Montana Department of Fish, Wildlife and Parks
Fisheries Division

Job Progress Report

STATE: Montana **PROJECT: Statewide Fisheries Management**

TITLE: Eastern Region 6 Pond, Stream and River Sampling

JOB: Northeast Montana Warmwater Ponds and River Investigations

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ABSTRACT

Northeast Montana provides anglers with diverse fishing opportunities from iconic Fort Peck Lake to the relatively underutilized Milk and Missouri Rivers to numerous small impoundments both on public and private lands. During 2016 and 2017 Fish, Wildlife & Parks (FWP) conducted a variety of fisheries related efforts to maintain recreational opportunities and monitor existing fisheries within the eastern district of Region 6 (Figure 1.) This management zone includes Valley, Daniels, Sheridan, Roosevelt and portions of Richland, McCone and Dawson Counties. This report does not include Fort Peck Reservoir, as it is a separate management entity.

Eastern Montana went through severe drought conditions in 2017, which was one of the driest spring and summers on record. Luckily, most ponds went into 2017 with decent water levels. During 2017 the Milk River had one early peak in mid-March, which may have been enough to produce a sauger spawn. In contrast, the Missouri River was somewhat flatlined from the operations of Fort Peck Dam. During 2016, the Milk river saw prolonged discharge due to both prairie rains and the lowering of Nelson Reservoir in Phillips County. Subsequently, the Missouri River had slightly higher than average flow throughout the summer season in 2016.

In general, fish populations and angler opportunities were good throughout the region in both 2016 and 2017. The Missouri River and Fort Peck Dredge cuts have been providing a lot of opportunity for good for sauger and walleye fishing. The Milk River continues to produce an abundance of channel catfish, which has gained traction with the continuation of the Milk River Cat Classic, a channel catfish tournament on the Milk River based out of Glasgow.

Another fishery that seems to be gaining popularity is the Fort Peck Dredge Cuts paddlefish archery season. The fishery requires the purchase of a blue harvest tag. Anglers must choose between the Dredge Cut Tag, the Missouri and Yellowstone yellow tag or the white

harvest tag that is for upstream of Fort Peck Reservoir, which is administered through a drawing. Over the past several years the number of blue tags sold for the archery fishery has increased from 111 in 2011 to 297 in 2017. Interestingly, while the number of tags sold has increased dramatically, the actual harvest estimates have remained relatively stable over the past several years.

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INTRODUCTION

The quality of many Eastern Montana fisheries are closely tied to water conditions. Prairie ponds benefit from wet years by holding more water, which helps buffer daily fluctuations in water temperature and dissolved oxygen. High water often increases spawning and rearing habitat and increases prey abundance by flooding terrestrial vegetation. The majority of small ponds throughout the eastern district of Region 6 were in drought conditions during 2017 and to a lesser extent in 2016. It is unclear at this point how the severe drought of 2017 has affected many of the areas ponds.

Similar to prairie ponds, the Milk River fishery benefits from above average water years. Several species of game and non-game fish spawn during the spring and early summer with the occurrence of spring pulses form prairie runoff and later mountain runoff. These pulses increase the number of fish that migrate to spawning grounds and increase survival of eggs and larvae to young-of-the-year fish. An observed difference in the densities of sauger, walleye, paddlefish, and other fishes exists in the Milk River during “good” and “bad” water years, with abundance being higher during years with more water. There are likely biological reasons that fish migrate into the Milk River during higher water periods. For example, paddlefish lay their eggs on hard substrates such as gravel and cobble, which is only exposed in the lower Milk River when discharge is great enough to place fine substrates into suspension. These spring flows help expose gravel bars where an abundance of fish spawn.

The Milk River observed varied water conditions in 2016 and 2017. During 2016 the Milk River had an early peak in late April and early May of over 2,000 cfs (Figure 2). Subsequently, discharge increased in mid may to approximately 8,370 cfs and stayed above 1,000 cfs until June 13th. Flows then decreased from mid-June to mid-July, but still for the most part above average. Flows once again increased to above 1,000 cfs from mid-July to August 7th. These higher flows were in large part due to the draining of Nelson Reservoir in Phillips County, an off channel storage reservoir near Malta, MT.

During 2017, the Milk River had a large pulse from mid-March peaking at 7,540 on March 21st. Flows then decreased, but stayed above 1,000 cfs until April 10th. From then, flows remained relatively low for the remainder of the season.

The Missouri River is heavily managed by the operations of Fort Peck Dam. Fort Peck Dam greatly dampens spring and early summer flow pulses. However, the Milk River significantly influences the magnitude of flows in the Missouri on above water years. During 2016, Missouri river flows were on average higher than the normal, with a peak of 16,000 cfs on May 16th. For the remainder of the summer, flows remained close to 10,000 cfs.

This report summarizes FWP fisheries management work conducted in the east portion of Region 6 for the 2016 and 2017 field seasons. Pallid sturgeon work done out of the Fort Peck office is summarized in three annual reports that are submitted to the United States Army Corps of Engineers. Those reports evaluate not only pallid sturgeon, but other native and non-native fishes residing in the Missouri River.

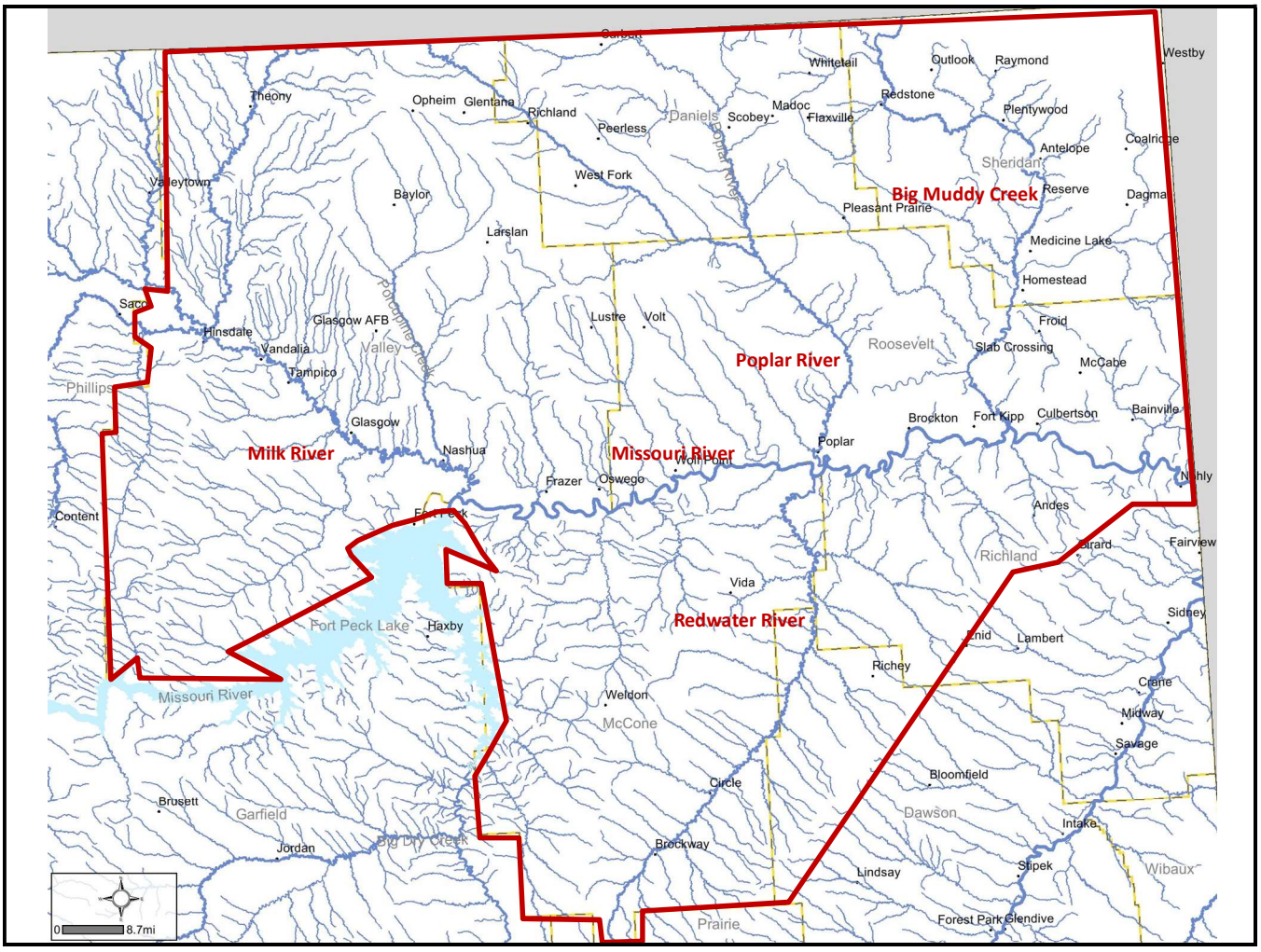

Figure 1. Map of the northeast Montana fisheries management district, including Valley, Daniels, Sheridan, Roosevelt, McCone and parts of Richland and Dawson Counties. Red line is approximate border of the management district.

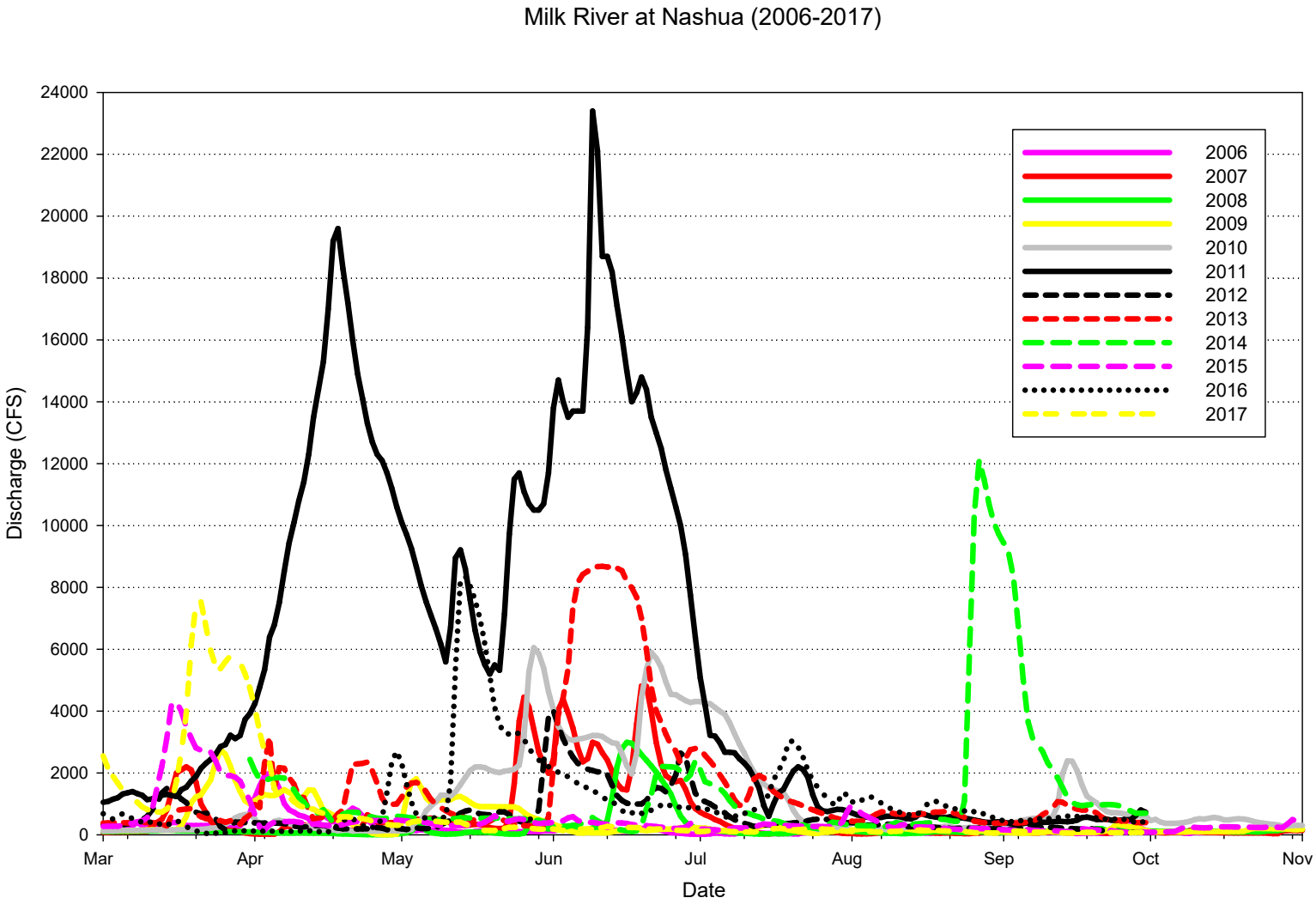

Figure 2. Hydrograph of the Milk River at Nashua, MT. March through November 2006-2011 and March through September for 2012 to 2017. Source USGS.

