THE OUTSIDE IS IN US ALL.



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# Fisheries Division Federal Aid Job Progress Report

Montana Statewide Fisheries Management

Federal Aid Project Number:	<u>F-113-R-6</u> July 1, 2022 – June 30, 2023
Project Title:	Montana Statewide Fisheries Management
Job Title:	Havre Area Warm Water Fisheries Management

Abstract: Severe drought conditions have persisted in Hill, Blaine and Phillips Counties since 2020 resulting in marginal to severe water conditions throughout most of area. Paddlefish tagging didn't occur due to low flow conditions and snagging success was below average. Furthermore, four remote self-creel stations were fully operational in 2022 to collect paddlefish harvest information. Angler reported harvest on the Upper Missouri River paddlefish population was 260 in 2022 (3-year average harvest is 312).

Young-of-year paddlefish surveys (visual counts) were conducted in August in the headwaters of Fort Peck Reservoir, with four YOY paddlefish being observed. The average size of adult fish remains stable and observed spawning success has been good in recent years due to high spring flows and elevated reservoir levels (2008, 2011, 2018-2020). Observed year-classes in 2008 and 2011 have started to recruit into the fishery, based on young male recruits aged.

Standardized gill netting and beach seining surveys were conducted at Fresno, Nelson, and Beaver Creek Reservoirs. Select ponds and streams were sampled throughout Hill, Blaine, and Phillips Counties to assess fish populations, survival, and recruitment. Additional wild fish transfers were also completed to re-establish or supplement existing populations that winterkill. Self-creel boxes were also maintained at select ponds in Hill, Blaine, and Phillips Counties to assess fishing pressure. Results of all other sampling are presented.

Seining surveys were conducted on prairie streams located within the Fort Belknap Indian Reservation to assess species presence/absence, diversity, and detect populations of northern pearl dace and pike. Due to severe drought conditions, most streams were dry or reduced to intermittent pools. Furthermore, pool elevations were severely impacted at Fresno and Nelson Reservoirs.

# **OBJECTIVES AND DEGREE OF ATTAINMENT**

<u>Survey and Inventory-</u> 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.

<u>Fish Population Management</u>- 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.

<u>Technical Guidance</u>- 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: (5) 310 and (7) 124 projects were reviewed along with one floodplain review with local agencies.

<u>Angler Education</u>- 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 multiple articles and information on local fisheries were provided via Facebook posts, videos, and newspaper outlets.

# **Methods**

Various sampling gears and methods were used to obtain the fisheries information presented in this report (Appendix 1). Whenever possible, captured fish were sorted by species, counted, measured for total length (TL: inches (in.)) and weighed to the nearest 0.01 pound (lbs.). Additionally, aging structures were collected from harvested paddlefish (jaw section) on the upper Missouri River and walleye (otolith) from select reservoirs.

Water conditions were monitored throughout the management area using stream and reservoir gauges where applicable and during onsite visits. Voluntary creel boxes were maintained at many of the ponds to determine fishing pressure, catch rates, and satisfaction. Four self-creel boxes were used to collect data and aging structures on harvested paddlefish and a post-season phone creel was conducted to collect additional angler information.

# 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 created productive rearing habitat, resulting in increased abundance and size of paddlefish, and established a valuable recreational snag fishery in the upper Missouri River. The alteration of flows from upstream dams and fluctuating water levels on Fort Peck Reservoir can impact reproductive success and survival of young paddlefish (Leslie 2007). Reduced size of adults and fecundity of females in the upper Missouri River have also been observed (Leslie 2007). 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.

Several paddlefish regulation and season changes have been implemented since 2007 (Nagel 2020). The 2022 season ran from May 1<sup>st</sup> – June 15<sup>th</sup> and a lottery draw for harvest tags occurred; the number of harvest tags issued in 2022 was 1,000. All paddlefish harvested must be mandatorily reported via phone, MyFWP, or on-site. Anglers who don't draw a harvest tag or opt to purchase an over-the-counter snag and release license are able to snag and release paddlefish throughout the season.

Effective management requires a thorough understanding of several key aspects of their life history. In 1993, a standardized monitoring program was established to assess population size, harvest rates, spawning periodicity, age structure, and to collect information on migration and identify spawning locations (Figure 1). Sampling occurs on the Upper Missouri River during the spawning period when paddlefish are staging around the Fred Robinson Bridge (Appendix 1). This effort takes place from April through May on the ascending arm of the hydrograph, typically at or above 8,000 cubic feet per second (cfs).

Beginning in 1996, concern over spawning success 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 (Appendix 1). Visual counts have been found to be the most effective means to survey YOY paddlefish (Fredericks and Scarnecchia 1997). Observed YOY paddlefish are divided into age groups based on estimated length (YOY, sub-adult, and adult).

#### Adult Paddlefish Monitoring and Tagging

In 2022, no paddlefish tagging occurred due to extremely low flows (Figure 1). Since tagging was initiated in 1977, 9,280 paddlefish have been tagged and 1,268 tagged paddlefish have been recaptured during annual drift netting surveys. On average, approximately 12% of the paddlefish captured in our drift nets is comprised of recaptured fish. In 2021, 15.4% of the paddlefish observed during our netting efforts were recaptured fish (Figure 1). 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 2). 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 (trophic upsurge; Figure 2). In 2021, five female paddlefish captured during our tagging efforts weighed 90 or more pounds (Figure 2). Females captured in 2021 averaged 71.3 pounds (n=71).

Since tagging was initiated in 1977, a total of 1,229-tagged paddlefish have been reported as harvested, which is about 13.2% of all tagged paddlefish. In 2022, 31 tagged paddlefish (all years) were reported as harvested and 15 tagged paddlefish were reported as snagged and released. One tagged paddlefish was also found floating dead in the water during summer YOY visual counts. This fish was located upstream of Devils Creek and appeared to be a prop strike mortality.



Figure 1. Number of paddlefish tagged and recaptured during spring gillnetting efforts from 1992-2021.

Figure 2. Percent of female paddlefish captured during adult tagging efforts weighing more than 90 pounds from 1973-2021.



Year

#### **Preliminary Population Estimates and Exploitation**

Estimates of population size of the recruited portion of the Fort Peck stock were developed from 1993 through 2019 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 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 2019, the four estimates suggest an adult population consisting of approximately 18,000 paddlefish (95% CI 12,000 – 20,000).

Glassic et al. (2019) analyzed 25 years (1993-2017) of FWP mark-recapture data using modified Jolly-Seber (POPAN) models on the Upper Missouri River to estimate survival, recapture, probability of entry, and abundance of adult paddlefish. In summary, the analysis found adult female estimated survival at 0.93 (CI 0.89-0.94) and adult males 0.82 (CI 0.53-0.94). Estimated abundance of adult females was between 4,488 (CI 1,698-11,860) and 10,254 (CI 7,287-14,431) individuals and for adult males abundance was between 4,337 (CI 2,889-6,512) and 22,757 (CI 18,525-27,956).

Glassic et al. (2019) found that maximum exploitation rate was 5.0% (CI 3.9-6.6%) for females in 2006 and 6.7% (CI 5.2-8.7%) for adult males in 2006. Adult female interval fishing mortality was 0.018 (0.012-0.025) and instantaneous fishing mortality was estimated at 0.018 (0.012-0.027) in 2017. Total annual mortality for adult females in 2017 was 0.08 (0.06-0.11).

#### **Spawning and Recruitment**

Spawning success of paddlefish is 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 upstream to spawning locations. This migratory trigger 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 summer 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 year-classes observed during higher flow events.

In 2022, the Missouri River basin snow water equivalent was 75% of normal on April 1<sup>st</sup>. The Missouri River at the Fred Robinson Bridge was free of ice cover late March. Flows remained under 6,000 cfs through early June and never obtained a trigger flow (flows > 14,000 cfs). Peak flow observed in 2022 was 12,200 cfs, occurring on June 19<sup>th</sup>.

Hydrograph information (Figures 3 and 4) suggests good spawning conditions vary among years. Poor year-class strength and recruitment due to low river flows and reduced pool elevations on Fort Peck Reservoir from 2000-2007 has been observed by YOY visual counts, which have been conducted annually since 1997 (Kozfkay & Scarnecchia 2002; Bowersox 2004; Miller 2005; Miller & Scarnecchia 2006). Effort has varied due to scheduling conflicts, limited personnel, and pit tagging efforts. Good recruitment of YOY paddlefish was observed in 1997, 1998, 2008, 2011 and 2018; when flows exceeded the historical hydrograph and Fort Peck Reservoir levels were high or rising.

In 2022, zero YOY and three sub-adult paddlefish were observed during the fixed transects between RM 1846.5 and 1861.5 (Table 2). In addition to the standardized counts, we applied a total of 12.75 hours of random search effort on August 4-5<sup>th</sup> and August 16<sup>th</sup>-18<sup>th</sup> 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 1850-1864). Random counts observed a total of four YOY, 18 sub-adult, and 29 adult paddlefish (Table 3).

Table 1. Paddlefish spawning and rearing condition ratings for the years 1974-2022, using trigger flow (> 14,000 cfs) incidence and duration, and Fort Peck pool elevations. 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.

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2017     X     X (2238')       2018     X     X (2246.5')       2019     X     X (2246.8')       2020     X     X (2240.3')       2021     X     X (2230.8')       2022     X     X (2222')	2016		· · ·	x		х	· · ·			
2018     X     X (2246.5')       2019     X     X (2240.3')       2020     X     X (2240.3')       2021     X (2230.8')       2022     X     X (2222')	2017	x				X (2238')				
2019     X     X (2246.8')       2020     X     X (2240.3')       2021     X     X (2230.8')       2022     X     X (2220.2')	2018	х				/	X (2246.5')			
2020     X     X (2240.3')       2021     X     X (2230.8')       2022     X     X (2222')	2019	x				X (2246.8')	(			
2021 X X (2230.8') 2022 X X (2222')	2020	x			X (2240.3')	- ( )				
2022 X X X(2222)	2021			х	X (2230.8')					
	2022			x	X (2222')					

<sup>1</sup>Flows measured at the Landusky Measuring Station

Figure 3. - Historical and observed Missouri River hydrograph at the USGS Landusky, MT gauging station 2000-2009.



Figure 4. - Historical and observed Missouri River hydrograph at the USGS Landusky, MT gauging station 2009-2022.



Table 2. - Results of standardized YOY paddlefish visual count surveys conducted in the headwaters of Fort Peck Reservoir from 1997 to 2022.

