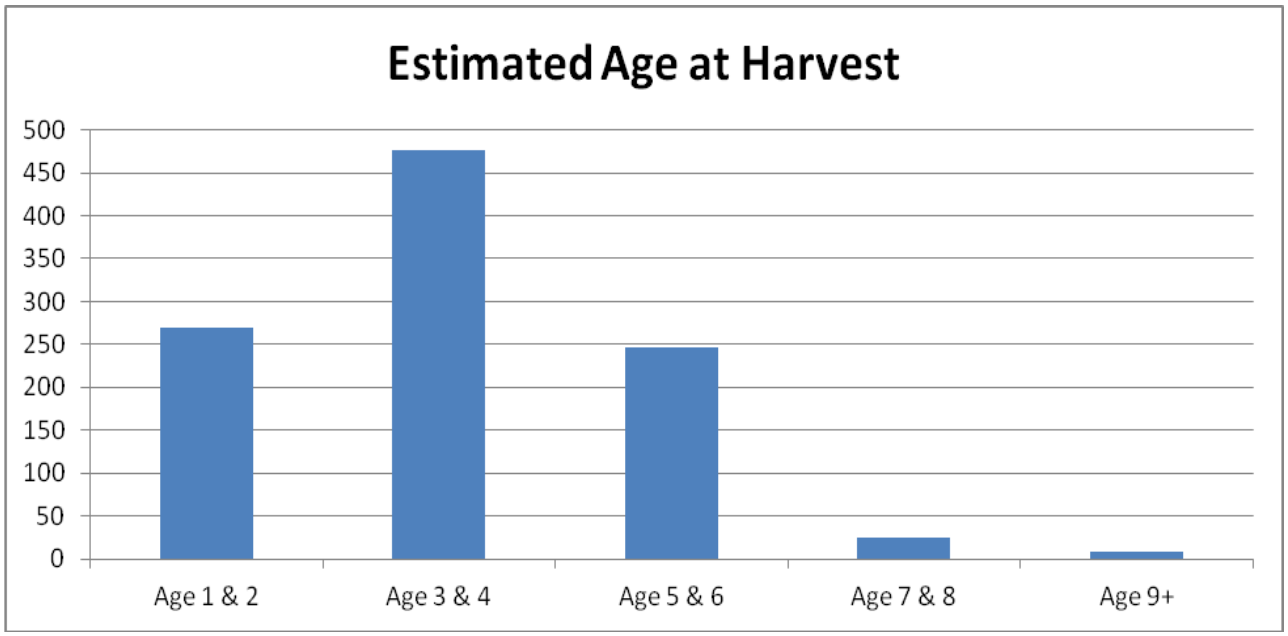


Table 19. Monthly breakdown of contribution of walleye < 14” to the fishery, as reported by anglers during the 2015 Fresno creel survey.

Month	Total Walleye Caught	Walleye Reported < 14"	Walleye < 14" Influnce on Creel
December	67	37	55.2%
January	87	26	29.9%
February	35	25	71.4%
March	17	5	29.4%
April	87	13	14.9%
May	903	435	48.2%
June	1135	601	53.0%
July	380	192	50.5%
August	862	433	50.2%
September	148	93	62.8%
October	131	26	19.8%
November	58	7	12.1%
Total	**3,910**	**1,893**	**48.4%**

Table 20. Length and weight data collected from harvested northern pike during the 2015 Fresno creel survey.

Month	Sample Size	Length Range	Length Average	Weight Range	Weight Average
December	12	20.2-33.0	25.16	2.25-9.5	3.83
January	14	15.0-34.0	23.66	1.0-10.4	3.76
February	5	17.0-25.5	21.2	1.0-5.25	2.9
March	16	18.5-35.0	23.66	1.25-8.5	3.14
April	--	--	--	--	--
May	4	22.5-32.5	25.6	2.0-7.9	3.72
June	12	17.9-24.6	21.18	0.92-2.81	1.85
July	6	19.5-23.7	22.38	1.32-2.54	2.08
August	7	17.9-24.5	21.94	1.33-3.34	2.24
September	2	22.5-34.5	28.5	2.62-7.1	4.86
October	18	20.1-25.6	23.51	1.71-3.84	2.87
November	--	--	--	--	--
Total	**96**	**15.0-35.0**	**23.36**	**0.92-10.4**	**3.02**

Table 21. Length and weight data collected from harvested yellow perch during the 2015 Fresno creel survey.

Month	Sample Size	Length Range	Length Average	Weight Range	Weight Average
December	49	10.7-13.0	12.1	0.6-1.3	0.98
January	2	11.75-12.0	11.88	0.8-1.0	0.9
February	2	10.5-10.75	10.63	0.5	0.5
March	--	--	--	--	--
April	1	12.5	12.5	0.63	0.63
May	1	11.5	11.5	0.5	0.5
June	1	14.5	14.5	0.89	0.89
July	--	--	--	--	--
August	9	6.1-12	9.51	0.11-1.0	0.51
September	2	12.2-12.7	12.45	0.94-1	0.97
October	--	--	--	--	--
November	--	--	--	--	--
Total	**67**	**6.1-14.5**	**11.56**	**0.11-1.3**	**0.83**

Table 22. Length and weight data collected from harvested black crappie during the 2015 Fresno creel survey.

Month	Sample Size	Length Range	Length Average	Weight Range	Weight Average
December	22	10.2-14.25	13.5	0.4-1.8	1.32
January	6	10.0-14.5	12.67	0.5-1.85	1.31
February	4	12.75-14.0	13.56	1.0-1.38	1.22
March	--	--	--	--	--
April	1	14.75	14.75	1.5	1.5
May	3	11-14.25	13	0.75-1.5	1.04
June	--	--	--	--	--
July	4	12.4-13.3	12.85	1.2-1.4	1.29
August	4	11-15.2	12.93	0.92-1.91	1.37
September	--	--	--	--	--
October	4	11.0-14.0	13.1	0.7-1.51	1.26
November	--	--	--	--	--
Total	**48**	**10-15.2**	**13.2**	**0.4-1.91**	**1.26**

Supplemental Questions

Anglers were asked several additional questions in regards to walleye harvest, satisfaction, their personal opinion on Fresno's fishery, and knowledge of aquatic invasive species (Figure 14).

Q1- Were you satisfied with the number of fish caught today?

This question was based on a numbered scale (1-5) with 1 being unsatisfied and 5 being very satisfied, 3 was considered neither satisfied nor dissatisfied. Of the 616 parties who responded to this question; 150 (24.3%) reported a satisfaction rating of 1, 99 (16.1%) reported a satisfaction rating of 2, 139 (22.6%) reported a satisfaction rating of 3, 124 (20.1%) reported a satisfaction rating of 4, and 210 (16.9%) reported a satisfaction rating of 5. The average satisfaction rate of all anglers surveyed was 2.89.

Q2- Were you satisfied with the average size of fish caught today?

This question was based on a numbered scale (1-5) as well, with 1 being unsatisfied and 5 being very satisfied, 3 was considered neither satisfied nor dissatisfied. Of the 616 parties who responded to this question; 160 (26%) reported a satisfaction rating of 1, 142 (23%) reported a satisfaction rating of 2, 169 (27.5%) reported a satisfaction rating of 3, 93 (15.1%) reported a satisfaction rating of 4, and 52 (8.4%) reported a satisfaction rating of 5. The average satisfaction rate of all anglers surveyed was 2.57.

Q3- In your opinion, what is the single most important factor influencing the overall fishery on Fresno Reservoir?

This question was very broad and open ended, with a wide array of answers. Answers were compiled, analyzed, and broken into six general categories, based on the answers given. These categories were 1) Biological (water, habitat, forage/fish densities) 2) Conditions (weather, water clarity, location) 3) Management (stocking, length limits, regulations) 4) Social (angling pressure, littering, infrastructure) 5) Other and 6) Don't Know (N/A).

A total of 616 parties interviewed responded to this question. Responses relating to biological (34.7%), don't know (20.1%), and conditions (19.9%) were the most frequently reported influences on the Fresno fishery. Water level management, habitat, forage densities, stocking, angling pressure/selective harvest, and proximity to Havre were the most frequent responses. Responses related to management (15.6%), social (9.6%), and other (0.2%) comprised a smaller portion of responses.

Q4. Are you aware of the threat to Montana waters from aquatic invasive species such as zebra mussels and Eurasian water milfoil?

All parties surveyed (anglers and pleasure boaters) were asked this question, which totaled 911 responses. Of those responding, 895 (98.2%) said yes, they were aware of the threat whereas 16 (1.8%) said no, they were not aware of the threat.