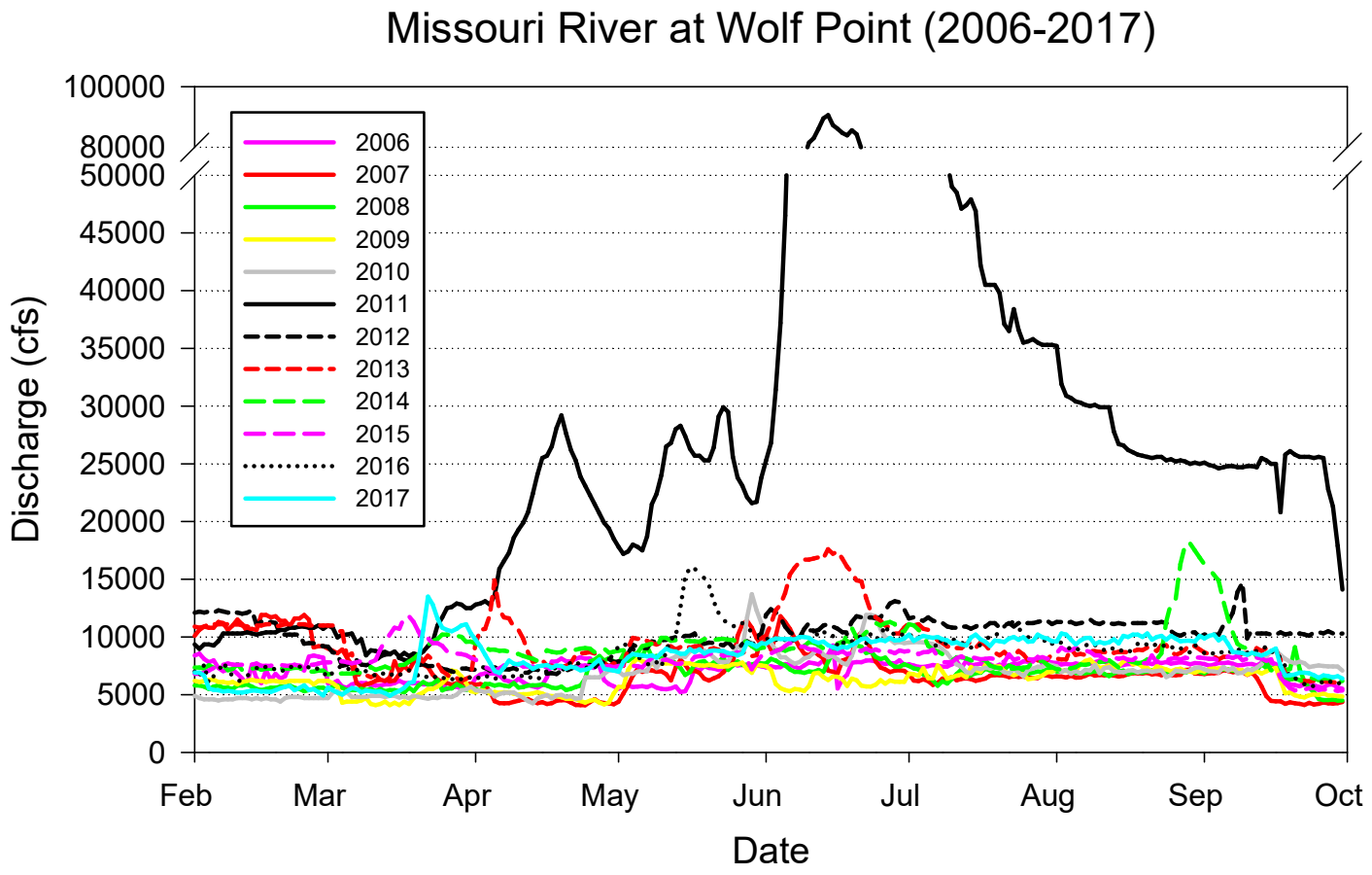

Figure 3. Missouri River hydrograph at Wolf Point, February through September, 2006-2017. Notice the break in the Y-axis from 50,000 to 80,000 cfs. Source USGS.

PROCEDURES

Northeast Montana Rivers and Streams

Milk River

Monitoring of the lower Milk River sauger population continued in 2016 and 2017. Electrofishing occurred on three occasions during 2016 from April 8th to April 22nd and once during 2017 on April 20th. Electrofishing was conducted with booms on a jet boat using a Smith Root rectifying unit. Electrofishing runs were made in a downstream manner. For the Milk River sauger sampling, sauger and walleye were dip netted as well as other game fish species, however since the abundance of other river fishes (suckers and goldeye) would have overwhelmed dip netters, those species were not netted. However, visual estimates of other species were recorded and those observations were input into the State of Montana's Fisheries Information System (Godzilla). Water conductivity was measured during all electrofishing efforts. All captured game fish (sauger, walleye, channel catfish, etc.) were measured to total length, weighed and their reproductive state was visually assessed and recorded. Figure 4 shows the length of the Milk River sauger electrofishing reach, which begins approximately at approximately river mile 4.5 and ends where the Milk River enters the Missouri River, therefore the run is approximately 4.5 miles in length.

Missouri River Trout Sampling

Electrofishing for rainbow and brown trout in the Missouri River downstream of Fort Peck Dam occurred in 2013, 2014, 2015 and 2017. This effort is being conducted to better understand the population structure of the rainbow and brown trout population downstream of Fort Peck Dam. All electrofishing efforts occurred at night from the Boy Scout Park boat ramp in a downstream manner to just upstream of the mouth of the Milk River (Figure 7). Crews used a jet boat boom mounted system with a Smith Root electrofishing rectifying unit. Each night consisted of shocking downstream on either river right or river left and attempting to net all trout (brown or rainbow) that were encountered. The opposite river bank was subsequently sampled the following night. All trout captured were anesthetized in a tricaine methanesulfonate (MS-222) bath, measured (total length) and weighed. Trout large enough received a passive integrated transponder tag (PIT tag) (Biomark, 12mm length) in their dorsal musculature.

During 2017, electrofishing occurred on six separate nights from September 27th through October 11th. The initial two nights of sampling on September 27th and 28th were the mark run and subsequent runs were considered recapture with replacement runs. This methodology lent itself to populating a Schnabel method mark/recapture population estimate.

A similar procedure was used for 2013, 2014 and 2015. The effort was similar for 2013. However, during 2014 four individual nights were sampled and during 2015 two nights were sampled. Using catch-per-unit-effort, data from the 2014 and 2015 sampling occasions can be compared to the population estimate conducted during 2013. Using this methodology for 2014 and 2015 reduced the amount of shocking and handling of trout.

Missouri River Dredge Cut Sampling

The Missouri River Dredge Cuts were sampled again in both 2016 and 2017 and have been sampled annually using both experimental and smelt gill nets since 1979. The monitoring began as a tool to evaluate the fishery since a re-regulation dam downstream of Fort Peck Dam was being proposed. Until 2010 the dredge cuts and the Fort Peck Dam tailrace were sampled twice a year, once in June and once in September using 10-125 ft experimental mesh and 4-100 x 6 ft gill nets with ½ inch mesh nets (smelt nets). In 2010 the spring sampling was eliminated, given that an evaluation of the data showed redundancy. However, due to the spill that occurred from Fort Peck Reservoir during 2011, the spring sample event was conducted from in 2011 and 2014 to get a better understanding of how spill may affect the species composition and relative abundance in the Dredge Cuts. Since 2015, only a fall sampling event took place, which will likely be the standard for the foreseeable future, barring another spill event from Fort Peck Reservoir.

Redwater River Sampling

The Redwater River near Nickwall Crossing was sampled in 2015, 2016 and 2017 using a bag seine. Sampling occurred on August 3, 2015, July 26, 2016 and May 30, 2017. The stream perched culverts at this site were removed during 2017 and replaced with large box culverts. Sampling upstream and downstream of the road crossing was done to gain insight into what fishes may be passing through the new fish friendly box culverts.

Pearl Dace Sampling

Bag seining occurred on August 28, 2017 on Eagle Creek in Daniels County and in Plentywood Creek in Sheridan County. Sampling was conducted to verify the presence or absence of Pearl Dace. Previous sampling by Montana State University had identified Pearl Dace in these drainages.

Dredge Cut Paddlefish Archery Season

Montana Fish, Wildlife and Parks administers an archery paddlefish season in the Missouri River Dredge Cuts from July 1 to August 31. There is a one fish per season limit and a blue harvest tag is required. Blue harvest tags can be obtained through FWP and currently there is no limit on the number of Blue tags distributed. However, within the State, an angler can only hold one valid tag, either a Blue archery tag, a White tag (Missouri River above Fort Peck) or a Yellow tag (Lower Missouri and Yellowstone Rivers). A phone survey is conducted on paddlefish harvest, which is currently the best available data on harvest for the archery fishery.

Northeast Montana Ponds

Several small impoundments in Valley, Sheridan and Roosevelt counties were sampled using trap and gill nets in 2016 and 2017. This is part of the routine sampling of the area's prairie ponds. FWP likes to get to each pond in eastern Region 6 sampled on an every few year basis, however certain ponds garner more public attention and those ponds are often sampled

on a more frequent interval. Box Elder Creek Reservoir located in Sheridan County is an example of a higher profile water body that receives sampling on a more frequent basis.

RESULTS AND DISCUSSION

Survey of Northeast Montana Rivers and Streams

Milk River- Electrofishing

Sampling of sauger and walleye in the lower Milk River was conducted in 2016 and 2017 using boat electrofishing. Electrofishing occurred on three occasions in 2016 and once during 2017. Sauger CPUE during both years was similar to other years of sampling (Figure 5). The average size of sauger was higher in 2017 at 14.6 inches, when compared to 13.3 during 2016 (Table 1). On average, sauger relative weight was very similar between the two years, with an estimated relative weight of 73.0 during 2017 and 73.3 in 2016. This was slightly lower than the previous years of sampling. The size distribution of sauger sampled in 2016 and 2017 did not differ greatly from other sampling years (Figure 7).

Walley CPUE was estimated at 20.9 fish/ hour in 2017, which was by far the highest estimate in the six years of sampling (Table 1). However, not too much should be made of this since only one sampling occasion occurred. In other years, multiple sampling occasions often contain days where the catch is relatively low, which may bring down the average. Nevertheless, walleye were abundant in the lower Milk Rive on April 20th during 2017.

Walleye CPUE during 2016 was much lower when compared to 2017 with an estimate of 5.5 fish/hour (Table 1). However, this was the second highest CPUE in the six sampling years. Walleye averaged 15.9 and 15.5 inches in total length during 2017 and 2016, respectively. The average relative weight of walleye was 82.4 in 2017 and 86.9 in 2016, which was similar to previous years. The size distribution of walleye sampled in 2016 and 2017 did not differ greatly from other sampling years (Figure 7).

Figure 5 shows a somewhat vague, but nevertheless a pattern of higher sauger densities during the early to mid-portions of April and decreasing numbers from late April to the end of May. It has been somewhat hard understanding the pattern of sauger abundance in relationship to discharge, since higher discharges seem to lower capture efficiency. Flows during 2011 were extremely high, which also equated to a low sauger catch. On the other hand, flows were very low during 2012 and sauger catch rates were relatively high throughout the season. Understanding if this is a result of more sauger in the system or just higher capture efficiencies will take further evaluation. Nonetheless, we can learn a lot about the sauger population by examining the size structure of the migratory population every year to every other year to see if significant changes occur. Furthermore, looking at changes in relative weight can help us understand if there are potential resource limitations occurring in adult sauger. So far, relative weights of sauger have remained relatively constant from 2011 to 2017.