							Reservoir	
	Transect		Station			# Sub-	Elevation	
Year	Dates	# Stations	Locations (RM)	# Transects	# YOY	Adults	(August)	Collector
97'				69	113	3	2248	
98'	7/27 to 9/23	8	1888 to 1866	216	97	54	2239	Kozfkay
99'	8/25 to 9/20	8	1888 to 1866	174	3	10	2236	Kozfkay
00'				90	0	11	2230	
01'				90	1	0	2221	
02'			1862 to 1856 ?				2219	Bowersox
03'			1862 to 1856 ?	54	2	4	2211	Bowersox
04'			1853 to 1838	54	0	3	2201	
05'	8/8 & 8/16	6	1853 to 1838	36	1	0	2202	Miller
06'	7/24 & 7/30	6	1853 to 1838	36	2	1	2204	Miller
07'	7/31 & 8/6	6	1854 to 1838	6	0	2	2201	Miller
08'	8/6 & 8/12	6	1844 to 1858	36	4	3	2209	Miller
09'	8/11 & 8/17	6	1843 to 1858	36	0	0	2220	Miller
10'	7/27 & 8/3	6	1863.5 to 1878.5	36	0	0	2236	Miller
11'	7/28 to 9/1	6	1866.5 to 1881.5	90	61	3	2242	Hemingway
12'	7/30 & 8/9	6	1863.5 to 1878.5	36	1	3	2234	Hemingway
13'	8/5 & 8/14	6	1855.5 to 1870.5	36	0	14	2226	Hemingway
14'	7/28, 8/4, & 8/17	6	1859.5 to 1874.5	54	0	0	2230	Hemingway
15'	8/3, 8/10, & 8/18	6	1866.5 to 1881.5	54	0	0	2236	Hemingway
16'	8/2 & 8/15	5	1863.5 to 1878.5	36	0	1	2235	Breen
17'	8/4 & 8/16	6	1867.5 to 1882.5	36	1	0	2239	Breen
18'	7/29 & 8/14	6	1866.5 to 1881.5	36	1	0	2245	Breen
19'	8/8 & 8/21	6	1866.5 to 1881.5	36	4	6	2246	Breen
20'	8/5 & 8/18	6	1863.5 to 1878.5	36	0	3	2240	Facer
21'	8/4 & 8/25	6	1849.5 to 1864.5	36	0	1	2230	Facer
22'	8/4 & 8/17	6	1846.5 to 1861.5	36	0	3	2221	Schott

Table 3. - Results of random YOY paddlefish visual count surveys conducted in the headwaters of Fort Peck Reservoir from 2008 to 2022.

		Effort	Station Locations		# Sub-		August Pool	
Year	Transect Dates	(Hours)	(RM)	# YOY	Adults	# Adults	Elevation	Collector
2008	8/6-8/13	24	1859-1861	42	0		2209	Miller
2009	8/11-8/17	12	1857-1862	2	3		2220	Miller
2010	7/26-9/27	75	1874.5-1884	0	26		2236	Miller
2011	7/25-8/8	27	1875-1888	205	2	13	2242	Hemingway
2012	7/31/, 8/9-8/10	14	1869.5-1884.7	1	16	75	2234	Hemingway
2013	8/ (6-7) (14-16) (21-22)	28	1859.5-1886	2	85	196	2226	Hemingway
2014	7/(29-30), 8/(5-6) (18-19)	27.25	1859-1887	0	7	54	2230	Hemingway
2015	8/4, 8/11, & 8/17	18	1865-1885	1	19	42	2236	Hemingway
2016	8/1, 8/2, & 8/16	10	1868-1880	0	1	25	2235	Breen
2017	8/3, 8/4, 8/15-8/17	15.25	1863-1887	1	1	6	2239	Breen
2018	7/29, 7/30, 8/15	11	1863-1887	11	1	6	2245	Breen
2019	8/9, 8/21, 8/22	9	1863-1887	4	10	28	2246	Breen
2020	8/4, 8/18, 8/19	8	1863-1881	3	20	40	2240	Facer
2021	8/4, 8/5, 8/25	3	1842-1867	0	1	1	2230	Facer
2022	8/3, 8/4, 8/16, 8/17, 8/18	12.75	1850-1864	4	18	29	2221	Schott

-- No data collected for observed period of record

#### Harvest: Paddlefish Creel Survey 2022

New regulations adopted on the upper Missouri paddlefish fishery altered the protocols surrounding the creel historically conducted during the paddlefish season. To accommodate anglers, four self-creel boxes were constructed to provide a location to report harvested paddlefish and collect additional harvest data. The boxes were located at Kipp, Jones Island, Slippery Ann and Rock Creek campgrounds. Boxes were checked and sanitized twice a week for the duration of the paddlefish season. Anglers who provided harvest information along with a jaw sample of their harvested paddlefish received a paddlefish hat and age letter.

Anglers were also able to submit harvest information via phone hotline or filling out the harvest collection card which was issued to them when they received their harvest tag. A phone creel was also used to collect participation, angling effort, and success from both harvest and snag and release anglers.

Figure 6. 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.



#### Paddlefish Phone Creel (2003-2022)

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 since 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 4). On average, approximately 2,680 angler's purchase a tag to snag for paddlefish above Fort Peck Reservoir, representing approximately 4,973 fishing days. On average, 1,854 paddlefish are caught above Fort Peck Reservoir with approximately 69% of the paddlefish being released (Table 4).

In 2022, phone creels were performed for harvest tag holders, snag and release (unsuccessful), and snag and release OTC. Approximately 75% of the harvest tag holders (n=750 (of 1,000)) and 28% of snag and release anglers were contacted in 2022.

### Effort

In 2022, 4,088 anglers applied for an Upper Missouri River paddlefish harvest tag, via entering the lottery draw. A total of 1,000 harvest tags were issued and an additional 1,565 overthe-counter snag and release licenses were sold. The sale of 5,653 Upper Missouri River paddlefish licenses was the highest ever documented. Increases in total licenses sold have occurred in eight of the last nine years (Table 4). Estimated paddlefish snagging effort was 5,496 angler days, with an estimated 281 paddlefish being harvested and an additional 1,193 paddlefish being caught and released (Table 4). Approximately 65% of harvest tag holders fished for paddlefish in 2022 while 40% of OTC snag and release holders and 20% of snag and release holders (unsuccessful draw) fished, respectively.

Table 4. –Summary of estimates for the Fort Peck paddlefish population from the Montana paddlefish telephone creel survey (2003-2022).

Missouri River Above Fort Peck																				
2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022																				
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	2,717	3,238	3,488	4,038	1,001	5,480	5,653
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	1,542	1,881	1,629	1,763	763	2,238	1,896
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	5,955	6,147	5,842	5,563	2,862	6,712	5,496
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	1,841	1,637	2,048	1,802	3,997	5,103	1,994	2,553	1,078	3,207	1,474
Number Harvested	868	787	1,028	1,067	634	300	564	575	598	381	292	307	334	350	346	199	305	452	415	281
Catch Rate (fish/day)	0.27	0.12	0.18	0.30	•	0.19	0.44	0.32	0.29	0.40	0.48	0.66	0.61	0.7	0.96	0.4	0.51	0.44	0.53	0.28
Harvest Rate (fish/day)	•		•	•	•								•	0.28	0.18	0.11	0.19	0.2	0.21	0.14
Percent Released	45%	29%	32%	53%	•	65%	76%	69%	58%	80%	82%	85%	82%	91%	93%	90%	88%	58%	87%	81%
Percent Contacted by F	WP Creel	Clerk/Mar	idatory Re	port		85.71%	62.14%	38.61%	60.00%	78.00%	76.00%	78.80%	83.60%	97.80%	90.60%	95.50%	94.70%	93.90%	96.50%	99.30%

\* Includes hours spent catch and release fishing

\*\* Includes lottery allocation tags plus over-the-counter snag and release tags

# Phone Creel-Supplemental Questions

In 2022, three supplemental questions were asked to anglers: 1) Satisfied with paddle fishing experience? Overall, 96% of respondents said they were satisfied with their 2022 paddlefish season. 2) Was a boat used to access snagging areas? Overall, 39.2% of respondents said they used a boat to access snagging areas. 3) Did you release at least one fish prior to harvesting a paddlefish? Overall, 17.4% of respondents said they released at least one paddlefish prior to harvest. Several reasons for release were stated but the most common response was either the fish was too small (n=35), or the fish was too big (n=7).

# **Harvest and Catch**

Anglers are required to provide the following information on their harvested paddlefish: angler harvest tag #, angler name, angler ALS #, harvest date, length (eye to fork), sex, jaw tag present (Y/N), jaw tag color, and jaw tag #. Though not required, anglers could also provide the weight and piece of the lower jaw for aging purposes. These samples were then sent to the University of Idaho for analysis.

Non-resident anglers, representing fourteen states comprised 4.4% of the harvest tag holders (Figure 5). Harvest tag holders represented 136 Montana cities; with Billings (n=140), Great Falls (n=86), Bozeman (n=72), Helena (n=47), Lewistown (n=47) and Kalispell (n=38) having the highest representation.

Angler's reported harvesting 260-paddlefish during the 2022 season (Figure 6). Angler success was evenly dispersed throughout the season. Overall success in 2022 was below average, poor flow conditions had paddlefish staging at downstream locations, fish were very dispersed, and no major upstream migration occurred during the season. Historically, angler's preferred to report their harvest to creel clerks stationed at Kipp and Rock Creek campgrounds, 2019 was the first-year anglers could report their harvested fish via the MyFWP portal. Reporting preference in 2022 was similar to historic reporting, with the majority reporting at on-site self-creel boxes (Figure 7).

Figure 5. State of origin for non-resident anglers who successfully drew a paddlefish harvest tag on the Upper Missouri River in 2022 (n=44).





Figure 6. Daily harvest of paddlefish during the Upper Missouri River paddlefish season (May 1-June 15, 2022).

Figure 7. Preference for anglers reporting a harvested paddlefish on the Upper Missouri River in 2022.



# Harvest Statistics- Paddlefish

Harvested paddlefish ranged in length from 28.0 to 58.0 inches (eye-fork length) and weight from 20 to 103 pounds (Table 5). Forty-two percent of the harvested paddlefish were females and 32/261 (12.3 %) of the harvested paddlefish had jaw tags. Harvested paddlefish ranged in age from 10 to 50 years with 51% of the harvested females (age 25-45) being classified as "prime spawners" and 13% of all harvested fish classified as new recruits (Figure 8).

Table 5. – Length, weight, and condition indices of harvested paddlefish on the Upper Missouri River (RM 1897-1921), May-June 2005-2022.