Historic Comparison

The creel survey conducted at Fresno Reservoir in 2015 was only the third creel survey in Fresno Reservoir history, and the first year-round creel survey ever performed. The two previous creel surveys were conducted in 1990 and 1996, and only consisted of the timeframe May-September. For comparison purposes, data displayed in Table 23, for the 2015 survey, consists of only May-September data collected.

Catch rates for walleye in 2015 were higher than those reported during both the 1990 and 1996 surveys (Table 23). The average length and weight of walleye harvested was larger than previous surveys as well, the percent of walleye harvest was almost half of that reported in the previous creels (Table 23). Catch rates for northern pike were lower in 2015 than the previous creels and reflect

northern pike densities between the three creel years (Table 23 and Figure 11). The average length and weight of northern pike harvested was higher in 2015 (Table 23). However, the percentage of northern pike harvested dropped from 29% (1990) to 11% (2015).

Catch rates for yellow perch were low in 2015, however no catch rates were identified in previous creel surveys and no comparison could be made (Table 23). The average length and weight of harvested yellow perch remained similar and no comparisons could be made in the percentages of yellow perch harvested among years (Table 23).

Fresno average pool elevations during the three creel surveys ranged from 6.5-9 feet below full pool elevation (elevation 2575; Table 23).

Table 23. Creel statistic comparison of the three previous surveys conducted at Fresno Reservoir (May-September).

Category	1990	1996	2015
Overall Catch Rate (WE/hr) May-September	0.5	0.41	0.75
Avg. Length of WE Harvested	14.8	14.2	15.38
Avg. Weight of WE Harvested (lbs.)	1.07	0.98	1.10
Percent Harvested	52%	53%	32%
Overall Catch Rate (NP/hr) May-September	0.2	0.41	0.1
Avg. Length of NP Harvested	19.8	20.4	22.6
Avg. Weight of NP Harvested (lbs.)	1.69	1.82	2.42
Percent Harvested	29%	19%	11%
Overall Catch Rate (YP/hr) May-September	N/A	N/A	0.01
Avg. Length of YP Harvested	10.8	N/A	10.5
Avg. Weight of YP Harvested (lbs.)	0.68	N/A	0.61
Percent Harvested	N/A	N/A	42%
Average Pool Elevation	2565.9	2566.1	2568.5

Discussion

The 2015 creel survey conducted on Fresno Reservoir showcased the current state of the walleye fishery and highlights the lack of diversity within this fish community from a sport fish and opportunity viewpoint. Walleye catch rates, lengths, and weights were high in 2015 when compared to surveys conducted in 1990 and 1996 (Table 23). However, catch rates for other species in 2015 remained low. Northern pike average length and weight was greater in 2015 when compared to previous creel surveys, yet anglers harvested fewer northern pike in 2015 (Table 23).

Walleye remain the primary target species for many anglers. However, this survey did highlight several other important species angler's target. Anglers increased interest in northern pike, yellow perch, and black crappie during the winter months and the interest in harvesting the vast majority of yellow perch and black crappie caught throughout the year suggest these species must be considered when making management and regulation decisions in the future.

Overall, most angler's were neutrally satisfied with their fishing experiences at Fresno in 2015. They highlighted biological, management, and social reasons as being the most important influences contributing to the current overall health of the fishery. These three categories should be at the forefront of every decision being made to this fishery and its surrounding lands and management. The

high response (98%) to knowing about the threat from aquatic invasive species suggests FWP's attempt to educate recreationists on aquatic invasive species and the importance of inspect, clean, and dry has been observed and absorbed by many.

Blaine County Fishing Waters

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.

Anita Reservoir

Anita Reservoir is a 50-acre reservoir located on BLM land in northern Blaine County. The reservoir was originally constructed in 1996 to increase waterfowl habitat and create a fishery. Not long after construction, torrential rains quickly filled the reservoir. The dam's integrity was jeopardized and needed to be breeched. The reservoir was reconstructed and never re-filled. In 2011, the reservoir filled and FWP trap and transferred pre-spawn yellow perch, black crappie, and fathead minnows in order to establish a forage base within the reservoir. In 2012, walleye fingerlings were planted and the reservoir now receives alternate year plants of 5,000 walleye fingerlings.

In 2013, two gillnets captured one black crappie and 35 yellow perch. The black crappie was 8.3 inches and the yellow perch averaged 8.06 inches. Two trap nets were also utilized and captured 49 brook stickleback, 2,297 fathead minnows, and 94 yellow perch, which averaged < 3 inches. Indicating natural reproduction is occurring within the reservoir.

In 2014, two gill nets captured two yellow perch which averaged 8.3 inches. Two trap nets were also utilized and captured 734 fathead minnows and 39 yellow perch, which averaged < 5 inches. In 2015, two gill nets captured three yellow perch ($\bar{x}$ TL= 7.1 in.) and three walleye ($\bar{x}$ TL= 7.7 in.). Two trap nets were also utilized and captured five fathead minnows, three brook stickleback, 16 yellow perch ($\bar{x}$ TL= 4.6 in.), and one walleye ($\bar{x}$ TL= 7.5 in.).

April Reservoir

April Reservoir is a 2-acre BLM reservoir located approximately 10 miles northeast of Zurich. The dam was constructed in 2001 and BLM personnel notified FWP about the potential for a new fishery. In 2010, one gill and trap net were set overnight to determine if any fishes existed within the reservoir and a thorough depth profile was done to determine if water levels were sufficient enough to sustain a fishery. The nets contained no fish and the depth profile found a max depth of 12 feet. April Reservoir was stocked in the fall of 2011 with bluegill.

In 2015, one gill and one trap net were set overnight to evaluate the stocking success. The gill net captured 32 bluegill ($\bar{x}$ TL= 5 in.) and the trap captured 512 bluegill ($\bar{x}$ TL= 4.6 in.). Based on these observations, In the fall of 2015 FWP utilized the abundant bluegill densities in April to trap and transfer approximately 1,245 bluegill to Wapiti to establish a forage base.

Cow Creek Reservoir

Cow Creek Reservoir is a privately owned 65 surface-acre reservoir located in the Bearpaw Mountains. Cow Creek Reservoir has been managed as a warm water fishery since 1994 and is comprised of walleye, channel catfish, black crappie, tiger muskie, and yellow perch (illegally introduced in 2001). Currently, Cow Creek Reservoir receives 5,000 walleye fingerlings biannually. Channel catfish and tiger muskie are stocked as needed.

In 2010, 12,000 pre-spawn yellow perch were transferred and stocked into Cow Creek Reservoir from the Kremlin Water Ponds and another 3,600 were transferred in the spring of 2013. Furthermore, 50 advanced fingerling tiger muskie from South Dakota were stocked in the fall 2010. The primary food sources for these sport fish are white suckers, fathead minnows, golden shiners, and northern red belly dace.

In 2015, water levels remained high and stable. Gill net surveys indicated a decrease in relative abundance of all species except tiger muskie (Table 24). Seining surveys documented average spawning/stocking success of walleye and black crappie.

Table 24. 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 (1994-2015).

		Yellow Perch		**Channel Catfish**			**White Sucker**		**Walleye**			**Tiger Muskie**	
Year	Nets	Rel. Abun.	Avg. Length	Rel. Abun.	Avg. Length	Rel. Weight	Rel. Abun.	Avg. Length	Rel. Abun.	Avg. Length	Rel. Weight	Rel. Abun.	Avg. Length
1994	2.0		--	0.0	--		2.0	--	23.5	7.2		0.0	--
1995	1.0	0.0	--	0.0	--		2.0	--	15.0	10.0	82.5	0.0	--
1996	2.0	0.0	--	5.0	9.1	116.1	1.0	--	48.0	11.1	82.3	0.0	--
1997	2.0	0.0	--	9.5	10.5	118.1	1.0	--	30.5	11.9	86.9	0.0	--
1998	3.0	0.0	--	6.3	13.9	107.7	7.0	14.6	11.3	13.2	87.1	0.0	--
2001	2.0	0.5	5.6	4.5	17.0	103.7	0.5	--	12.5	13.3	94.7	0.5	15.7
2003	2.0	0.0	--	11.0	19.5	115.7	8.0	15.9	1.0	13.0	97.0	1.5	19.4
2005	2.0	1.0	9.8	9.0	21.3	104.3	6.0	17.6	8.0	14.7	85.5	0.0	--
2006	2.0	1.5	9.6	9.5	21.5	108.4	7.0	17.6	12.0	13.0	87.1	0.0	--
2007	2.0	0.5	10.3	7.0	23.5	118.8	0.0	--	7.5	11.8	92.2	1.5	21.5
2008	2.0	0.0	0.0	6.0	14.4	120.4	2.5	18.1	4.5	9.3	90.5	0.0	0.0
2009	2.0	0.5	10.4	8.0	22.7	111.3	1.5	15.2	13.0	10.0	96.1	0.5	19.7
2010	2.0	0.5	5.8	0.5	13.4	135.9	2.5	17.1	7.0	9.8	97.3	0.0	0.0
2011	No Sampling Occurred												
2012	2.0	3.0	8.3	14.5	18.1	136.7	4.0	14.8	6.5	11.3	83.3	0.0	0.0
2013	2.0	0.5	7.0	2.0	16.5	118.4	7.0	14.1	10.0	11.8	77.8	0.0	0.0
2014	2.0	1.0	9.3	3.5	18.1	116.1	17.0	13.5	3.5	13.1	86.0	0.0	0.0
2015	2.0	0.0	0.0	0.0	0.0	0.0	0.5	15.7	2.5	11.3	0.0	0.5	36.5

Don's Reservoir

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

In 2015 two trap nets were set overnight to assess the fish population. The trap nets captured 157 bluegill ($\bar{x}$ TL= 2.9 in; range= 1.7-8.6 in).