Catch rates, average length, weight and relative weights of other game fishes, including freshwater drum and shortnose gar are shown in Table 1.

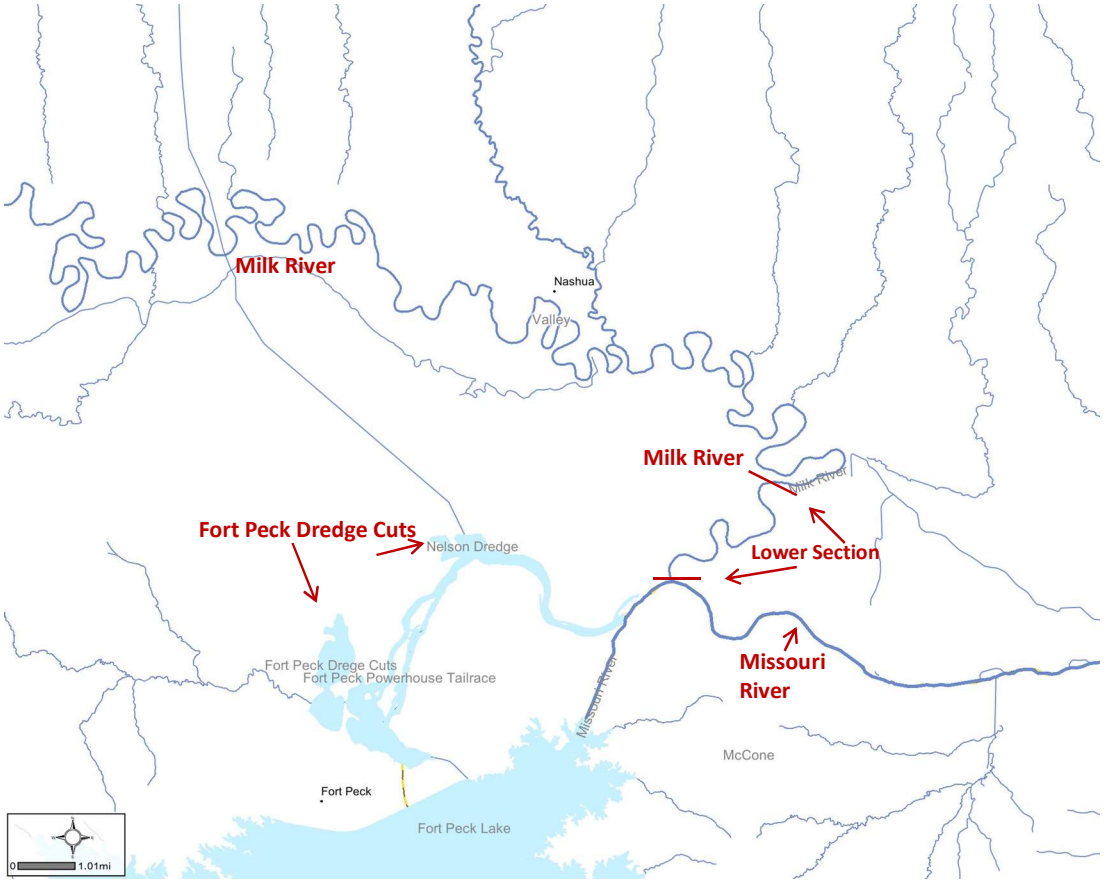

Figure 4. Map of the lower Milk River study section and the Fort Peck Dredge Cuts.

Table1. Electrofishing summary for the lower Milk River 2011 to 2017. Tables represents the total catch during all lower Milk River electrofishing. Effort varies between years.

Species	Year	# Sampled	Length Avg (in)	Min Length (in)	Max Length (in)	Weight Avg (lbs)	Relative Wt Avg	CPUE (fish/hour)
Burbot	2011	2	17.3	15	19.5	1.2	83.3	0.3
	2012	1	24.4			2.3	61.8	0.1
	2013	0						0
	2014	0						0
	2016	1	24.4				71.8	0.2
	2017	0						0
Channel Catfish	2011	10	17.3	15	19.5	1.6	100.4	1.4
	2012	6	17.4	15.2	22	1.8	92.4	0.68
	2013	25	20.3	14.4	30.4	3.5	90.7	6.4
	2014	16	18.6	13.4	25.4	2.4	91.5	1.9
	2016	17	15	2.4	24	1.2	79.6	3.3
	2017	1	16.4			1.1	73.9	0.6
Freshwater Drum	2011	1	20.4			3.5	83.7	0.14
	2012	0						0
	2013	6	15.5	13.1	18.5	1.7	97.5	2.6
	2014	2	15.6	15.2	15.9	2	116.3	0.2
	2016	3	16.5	15.9	17.6	2.1	97.3	0.6
	2017	1	16.2			1.8	88.1	0.6
Northern Pike	2011	1	20.6			2.2	104.5	0.14
	2012	6	17.6	11.2	26.2	1.6	91.3	0.68
	2013	12	23.4	18.8	31.3	3.3	88.9	4.4
	2014	1	23.9					0.1
	2016	0						0
	2017	0						0
Sauger	2011	98	15	2.2	20.5	1.1	77	13.6
	2012	342	14.6	9.6	21.7	0.9	75.2	38.9
	2013	254	14	9.1	22	0.8	73.6	39.9
	2014	108	13.2	9.4	18.8	0.6	75.8	12.8
	2016	205	13.3	8.7	20.3	0.7	73.3	40.2
	2017	46	14.6	10.6	18.7	0.9	73	25.3
Shortnose Gar	2011	0						0
	2012	0						0
	2013	7	23.3	21.2	23.4	1.3	NA	2.4
	2014	0						0

Species	Year	# Sampled	Length Avg (in)	Min Length (in)	Max Length (in)	Weight Avg (lbs)	Relative Wt Avg	CPUE (fish/hour)
	2016	0						0
	2017	2	24.6	24.1	25.1	1.9		1.1
Walleye	2011	11	16.7	7	25.5	1.1	107.3	1.5
	2012	44	16.5	4.9	29.3	2.13	84	5
	2013	18	16.4	8.6	30.6	2.3	83.1	4.2
	2014	12	14.8	6.2	18.6	1.2	86.5	1.4
	2016	28	15.5	10.2	24	1.3	86.9	5.5
	2017	38	15.9	9.1	20.8	1.3	82.4	20.9

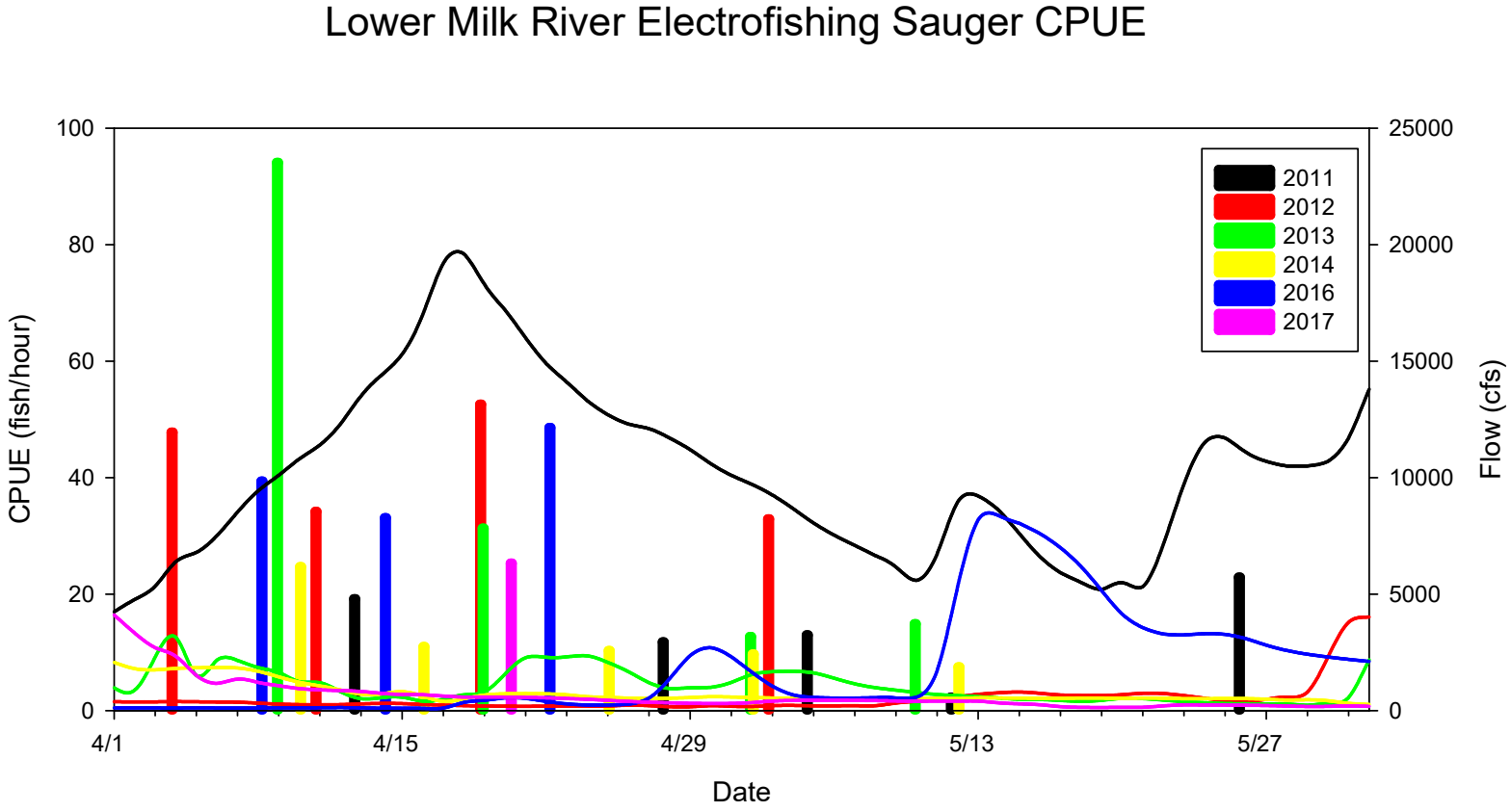

Figure 5. Electrofishing sauger CPUE and river discharge in the lower Milk River, 2011 through 2017, excluding 2015.