		Sample	Length Range	Length	Length	Weight	Weight	Weight
Species	Year	Size	(in.)	Avg.	50	Kange (ibs.)	Avg.	50
PF	2005	241	33.3-60.5	41.7	1.2	12.0-90.0	40.3	47.6
$\mathbf{PF}$	2006	259	28.1-65.0	42.7	1.3	15.1-112.0	47.0	36.5
$\mathbf{PF}$	2007	179	27.0-72.0	42.3	1.1	24.5-69.0	47.7	97.3
$\mathbf{PF}$	2008	322	26.0-56.8	41.0	5.7	13.0-104.0	43.5	20.8
$\mathbf{PF}$	2009	249	24.0-54	41.7	5.9	16.0-100	47.6	21.2
$\mathbf{PF}$	2010	300	28.0-60.0	42.0	5.5	16.0-115	49.4	21.8
$\mathbf{PF}$	2011	484	32.0-57.0	42.7	5.3	19.0-127.0	50.5	21.4
$\mathbf{PF}$	2012	408	30.0-54.1	42.5	5.2	20.0-119.1	48.8	21.9
$\mathbf{PF}$	2013	255	31.5-54.1	44.0	5.9	20.0-131.1	54.7	22.7
$\mathbf{PF}$	2014	203	23.5-56.5	41.8	4.8	21.0-127.0	46.9	20.2
$\mathbf{PF}$	2015	171	30.0-55.4	44.5	6.0	16.0-119.0	55.6	25.1
$\mathbf{PF}$	2016	291	25.0-70.0	43.4	5.9	18.0-119.0	54.2	24.0
$\mathbf{PF}$	2017	300	22.0-57.0	43.3	5.9	16.0-112.0	54.3	23.8
$\mathbf{PF}$	2018	198	27.0-58.1	43.1	5.6	16.0-115.1	53.5	23.7
$\mathbf{PF}$	2019	223	31.0-57.1	44.6	5.6	16.0-121.1	59.3	21.8
$\mathbf{PF}$	2020	324	24.0-57.0	44.0	6.6	17.0-117.0	56.0	24.1
$\mathbf{PF}$	2021	337	34.0-74.0	43.8	7.3	15.0-105.0	53.9	24.0
PF	2022	254	28.0-58.0	42.5	5.4	20.0-103.0	50.3	21.3

Figure 8. Age structure of male (n=99) and female (n=75) paddlefish harvested in the Upper Missouri River (RM 1897-1921) during the 2022 paddlefish season (May and June).



#### Discussion

Annual variability in Fort Peck Reservoir pool elevations and flows in the Missouri River influence the reproductive success, recruitment, and growth. 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. Furthermore, Fort Peck Reservoir water levels increased from 2008-2011 and 2018-2020 (Table 1). Successful paddlefish reproduction has been documented during YOY transects and adult fish captured during spring tagging efforts are in good condition and new recruits are being observed, based on aging structures.

Upper Missouri River flows in 2021 and 2022 were very poor and YOY transects conducted in August reflect that. Drought conditions and altered flow regime from upstream reservoirs in the upper Missouri River basin have further increased the annual variability in pool elevations on Fort Peck. If these conditions persist for an extended period, zooplankton production is reduced and potentially impacts adult condition, recruitment, and growth of YOY paddlefish into the existing population.

The increase in popularity by anglers on this fishery is being closely monitored, especially the number of paddlefish being snagged and released, and the amount of boat traffic occurring during the season. The Upper Missouri River paddlefish population continues to function as a self-sustaining fishery, with no hatchery augmentation ever occurring on this stock. The adult population continues to naturally reproduce and FWP has implemented regulations promoting sustainable harvest to the population.

#### **Hill County Fishing Waters**

#### **Bailey Reservoir**

Bailey Reservoir was constructed in 1968 covering approximately 70 surface-acres and has a maximum depth of 28 feet. In 2012, with the help of Montana Walleyes Unlimited, FWP acquired approximately 108 acres surrounding the reservoir for development of a Fishing Access Site.

Adult sport fish populations have been monitored since 1990 and a voluntary creel box was erected in the summer of 2005 and maintained through 2022 to determine angler use, catch rates, and satisfaction. Bailey ranked 26<sup>th</sup> in the region for angler pressure in 2019/2020 (361 +/-236 angler days; MTFWP Fisheries Bureau 2020).

Since 2010, population densities of all species have fluctuated greatly (Figure 9 and 10). Water levels and spawning conditions have been variable during this period and population densities have remained below long-term averages. Seining surveys conducted in 2015, 2016 and 2019 documented successful spawning and rearing, however no juvenile fish were observed in 2022, under poor water conditions (Table 6). Water levels were down approximately 10-12 feet by late July.



■ Walleye

■Black Crappie

Figure 9. – Relative abundance of northern pike, yellow perch, black crappie, and walleye in Bailey Reservoir, 2010-2022.

Figure 10. Summary of relative abundance for yellow perch, black crappie, northern pike, fathead minnow, walleye, bluegill and rainbow trout captured by trap nets in Bailey Reservoir, 2010-2022.

Year

Gamma Yellow Perch

■Northern pike



Table 6. 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 2022.

			YP	YP	NP	NP	WE	WE	BLC	BLC			
Date	Year	Sites	(yoy)	(adult)	(yoy)	(adult)	(yoy)	(adult)	(yoy)	(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				
7/26/2016	2016	4	426	3	7	0	3		1,322				
7/31/2019	2019	1	681	1	2	0	0		131				
7/27/2022	2022	4											

#### **Beaver Creek Reservoir**

Beaver Creek Reservoir, located south of Havre, is a 200-surface-acre reservoir, with a maximum depth of 70 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 19<sup>th</sup> in the region for angler pressure in 2019/2020 (930 +/- 562 angler days; MTFWP Fisheries Bureau 2020). Water levels in September were down approximately 8 feet during our sampling effort.

### Northern pike

Since 2004 northern pike relative abundance has remained stable within Beaver Creek Reservoir (Figure 11). Northern pike reproduction and adult abundance varies within Beaver Creek Reservoir due to reservoir fluctuations and spring water conditions. Good northern pike reproduction has been documented following periods of reduced water levels and quick refill events in the spring (Table 7). The current northern pike population is made up of multiple yearclasses and the condition of these fish is great, when compared to other northern pike populations in the area.

### Yellow perch

Since their introduction, yellow perch have thrived within the reservoir (Figure 11). 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, such as Home Run Pond in Glasgow.

Yellow perch abundance has trended upward recently. From 2014-2018, yellow perch relative abundance had been declining. A strong year-class from 2018 recruited into the adult population and is currently dominating the population (Figure 11). The current perch population consists of stock and quality sized fish (6-9 in.). Severe drought conditions have occurred across the region in 2017 and 2021-2022, which increased the water demands from Beaver Creek Reservoir. From July to October, reservoir pool elevations dropped approximately 15 feet, creating less than ideal rearing conditions and reduced the presence of YOY yellow perch (Table 7). These drawdowns typically result in increased terrestrial vegetation growth in the littoral zone which benefits yellow perch spawning habitat.

#### Walleye

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

Walleye in Beaver Creek Reservoir have maintained stable abundances in recent years (Figure 11). A good forage base consisting of yellow perch and high rainbow stocking rates allow walleye in Beaver Creek Reservoir to achieve memorable and trophy sizes. Walleye size structure has been slowly increasing since 2016 (PSD 25). In 2022, walleye PSD was 75 but a strong year-class of walleye < 10" was observed during netting surveys.

#### Smallmouth bass

Smallmouth bass were first introduced by FWP in 1997. A self-sustaining population of smallmouth bass now exists in Beaver Creek Reservoir. Smallmouth bass have historically had low relative abundance during gill netting surveys due to the selectivity of the gear (Figure 11). Catches of 8"-16" bass by anglers are common. Smallmouth bass reproduction is variable due to reservoir pool levels during the spawning and rearing periods (late spring/summer; Table 7). FWP will be trapping smallmouth bass from Beaver Creek Reservoir and transferring them to East Fork Reservoir (upstream impoundment) in 2023.

Table 7. 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, 2004 to 2022.

			YP			SMB	SMB		NP	WE	WE	Other
Date	Sites	YP (yoy)	(adult)	W SU	SP SH	(yoy)	(adult)	NP (yoy)	(adult)	(yoy)	(adult)	Sp. <sup>1</sup>
Aug-04	6	1,545	0	0	0	5	0	2	0	2	0	0
Jul-05	6	185	0	3	1	0	0	36	0	12	0	0
Aug-06	6	1,154	0	8	608	12	0	32	0	11	0	0
Jul-07	6	253	0	0	0	13	0	4	0	9	0	0
Jul-08	6	113	0	0	0	2	0	0	0	0	0	0
Aug-09	6	1,177	135	0	3	1	1	15	1	63	1	0
Aug-10	6	0	491	0	0	6	0	0	0	2	4	0
Aug-11	6	201	66	629	0	1	0	1	2	0	0	0
Aug-12	6	3,206	24	4	0	5	0	12	1	7	0	0
Aug-13	6	2,712	55	0	0	10	0	2	0	5	0	0
Aug-14	6	392	20	17	6	1	2	8	5	0	0	0
Aug-15	6	1,342	0	4	16	13	0	7	2	1	0	0
Aug-16	6	499	493	0	5	0	0	0	0	10	0	0
Aug-17	6	75	41	1	0	3	0	8	0	1	0	0
Aug-18	6	981	1	31	8	9	0	1	0	1	0	0
Aug-19	6	2	667	0	13	0	0	2	0	1	0	0
Aug-20	6	162	116	0	6	5	0	0	0	6	0	0
Aug-21	6	18	8	0	0	51	0	0	0	4	0	0
Aug-22	6	1,639	256	1	9	2	2	0	1	11	0	0

<sup>1</sup> Consists of emerald shiners, northern redbelly dace, lake chub, western silvery/plains minnow, brassy minnow, and longnose dace

Figure 11. Relative abundance of fishes collected during fall netting surveys (sinking gill nets), at Beaver Creek Reservoir 2004-2022.



#### **Fresno Reservoir**

Fresno Reservoir is a main-stem reservoir built in 1939 on the Milk River as an irrigation storage facility managed by the Bureau of Reclamation (Reclamation). Fresno is a highly fluctuating reservoir of 5,200 surface acres. On average, water levels in Fresno fluctuate 10-25 feet per year with an annual water retention rate of 85 ( $\pm$ 25) days (mean storage (acre-feet)/average daily in/out flows (acre-feet)). The timing of this fluctuation greatly impacts the reproduction and survival of forage and sport fish. Fresno ranked 5<sup>th</sup> in the region for angler pressure in 2019/2020 (11,155 +/- 2,586 angler days; MTFWP Fisheries Bureau 2020). Winter angling pressure in 2019/2020 was estimated at 201 angler days and made up less than 2% of the overall estimated pressure, the lowest winter angling estimate observed at Fresno since 2001.