Dry Fork Reservoir

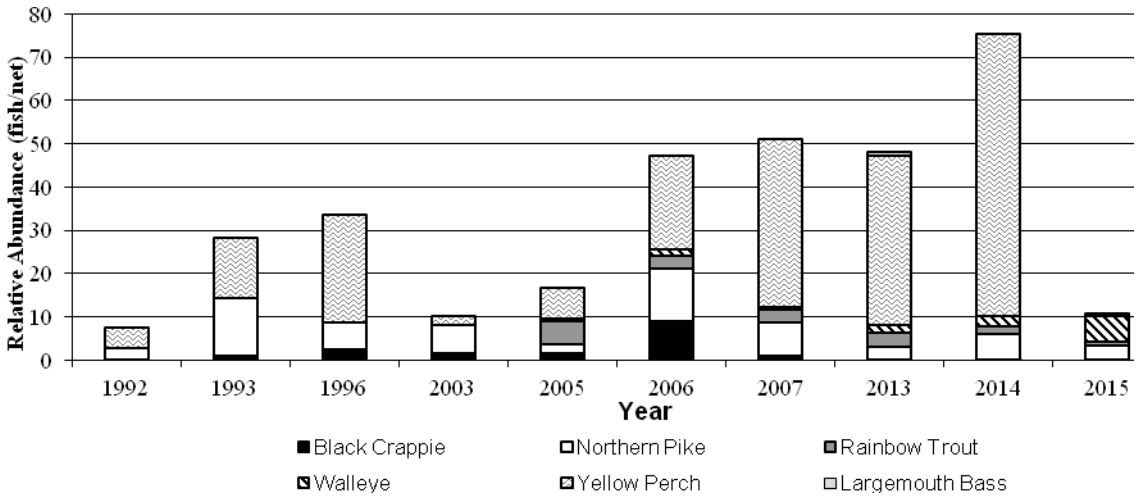
Dry Fork Reservoir is a 300 surface-acre reservoir located seven miles north of Chinook. Historically, Dry Fork has been a popular yellow perch and northern pike fishery, which has been limited by drought and subsequent water demands (irrigation) that severely reduce water levels and have eliminated this fishery twice (2001 and 2008).

In 2011, high spring runoff and rain events refilled Dry Fork. To re-establish the fishery, FWP trap and transported 3,400 pre-spawn yellow perch, 3,000 fathead minnows, and 93 adult black crappie. In 2011, 10,000 rainbow trout were stocked as well and largemouth bass were transferred via over-flow water from surrounding up-stream impoundments. In 2012, an additional 10,000 rainbow trout were stocked. Walleye fingerlings were stocked and will continue to be stocked at a rate of 10,000/biannually. In 2013, FWP continued to trap and transport adult northern pike (33) and the reservoir received 4,000 catchable rainbow trout.

In 2014 gill net surveys documented the highest relative abundances ever recorded for both walleye (2.33/net) and yellow perch (65.3/net; Figure 15). Northern pike abundance and growth continues to increase and the overall success of all sport fishes is evident based on recent statewide angling pressure surveys. In 2013/2014 this reservoir received 1,596 (± 669) angler days which ranked 18th in regional use (MTFWP Fisheries Bureau 2014).

Water conditions have remained favorable in Dry Fork. In 2015, relative abundance of all species except walleye (6/net) dropped; yellow perch abundance (0.67/net) dropped significantly (Figure 15). The average lengths of all species continue to grow, as well as the abundance of predatory species. The walleye and northern pike populations have established themselves within Dry Fork and continue to grow in size and mature. These fish are obtaining lengths that allow them to shift their diets towards other fish and likely explains the rapid drop in yellow perch abundance.

Figure 15. Relative abundance of yellow perch, northern pike, black crappie, rainbow trout, largemouth bass, and walleye in Dry Fork Reservoir (periodic sampling 1992 to 2015).



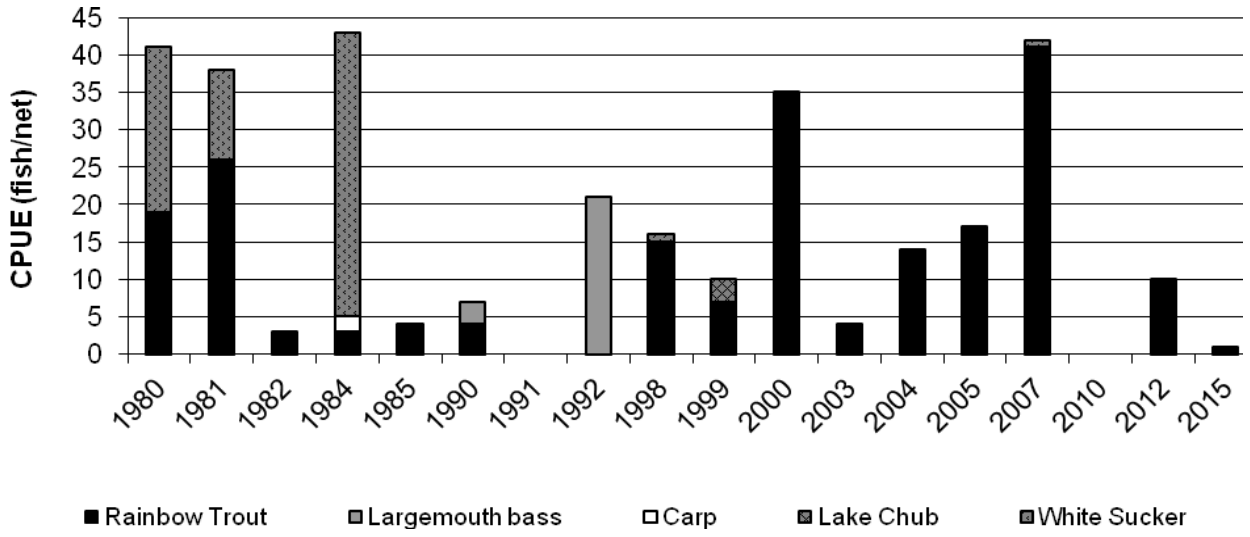
North Faber Reservoir

North Faber reservoir is a five-acre pond located on BLM land that has been managed as a rainbow trout fishery since 1972. This reservoir is maintained with annual plants of approximately 1,500 fingerling rainbow trout. Other species have been found within the reservoir during annual surveys however the stocking records are not complete, so it is not clear if these fish were legally or illegally introduced.

In 2010, gill and trap net surveys suggest a winterkill occurred as no rainbow trout were captured. The trap net contained 20 fathead minnows. North Faber received 1,500 rainbow trout in May 2010 and 2011. Bluegill and largemouth bass were also stocked in 2011 due to increased water levels and to diversify the fishery.

In 2012, one gill net captured 10 rainbow trout (Figure 16). Rainbow trout ranged in length from 5.3-18.3 inches ($\bar{x}$ =14.38 in.) and weighed 0.07-3.40 lbs. ($\bar{x}$ =1.54 lbs.). One trap net captured 5 brook stickleback, one rainbow trout (TL=13.9 in; WT=0.98 lbs.), and 40 bluegill ($\bar{x}$ TL= 7.52; $\bar{x}$ WT= 0.47 lbs.). Anglers also reported catching largemouth bass from 6-12 inches throughout the summer. In 2015, one gill captured one rainbow trout (21.7 in; Figure 16). One trap net captured 32 bluegill ($\bar{x}$ TL= 7.48; $\bar{x}$ WT= 0.49 lbs.).