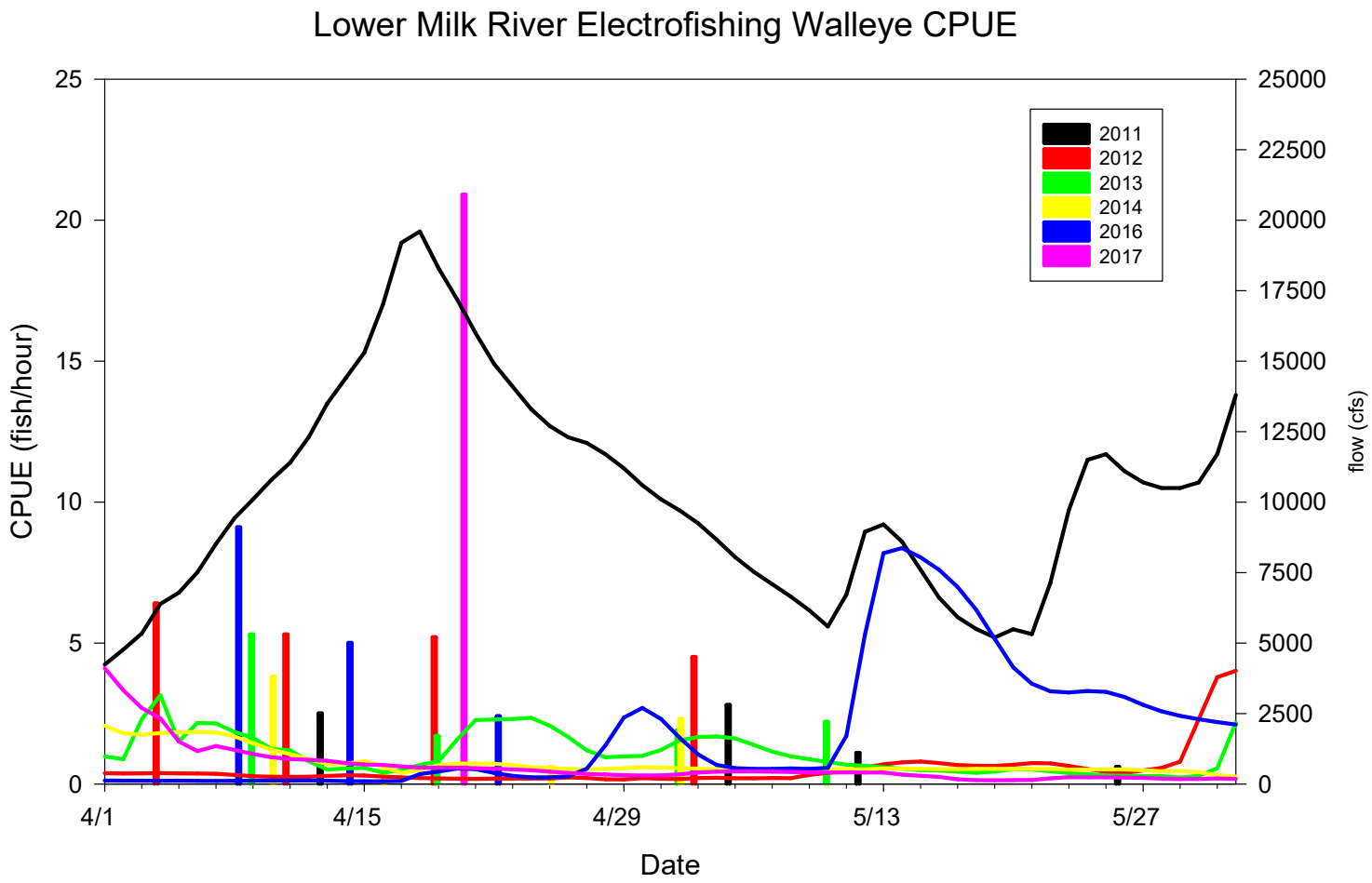

Figure 6. Electrofishing walleye CPUE and river discharge in the lower Milk River, 2011 through 2017, excluding 2015.

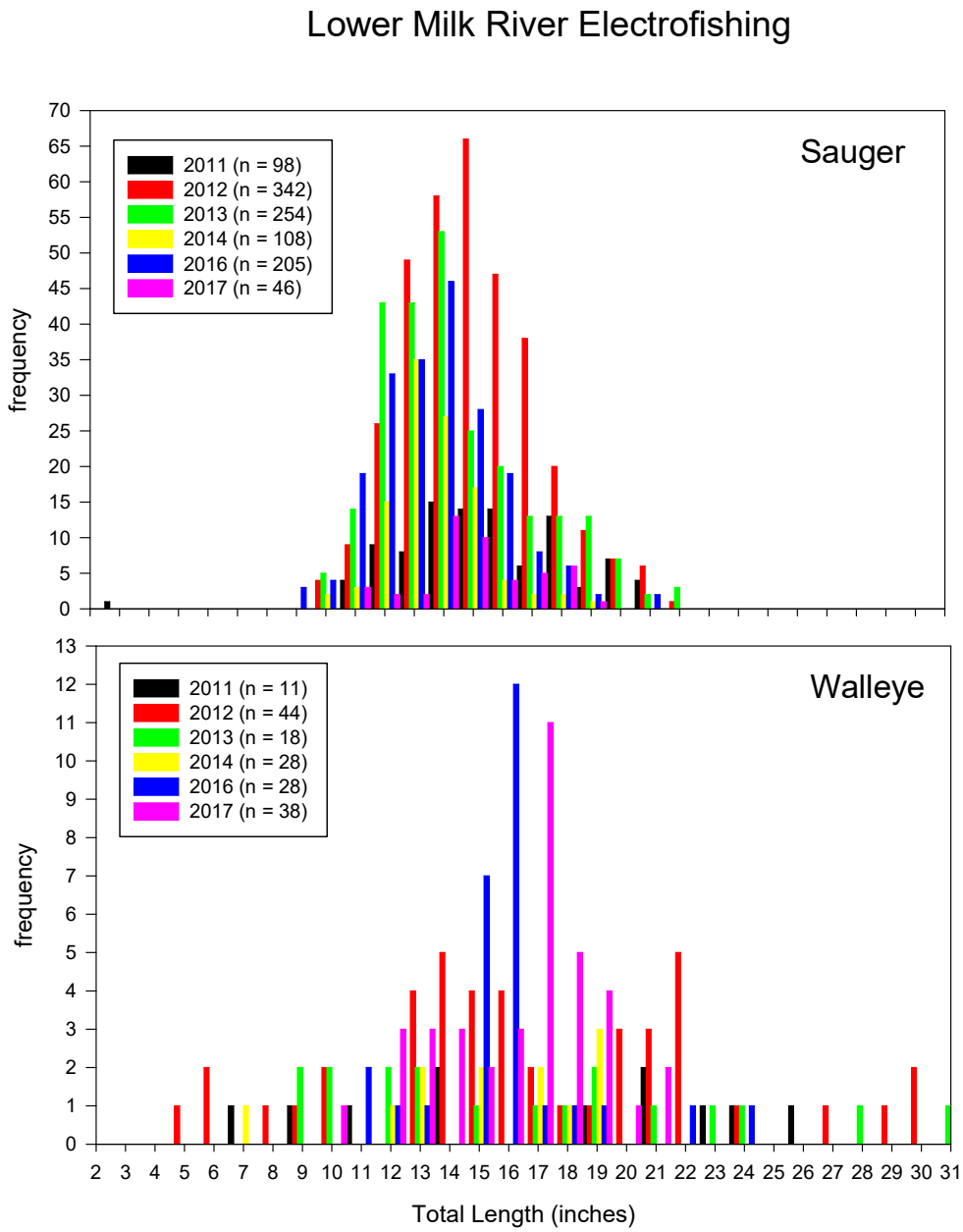

Figure 7. Length frequency histogram for sauger and walleye collected in the lower Milk River electrofishing effort, 2011 to 2017, excluding 2015. Note the difference in the scale of the Y-axis.

Missouri River-Trout Sampling

Electrofishing for rainbow and brown trout in the Missouri River downstream of Fort Peck Dam was conducted during 2013, 2014, 2015 and 2017. Since electrofishing runs were the same length, all CPUE estimates are for fish/reach. Rainbow trout CPUE was at the lowest we've observed in 2017 with 50 fish/run (Table 2). The highest CPUE of rainbow trout was observed during 2014 with 88 fish/reach, followed by 2015 with 82 fish/reach and 2013 with 65.3 fish/reach (Table 2). However, CPUE is not directly related to the population estimates, since changes in capture probability occur between years due to discharge, who's netting, etc.

Population estimates have been estimated for rainbow trout over 14 inches in length for 2017 and 2013 (Table 3). This estimate represents the number of trout over 14 inches in the reach from Boy Scout Park boat ramp to the mouth of the Milk River (Figure 8). The population estimate for 2017 was 785 fish, with a lower 95% confidence interval of 445 and an upper of 1,489. This was a higher estimate than the 2013 estimate of 638 fish. Therefore, although the CPUE estimate was lower in 2017, it appears there are at least as many, if not more rainbow trout larger than 14 inches in the population.

While CPUE varied somewhat between years, the average size of rainbow trout caught remained very similar. Rainbow trout averaged 21.1, 21.6, 21.5 and 20.4 inches in length during 2013, 2014, 2015 and 2017 respectively (Table 2 and Figure 9). While the average sizes of rainbow trout have remained similar through the four years of sampling, average relative weights have decreased (Table 2 and Figure 14). Average relative weight was at a low in 2017 at 81.2, down from 100.1 in 2015. When we compare the relative weights from 2013 and 2017 by size class (Figure 15), we see that the largest difference has occurred in rainbow trout 21 inches and longer. Although all sizes classes on average has seen a decrease, although not necessarily statistically significant.

As would be expected, annual growth of rainbow trout is highest when fish are smaller than 15 inches in length and lowest for fish over 20 inches (Figure 11). Figure 13 shows actual growth rates of individual rainbow that were smaller than 15 inches when initially tagged and subsequently recaptured within a two-year time span. Annual growth rates ranged from 4.8 to 6.5 inches/year.

Brown trout total catch and CPUE estimates were relatively low compared to rainbow trout during all three sampling seasons (Table 2). Over the three-year sampling period, the ratio of rainbow trout to brown trout was 9.6:1. Brown trout CPUE increased each year from 2013 to 2015, beginning at 6 fish/ reach in 2013 to 9.5 fish/reach in 2014, to 11 fish/ reach in 2015. On average, brown trout were larger in all three sampling years than rainbow trout. Brown trout averaged 23.7, 22.6 and 23.2 inches in length in 2013, 2014 and 2015, respectively. The average relative weights for brown trout were higher than rainbow trout in all years and averaged over 100 in all three years.

During 2013 a mark/recapture population estimate was performed for rainbow and brown trout. Estimates of this multiple pass mark/recapture effort are shown in Table 3. The estimates indicate that there are roughly 638 rainbow trout over 13.8 inches in length within the sampling

reach, with 95% confidence intervals placing the lower end of the estimate at 460 and the upper estimate at 909. Fewer rainbow trout under 13.8 inches are estimated, with an estimate of 165 and lower and upper confidence estimates of 73 to 158.

Due to the lower number of brown trout marked and recaptured, all sizes of brown trout were lumped into one estimate. The model produced an estimate of 72 brown trout for the reach, with lower and upper confidence estimates at 36 to 158 fish/reach.

One Chinook salmon was captured during the three years of electrofishing. This one fish measured 26.3 inches and weighed 7.7 lbs.

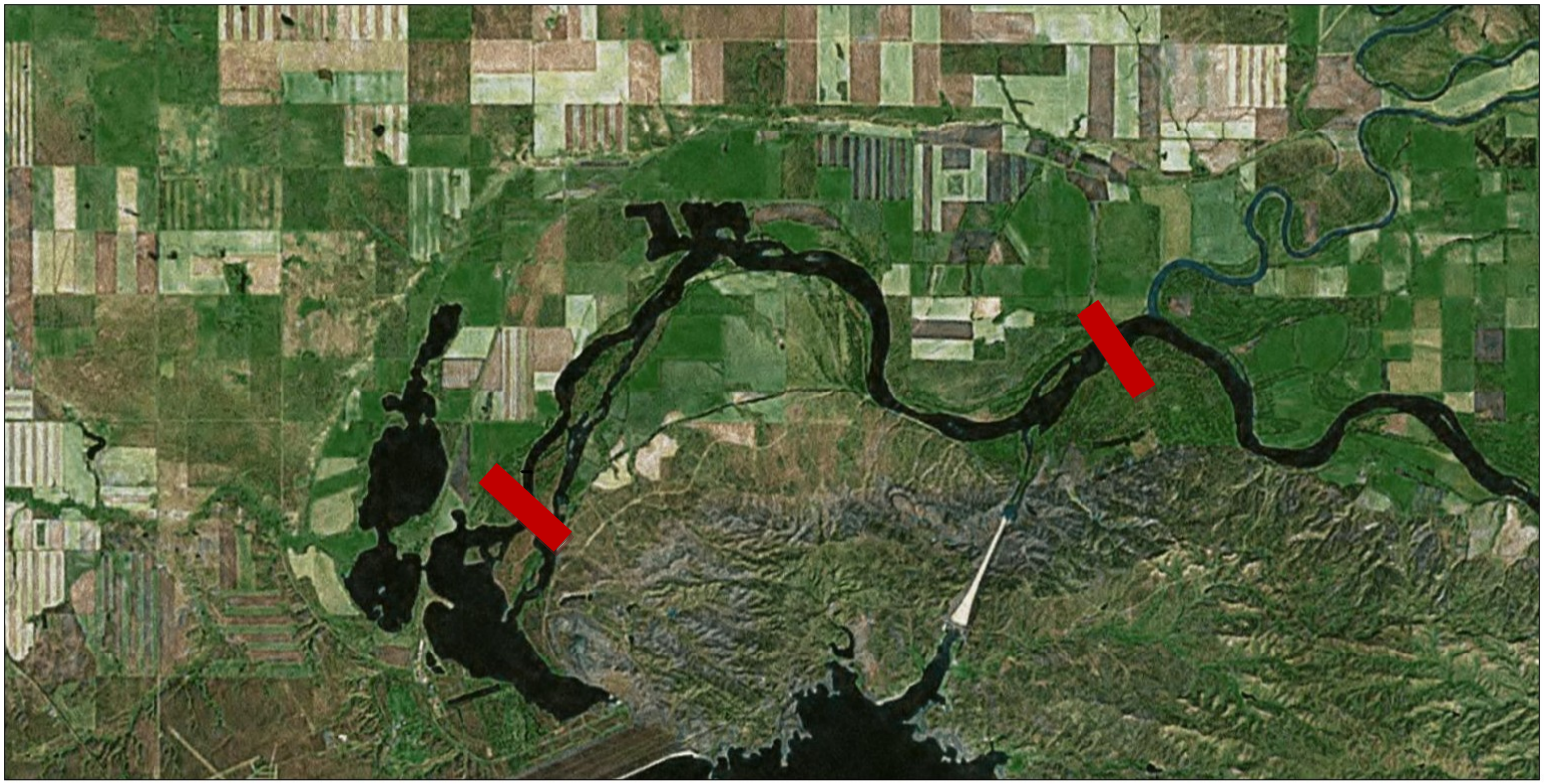

Figure 8. Location of Missouri River trout electrofishing run. Electrofishing occurred in the main channel. Upper and lower bounds of section are indicated by the red bars

Table 2. Data summary for rainbow and brown trout sampled during mark/recapture electrofishing surveys on the Missouri River. Electrofishing occurred six nights from August 7th to September 5th, 2013, four nights from October 15th through 23rd during 2014, two nights from September 8th and 9th, 2015 and six nights from September 27th to October 10th. CPUE= fish per full run (2 nights, right and left bank).