Since 2017, FWP has partnered with the Fresno Chapter of Walleyes Unlimited to increase yellow perch spawning habitat utilizing recycled Christmas trees. Approximately 900 trees have been donated and used to construct "spawning reefs" at locations in Kremlin and Keihn's Bay, as well as bays near the dam.

Severe drought conditions and infrastructure failures have occurred along the Hi-Line and within the Milk River Project since 2017. The demands for irrigation water have been high and Fresno has been drawn down approximately 30+ feet in four of the last six years (13% of storage capacity). Poor water conditions in the spring of 2021 and 2022 has limited Reclamation's ability to re-fill the reservoir in spring, during critical spawning periods. Based on the statewide creel survey conducted by FWP in 2017/2018, Fresno received an estimated 4,370 +/- 1,979 angler days (MTFWP Fisheries Bureau 2018). This was lowest observed fishing pressure since 2001/2002, the last time Fresno pool elevations were drastically reduced.

#### **Population Status of Young-of-Year Fishes**

Historically, the abundance of YOY fishes is correlated with the magnitude of spring runoff and annual fluctuations in water levels within Fresno Reservoir. Extreme water drawdowns in Fresno greatly reduce the reproductive success and survival of most juvenile fishes (Table 8). This also correlates to the amount of available forage for walleye, the most popular gamefish targeted by anglers in Fresno (Figure 12).

Excellent water conditions had persisted within the reservoir from 2008-2016, Fresno filled to capacity and flooded a substantial amount of shoreline vegetation, creating excellent spawning and rearing habitat. In these years walleye, northern pike, yellow perch, spottail shiner, and black crappie, all benefited from this rise in water levels with excellent reproduction and survival (Table 8). Walleye have been the one species that has shown spawning success and survival of juveniles during the recent drawdowns (Table 8; Figure 16).

Table 8. – A summary of forage and YOY sport fish collected using a beach seine in Fresno Reservoir, 2013-2022.

	Seine				Northern	YP	YP	Emerald	Crappie	Spottail	Sucker	Minnow	
Year	Hauls	Sanders	Walleye	Sauger	Pike	(yoy)	(adult)	Shiner	Sp.	Shiner	$sp.^1$	sp. <sup>2</sup>	Other <sup>3</sup>
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
2016	12		21	0	1	399 <sup>-</sup>	5	263	357	641	0	6	0
2017	12		16	0	1	115	2	3	88	207	0	15	0
2018	12		30	0	4	377	1	0	136	957	1	0	0
2019	12		43	0	1	782	2	0	1,214	1,066	0	14	0
2020	12		70	2	2	574	3	0	76	449	52	0	1
$2021^{+}$	12		25	0	2	429	0	2	24	243	0	59	1
$2022^{+}$	12		22	0	1	1,360	0	0	23	222	1	11	0

<sup>1</sup>Consists of white and longnose sucker

<sup>2</sup>Consists of western silvery minnows, lake chubs, flathead chubs, and fathead minnows

<sup>3</sup>Consists of burbot, smallmouth bass, pumpkinseed sunfish, lake whitefish and brook sticklebacks

<sup>+</sup> Years in which walleye fry or fingerling were stocked

- Years in which pre-spawn adult yellow perch were supplementally stocked

Figure 12. – Percentage of empty walleye stomachs observed during fall netting surveys in Fresno Reservoir, 2017-2022 (N= number of individual stomachs checked).



### **Population Status of Adult Fishes**

In 2022, reduced water levels eliminated one standardized net location and 11 of 12 nets were set over a two-day period (Appendix 1).

# Lake Superior Whitefish

Lake Superior whitefish (whitefish) in Fresno Reservoir have historically comprised a portion of the gill net catch but are rarely targeted by anglers (Figure 13). Whitefish exhibit fast growth rates in the reservoir and thereby avoid predation from all but the largest walleye and northern pike.

Figure 13. - Relative abundance and size structure of lake whitefish collected with sinking experimental gill nets in Fresno Reservoir, 2013-2022.



# **Yellow Perch**

From 2011-2019, pre-spawn yellow perch were stocked due to excellent spring water conditions and a reliable source was available. However, this effort appears to have had little impact on yellow perch densities and recruitment (Table 8; Figure 14). Available spawning habitat, water level management, and predator densities have the greatest impacts on yellow perch population dynamics.

Low water levels throughout the fall and winter months limit overwinter rearing habitat and increases the vulnerability of YOY yellow perch to walleye and northern pike predation. The current yellow perch population is below historical population densities and is comprised of stock sized fish (Figure 14). Figure 14. - Relative abundance, size structure, and relative weight of yellow perch collected with sinking experimental gill nets in Fresno Reservoir, 2013-2022.



# Northern pike

Northern pike densities in Fresno Reservoir has fluctuated over the years (Figure 15). Northern pike reproduction has recently stabilized with most pike falling in the stock-quality size classes (Table 8; Figure 15). Northern pike relative abundance and condition (relative weight) remain low and reflect the current impacts of reduced water and forage conditions

Figure 15. - Relative abundance, size structure, and relative weight of northern pike collected with sinking experimental gill nets in Fresno Reservoir, 2013-2022.



#### Walleye

Approximately 50,000 walleye fingerlings were stocked in 2022 and follow walleye stocking strategies set forth in the Fresno Management Plan (Nagel and Dalbey 2022). The re-establishment of annual walleye plants is to increase inter and intra specific competition, increasing walleye catch rates for anglers. Continued declines in walleye relative weights have been observed for several years, and fell to 76 in 2022, the lowest relative weight observed in walleye since 2001 (Wr 71; Figure 16). Walleye growth was below average in 2022 for all ages observed and reflect the current forage shortfalls and water conditions (Figure 19).

Sampling efforts in 2022 documented walleye relative abundance at 12.4 walleye/net (Figures 16). This is the lowest observed walleye relative abundance since 2005 (4.8 walleye/net) and indicates the impacts of multiple significant water withdrawals on the entire Fresno fish community. The current population still maintains a good age and size structure with walleye to age 12 being observed and walleye PSD was 49 (Figure 17 and 18).

Figure 16. - Relative abundance, size structure, and relative weight of walleye in Fresno Reservoir for the years 2013-2022.



Figure 17. Proportional Stock Density (PSD) of walleye captured during fall gill net surveys 2012-2022.





Figure 18. Observed walleye age structure and distribution in Fresno Reservoir, 2022.

Figure 19. Walleye length at age in Fresno Reservoir, 2004-2022.



#### **Black Crappie**

Black crappie were most likely introduced into Fresno in the 1950's however the first record of stocking by FWP occurred in 1991. In 2010, YOY black crappie abundance was the highest observed since 1974 and good reproduction occurred again in 2014, 2018 and 2019 (Table 8; Figure 20). The recent spawning success of black crappie is attributed to timely spring rains and good reservoir pool levels during the spawning period (June), with water levels rising or remaining stable during this period. Although several good year-classes of black crappie have been observed since 2008, recruitment to adults has been poor (Figure 20). Rapid reductions to Fresno's pool elevations in 2017 and 2020-2022 impacted black crappie spawning conditions and likely increased entrainment and predation of the few YOY black crappie produced (Table 8).

Figure 20. - Relative abundance and size structure of black crappie collected with sinking experimental gill nets in Fresno Reservoir, 2013-2022.



#### **Blaine County Fishing Waters**

#### **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 created a fishery. In 2011, the reservoir filled and FWP trap and transferred pre-spawn yellow perch, black crappie, and fathead minnows to establish a forage base within the reservoir. In 2014, walleye fingerlings were stocked, and the reservoir now receives alternate year plants of 5,000 walleye fingerlings. Since 2015, 5,000 fingerling Gerrard rainbow trout have been stocked annually in the fall. A supplemental plant of 1,100 adult black crappie occurred in 2018 to aid in the establishment of this species.

Yellow perch and walleye have established good population densities and black crappie densities continue to remain low (Figure 21). Though yellow perch growth has been slow, trap net surveys suggest reproduction occurs annually (Table 9). Walleye stocking has been successful, with age-2 walleye obtaining 13+ inches and are likely utilizing the abundant yellow perch population as its primary forage (Figure 21; Table 9). Rainbow trout (Gerrard) stocking has also been very successful, and these fish have exhibited good growth rates, rainbow trout are exceeding 25 inches in total length (Figure 21; Table 9).



Figure 21. Relative abundance of yellow perch, walleye, black crappie and rainbow trout collected using two sinking gill nets in Anita Reservoir 2013-2022.

Table 9. Relative abundance (fish/net) and average length of yellow perch, walleye, black crappie, fathead minnow, brook stickleback and rainbow trout using trap nets in Anita Reservoir (2013-2022).

			Yellow	/ Perch	Wa	lleye	Black	Crappie	Fathead Minnow	Brook Stickleback	Rainbo	w Trout
			Rel.	Avg.	Rel.	Avg.	Rel.	Avg.	Rel.	Rel.	Rel.	Avg.
Year		Net #	Abun.	Length	Abun.	Length	Abun.	Length	Abun.	Abun.	Abun.	Length
Jun-13	2013	2	47	3					1,149	24.5		
Jun-14	2014	2	19.5	4.41					367	11		
Jun-15	2015	2	8	4.60	0.5	7.50			2.5	1.5		
Jun-16	2016	2	101.5	4.10	0.5	13.00			65		0.50	11.6
Jun-17	2017	2	93.5	4.33	2	12.63			0.5		0.50	10.3
Jun-18	2018	2	35.5	2.75	0.5	19.6			70.5		0.50	21.6
Jul-19	2019	2	5	4.67	1.5	7.57	0.50	10.8				
Jul-20	2020	2	9	4.06	5.5	11.95	1.00	3.15	3			
Jun-22	2022	2	0.5	3.6					4			

#### **Cow Creek Reservoir**

Cow Creek Reservoir is a privately owned, 65 surface-acre reservoir, located in the Bearpaw Mountains. Cow Creek Reservoir receives 3,000 walleye fingerlings biennially and channel catfish, yellow perch, and tiger muskie are stocked as needed. Cow Creek Reservoir ranked 33<sup>rd</sup> in the region for angler pressure in 2019/2020 (152 +/- 108 angler days; MTFWP Fisheries Bureau 2020).

In 2017, four artificial habitat structures were placed near the boat ramp to increase offshore habitat and potentially increase yellow perch spawning and rearing habitat. In 2020, water levels were reduced approximately four feet and an extensive algal bloom occurred in early August. Gill net surveys suggest yellow perch relative abundance remained stable and was comprised of larger fish (Figure 22). On August 12<sup>th</sup> FWP fisheries investigated a reported fish kill that had occurred a few days prior. Approximately 100+ yellow perch (6-12+"), 20 walleye

(10-20") and one channel catfish (24") were observed dead along the shoreline. The observed kill was concentrated near the upper end of the reservoir in shallower water near known weed flats. Fish health samples and additional netting was conducted in September. All disease testing results were negative, and sampling confirmed that the kill was partial and impacted primarily yellow perch. The residual impacts of the 2020 fish kill were observed during sampling conducted in 2022 (Figure 22). Relative abundance of all species were down and supplemental plants of yellow perch and channel catfish should be done in 2023 if these species are available.