Figure 16. - Relative abundance of rainbow trout, largemouth bass, carp, lake chub, and white suckers in North Faber Reservoir, 1980 to 2015.



Reser Reservoir

Reser reservoir is located in northwestern Blaine County. This reservoir has been managed as a fishery since 1981 and over the years has been stocked with fathead minnows, lake chub, northern redbelly dace, western silvery/plains minnows, golden shiners, largemouth bass, channel catfish, toger muskie, black crappie, bluegill, and rainbow trout. This reservoir had frequent winterkills occur in the early 1990s and as a result a windmill aeration system was installed. Since the installation of the aeration system, two partial fish kills have occurred. One was suspected to have occurred as a result of chemical runoff from surrounding fields and the other occurred during the winter of 2010/2011.

Following the winterkill in 2010/2011, FWP stocked largemouth bass, rainbow trout, black crappie, and bluegill. Resers fish assemblage continues to be dominated by golden shiner and yellow perch (Figure 17). The largemouth bass stocked in 2011 have reached 14+ inches and are approaching

three pounds, suggesting good forage conditions for this species. Trap netting also confirmed successful spawning and recruitment of stocked bluegill and black crappie (Figure 18). In 2013/2014 this reservoir received 78 (± 78) angler days (MTFWP Fisheries Bureau 2014). In 2015 the BLM improved the road accessing Reser by installing a new cattle guard, re-sloping and graveling the road, and creating a parking area on the south side of the dam.

Figure 17. - Relative abundance of rainbow trout, largemouth bass, yellow perch, golden shiner, black crappie, and bluegill collected with sinking experimental gill nets in Reser Reservoir, 1987-2015.

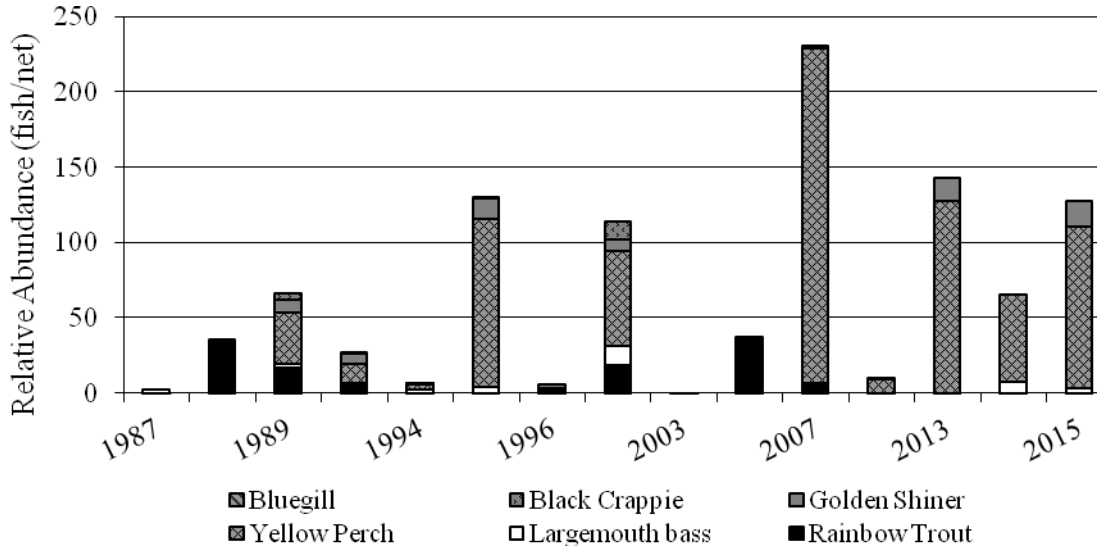
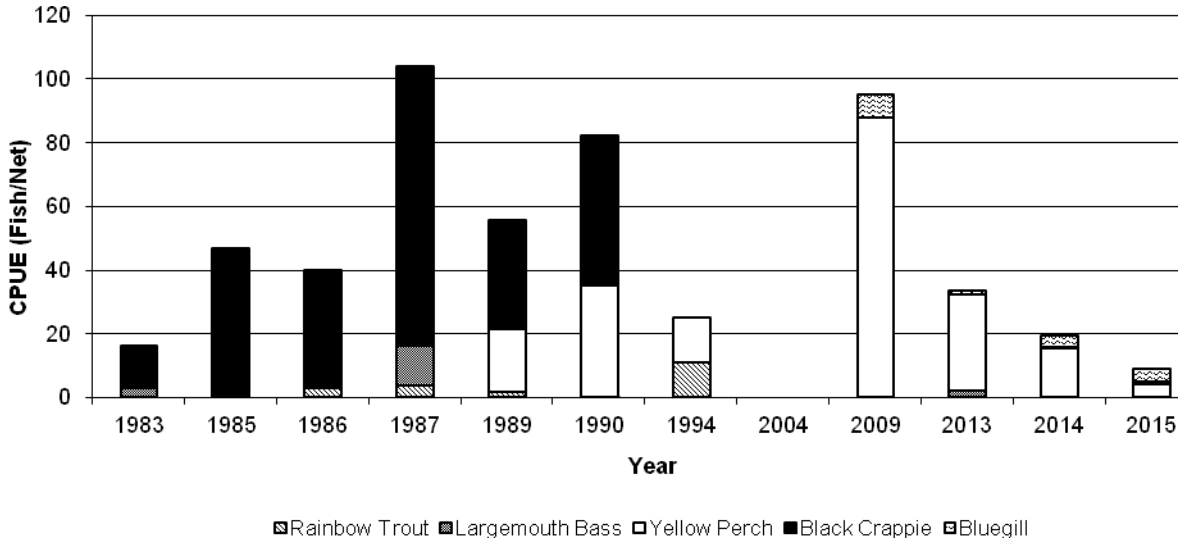


Figure 18. - Relative abundance of rainbow trout, largemouth bass, yellow perch, golden shiner, black crappie, and bluegill collected with trap nets in Reser Reservoir, 1983-2015.



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.

Doucette Reservoir

Doucette Reservoir is a 6 surface-acre reservoir located on BLM land approximately 10 miles northeast of Dodson. Historically, Doucette has been managed as a rainbow trout fishery, stocked with rainbow trout fingerlings from 1979-1996, annually. Largemouth bass were also stocked in 1987 in an attempt to diversify the fishery. Adult and juvenile largemouth bass were captured in netting surveys conducted in 1993 and 1998 (Table 25), largemouth bass captured ranged in length from 5.4-13.0 inches.

Severe drought conditions impacted the area from 2000-2008 and observations documented the reservoir down approximately 20 feet in the summer of 2004. Low water levels persisted for several more years and the stocking plan was eliminated. Near record snowfall and spring run-off conditions in 2011 filled Doucette. The reservoir was immediately stocked with 1,000 fingerling rainbow trout and 3,000 fingerling largemouth bass were stocked in the summer of 2012. This reservoir will continue to be stocked biannually with 1,000 rainbow trout and largemouth bass (as needed).

In 2012, one gill and trap net were set overnight to assess the fish population. The gill net captured 33 rainbow trout that ranged in length from 12.6-15.2 inches ($\bar{x}$ =13.95 in.) and averaged 1.22 lbs (Table 7). The trap net captured no fish. In 2015 a winterkill of rainbow trout was reported and one gill and trap net were set to assess the severity. The gill net contained one largemouth bass and the trap contained no fish. However, approximately 12 largemouth bass ranging from 5-8" were observed near the trap net but not in it.

Table 25. - Relative abundance and average total length of rainbow trout and largemouth bass in Doucette Reservoir based on gill netting surveys from 1980 to 2015.