Species		# Sampled	Avg. Length (in)	Min Length (in)	Max Length (in)	Avg Wt. (lbs)	Avg Relative Wt.	CPUE Fish/Full Run
Rainbow Trout	2013	261	21.1	7.2	27.7	4.1	100.1	65.25
	2014	176	21.6	8.7	27.6	4	92.9	88
	2015	82	21.5	8.5	27.8	3.9	89.2	82
	2017	150	20.4	2.8	27.8	3.59	81.21	50
Brown Trout	2013	24	23.7	17.3	31.1	6.3	113.7	6
	2014	19	22.6	10.6	30.1	4.8	102.7	9.5
	2015	11	23.2	16.1	30.6	4.9	100.2	11
	2017	29	22.7	16	30.7	5.19	104.1	9.7
Chinook Salmon	2013	0						0
	2014	0						0
	2015	1	26.3	26.3	26.3	7.7	102.5	1
	2017	2	24.4	23.6	25.1	5.7	92.8	0.67

Table 3. Mark/recapture population estimate for rainbow and brown trout in the Missouri River during the fall of 2013. N = estimate, LCI = Lower 95% Confidence Interval, UCI = Upper 95% Confidence Interval.

Population Estimate (Schnabel) - Rainbow Trout > 14 inches

Year	N	LCI	UCI
2013	638	460	909
2017	785	445	1489

Population Estimate (Schnabel)-Brown Trout

Year	N	LCI	UCI
2013	72	36	158
2017	46	26	87

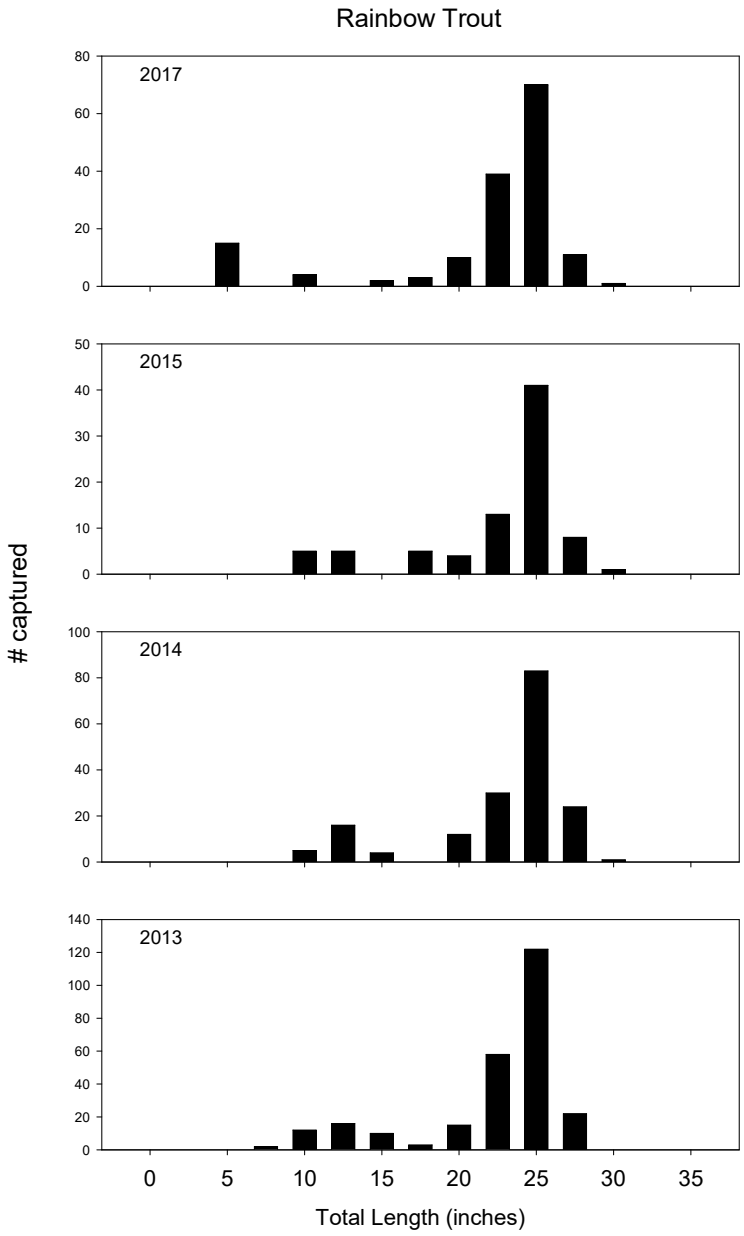

Figure 9. Length frequency of rainbow trout captured in the six day mark/recapture effort on the Missouri River downstream of Fort Peck Dam in 2013 (August 7th through September 5th), a four day effort in 2014 (October 15 to 23rd), the two day electrofishing effort in 2015 (September 8th and 9th) and a six day effort in 2017 (September 27th to October 10th).

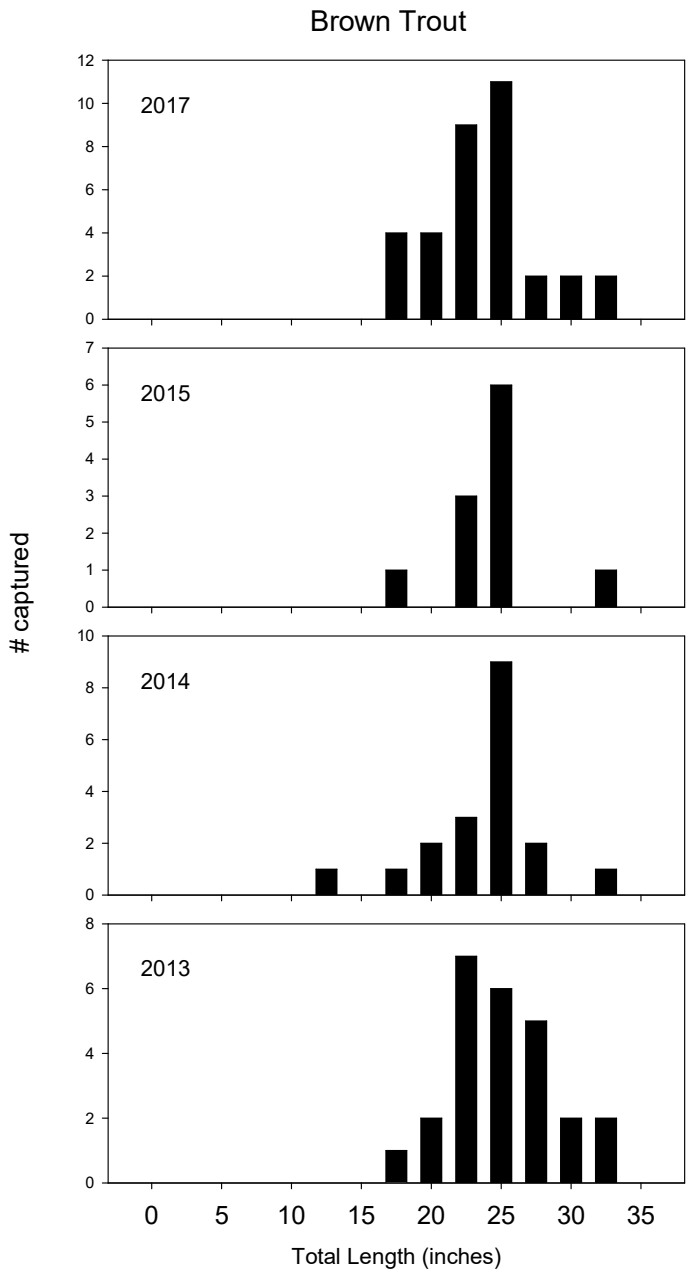

Figure 10. Length frequency of brown trout captured in the six day mark/recapture effort on the Missouri River downstream of Fort Peck Dam in 2013 (August 7th through September 5th), a four day effort in 2014 (October 15 to 23rd), the two day electrofishing effort in 2015 (September 8th and 9th) and a six day effort in 2017 (September 27th to October 10th).

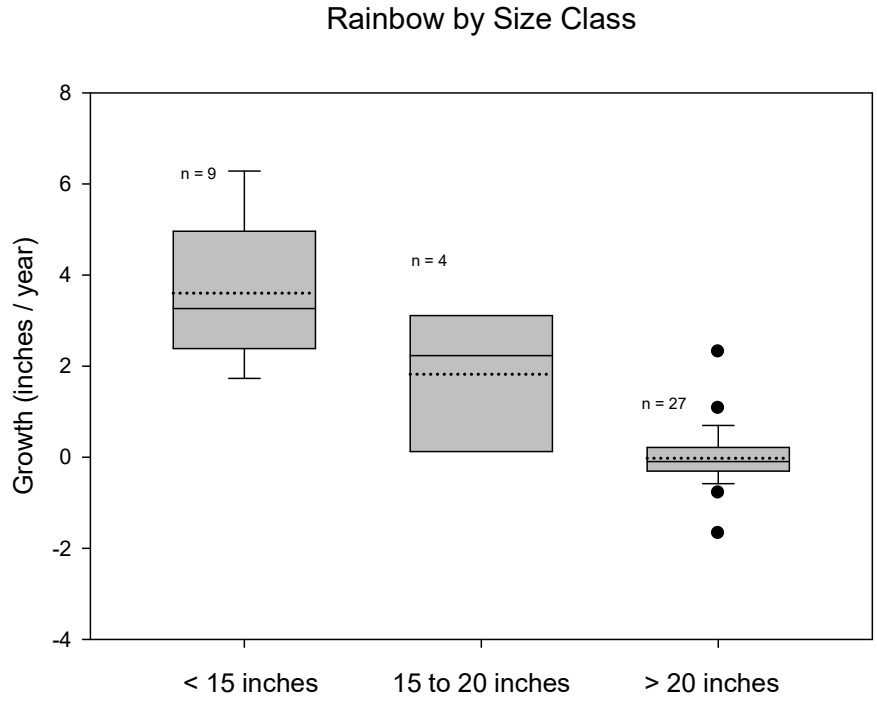

Figure 11. Growth of rainbow trout in the Missouri River by size class. Box plots represent the quartiles, outliers, median and mean (dotted line). Sample size is given.