Figure 22. Relative abundance (fish/net) of yellow perch, channel catfish, white sucker, walleye, and tiger muskie using gill nets in Cow Creek Reservoir (2012-2022).



#### **Dry Fork Reservoir**

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

Walleye fingerlings have been stocked since 2012 at a rate of 10,000/biennially and yellow perch, black crappie, rainbow trout, and largemouth bass have been stocked periodically to supplement the fishery. In 2019/2020 this reservoir received 1,232 ( $\pm$  755) angler days which ranked 15<sup>th</sup> in regional use (MTFWP Fisheries Bureau 2020).

Good snowpack and run-off in early 2018 re-filled Dry Fork to capacity but severe drought conditions in 2021-2022 had reservoir water levels down approximately 18 feet. Gill net surveys suggests relative abundances for all species have remained low following the initial refill of this reservoir (Figure 23). Walleye and yellow perch densities appear to be declining, shifting to a northern pike dominated fishery. Water levels are starting to reach critically low levels, similar to 2008, the last time the reservoir was dewatered. If drought conditions continue to persist the Dry Fork fishery will be a high risk for winter or summer kill and likely be dewatered for a third time since 2000.

Figure 23. Relative abundance of yellow perch, northern pike, black crappie, rainbow trout, largemouth bass, and walleye in Dry Fork Reservoir, 2013-2022.



### North Faber Reservoir

North Faber reservoir is a five-acre pond located on BLM land. This reservoir is maintained with annual plants of 1,500 fingerling rainbow trout. Largemouth bass and bluegill are also periodically stocked to supplement this fishery.

In 2022 water levels were down approximately 12 feet in late June. The windmill aeration system was working, and max depths observed were 10 feet. Low water conditions prevented the use of a gill net, and two trap nets were set instead. The traps captured three adult white sucker (> 16"), two adult largemouth bass were also visually observed from the shore. The white sucker observed were likely illegally introduced via bait dumping. North Faber water levels were low going into the winter and this reservoir stands a high likelihood of winterkill in 2022/2023.

#### Salmo Reservoir

Salmo reservoir is a four-acre pond with a windmill aerator located on BLM land north of Chinook. Salmo currently has rainbow trout, largemouth bass, and bluegill. The rainbow trout fishery is maintained with annual plants of approximately 1,000 catchables.

In 2010/2011 Salmo experienced a complete winterkill. Rainbow trout, bluegill, and largemouth bass were immediately stocked thereafter to re-establish sport fish populations. In 2022, two trap nets were set overnight and captured two rainbow trout ( $\bar{x}$  TL=8 in.) and six bluegill ( $\bar{x}$  TL=5.7 in). Water levels were down 14 feet and max depth was seven feet, these water conditions will increase the likelihood of winterkill in Salmo in 2022/2023.

### **Phillips County Fishing Waters**

#### **Bar Island Reservoir**

Bar Island Reservoir is a small reservoir located on BLM land in south Phillips County. This reservoir has been sampled sparingly since 2003. Sampling events in 2003 and 2005 captured only fathead minnow and white sucker. In 2017 yellow perch were also captured, but in low densities (less than five individuals). In 2022, yellow perch prevalence increased to 44, averaging 7.3 inches with some perch exceeding 10 inches. White sucker densities were also high (> 100 individuals) and fathead minnow were observed.

#### **Bresaylor Reservoir**

Bresaylor reservoir is a BLM pond located immediately downstream of Lark Reservoir. Several largemouth bass stocking events have occurred since 2008 but limited sampling has been conducted. In 2022 one trap and gill net captured four largemouth bass and additional hook and line sampling captured another six. The bass averaged 11 inches and no other fish were observed. Water levels were down approximately four feet.

#### **Cole Ponds**

The Cole Ponds are a FWP fishing access site consisting of three ponds that are approximately 9 acres each. These ponds are old gravel pits and are very deep, clear ponds. The ponds contain self-sustaining populations of largemouth bass, yellow perch, northern pike, pumpkinseed sunfish, and black crappie. Rainbow trout are also stocked to increase angling opportunity. In 2019/2020 these ponds received 137 ( $\pm$  137) angler days (MTFWP Fisheries Bureau 2020).

In 2022, three gill nets and three trap nets were set overnight to assess the fish community. Yellow perch (14/net) and northern pike (2.3/net) comprised a majority of fish captured with gill nets, rainbow trout (0.3/net) were also captured. The trap nets captured yellow perch (0.3/net), pumpkinseed (26/net) and northern pike (0.3/net).

### Ester Lake

Ester Lake is a 139-acre reservoir located on state land and has been managed by FWP since the 1950s. From 2009-2018 adult yellow perch were trap and transferred to boost densities and forage. This strategy increased yellow perch densities, providing both additional forage and established another angling opportunity during the winter months (Figure 24 and 25). The loss of our yellow perch donor source has eliminated FWP's ability to continue this effort and recent irrigation practices and drought have impacted water levels and yellow perch natural reproductive success.

In 2019/2020 Ester received 124 ( $\pm$  124) angler days (MTFWP Fisheries Bureau 2020). Drought impacts since 2017 have increased the water demands from Ester Lake and in late September it has been drawn down approximately 5+ feet annually, max depths are only 11 feet. Northern pike densities remain good and yellow perch densities have been variable. Walleye and black crappie densities have been reduced and this may be due to susceptibility to entrainment, reduced water levels during spawning periods, and/or increased predation (Figures 24 and 25). Figure 24. - Relative abundance of yellow perch, northern pike, black crappie, and walleye in Ester Lake (gill net 2013 to 2022).



Figure 25. - Relative abundance of yellow perch, northern pike, black crappie, and walleye in Ester Lake (trap net 2013 to 2022).



#### Lark Reservoir

Lark Reservoir is a 6-acre pond located on BLM land in south Phillips County. Since the mid-1990s this reservoir has been managed as a largemouth bass fishery. In 2011, approximately 300 adult bluegill were stocked into Lark to establish a primary forage base for largemouth bass and provide an alternate angling opportunity at this reservoir. Additional bluegill were stocked in 2020 and 2021.

Gill net surveys conducted over the past several years suggests the largemouth bass and bluegill populations in Lark are stable (Tables 10 and 11). The wide range in bluegill lengths observed suggests the introduction of bluegill into Lark was successful and these fish have been able to reproduce in this reservoir. Lark Reservoir is one of the more popular fisheries in south Phillips County. In 2017/2018 it was estimated Lark received approximately 390 (±390) angler days (MTFWP Fisheries Bureau 2018).

Table 10. Relative abundance and average total length and weight of largemouth bass in Lark Reservoir based on gill netting surveys from 2005to 2018.

	Largemouth Bass										
	Rel.	Avg.	A∨g.								
Date	Abun.	Length	Weight								
7/13/2005	0	0	0.00								
7/5/2007	8	9.40	0.86								
7/17/2009	2	10.40	0.59								
7/2/2014	12	9.44	0.42								
7/19/2018	2	6.55	0.13								

Table 11. Relative abundance and average total length and weight of bluegill in Lark Reservoir based on trap netting surveys from 2009 to 2022.

		Bluegill		Largemouth Bass				
	Rel.	Avg.	Avg.	Rel.	Avg.	Avg.		
Date	Abun.	Length	Weight	Abun.	Length	Weight		
7/17/2009	0	0	0	0	0	0.00		
7/2/2014	37	5.48	0.25	0	0.00	0.00		
7/19/2018	19	5.87	0.18	0	0.00	0.00		
7/12/2022	63	2.41	0.01	8	1.70			

#### Milk River (Dodson Dam and Dodson WMA)

Dodson Dam and WMA are located approximately four miles west of Dodson, just off Highway 2. The WMA consists of two off-channel oxbows with limited connectivity to the Milk River and provides limited angling access. In 2022, sampling occurred in both oxbows on the WMA as well as the Milk River immediately upstream of Dodson Dam. Max depths in the east oxbow were six feet, nine feet in the west oxbow, and 11feet upstream of Dodson Dam.

Gamefish species observed in the WMA oxbows included: northern pike, yellow perch, lake whitefish, and bluegill. Common carp, pumpkinseed, black bullhead, golden shiner, and fathead minnows were also observed. Northern pike captured ranged in length from 8.8-30.3" and yellow perch ranged from 5.5-8.8". Gamefish observed immediately upstream of Dodson Dam included: channel catfish, northern pike, smallmouth bass, walleye, and yellow perch. White sucker was also observed. Walleye and northern pike were the only gamefish species observed in high abundance. Walleye ranged in length from 12.1-22.1" and northern pike from 10.5-20".

Limited historic sampling data exists for this area but based on observations made in 2022, the WMA and Dodson Dam fisheries are great opportunities for anglers. FWP should try to increase angling access to these areas based on proximity to the town of Dodson and access from Highway 2.

### **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 as severely impacted by drought conditions, when compared to other regional reservoirs. On average, Nelson water levels fluctuate 8.36 feet and has an average water retention time of 610 days (storage capacity (acrefeet)/average annual inflow (acre-feet)).

Nelson contains 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 the population. In 2019/2020 it was estimated Nelson received approximately 13,711 ( $\pm$ 3,190) angler days (MTFWP Fisheries Bureau 2020).

Due to a Reclamation safety of dam's project and persistent drought conditions from 2020-2022, Nelson has been drawn down approximately 12+ feet four times since 2016. The unstable water conditions have impacted some fish species but have also allowed a substantial amount of terrestrial vegetation to establish in the littoral areas of the reservoir. This vegetation will benefit the fishery once water conditions begin to rebound throughout the Milk River watershed. Since 1993, fish populations have been monitored at 10 fixed sites (Appendix 1).

Table 12	А	summary	y of youn	g-of-yea	r forage	and	sport	fish	collected	at ten	fixed	sites	using	a
beach seine	in :	Nelson F	Reservoir,	, 2013-2	022.									