	Rainbow Trout		Largemouth Bass	
Date	CPUE	Avg. Length	CPUE	Avg. Length
04/22/80	--	--	--	--
08/23/93	5	9.12	17	8.94
09/21/98	--	--	1	6.2
07/06/12	33	13.95	--	--
07/07/15	--	--	1	5.5

Ester Lake

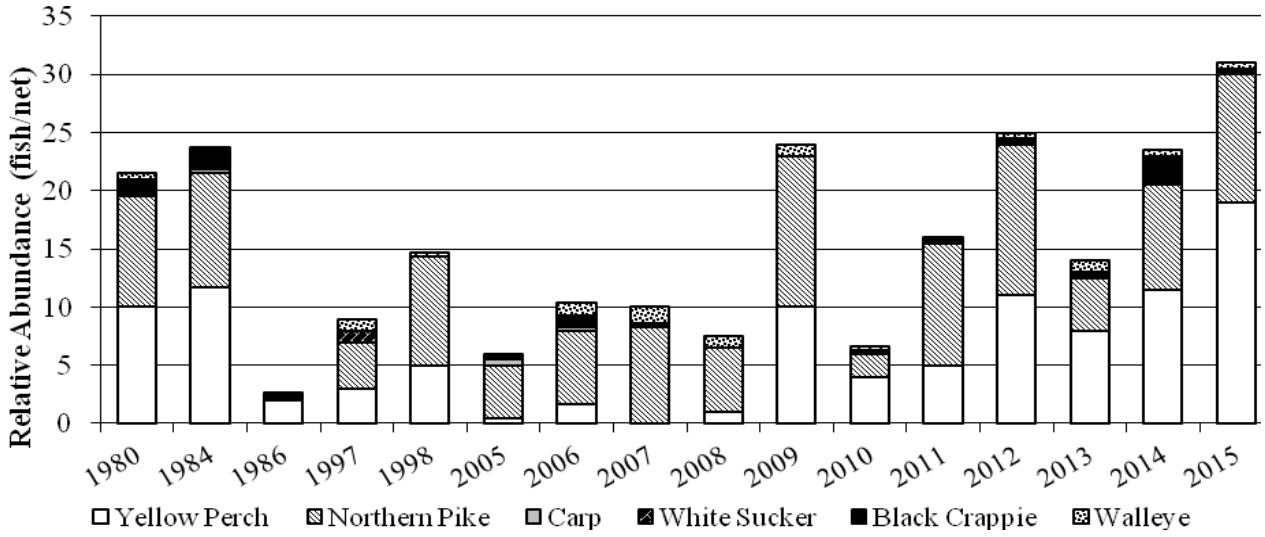
Ester Lake is a 139-acre reservoir located on state land and has been managed by FWP since the 1950s. In the 1960's Ester was a productive fishery with high numbers of yellow perch, black crappie, and walleye.

In 2009 and 2010, Ester received 8,000 and 2,600 pre-spawn yellow perch to boost the forage base that had been non-existent since the early 1980s (Figure 19). The supplemental plants of yellow perch have boosted the population and in 2011 approximately 3,900 fathead minnows were planted to establish a secondary forage species. In 2012, an additional 3,500 yellow perch were stocked to

supplement the adult population and another 1,733 pre-spawn adult yellow perch were trap and transferred in 2014.

Netting surveys conducted since initiating the supplemental yellow perch stocking in 2009 suggest a more balanced fishery with very good abundance of yellow perch and northern pike (Figure 19). Abundance, growth and condition of all species have been very good and the status of this fishery is the best we've documented in 30 years.

Figure 19. - Relative abundance of yellow perch, northern pike, carp, white sucker, black crappie, and walleye in Ester Lake (periodic gill net sets 1980 to 2015).



Nelson Reservoir

Nelson Reservoir, located 19 miles northeast of Malta is an off-stream storage reservoir constructed in 1915 for irrigation along the Milk River. 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 conditions, when compared to other regional reservoirs, with an average annual fluctuation of 8.36 feet and average water retention time of 24 days (storage capacity (acre-feet)/average annual inflow (acre-feet)).

Nelson was established as a fishery in the 1930s & 40s with the introduction of largemouth bass, black crappie, bullheads, and rainbow trout. Commercial fishing for carp, buffalo, and goldeye was conducted in the 1920s, 30s, and again in the mid 60s. Nelson has approximately 26 fish species and is managed primarily as a walleye fishery. Walleye reproduce naturally in Nelson; however walleye fingerlings have been stocked annually since 2003 to supplement an already good population. Increased stocking effort has had little impact to the walleye population thus far and will be further evaluated in coming years. Spawning shoals were constructed in 1993 at three locations within the reservoir to improve the spawning habitat for walleye. Their contribution to the overall spawning success of walleye is unknown and may function more as rearing habitat.

Population Status of Adult and Young-of-Year Fishes

Since 1993, adult fish populations have been monitored at 10 fixed experimental gill netting stations. Gill netting is conducted over a two-day period utilizing five sinking experimental gill nets each day (10 net-days). The sinking multi-filament experimental gill nets measure 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.

The abundance and reproductive success of sport and forage fishes were monitored at 10 predetermined sites. Beach seining was conducted in early August using a 75'- x 9' x ¼" square mesh beach seine. Fish were sorted by species and counted.

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, 1982-2015.

	Shorline Seined (ft)	Walleye	Yellow Perch	YP (Adult)	Northern Pike	Spottail Shiner	White Sucker	Black Crappie	Goldeye	Buffalo sp[1]	Smallmouth Bass	Longnose Sucker
1982	660	0	4,553	--	3	0	202	245	0	0	0	0
1983	1,420	4	138	--	18	0	543	238	0	0	0	0
1984	1,530	0	133	--	0	0	0	0	0	0	0	0
1985	510	3	2,272	--	16	1	16	67	1	0	0	0
1986*	700	0	3	--	7	0	10	232	0	0	0	0
1987*	495	5	1,987	--	0	4	45	10	7	0	0	0
1988*	520	0	783	--	0	1	0	35	0	0	0	0
1989*	910	10	736	--	4	43	1,503	135	0	0	0	0
1990	1,320	7	2,631	--	1	56	181	21	0	0	0	0
1991*	660	8	77	--	1	54	33	26	0	0	0	0
1992	635	21	140	--	6	387	175	18	0	4	0	0
1993*	520	3	8,287	--	1	520	2,688	62	0	0	0	0
1994*	830	6	1,802	--	10	621	697	49	0	0	0	0
1995*	760	36	232	--	0	3,780	180	163	0	0	0	0
1996*	870	25	4,521	--	13	21	101	0	0	0	0	0
1997*	890	53	2,205	--	0	159	534	1	0	0	0	0
1998*	340	0	126	--	0	33	235	4	0	0	0	0
1999	750	11	1,489	--	2	222	497	1	0	0	0	0
2000*	440	4	449	--	2	189	258	5	6	0	0	0
2001	430	2	72	--	1	27	800	88	0	0	0	0
2002*	415	2	19	--	4	8	38	482	21	62	0	0
2003	530	3	361	--	33	49	235	6,597	0	0	3	0
2004*	443	10	1,781	--	0	19	195	5	1	0	10	0
2005*	754	5	423	--	2	34	155	278	23	5	1	0
2006*	831	3	773	--	8	66	319	89	0	3	1	0
2007*	489	6	586	--	2	75	596	5	0	12	9	0
2008*	500	10	62	--	0	8	272	1,237	11	94	11	0
2009*	750	4	4,522	--	4	3	478	20	8	2	61	14
2010*	750	11	2,914	184	3	98	224	131	0	0	115	2
2011*	750	8	2,404	530	6	34	181	69	0	0	40	0
2012*	750	2	685	312	1	66	49	935	0	7	6	1
2013*	750	1	362	2	6	48	24	261	0	7	8	0
2014*	750	6	345	280	4	36	38	2,564	6	112	7	0
2015*	750	1	883	8	5	6	26	80	0	2	60	0

*Years in which walleye fry or fingerlings were stocked

[1] Consists of bigmouth buffalo and smallmouth buffalo

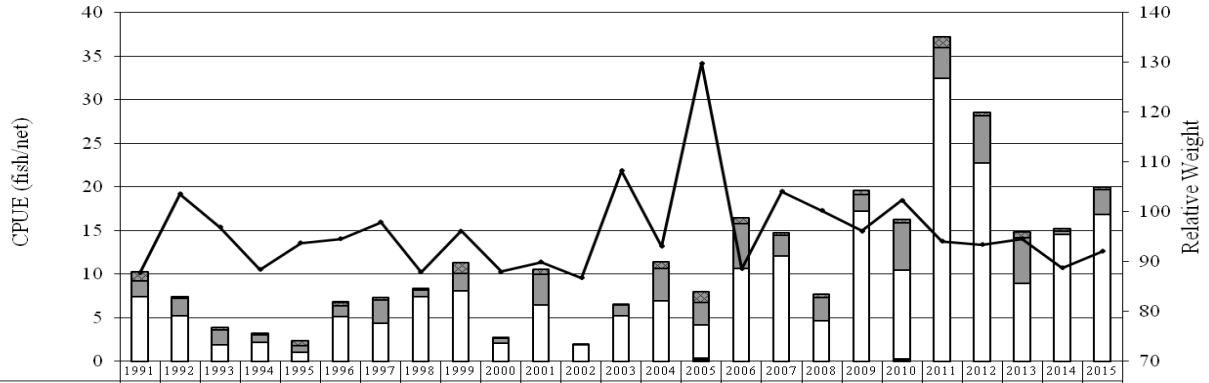
Yellow Perch

The yellow perch fishery in Nelson Reservoir has been cyclic over the last 15 years due to drought, timing of water fluctuations, and quality of available spawning habitat. In the early 1990s and

in 2000 and 2002, the relative abundance of yellow perch was significantly reduced due to severe drought conditions and reduced pool elevations (Figure 20). However, since 2003 spring and summer rains have enabled water levels to flood shoreline vegetation and remain stable during crucial spawning and rearing periods (April-October), resulting in the highest yellow perch densities seen in Nelson (Table 26; Figure 20).