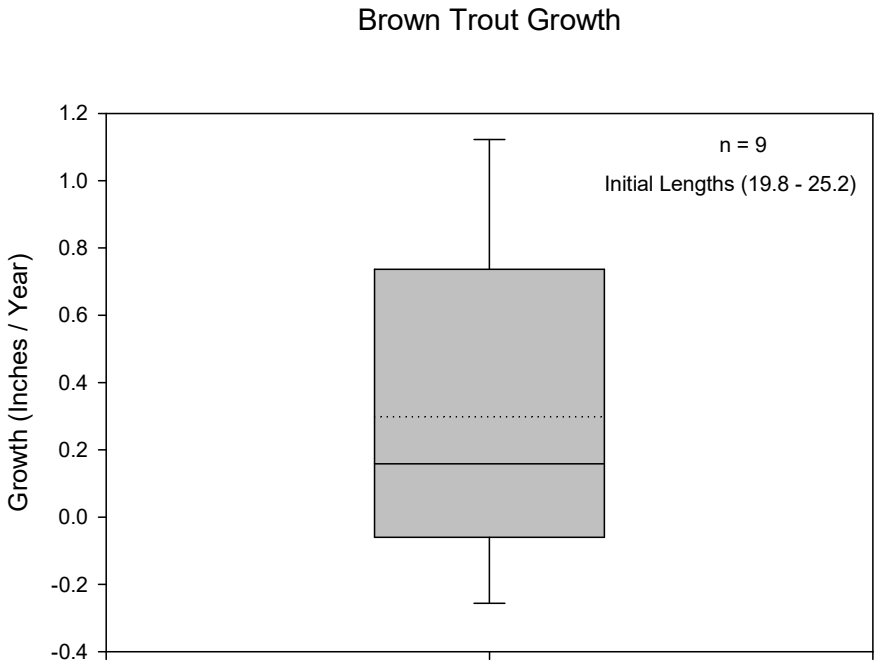

Figure 12. Growth of recaptured brown trout in the Missouri River downstream of Fort Peck Dam. Box plot represents the quartiles, range, median and mean (dotted line). Sample size is given.

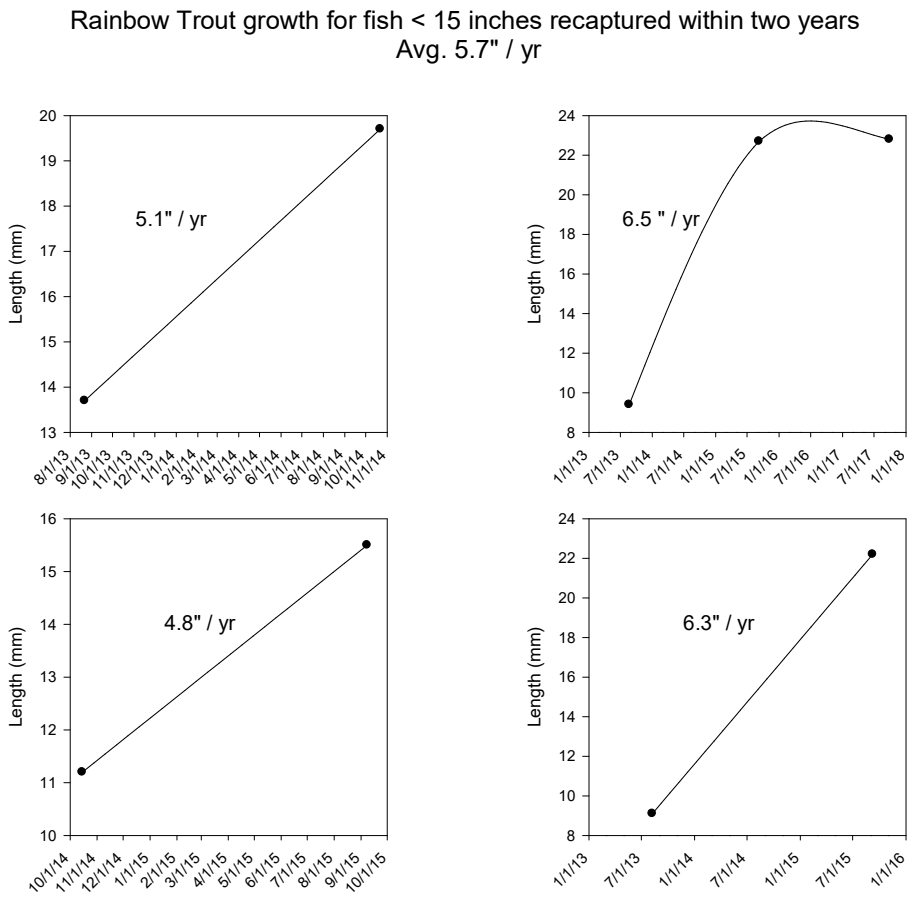

Figure 13. Graphs depicting the growth of individual rainbow trout recaptured within a two-year time span. Overall, these fish averaged 5.7 inches of growth per year. The upper right graph shows how these fish grow rapidly to about 22 inches and then their growth slows appreciably.

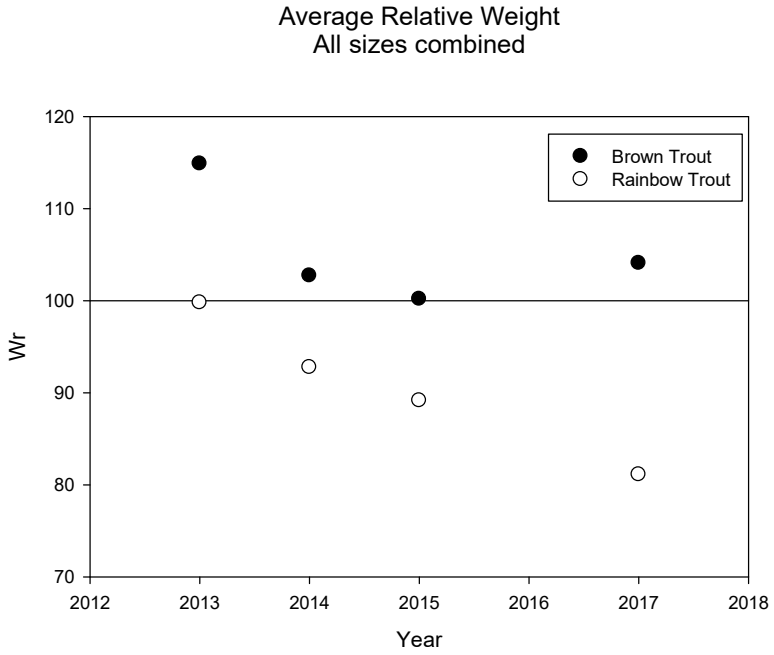

Figure 14. Average relative weights of rainbow (open circles) and brown (filled circles) trout. Note the downward trend in average relative weight from 2013 to 2017 for rainbow trout.

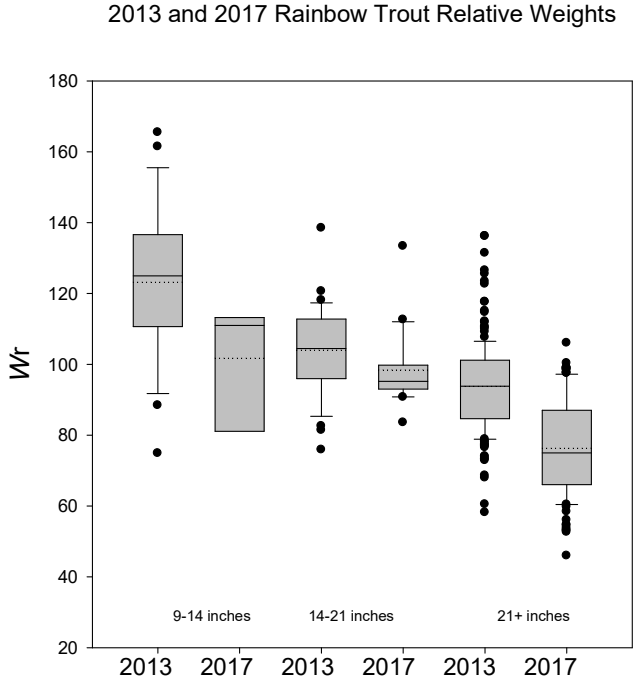

Figure 15. Rainbow trout relative weight by size class for both 2013 and 2017. The box and whisker plots represent the median (dark line), the mean (dotted line) the upper and lower quartile ranges are represented by the box and the outliers are shown as dots.

2016-2017 Survey of Northeast Montana Ponds

Several prairie ponds were sampled in Valley and Sheridan counties in 2016 and 2017. Below is a brief summary of those ponds, however all data is put into tabular form in Table 4.

Roosevelt County

Knudsen Brothers Pond, which is currently owned by Chris Hansen was sampled on September 26, 2017. One experimental gill net captured 20 rainbow trout ranging in length from 10.6 to 13 inches. Two trap nets captured just 4 fathead minnows total.

Sheridan County

Box Elder Creek Reservoir was sampled on July 26, 2017 using gill nets and trap nets. Box Elder Creek Reservoir has its own section below.

Valley County

Trout Pond in the Fort Peck Dredge Cut area was sampled using gill nets and trap nets on June 22, 2016. Gill nets captured 28 yellow perch, 25 northern pike, 24 bluegill, 9 white suckers, 3 largemouth bass, and one walleye and channel catfish. More details on sizes of fish sampled are provided in Table 4.

Home Run Pond was sampled using an experimental gill net and some angling on October 10, 2017. A total of four rainbow trout and one black bullhead and one yellow perch were sampled. More details are in Table 4.

Table 4. Fish species sampled by gear for ponds sampled in northeast Montana during 2016 and 2017.

County	Reservoir Name	Date	Gear	Species	# Sampled	Avg. Length (In.)	Min. Length (In.)	Max Length (In.)	Avg. Weight (lbs)
Valley	Home Run Pond	10/10/2017	Gill Net (1) and Hook and Line	Black Bullhead	1	5.3	5.3	5.3	-
				Rainbow Trout	4	13.85	13.4	14.8	-
				Yellow Perch	1	5.3	5.3	5.3	-
	Trout Pond	6/22/2016	Gill Net (4) and Trap Net (2)	Bluegill	280	4.3	1.4	6.8	0.11
				Channel Catfish	1	22.6	-	-	4.70
				Largemouth Bass	3	7.7	7.4	8	0.28
				Northern Pike	25	22	10.7	30.3	3.40
				White Sucker	9	16.7	15.7	18.2	2.40
				Walleye	1	22.4	-	-	4.00
				Yellow Perch	76	5.7	1.3	7.7	0.14
Roosevelt	Knudsen Brothers Pond	9/26/2017	Gill Net (2) and Trap Net (1)	Fathead Minnow	4	2.9	2.6	3.1	-
				Rainbow Trout	20	10.6	10.6	13	-
		10/24/2016	Gill Net (2) and Trap Net (1)	Brook Stickleback	20	-	-	-	-
				Fathead Minnow	1,000	-	-	-	-
				Plains Minnow	20	-	-	-	-
				Yellow Perch	4	8.1	7.3	9.1	-

Box Elder Creek Reservoir

Box Elder Reservoir is the largest reservoir in northeastern part of Region 6 with approximately 74 surface acres. The reservoir has a maximum depth of approximately 30 ft. Box Elder Reservoir has been sampled seven of the past 10 years using a variety of netting and electrofishing techniques. The reservoir had been stocked with walleye on almost an annual basis since 1985 to 2017. In 2016 Box Elder Reservoir was stocked with 250,000 walleye fry, 8,288 northern pike fingerlings, 20,000 northern pike fry and 5,000 catchable rainbow trout.

During 2016 Box Elder was sampled using both gill (n = 4) and trap nets (n = 4). A total of 9 walleye were captured in gill nets, which was excellent to see since zero had been sampled in the 2015 and 2013 sampling. Walleye averaged 12.9 inches in total length and had a maximum size of 14.7 inches (Tables 5 and 6). Walleye CPUE was estimated at 2.25 fish/ net night, up from zero in 2015 and 2013.

Northern pike were the most abundant game fish captured in gill nets, with a total of 20 sampled. Northern pike averaged 21 inches in length and had a maximum size of 24.8 inches. The northern pike CPUE was estimated at 5 fish/ net night, which was an increase from 1.5 fish/ net night in 2015 and 1.6 fish/net night in 2013.