	Seined		Yellow	YP	Northern	Spottail	White	Black			Smallmouth	Longnose	e
Year	(ft)	Walleye	Perch	(Adult)	Pike	Shiner	Sucker	Crappie	Goldeye	Carp	Bass	Sucker	Pumpkinseed
2013*	750	1	362	2	6	48	24	261	0	7	8	0	0
2014*	750	6	345	280	4	36	38	2,564	6	112	7	0	0
2015*	750	1	883	8	5	6	26	80	0	2	60	0	0
2016*	750	11	126	16	0	108	213	1,362	0	1	2	0	5
2017	750	14	952	0	6	311	191	639	0	4	33	0	0
2018*	750	8	1,196	0	0	251	75	12	0	25	24	0	0
2019*	750	0	5	14	1	253	95	100	0	0	22	1	0
2020*	750	0	274	3	5	71	40	387	0	24	5	0	80
2021*	750	3	104	0	0	2,180	35	14	1	48	12	0	0
2022*	750	11	22	0	1	201	70	127	0	22	79	0	0

\*Years in which walleye fry or fingerlings were stocked

### **Yellow Perch**

The yellow perch population in Nelson Reservoir has historically maintained good densities and is the primary forage species for walleye and northern pike. Since 2017, spawning success has been poor and adult relative abundance has declined (Table 12; Figure 26). The yellow perch population responded well to exceptional water and habitat conditions at Nelson in 2018 and relative abundance was the second highest on record at 36.5 yellow perch/net. Yellow perch abundance has dropped to 1.4 perch/net in 2022 (Figure 26). Poor reproductive success and subsequent declines in relative abundances are likely correlated to the highly variable and poor water conditions at Nelson Reservoir for the past several years.

Figure 26. - Relative abundance, size structure, and relative weight of yellow perch collected with sinking experimental gill nets in Nelson Reservoir, 2013-2022.



#### Walleye

Historically, walleye fingerlings and fry were periodically stocked into Nelson Reservoir to supplement natural reproduction. Nelson has been maintained with annual plants of 100,000 fingerling walleye since 2003. An OTC evaluation was conducted from 2007-2020 to evaluate survival of stocked walleye, the study estimated the average annual stocked walleye contribution to the adult population was 25% (Nagel 2020). Even with the addition of these fish, catch of YOY walleye during seining surveys remain similar to historic numbers (Table 12). However, the high proportion of stock (10-14.9 in.) and quality sized (15.0-19.9 in.) walleye in the population indicates consistent recruitment of walleye, resulting in stable adult relative abundances (Figure 27).

Since 2017, walleye relative abundance has fluctuated from 12.1 to 22.3 walleye/net (Figure 27). The current age structure of walleye in Nelson is dominated by age-4 fish produced in 2018 but younger year-classes are also represented (Figure 28).

Walleye condition and growth was slightly below average for walleye younger than age 5, possibly due to competition among individuals in that strong age-4 year-class that currently dominates the population (Figure 28 and 29). The future looks bright and the current age-4 year-class should continue to carry the fishery in the coming years.

Figure 27. - Relative abundance, size structure, and relative weight of walleye collected with sinking experimental gill nets in Nelson Reservoir, 2013-2022.



Figure 28. Observed walleye age structure and distribution in Nelson Reservoir, 2022.





Figure 29. Walleye length at age in Nelson Reservoir, 2004-2022.

# **Northern Pike**

Relative abundance of adult northern pike has remained stable, consisting of a high proportion of quality and preferred sized fish (Figure 30). Low reservoir pool elevations have allowed terrestrial vegetation growth in the littoral areas surrounding Nelson and young (substock) northern pike have comprised nearly half the catch during fall netting surveys conducted in 2017, 2018, and 2022 (Figure 30). These year-classes have exhibited excellent growth and the current pike population is comprised of preferred and memorable sized northern pike (Figure 30).

Figure 30. - Relative abundance, size structure, and relative weight of northern pike collected with sinking experimental mesh gill nets in Nelson Reservoir, 2013-2022.



### Lake Whitefish

The lake whitefish population has remained stable for several years with the majority of whitefish collected falling in the preferred and memorable size classes (Figure 31). Whitefish exhibit fast growth rates in Nelson but are underutilized by anglers as a gamefish.

Figure 31. - Relative abundance and size structure of lake whitefish collected with sinking experimental gill nets in Nelson Reservoir, 2013-2022.



# **Black Crappie**

Historically, black crappie persisted at low densities in Nelson Reservoir. Strong yearclasses of black crappie have been observed during annual surveys but often vanish a year or two later (Table 12; Figure 32). Reproductive success has been attributed to water levels during the early summer spawning period in June (Table 12).

Significant reductions in adult black crappie relative abundance was observed during fall gill net surveys in 2017-2019 and 2021-2022 (Figure 32). It is unknown whether this was directly correlated with reductions in pool elevations for two straight years or whether the reductions in pool elevations increased predation and/or entrainment of black crappie.

Figure 32. - Relative abundance and size structure of black crappie collected with sinking experimental gill nets in Nelson Reservoir, 2013-2022.



#### Other Fishes

A variety of other fishes are found within Nelson Reservoir; however, they are rarely utilized as sport fish due to low abundances or their non-game status. Channel catfish, stonecats, bigmouth buffalo, smallmouth buffalo, goldeye, white sucker, shorthead redhorse, pumpkinseed and smallmouth bass are all present at low levels within Nelson Reservoir

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 12) and will continue to recruit and supplement the adult population. Pumpkinseeds also showed up in higher numbers during our summer seining surveys in 2020 (Table12). This species was first documented in Nelson Reservoir in 2016 but their presence in our sampling gear has been highly variable. FWP will continue to monitor this species abundance, recruitment, and impacts/contributions to the Nelson fish community.

### PR 054

PR 054 is a 7.6-acre BLM pond located north of Malta, 3-miles from the Canadian border. This pond is managed as a largemouth bass fishery and was last stocked with largemouth bass in 2011. Bluegill were stocked in 2020 and 2021 to increase bass forage and provide additional angling opportunities.

Sampling conducted in 2022 captured seven bass and two bluegill. The bass ranged from 3-15 inches and the bluegill were less than four inches.

### **Sagebrush Reservoir**

Sagebrush reservoir is a 5.2-acre BLM pond located in south Phillips County. Rainbow trout are stocked annually. A windmill aerator system was installed in 2001. Bluegill and largemouth bass populations are self-sustaining and rainbow trout have exhibited excellent growth when they recruit into the fishery (Table 13).

Water levels in July were down approximately seven feet and a majority of the reservoir was only 2-3 feet deep when sampling occurred in 2022. Sedimentation is high at Sagebrush and it no longer has the max depths it had when originally built. Sagebrush will likely winterkill in 2022/2023.

	Ra	ainbow Tro	out	Lar	gemouth E	Bass	Bluegill				
	Rel.	Avg.	Avg.	Rel.	Avg.	Avg.	Rel.	Avg.	Avg.		
Date	Abun.	Length	Weight	Abun.	Length	Weight	Abun.	Length	Weight		
08/18/82	0	0	0.00	0	0	0	0	0	0		
05/22/01	10	11.30	0.59	0	0.00	0.00	0	0	0		
07/14/05	3	16.20	1.55	3	8.10	0.26	11	7.5	0.31		
07/21/09	0	0.00	0.00	1	13.20	1.28	0	0	0		
06/29/15	0			1	6.8	0.18	7	6	0.18		
07/20/16	0	0	0.00	1	8	0.2	4	6.65	0.2		
07/18/18	1	12.9	0.77	0			19	5.69	0.15		
07/13/22	0			1	15.6	1.89	0				

Table 13. - Relative abundance and average length and weight of rainbow trout, largemouth bass, and bluegill in Sagebrush Reservoir (periodic gill net sets 1982 to 2022).

#### **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 average lengths of fish (Table 14). 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 annual plants of rainbow trout.

Water levels were down 7 feet in July and max depths were approximately 3-4 feet. Bluegill dominated the catch but several largemouth bass were visually observed along the shore. Taint will be highly susceptible to winterkill in 2022/2023.

Table 14. - Relative abundance and average length and weight of largemouth bass and bluegill in Taint Reservoir (periodic trap net sets 2005 to 2022).

		Bluegill		Largemouth Bass					
		Avg.	Avg.		Avg.	Avg.			
Date	CPUE	Length	Weight	CPUE	Length	Weight			
07/20/05	15	5.8	0.15	0	0	0			
07/21/09	97	3.70	0.12	5	1.60	0.00			
06/29/15	5	6.80	0.29	0	0.00	0.00			
07/19/18	25	5.55	0.14	0	0.00	0.00			
07/13/22	258	4.85	0.14	0	0	0			

#### Wapiti Reservoir

Wapiti is located on BLM land is managed primarily as a largemouth bass fishery, a windmill aerator system has been installed since 2001. Golden shiner and bluegill were introduced in 2011 and 2015 to provide additional forage. Based on sampling conducted in 2022, bluegill appear to be establishing themselves in the reservoir (Table 15).

In 2022, water levels were down eight feet in July during our sampling effort. No largemouth bass or golden shiner were observed and it's unclear if a partial fish kill had occurred. Wapiti will be highly susceptible to winterkill in 2022/2023.

Table 15. - Relative abundance and average length and weight of largemouth bass, golden shiner, and bluegill in Taint Reservoir (periodic trap net sets 2009 to 2022).

	Lar	gemouth E	Bass	Golden	n Shiner	Bluegill			
	Rel.	Avg.	Avg.	Rel.	Avg.	Rel.	Avg.		
Date	Abun.	Length	Weight	Abun.	Length	Abun.	Length		
07/16/09	0	0	0.00	0					
07/23/14	247	1.50	0.00	1					
07/18/18	109	2.44	0.00	1	5.70	1	2.8		
07/12/22	0			0		12	4.53		

### 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 historically has retained good water levels however, water levels were down 6 feet in 2022. Max depths observed were around eight feet, but no fish were captured in our sampling gear. It's unclear what the status of this fishery is but it will be highly susceptible to winterkill in 2022/2023.

# 2022 Prairie Stream Sampling- Fort Belknap Streams

In early October 2022, MFWP partnered with Fort Belknap Agency Fish and Wildlife and U.S. Fish and Wildlife Service staff to conduct prairie stream sampling on several streams located within and near the Fort Belknap Reservation (Figure 33). The primary objective of this assessment was to identify the presence of pearl dace populations within Fort Belknap. Secondary objectives were to document species composition, presence/absence of northern pike, and general fish distribution and abundance.

Historically, a limited number of stream sampling events has occurred within Fort Belknap. Two sampling events occurred in 1979 on Lodgepole and Little Peoples Creeks, People's Creek (near Boxelder Coulee) was sampled in 2000, and several streams were sampled in 2019. Surveys conducted in 2022 occurred on Beaver Creek, Big Warm Creek, Little Warm Creek, Lodge Pole Creek, North Fork White Bear Creek, People's Creek, South Fork White Bear Creek, and White Bear Creek (Figure 33). Sites were identified based on proximity to access roads and historical sampling sites. The number of hauls varied among sites and was based on the number of species observed and sampling efficiency, total haul length ranged from 30-150 feet (Table 15). A 25-foot x 4-foot x 1/8-inch mesh drag seine was pulled through the pools and beached on a low gradient shoreline. Wire mesh 24" x 12" minnow traps baited with dog food were also deployed at several sites. Fish were sorted by species and counted (Table 16).