In 2011, yellow perch relative abundance was the highest ever recorded (37.1 perch/net) and consisted mostly of stock (5-7.9 in.) and quality (8.0-9.9 in.) sized fish. Yellow perch relative abundance remained high in 2012 (28.5 perch/net), densities then dropped significantly in 2013 (15 perch/net), stabilized in 2014, and increased in 2015 (Figure 20). Current relative abundance of yellow perch remains above the long-term average (11.8 perch/net). The majority of fish sampled in 2015 consisted of stock sized yellow perch. The yellow perch population has responded well due to several consecutive exceptional water years and will remain stable if the current water conditions persist.

Figure 20. - Relative abundance, size structure, and relative weight of yellow perch collected with sinking experimental gill nets in Nelson Reservoir, 1991-2015.



	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Memorable (>12 in.)	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0
Preferred (10-11.9 in.)	1.00	0.20	0.20	0.20	0.60	0.40	0.30	0.10	1.30	0.10	0.60	0.00	0.10	0.80	1.20	0.70	0.3	0.3	0.4	0.4	1.2	0.4	0.7	0.3	0.3
Quality (8-9.9 in.)	1.80	2.00	1.80	0.90	0.70	1.20	2.70	0.70	2.00	0.60	3.50	0.10	1.20	3.70	2.60	5.10	2.4	2.7	1.9	5.4	3.5	5.4	5.2	0.4	2.8
Stock (5-7.9 in.)	7.40	5.20	1.80	2.10	1.00	5.10	4.30	7.40	8.00	2.00	6.40	1.80	5.10	6.90	3.80	10.60	12	4.6	17.2	10.2	32.4	22.7	8.9	14.5	16.8
Sub Stock (<5 in.)	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.3	0	0	0	0	0.2	0	0	0	0	0
Relative weight	87.70	103.58	96.83	88.45	93.77	94.56	97.87	87.94	96.13	87.97	89.95	86.76	108.25	93.10	129.76	88.60	104	100.23	96.15	102.3	94.08	93.38	94.6	88.69	92.1

Walleye

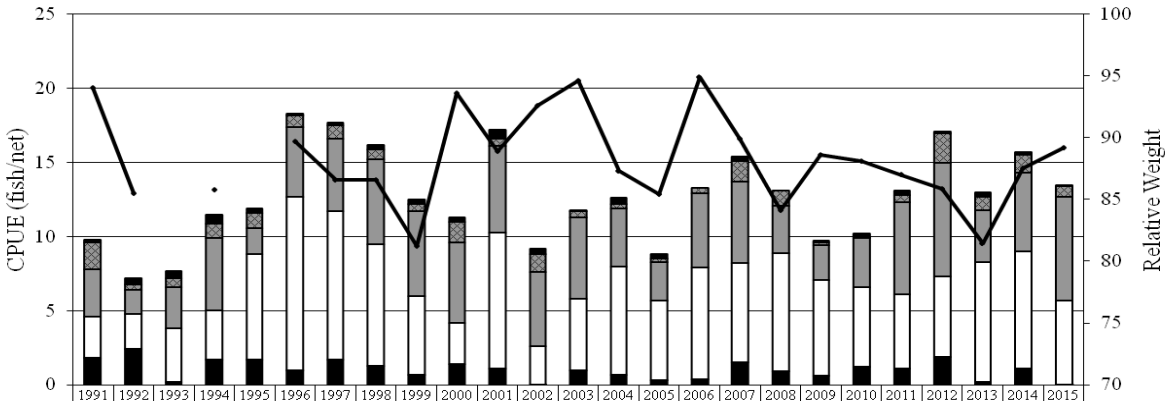
Historically, walleye fingerlings and fry have been periodically stocked into Nelson Reservoir to supplement natural reproduction. From 2002 to 2011 (with the exception of 2006), all walleye fingerlings stocked into Nelson Reservoir have been marked with 750 ppm OTC to allow the calculation of survival on stocked fish and to distinguish stocked fish from naturally reproduced fish. There was a miscommunication with the Fort peck Hatchery and no walleye fingerlings stocked in 2012 were marked, but OTC markings were completed in 2013-2015. In 2006, only half of the walleye stocked were marked with OTC due to problems with reaction of the walleye to the chemicals.

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 (10-14.9 in.) and quality size (15.0-19.9 in.) walleye in the population indicates good survival of YOY walleye from 2003 through 2015 (Figure 21). OTC analysis suggests the majority (> 70%) of YOY walleye recruiting into the population are naturally reproduced.

The relative abundance of adult walleye has historically remained stable over the years, regardless of walleye stocking densities and size (Figure 21). In 2015, walleye relative abundance was slightly above average (13.5 walleye/net; Figure 21). The current walleye population consists of a very balanced age structure and length classes (Figure 21).

Exceptional water and forage conditions are most likely the primary factors contributing to the increase in walleye densities observed in 2012. The walleye population on Nelson Reservoir has remained consistent and trend data suggests the contributions from supplemental stocking efforts aren't increasing walleye densities, and stocked fish may actually be replacing naturally reproduced walleye that would otherwise recruit into the population if no stocking would occur. Further evaluation on this species and subsequent stocking efforts are needed to better understand the current population trends.

Figure 21. - Relative abundance, size structure, and relative weight of walleye collected with sinking experimental gill nets in Nelson Reservoir, 1991-2015.



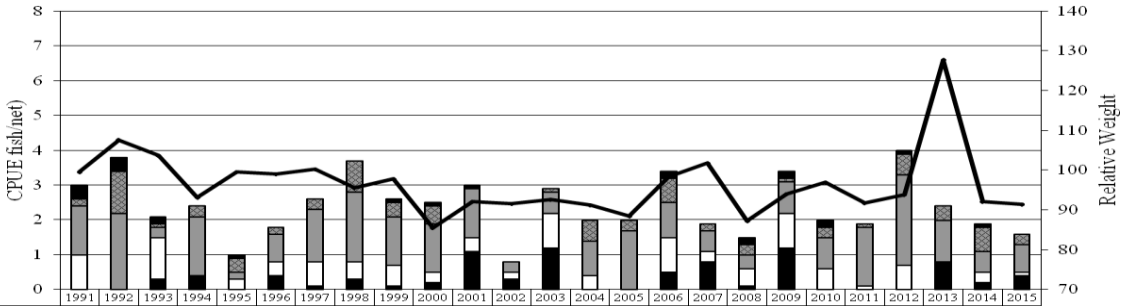
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Memorable (>25 in.)	0.20	0.40	0.50	0.60	0.30	0.10	0.20	0.30	0.30	0.30	0.60	0.40	0.10	0.40	0.30	0.00	0.3	0	0.1	0.2	0.3	0.1	0.3	0.2	0.1
Preferred (20-24.9 in.)	1.80	0.40	0.60	1.00	1.00	0.80	0.90	0.70	0.50	1.40	0.50	1.20	0.40	0.30	0.20	0.40	1.4	1	0.2	0.1	0.5	2	0.9	1.2	0.7
Quality (15-19.9 in.)	3.20	1.60	2.80	4.90	1.80	4.70	4.90	5.70	5.70	5.40	5.80	5.00	5.50	3.90	2.60	5.00	5.5	3.2	2.3	3.3	6.2	7.7	3.5	5.3	7
Stock (10-14.9 in.)	2.80	2.40	3.60	3.30	7.10	11.70	10.00	8.20	5.30	2.80	9.20	2.50	4.80	7.30	5.40	7.50	6.7	8	6.5	5.4	5	5.4	8.1	7.9	5.6
Sub-stock (<10 in.)	1.80	2.40	0.20	1.70	1.70	1.00	1.70	1.30	0.70	1.40	1.10	0.10	1.00	0.70	0.30	0.40	1.5	0.9	0.6	1.2	1.1	1.9	0.2	1.1	0.1
Relative weight	94.03	85.50		85.80		89.70	86.60	86.60	81.20	93.60	88.90	92.60	94.60	87.30	85.40	94.90	89.9	84.1	88.59	88.1	86.98	85.84	81.42	87.51	89.2

Northern Pike

Historically, the relative abundance of adult northern pike has remained stable, consisting of a high proportion of quality, preferred, and memorable sized fish (Figure 22). Northern pike populations were reduced in 2002 due to severe drought conditions, however the population quickly replenished itself with the recruitment of YOY fishes in 2003 (Table 26). In 2011, the northern pike population remained stable at 1.9 fish/net and was dominated by quality sized fish (Figure 22).