A total of 8 yellow perch were sampled in gill nets, for a CPUE of 2/net night. They averaged 8.3 inches in length with a maximum length of 9 inches. CPUE was slightly down from that of 2015 which had an estimate of 2.5 fish/net night, but a significant increase from 0.4 fish/net night in 2013. It's good to see yellow perch in the sampling, since before 2010 we were not seeing any yellow perch. As a result, adult yellow perch stockings occurred from 2010 to 2012. In all, a total of approximately 10,700 adult perch were stocked. A daily bag limit of 25 yellow perch was implemented in 2012.

Black bullheads are very abundant in Box Elder Reservoir, with a total of 268 caught in gill nets in 2016. They averaged 7 inches in length with a max length of 8.8 inches. Common carp CPUE was estimated at 1.5 fish/net night in 2016, which is much lower than the 2013 estimate of 5.4 fish/net night.

Table 5. Summary of gill netting data for Box Elder Creek Reservoir June 13, 2013 (5 experimental gill nets), April 14, 2015 (4 nets), and July 26, 2016 (4 nets).

Species	Year	# Sampled	Length Avg. (in)	Min Length (in)	Max Length (in)	Relative Wt Avg	CPU (fish/net night)
Black Bullhead	2013	25	8.8	6.6	11.7	60	5
	2015	123	8.5	5.2	10.8		30.75
	2016	268	7	4.9	8.8	96.5	67
Common Carp	2013	27	13.5	12.1	15.9	100.3	5.4
	2015	7	21.6	17.2	25.9	119.6	1.75
	2016	6	13.4	7.5	18.8	105.1	1.5
Northern Pike	2013	8	31.2	22.9	63	86.1	1.6
	2015	6	25.3	16.8	41.3	270	1.5
	2016	20	21	15.2	24.8	95.3	5
Walleye	2013	0					0
	2015	0					0
	2016	9	12.9	6.7	14.7	91.2	2.25
White Crappie	2013	0					0
	2015	0					0
	2016	3	5.6	4.9	6.4		0.75
White Sucker	2013	33	14.4	9	19.8	80.3	6.6
	2015	24	15.6	13	18.4	99.1	6
	2016	5	16	11.6	19.3	95.8	1.25
Yellow Perch	2013	2	6.9	6.1	7.6	102.3	0.4
	2015	10	7.3	5.5	10.8	86	2.5
	2016	8	8.3	8	9	109.2	2

Table 6. Summary of trap netting data for Box Elder Creek Reservoir June 13, 2013 (4 trap nets), April 15, 2015 (4 nets) and July 26, 2016 (4 nets).

Species	Year	# Sampled	Length Avg. (in)	Min Length (in)	Max Length (in)	CPU (fish/net night)
Black Bullhead	2013	11	9	6.6	11.7	2.75
	2015	931				232.75
	2016	264	7.6	5.5	8.1	66
Common Carp	2013	1	NA	15.7	15.7	0.25
	2015	4				1
	2016	1	8.7	-	-	0.25
Walleye	2013	0				
	2015	0				
	2016	4	8.7	6.6	14.4	1
White Crappie	2013	0				
	2015	0				
	2016	1	6.5	-	-	0.25
White Sucker	2013	0				0
	2015	4				1
	2016	5	12.1	6.4	17	1.25
Yellow Perch	2013	0				0
	2015	1	9.9	9.9	9.9	0.25
	2016	3	8.2	7.9	8.5	0.75

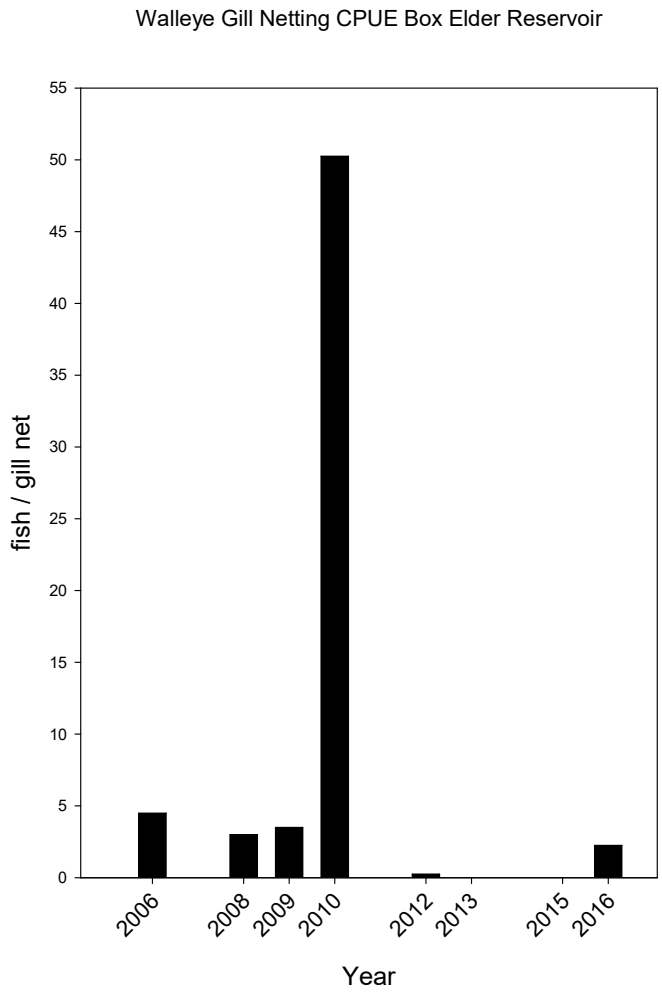

Figure 16. Box Elder Reservoir gill net walleye CPUE 2006-2016, note that no sampling occurred in 2007, 2011, 2014 or 2017.

Missouri River Dredge Cuts

The Missouri River Dredge Cuts have been sampled annually using both experimental and smelt gill nets since 1979. The monitoring began as a tool to evaluate the fishery since a re-regulation dam downstream of Fort Peck Dam was being proposed. Until 2010 the dredge cuts and the Fort Peck Dam tailrace were sampled twice a year, once in June and once in September using 10-125 ft experimental mesh and 4-100 x 6 ft gill nets with ½ inch mesh nets (smelt nets). In 2010 the spring sampling was eliminated, given that an evaluation of the data showed redundancy. However, due to the spill that occurred from Fort Peck Reservoir during 2011, the spring sample event was conducted from in 2011 and 2014 to get a better understanding of how spill may affect the species composition and relative abundance in the Dredge Cuts. During 2016 and 2017, only a fall sampling event took place, which will likely be the standard for the foreseeable future, barring another large spill event from Fort Peck Reservoir.

Due to the hypolimnetic withdrawals from Fort Peck Dam the tailrace area can be characterized as a relatively stable area with cold summer water temperatures and warm winter temperatures as well as low productivity due to Fort Peck Reservoir acting as a nutrient sink. The Dredge Cuts are connected to the Missouri River, but a much higher retention time equates to warmer summer water temperatures and a more diverse littoral area. Both areas have become very popular recreation areas with anglers, boaters and water skiers.

All gill netting data for fall sampling from 2017 and 2016 is summarized in Tables 7 and 8. During the sampling period of 2016 and 2017, walleye CPUE significantly increased from the prior four years (Figure 17). Walleye CPUE in 2016 was estimated at 5.5 fish/net night, which was the largest in over 25 years. While walleye CPUE went slightly down to 3.8 fish/net night in 2017, it was still one of the highest catch rates recorded in the past 25 years. In 2017 walleye averaged 15.5 inches in length and 1.3 lbs. During 2016, walleye averaged 13.9 inches and 1.0 lbs. Although the average relative weights 2016 and 2017 were 87 and 85, respectively, many fish that were sampled were very robust and healthy looking.

In contrast to walleye CPUE, sauger CPUE remained relatively low in 2016 and 2017 (Figure 17). Only 4 and 2 sauger were sampled in 2017 and 2016, respectively. This equates to a CPUE of 0.4 fish/net night and 0.2 fish/net night for 2017 and 2016, respectively.

Northern pike abundance has remained relatively consistent through the past 25 years, with slightly higher numbers in the past 6 years (Figure 17). A total of nine northern pike were sampled in 2017, averaging 29.2 inches in length. During 2016 a total of 11 northern pike were sampled, averaging 27.5 inches in length. During 2017 a northern pike measuring 38.4 inches was captured, making it the largest over the two year sample period.

Northern pike CPUE in 2015 was about half of that recorded in both 2014 and 2013. During 2015 northern pike had an average CPUE of 0.6 fish/net night, when compared to 1.3 fish/ net night during both 2014 and 2013. Northern pike averaged 26.8 inches in total length during

2015 with an average relative weight of 92.5. The relative weight for northern pike was down from the 23 year high recorded in 2013 (Figure 14).

Channel catfish catch rates remained similar in 2016 and 2017 to the estimate of 2015 (Figure 17). In 2017, channel catfish CPUE was estimated at 5.1 fish/net night, which is similar to the long-term trend. Similarly, in 2016 channel catfish CPUE was at 3.3 fish/net night, again similar to the long-term average.

Relative weight data for walleye, sauger, northern pike and channel catfish can be found in Figure 18 below. Several other species of game and non-game fish were captured during the Dredge Cut sampling in 2017 and 2016.

Table 7. Missouri River Dredge Cuts gill netting summary data, 2017.

Species	# Sampled	Ave. Length (in)	Min Length (in)	Max Length (in)	Ave. Weight (lbs)	Ave. Relative Weight
Bluegill	4	5.27	4.8	6.1	0.13	113.94
Channel Catfish	51	16.51	14.2	22	1.42	88.89
Common Carp	2	21.4	21.3	21.5	4.38	89.21
Cisco	14	9.18	4.3	15.6	0.74	
Goldeye	12	14.05	12.6	15	0.85	
Lake Whitefish	3	19.63	17.2	21.5	2.45	
Northern Pike	9	29.22	13	38.4	7.21	88.19
Rainbow Smelt	3	5.47	5.1	5.9	0.02	
River Carpsucker	15	17.5	15.3	19.7	2.74	
Shovelnose Sturgeon	16	25.86	21.5	31.1	2.87	102.62
Sauger	4	13.98	9.7	17.2	0.96	85.43
Shorthead Redhorse	1	15.8	15.8	15.8	2	
Smallmouth Buffalo	2	21.5	21.3	21.7	5.61	83.53
White Bass	1	12.9	12.9	12.9	0.94	88.26
White Sucker	12	16.57	12.5	18.5	2.16	104.01
Walleye	38	15.54	7.8	20	1.31	85.58
Yellow Perch	2	6.4	6.3	6.5	0.12	99.51

Table 8. Missouri River Dredge Cuts gill netting summary data, 2016.