Regional drought conditions impacted stream flows at most locations, many streams were dry or reduced to intermittent pools (Figure 33). There were several areas on Beaver Creek and Lodgepole Creek with large pools created by beaver dams and one area on Little Warm Creek with some larger pools created by muskrats. These areas were very difficult to sample using active gear due to deep water and complex habitat (woody debris). Minnow traps were used in these locations with varying success.

# Beaver Creek- (Adjacent to Beaver Creek Highway)

This site was surrounded by native prairie and consisted of three large pools formed by beaver dams; water was flowing at the site. Habitat complexity was high and sampling gear was limited to three minnow traps set overnight. Combined, the three traps captured Northern redbelly dace, fathead minnow, and brook stickleback (Table 16).

### Big Warm Creek (4 Sites)

**BW1** (Beaver Creek Highway crossing) - This site was surrounded by native prairie and consisted of cobble, gravel, and sand. Stream flow was very good at this site and one minnow trap was set overnight on the downstream side in a large plunge pool. No fish were captured but one virile crayfish was observed in the trap (Table 16).

**BW2** (TRS 26N26E05) - This site was surrounded by native prairie and the stream was slightly altered due to a failed road crossing. Stream substrates consisted of mixed cobble/gravel and sand/silt; water was flowing at this location. Two seine hauls captured six fish species and one virile crayfish at this site. White sucker, northern redbelly dace, brassy minnow, and lake chub had the highest densities, longnose dace and longnose sucker were also observed (Table 16). This was the first observation of longnose sucker in Big Warm Creek.

Additionally, we collected anal fin clips from lake chub (N=10) at this site for genetic analysis. The primary objective of this sampling effort was to determine if any pearl dace populations occur within Fort Belknap. Lake chub closely resemble pearl dace and field ID is often difficult using physical characteristics alone. Genetic analysis confirmed the species we observed were lake chub, previous surveys also observed lake chub in this stream.

**BW3** (State lands off Stage Road) - This site was surrounded by native prairie and consisted of rock/cobble and gravel/silt; water was flowing at this site. Three seine hauls captured eight fish species and 159 virile crayfish at this site. Longnose dace and white sucker had the highest densities. Other species observed were northern redbelly dace, brassy minnow, lake chub, fathead minnow, Iowa darter, and brook stickleback (Table 16).

**BW4** (off bridge crossing on Stage Road) - This site was surrounded by native prairie and consisted of a deep pool with large rock, sand, and silt; water was flowing. Two minnow traps were set overnight and captured lake chub, fathead minnow, and northern redbelly dace (Table 16). A personal minnow trap was also set at this location and this site is likely a popular area to collect fish intended to be used as live bait.

# Little Warm Creek (Crossing on Stage Road)

This site was located up and downstream of a road crossing on Stage Road and was surrounded by native prairie. The site consisted of dense cattails and wetland habitats; the stream was entrenched with very good connectivity to the floodplain. Several muskrat dams were in this reach as well, the bottom was a sand/gravel mix, water clarity was excellent, and water was flowing. One seine haul and two minnow traps captured fathead minnow, brassy minnow, white sucker, northern redbelly dace, brook stickleback, and lake chub (Table 16).

Additionally, we collected anal fin clips from lake chub (N=5) at this site for genetic analysis. The primary objective of this sampling effort was to determine if any pearl dace populations occur within or near Fort Belknap. Lake chub closely resemble pearl dace and field ID is often difficult using physical characteristics alone. Genetic analysis confirmed the species we observed were lake chub, previous surveys also observed lake chub in this stream.

# Lodge Pole Creek (3 Sites)

**LP1** (in Lodge Pole) - Two sites were selected within the town of Lodge Pole; both were crossings located on Route 8 and Route 11. This area was comprised of dense willow and native prairie with beaver dams constructed throughout, creating deep pools that were difficult to sample with seines. The stream was somewhat clear and comprised of cobble, gravel, and sand, water was flowing in this reach. Two minnow traps were set overnight, and no fish were captured (Table 16).

**LP2** (2.5 miles NW of Lodge Pole) – This site was located on private land located approximately 2.5 miles northwest of Lodge Pole or 5 stream miles downstream of LP1. This site was comprised of native prairie with some willow and deciduous trees located within the riparian corridor. No stream flow was observed at this location and the site was comprised of deep standing pools that varied in size. Three seine hauls were conducted in this reach and captured no fish and one virile crayfish. Beaver activity was also observed in this area.

**LP3** (3 Buttes Road Crossing) – This site was located up and downstream of the 3 Buttes Road crossing. The site was comprised of native prairie with some cattails and rush present, muskrat dams were also present. No water was flowing at this site and the reach was mostly dry with a few intermittent pools present. Stream substrate was mostly muck/mud with some aquatic vegetation present, larger rock rip rap was located within the large pool sampled immediately downstream of the crossing. Three seine hauls were conducted in this reach and captured 12 northern pike that ranged from 14"-18", an additional 15 northern pike were not captured with our gear but visually observed (Table 16). No other fish species were observed but we did observe two virile crayfish, 10 northern painted turtles, and juvenile fatmucket shells in this reach.

# North Fork White Bear Creek (Snake Butte Buffalo Pasture)

This site was located within the Snake Butte buffalo pasture approximately 4.25 miles upstream of the Highway 66 crossing on White Bear Creek. This site was surrounded by native prairie and willow, stream substrates consisted of cobble, gravel, and mud. We walked approximately 0.5 miles of stream and it was dry, no water was present (Table 16).

### Peoples Creek (3 Sites)

**People's 1** (Hwy 2 crossing) -This site was surrounded by hayfields and substrates consisted of some cobble and mud with woody debris and aquatic vegetation present throughout. Sampling occurred between two beaver dams, the stream was wetted throughout, but very little water was flowing. Four seine hauls captured white sucker, fathead minnow, and northern pike; virile crayfish were also observed in this reach (Table 16).

**People's 2** (Route 8 crossing (north))-This site was surrounded by native prairie and substrates consisted of cobble, gravel, and sand. The stream at this site was intermittent pools and stream flow was limited to a trickle. A large rock weir was constructed in the upstream portion of this reach, creating a long pool. Two seine hauls captured northern pike, common carp, white sucker, and fathead minnows (Table 16). Virile crayfish and fatmucket shells were also observed in this reach. One minnow trap set overnight in the long pool captured no fish, but two northern pike were visually observed.

**People's 3** (Route 8 crossing (south)) - This site was surrounded by native prairie and consisted of cobble, gravel, and sand. The stream at this site was mostly dry with three small intermittent pools present. Three seine hauls captured white sucker, fathead minnow and northern pike, we also captured two virile crayfish, five northern leopard frogs, and 12 northern painted turtles at this site (Table 16).

### South Fork White Bear Creek (Snake Butte Buffalo Pasture)

This site was located within the Snake Butte buffalo pasture approximately 4.35 miles upstream of the Highway 66 crossing on White Bear Creek. This site was surrounded by native prairie and willow, stream substrates consisted of cobble, gravel, and mud. We walked approximately 0.5 miles of stream and it was dry, no water was present (Table 16).

#### White Bear Creek

The site was located just upstream of the US Highway 66 crossing and consisted of a large deep pool with fine sediments and thistle. There was no stream flow, and the water was tea colored. Three seine hauls and one minnow trap set for several hours captured no fish, one northern painted turtle was observed (Table 16). This site was sampled in 2019 and several fish species were observed during that sampling effort.

# **Summary**

Water conditions throughout the sampling area were variable with most streams reduced to intermittent pools or dry. Consecutive years of drought had this area of Montana in moderate to severe drought classifications when sampling occurred. The drier conditions concentrated fish in small pool habitats that varied in depth, making sampling efficiency high in most locations. However, a handful of sites on Beaver, Big Warm, and Lodge Pole Creeks were very difficult to sample due to deep water and complex habitats created by beaver dams and dense willow stands.

Forty percent of the sites sampled had no fish observed. Two of the sites were dry and the other sites may have been due to sampling inefficiency, or no fish were present. Similar to sampling conducted in 2019, only northern pike were observed in Lodge Pole Creek in 2022 (Table 16). Additional sites were selected farther upstream in Lodge Pole Creek in 2022 and no fish were observed in these locations (Tables 15 and 16).

A total of 11 fish species were observed during the 2022 sampling effort with all but two species being native fish (Table 16). Fathead minnow, white sucker, and Northern redbelly dace were the most common species observed with the highest fish diversity being observed in Little and Big Warm Creeks (Table 16). These two streams also had the best water conditions of all sites sampled. Northern pike were observed in People's and Lodge Pole Creeks with some of these fishing approaching 20" in total length. Similar to other sampling events when northern pike are present, we observed low species diversity and the majority of other fish present are of equal or greater length of the northern pike observed (i.e., large white suckers or common carp). Longnose sucker was observed in Big Warm Creek, the first time this species has been documented there.

One of the primary objectives was to identify if pearl dace are present in any of the prairie streams on or near the Fort Belknap Reservation. Although pearl dace haven't been observed so far, more research into the historical distribution of pearl dace in Montana should occur. Sampling efforts in 2019 and 2022 identified the presence of northern redbelly dace and Iowa darter in White Bear, Little Warm and Big Warm Creeks, two species thought to have overlapping habitat requirements with pearl dace. However, it's unclear if pearl dace were found in these streams historically.

**Recommendations:** 

- 1. Investigate the water chemistry in Lodge Pole Creek to see if there are any underlying conditions limiting fish abundance and distribution in this stream.
- 2. Continue to investigate northern pike distribution in Peoples and Lodge Pole Creeks and determine if removal efforts would improve native species distribution and abundance in these streams.
- 3. Consider expanded sampling in White Bear and Little and Big Warm Creeks as part of an ongoing effort to determine pearl dace distribution and potential for restoration on Fort Belknap.



Figure 33. Locations of sampling sites within Fort Belknap boundaries, October 2022.

Table	15.1	Parameters	of fifteen	sampling	sites v	within	and near	Fort E	Belknap	boundaries,	October
2022.	Site	s with no h	aul length	were sam	pled v	vith mi	innow tra	ips onl	ly.		