In 2012, northern pike relative abundance was at its highest level ever documented (4 fish/net) but has continued to drop the last three years (1.6 fish/net; Figure 22. The current pike population is very balanced. Exceptional water and forage conditions are most likely the primary factors contributing to the increased size structure of northern pike. Northern pike abundance should remain stable if the current water conditions persist.

Figure 22. - Relative abundance, size structure, and relative weight of northern pike collected with sinking experimental mesh gill nets in Nelson Reservoir, 1991-2015.

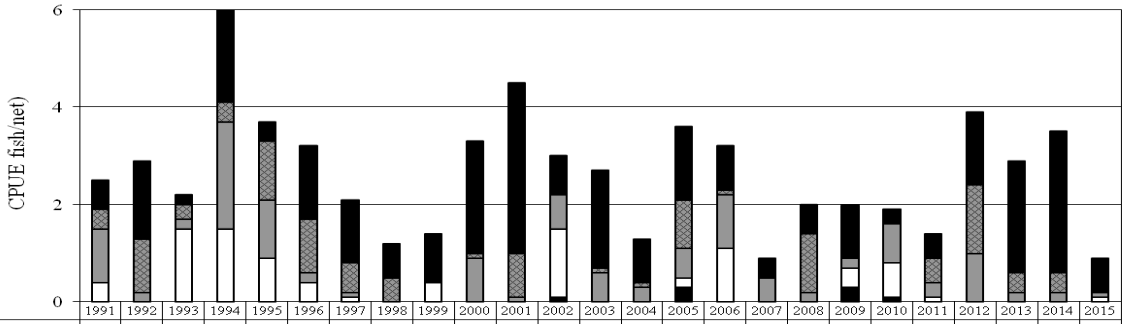


	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Memorable (>34 in.)	0.40	0.40	0.20	0.00	0.10	0.00	0.00	0.00	0.10	0.10	0.10	0.00	0.00	0.00	0.00	0.20	0	0.2	0.2	0.2	0	0.1	0	0.1	0
Preferred (28-33.9 in.)	0.20	1.20	0.10	0.30	0.40	0.20	0.30	0.90	0.40	0.50	0.00	0.00	0.10	0.60	0.30	0.70	0.2	0.3	0.1	0.3	0.1	0.6	0.4	0.7	0.3
Quality (21-27.9 in.)	1.40	2.20	0.30	1.70	0.20	0.80	1.50	2.00	1.40	1.40	1.40	0.30	0.60	1.00	1.70	1.00	0.6	0.4	0.9	0.9	1.7	2.6	1.2	0.6	0.8
Stock (14-20.9 in.)	1.00	0.00	1.20	0.00	0.30	0.40	0.70	0.50	0.60	0.30	0.40	0.20	1.00	0.40	0.00	1.00	0.3	0.5	1	0.6	0.1	0.7	0	0.3	0.1
Sub Stock (<14 in.)	0.00	0.00	0.30	0.40	0.00	0.40	0.10	0.30	0.10	0.20	1.10	0.30	1.20	0.00	0.00	0.50	0.8	0.1	1.2	0	0	0	0.8	0.2	0.4
Relative weight	99.55	107.5	103.6	93.18	99.59	99.04	100.2	95.52	97.76	85.42	92.05	91.52	92.65	91.13	88.38	98.40	101.8	87.2	93.97	96.9	91.67	93.73	127.7	92.07	91.31

Lake Whitefish

The lake whitefish population has fluctuated since 1991 due to fluctuations in water levels and summer water temperature, which have reduced recruitment of YOY fish to the population (Figure 23). In 2007, there was a massive summer kill of lake whitefish reported and fall gill netting surveys indicated a decrease in the abundance of lake whitefish (CPUE = 0.9 fish/net; Figure 23; Leslie 2007). Gill netting surveys conducted in 2012-2014 revealed increased relative abundance and size, however the relative abundance observed in 2015 reflected those numbers observed in 2007 (Figure 23).

Figure 23. - Relative abundance, size structure, and relative weight of lake whitefish collected with sinking experimental mesh gill nets in Nelson Reservoir, 1991-2015



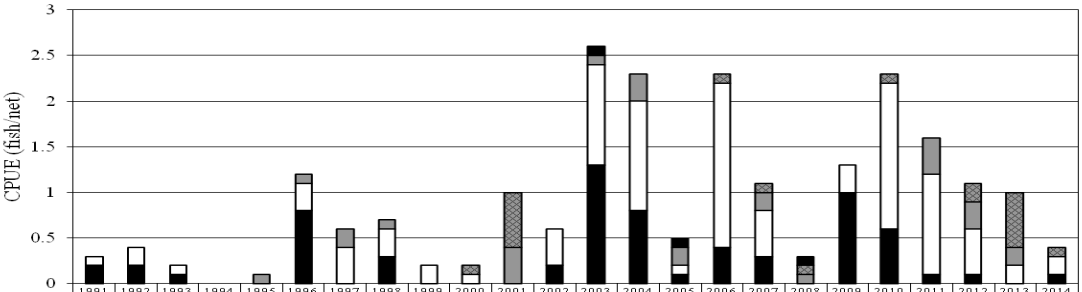
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Memorable (>18.0 in.)	0.6	1.6	0.2	1.9	0.4	1.5	1.3	0.7	1	2.3	3.5	0.8	2	0.9	1.5	0.9	0.4	0.6	1.083	0.3	0.5	1.5	2.3	2.9	0.7
Preferred (14.0-17.9 in.)	0.4	1.1	0.3	0.4	1.2	1.1	0.6	0.5	0	0.1	0.9	0	0.1	0.1	1	0.1	0	1.2	0	0	0.5	1.4	0.4	0.4	0
Quality (11.0-13.9 in.)	1.1	0.2	0.2	2.2	1.2	0.2	0.1	0	0	0.9	0.1	0.7	0.6	0.3	0.6	1.1	0.5	0.2	0.2	0.8	0.3	1	0.2	0.2	0.1
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	0	0	0.4	0.7	0.1	0	0	0	0.1
Sub Stock (<6.0 in.)	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0.3	0	0	0	0.3	0.1	0	0	0	0	0

Black Crappie

Historically there has been a low abundance of black crappie in Nelson Reservoir. Since 2003, some of the highest (2003, 2008, 2012, and 2014) and most consistent year-classes of black crappie have been observed during annual seining surveys (Table 26). Recruitment of YOY crappie into the adult population has resulted in higher relative abundances of adult black crappie during that same timeframe (Figure 24). High reproductive success over the last nine years indicates the conditions within Nelson Reservoir have been favorable for black crappie, due to rising/stable water conditions

during the month of June. If these conditions persist the population will continue to remain at good levels.

Figure 24. - Relative abundance, size structure, and relative weight of black crappie collected with sinking experimental gill nets in Nelson Reservoir, 1991-2015.



	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Memorable (>12.0 in.)	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1	0	0	0.1	0	0	0	0	0	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	0.1	0.1	0	0.1	0	0.2	0.6	0.1
Quality (8.0-9.9 in.)	0	0	0	0	0.1	0.1	0.2	0.1	0	0	0.4	0	0.1	0.3	0.2	0	0.2	0.1	0	0	0.4	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	0.5	0	0.3	1.6	1.1	0.5	0.2	0.2
Sub Stock (<5.0 in.)	0.2	0.2	0.1	0	0	0.8	0	0.3	0	0	0	0.2	1.3	0.8	0.1	0.4	0.3	0	1	0.6	0.1	0.1	0	0.1

A variety of other fishes are found within Nelson Reservoir, however they are rarely utilized as a sport fishery due to low abundances or their non-game status. Channel catfish, stonecats, bigmouth buffalo, smallmouth buffalo, and smallmouth bass are all present at low levels within Nelson Reservoir. Spottail shiners are also present and provide an important forage base, however in recent years their populations have been reduced and adult spottail shiners have not been present in high numbers within the annual seining surveys (Table 26).