Sampling Site	Sample Name	Haul Length (ft)	River Mile	Latitude	Longitude	Township	Range	Section
Beaver Creek	Beaver 1		241.7	47.95452	-108.4014	25N	26E	5
Big Warm Creek	BW 1		69.5	48.00808	-108.45197	26N	25E	13
Big Warm Creek	BW 2	50	61.3	48.03932	-108.40739	26N	26E	5
Big Warm Creek	BW 3	75	50.7	48.04709	-108.31777	27N	26E	36
Big Warm Creek	BW 4		48.1	48.06422	-108.30955	27N	26E	25
Little Warm Creek	LW 1	30	29.1	47.98955	-108.31458	26N	26E	24
Lodgepole Creek	LP 1		26.2	48.03728	-108.53154	26N	25E	5
Lodgepole Creek	LP 2	75	21.5	48.05413	-108.57109	27N	24E	36
Lodgepole Creek	LP 3	75	3.9	48.15981	-108.61372	28N	24E	27
North Fork White Bear Creek	N FK White Bear		4.8	48.36151	-108.81213	30N	22E	13
Peoples Creek	People's 1	150	4.2	48.40734	-108.38766	31N	26E	32
Peoples Creek	People's 2	75	8.1	48.36361	-108.35769	30N	26E	16
Peoples Creek	People's 3	40	24	48.28108	-108.44536	29N	25E	11
South Fork White Bear Creek	S FK White Bear		4.4	48.35407	-108.81316	30N	22E	13
White Bear Creek	White Bear 1	50	29	48.35853	-108.71572	30N	23E	15

Table 16. Water temperature, species composition, longitudinal distribution and observed abundance of fishes in streams sampled within Fort Belknap, October 2022. (\*=none observed; (--) no sampling occurred).

Species (N depicts native fish)	Beaver 1	BW 1	BW 2	BW 3	BW 4	LW 1	LP 1	LP 2	LP 3	N FK WB	People's 1	People's 2	People's 3	S FK WB	White Bear 1
Water Temperature (F)	54	64	60	59	59	58	58	56	60	DRY	58	62	66	DRY	58
brassy minnow (N)- Hybognathus bankinsoni	*	*	101	6	*	90	*	*	*		*	*	*		*
brook stickleback (N)- Culaea inconstans	1	*	*	2	*	4	*	*	*		*	*	*		*
common carp- Cyprinus carpio	*	*	*	*	*	*	*	*	*		*	2	*		*
fathead minnow (N)- Pimephales promelas	2	*	*	9	1	21	*	*	*		7	119	16		*
lowa darter (N)- Etheostoma exile	*	*	*	6	*	*	*	*	*		*	*	*		*
lake chub (N)- Couesius plumbeus	*	*	44	10	5	68	*	*	*		*	*	*		*
longnose dace (N)- Rhinichthys cataractae	*	*	2	122	*	*	*	*	*		*	*	*		*
longnose sucker (N)- Catostomus catostomus	*	*	3	*	*	*	*	*	*		*	*	*		*
northern pike- Esox lucius	*	*	*	*	*	*	*	*	27		1	8	12		*
Northern redbelly dace (N)- Chrosomus eos	59	*	19	9	2	52	*	*	*		*	*	*		*
white sucker (N)- Catostomus commersoni	*	*	22	30	*	16	*	*	*		5	3	35		*

### RECOMMENDATIONS

### Paddlefish: Fort Peck Stock

Annual tagging efforts should continue with a target of tagging 300 or more new paddlefish annually. On-site paddlefish creel survey boxes should be provided in 2023 to allow on-site mandatory reporting 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 2023, using the database of anglers who drew harvest tags, as well as 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. A snag and release mortality study should be considered to establish an annual mortality rate of paddlefish due to snag and release activities. The study should look at several variables related to each snag and release encounter (date, water temp, fight time, etc.) and either track via jaw tag or transmitter for a period of time to relocate and determine the fate of each fish.

### 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. Fresno walleye stocking strategies and management will follow the plan set forth in the Fresno Management Plan. Continue to stock 100k walleye annually into Nelson and look for habitat enhancement opportunities at both reservoirs (Christmas trees, artificial structures, etc.). Continue to be involved in the Milk River Project and various water related studies, infrastructure upgrades, and construction activities currently ongoing within the watershed.

# **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, Anita and Cow Creek Reservoirs. All other ponds should be sampled every two to five 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. Continue to identify habitat enhancement projects that benefit the fisheries and extend a ponds production and fishery value.

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Key words:

Region 6, prairie ponds, warm water species, Fresno Reservoir, Nelson Reservoir, Beaver Creek Reservoir, Bearpaw Lake, Blaine County, Hill County, Phillips County, paddlefish, walleye, Lake Superior whitefish, northern pike, black crappie, yellow perch, largemouth bass, bluegill, rainbow trout. Prepared by: <u>Cody Nagel</u>

Date: April 1, 2023

Appendix 1. Sampling methods and equipment used to conduct fish monitoring activities at various regional waterbodies.

Waterbody	Gear Type	Mesh Size (Inches)	Net Dimensions (L X W)	Number of Nets Used	Time of Year (month)	Frequency	Purpose
Bearpaw Lake	Experimental Floating Gill Net	0.75"-2.0"	125' X 6'	2	September	Annually	Species trends and abundance
	Experimental sinking Gill Net	0.75"-2.0"	125' X 6'	1	September	Annually	Species trends and abundance
	Trap Net	0.25"	3' X 4'	Multiple	April-June	Periodic	White sucker removal
Beaver Creek Reservoir	Experimental Floating Gill Net	0.75"-2.0"	125' X 6'	3	September	Annually	Species trends and abundance
	Experimental sinking Gill Net	0.75"-2.0"	125' X 6'	3	September	Annually	Species trends and abundance
	Beach Seine	0.25"	75' X 10'	6 Hauls	August	Annually	Reproduction success and forage availability
Fresno Reservoir	Experimental sinking Gill Net	0.75"-2.0"	125' X 6'	12	September	Annually	Species trends and abundance
	Beach Seine	0.25"	75' X 10'	12 Hauls	August	Annually	Reproduction success and forage availability
Nelson Reservoir	Experimental sinking Gill Net	0.75"-2.0"	125' X 6'	10	September	Annually	Species trends and abundance
	Beach Seine	0.25"	75' X 10'	10 Hauls	August	Annually	Reproduction success and forage availability
Mid-Sized Reservoirs (25- 400 surface	Experimental sinking Gill Net	0.75"-2.0"	125' X 6'	2-3	June/July	Variable	Species trends and abundance
acres)	Trap Net	0.25"	3' X 4'	2-4	June/July	Variable	Species trends and abundance
	Beach Seine	0.25"	75' X 10'	1-4 Hauls	July/August	Variable	Reproduction success and forage availability
Small Ponds (< 20 surface	Experimental sinking Gill Net	0.75"-2.0"	125' X 6'	1	June/July	Variable	Species trends and abundance
acres)	Trap Net	0.25"	2' X 3' and/or 3' X 4'	1-2	June/July	Variable	Species trends and abundance
Paddlefish							
Missouri River	Drift Net	4"	150' X 8'	1-2	April/May	Annually	Jaw tag adults to track movements, spawning periodicity, habitat use, and obtain population estimates
Fort Peck Headwaters	Visual Transects			6 sites and 18 total transects	August	Annually	Reproduction success
Prairie Streams	Seine	0.25"	25' X 4'	1	Variable	Variable	Species trends, abundance, and presence/absence

Appendix 2. Breakdown of species observed through time at five streams sampled in 2022 on Fort Belknap (P=Present \*=Absent). \*Disclaimer\*: Species distribution is variable among these streams and species presence shouldn't be assumed to be drainage wide.

Species (N = Native fish; I = Introduced)	Big	Warm	Creek I	(Beave Hwy 19	er Cree )1)	k Rd. t	o US	Little	Warm	Creek ( US Hv	Beaver vy 191)	Creek	Rd. to	Lod Lodger) E	gepole C pole Rd t Buttes Rd	reek o Three I)	People's to	Creek (U D US Hwy	S Hwy 66 2)	White Be (US Hwy Hw	ear Creek 66 to US y 2)
Sampling Date	1989	1991	1994	2000	2005	2015	2022	2005	2008	2015	2020	2021	2022	1979	2019	2022	2000	2019	2022	2019	2022
brassy minnow (N)- Hybognathus bankinsoni	*	*	*	*	Р	*	Р	*	Р	Р	Р	*	Р	*	*	*	*	*	*	Р	*
black bullhead (I)- Ameiurus melas	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	Р	*	*	Р	*
bluegill (I)- Lepomis macrochirus	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	Р	*
brook stickleback (N)- Culaea inconstans	*	*	*	*	*	*	Р	Р	Р	Р	Р	Р	Р	*	*	*	*	*	*	*	*
brook trout (I)- Salvelinus fontinalis	*	*	*	*	*	*	*	*	*	*	*	*	*	Р	*	*	*	*	*	*	*
common carp (I)- Cyprinus carpio	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	Р	*	*
fathead minnow (N)- Pimephales promelas	*	*	*	*	Р	Р	Р	Р	Р	Р	Р	Р	Р	*	*	*	*	Р	Р	Р	*
golden shiner (I)- Notemigonus crysoleucas	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	Р	*
Iowa darter (N)- Etheostoma exile	*	*	*	Р	*	*	Р	*	*	*	*	*	*	*	*	*	*	*	*	Р	*
lake chub (N)- Couesius plumbeus	*	*	*	*	Р	Р	Р	*	Р	Р	*	*	Р	Р	*	*	*	Р	*	Р	*
longnose dace (N)- Rhinichthys cataractae	*	Р	*	*	Р	Р	Р	*	Р	Р	Р	Р		Р	*	*	*	*	*	*	*
longnose sucker (N)- Catostomus catostomus	*	*	*	*	*	*	Р	*	*	*	*	*	*	*	*	*	*	*	*	*	*
mountain sucker (N)- Catostomus platyrhynchus	Р	Р	*	*	*	*	*	*	*	*	*	*	*	Р	*	*	*	*	*	*	*
northern pike (I)- Esox lucius	*	*	*	*	*	*	*	*	*	*	*	*	*	*	Р	Р	Р	*	Р	*	*
Northern redbelly dace (N)- Chrosomus eos	*	*	*	*	Р	Р	Р	Р	Р	Р	Р	Р	Р	Р	*	*	*	*	*	Р	*
plains minnow (N)- Hybognathus placitus	*	*	*	*	*	*	*	*	*	Р	*	*	*	*	*	*	*	*	*	*	*
smallmouth bass (I)- Micropterus dolomieu	Р	Р	Р	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
stonecat (N)- Noturus flavus	Р	Р	Р	*	*	Р	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
white sucker (N)- Catostomus commersoni	Р	Р	Р	Р	Р	Р	Р	Р	*	Р	Р	Р	Р	Р	*	*	*	Р	Р	Р	*
yellow perch (I)- Perca flavescens	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	Р	*

P= Present

\* = not observed