It was reported that anglers are starting to figure out that Nelson has a very good adult population of smallmouth bass and the serious bass anglers are starting to target them. Good smallmouth bass reproduction has been documented in recent years (Table 26) and will continue to recruit and supplement the adult population.

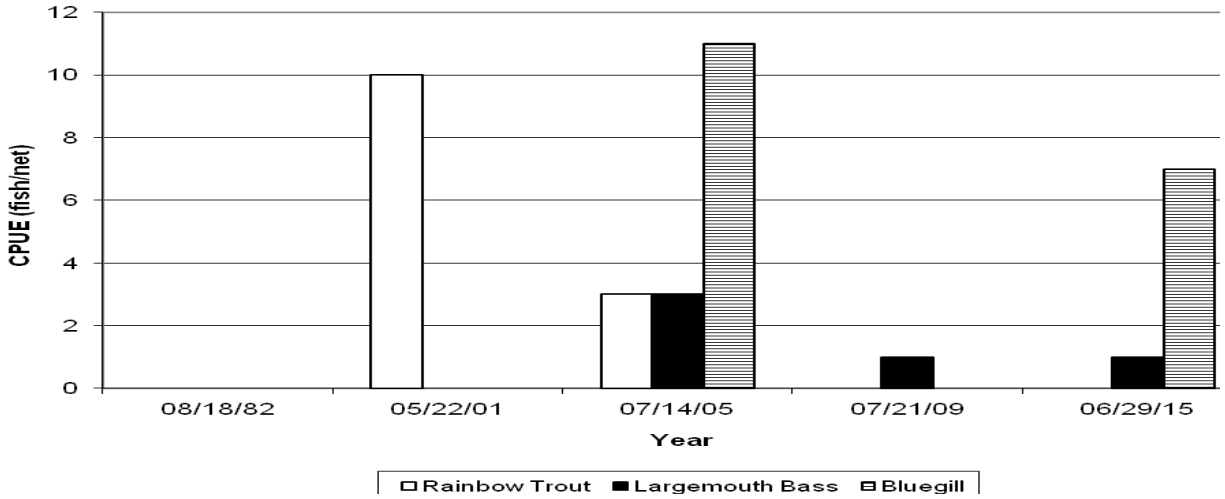
PR 20 Reservoir

PR 020 is a 7-acre pond located on BLM land in south Phillips County and is managed as a largemouth bass fishery. PR 020 was spilling over in 2004 and the reservoir has maintained good pool elevations since. Largemouth bass were last stocked in 1993 and are successfully recruiting within this reservoir. In 2009, gill net surveys resulted in one largemouth bass (TL=13.5). In 2015, one gill net captured 14 largemouth bass ranging in length from 6-9.3 inches. One trap net collected no fish.

Sagebrush Reservoir

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 by FWP in 1989 followed by bluegill and channel catfish in 2001. Rainbow trout are stocked periodically, with the last stocking occurring in 2014. A windmill aerator system was installed in 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 2009, one gill net and one trap net were set overnight. The gill net contained one largemouth bass (TL= 13.2 in.; Figure 25) and the trap net had 163 bluegill and one largemouth bass. In 2010 and 2011 Sagebrush Reservoir was utilized as a donor source for bluegill, approximately 1,270 bluegill have been removed and planted in Karsten Coulee, PR 018, and Lark Reservoirs. In 2015 one gill net collected one largemouth bass (TL=6.8 in.) and seven bluegill (Figure 25). One trap net collected 60 bluegill (mean TL=5.6 in.).

Figure 25. - Relative abundance of rainbow trout, largemouth bass, and bluegill in Sagebrush Reservoir (periodic gill net sets 1982 to 2015).

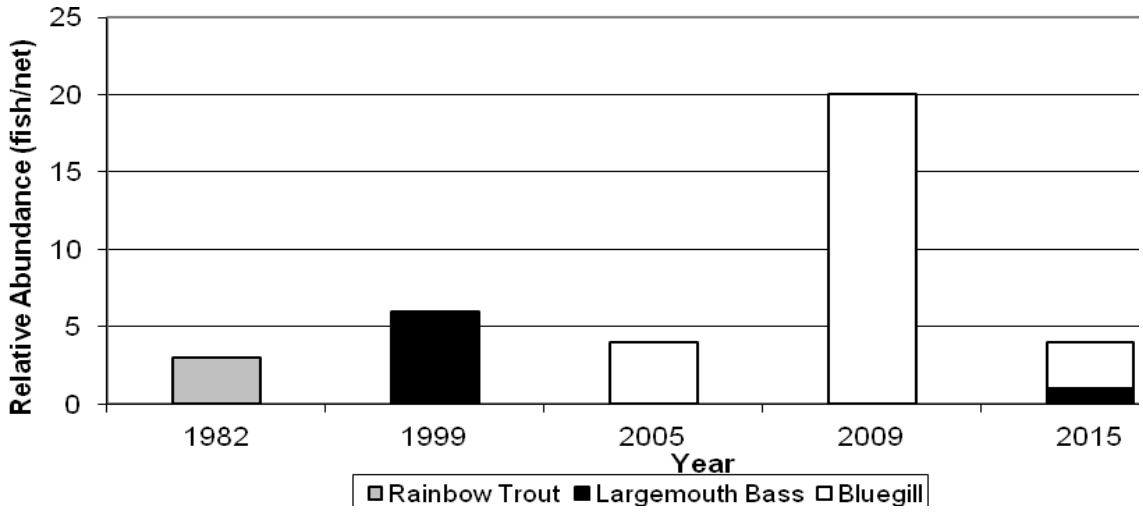


Taint Reservoir

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. In 2010 and 2011 Taint Reservoir was utilized as a donor source for bluegill, approximately 700 bluegill were removed and planted in Karsten Coulee and Lark Reservoirs. This reservoir also receives periodic plants of rainbow trout.

In 2015, one gill and trap net were set overnight. The gill net collected three bluegill and one largemouth bass (Figure 26). The trap net contained five bluegill, however many largemouth bass up to 10 inches were observed near the shoreline.

Figure 26. - Relative abundance of rainbow trout, largemouth bass, and bluegill in Taint Reservoir (periodic gill net sets 1982 to 2015).



Whiteface Reservoir

Whiteface is located on BLM land is managed as a largemouth bass fishery; however stocking records do not indicate when largemouth bass were introduced to this reservoir. Whiteface reservoir has had good water levels and was full in 2015. Gill netting surveys conducted in 2010 resulted in marginal catches rates (relative abundance=2 fish/net) and size distribution (TL=6.4 in.) of largemouth bass. Surveys conducted in 2015 yielded no fish captured (one gill and trap net). However, crews did observe many 8-10 inch bass surfacing within the reservoir and hook and line sampling captured three bass in 30 minutes of effort.

RECOMMENDATIONS

Paddlefish: Fort Peck Stock

Annual tagging efforts should continue with over 300 new paddlefish being tagged annually. An on-site paddlefish creel survey should be conducted in 2016 to provide on-site mandatory reporting stations to collect harvest data such as length, weight, sex, and jaw samples to assist in determining the age structure of the Fort Peck Reservoir paddlefish stock. A phone survey should be conducted in 2016, using the database of anglers who drew harvest tags, as well as though anglers participating in snag and release, to assess angler demographics, effort, and success during the paddlefish season. YOY visual counts should be conducted to assess reproductive success and year-class strength.

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 fingerling stocking program on Fresno and Nelson should continue to be evaluated to determine best stocking strategy for each reservoir.

Beaver Creek Reservoir

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

Hill, Blaine & Phillips Co. Ponds

Sampling of adult sport fish populations should continue annually at Bailey Reservoir, Ester Reservoir, Dry Fork, and Cow Creek Reservoir. All other ponds should be sampled every two to three years to assess adult fish populations, growth, and recruitment. In addition, new self-creel survey boxes will be distributed and/or maintained throughout each county 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

164303 Anita Reservoir
154531 April Reservoir
154535 Bailey Reservoir
154570 Beaver Creek Reservoir
164789 Cow Creek Reservoir
155030 Don Reservoir
155036 Doucette Reservoir
155083 Dry Fork Reservoir
155120 Ester Lake
165140 Fort Peck Reservoir
155240 Fresno Reservoir
162500 Missouri River Sec. 05
162520 Missouri River Sec. 06
156480 Nelson Reservoir
156535 North Faber
167780 PR 020
158860 Reser Reservoir
168047 Sagebrush Reservoir
168475 Taint Reservoir
168815 Whiteface 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

Prepared by: Cody Nagel
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