Species	# Sampled	Ave. Length (in)	Min Length (in)	Max Length (in)	Ave. Weight (lbs)	Ave. Relative Weight
Bluegill	2	4.4	4.3	4.5	0.06	104.31
Bigmouth Buffalo	1	22.6	22.6	22.6	6.37	
Channel Catfish	33	16.98	14.8	21.8	1.42	82.5
Common Carp	3	21.47	20.8	22.2	4.33	86.87
Cisco	24	10.63	5.3	16	0.46	
Goldeye	44	13.81	12.1	15.3	0.74	
Lake Whitefish	4	18.23	17.5	18.9	2.28	
Northern Pike	11	27.45	20.6	33.3	5.27	95.32
Rainbow Smelt	7	5.8	4.4	6.7	0	
River Carpsucker	16	17.73	16.2	19.8	2.82	
Shovelnose Sturgeon	8	24.65	17.3	30.9	2.29	88.52
Sauger	2	14.15	12.7	15.6	0.78	74.1
Shorthead Redhorse	8	17.51	14.2	19.4	2.5	
Smallmouth Buffalo	4	20.55	19.8	20.9	4.37	74.8
Spottail Shiner	1	4.6	4.6	4.6	0	
White Sucker	14	15.74	8.5	19	1.89	95.84
Walleye	55	13.93	7.4	20.2	0.96	87.05
Yellow Perch	4	5.62	3.3	6.6	0.18	135.68

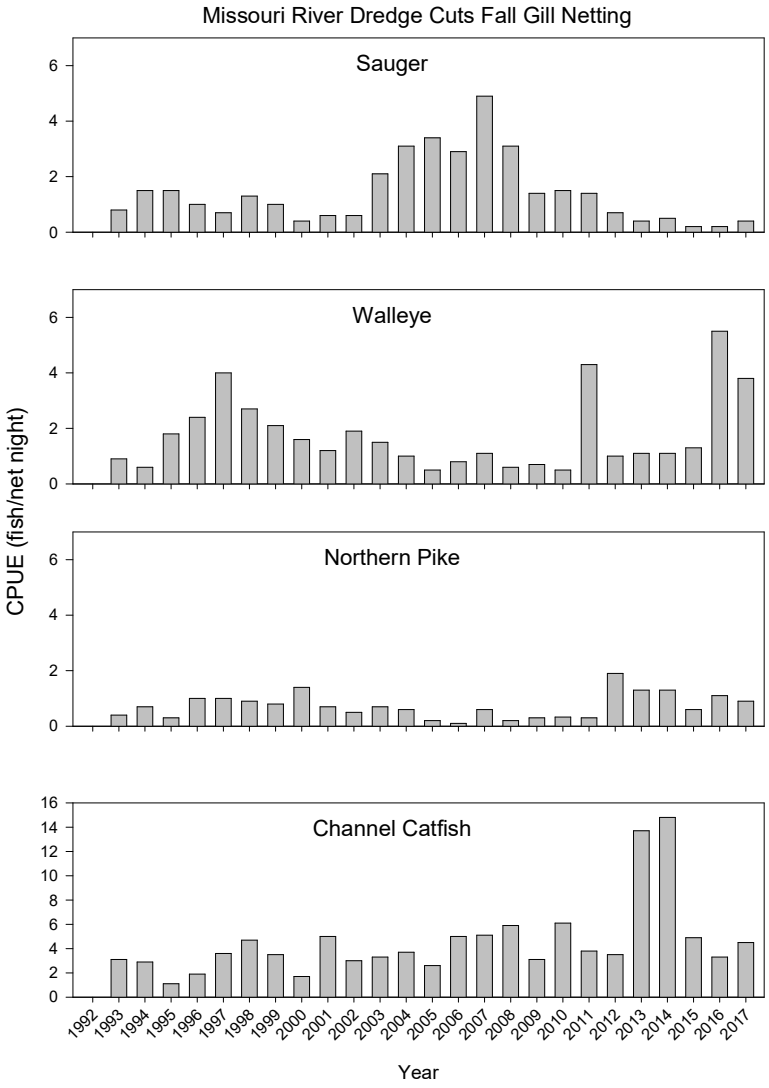

Figure 17. Fall gill netting CPUE of sauger, walleye, northern pike and channel catfish in the Missouri River Dredge cuts from 1993-2017.

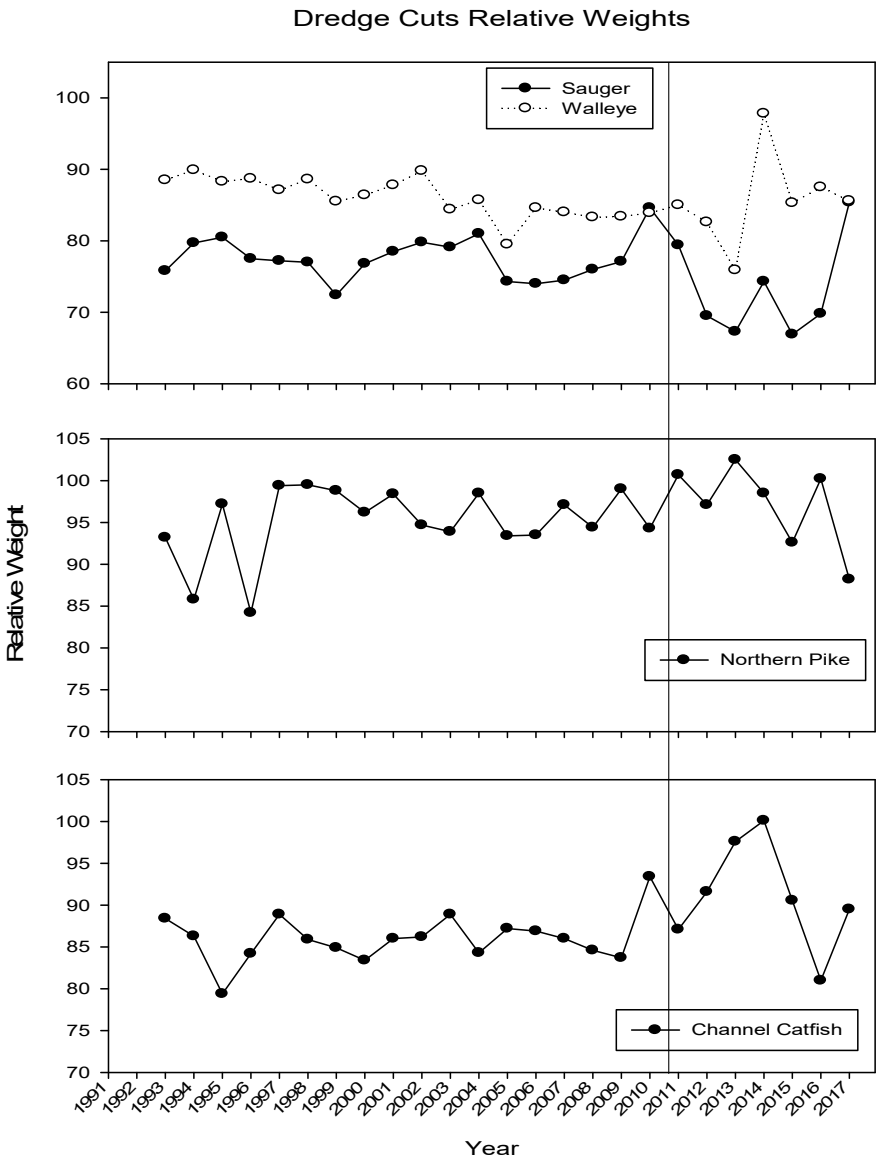

Figure 18. Relative weights of sauger and walleye (top panel), northern pike (middle panel) and channel catfish (bottom panel) captured in the Missouri River Dredge Cuts 1993-2017. Fall and spring samples combined from 1993 to 2010. Fall only samples from 2011 to 2015 (Indicated by the vertical line).

Redwater River

The Redwater River is one of the largest tributaries to the lower Missouri River in Montana. The Missouri and Redwater River's contain an extremely high diversity of fishes, including several Montana species of special concern. Species of special concern that have been documented in the Redwater River include northern redbelly dace, sauger, Iowa darter and sturgeon chub. Game fish that have been documented include channel catfish, northern pike, walleye and sauger. Up until 2017, the Nickwall Crossing, located just 1.25 miles upstream from the confluence of the Redwater and Missouri Rivers precluded fish from upstream migrations during most flows. Photograph 1 shows the old perched culverts at the Nickwall Crossing that kept fish from migrating upstream during most flow scenarios.

During 2017 FWP with the assistance of the Bureau of Land Management and U.S. Fish and Wildlife Service, reconfigured the Nickwall Crossing on the Redwater River to provide fish passage. The collaborative project has now opened up 25 river miles of the Redwater River to several species of native fish. Two large box culverts with baffles to hold native sediment were used to create a natural river channel under the road. Photograph 2 shows the newly renovated site. The new structure has created free river passage for all species of fish within the Redwater River and will likely benefit a plethora of species. During times of drought fish will be able to seek refuge in pools or in extreme cases seek refuge in the Missouri River. It is also possible that new spawning habitats are now accessible for fish migrating out of the Missouri River into the Redwater River.

Fish sampling on the Redwater River upstream and downstream of the Nickwall Crossing occurred in 2017, 2016 and 2015. Each sampling effort consisted pulling a beach seine several times both upstream and downstream of the Nickwall Crossing. Sampling occurred on May 30th during 2017, July 26th in 2016 and August 3rd during 2015. Summary data for all sampling can be found below in Tables 9 through 11 and Figure 19.

Photograph 1. Nickwall Crossing on the Redwater River before habitat work was conducted.

Photograph 2. Nickwall crossing after the two box culverts were installed.

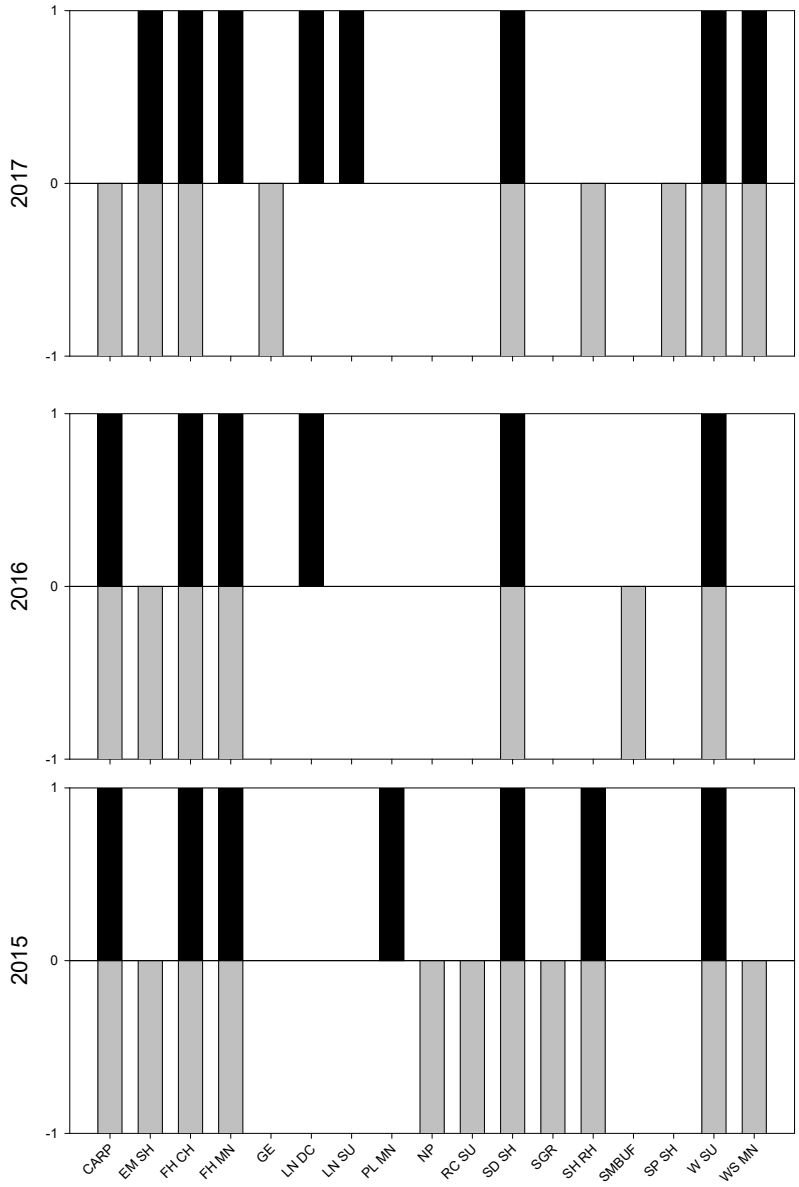

Figure 19. Diagram indicating the presence and absence of species collected in the Redwater River during 2015 (bottom panel), 2016 (middle panel) and 2017 (upper panel). A species present upstream the crossing is indicated by a black bar (above the middle line) and a species present downstream of the crossing is indicated by a grey bar (below the middle line). No bar indicates that species was not collected that year.

Table 9. Summary of 2017 seining data for the Redwater River. Data are broken into upstream and downstream of Nickwall Crossing. Asterisks (*) indicate that the particular species was only found in that site.

2017 Bag Seining Redwater River
Upstream of Nickwall Crossing

Species	# Sampled	Length Avg. (in)	Min Length (in)	Max Length (in)
Emerald Shiner	14	3.1	2.9	3.4
Flathead Chub	42	3.7	2.0	6.3
Fathead Minnow*	1	1.5	1.5	1.5
Longnose Dace*	1	2.7	2.7	2.7
Longnose Sucker*	2	4.4	3.9	4.8
Sand Shiner	87	1.9	1.5	2.2
White Sucker	16	4.4	1.9	6.7
Western Silvery Minnow	2	3.1	2.5	3.6

Downstream of Nickwall Crossing

Species	# Sampled	Length Avg. (in)	Min Length (in)	Max Length (in)
Common Carp*	3	4.1	3.0	5.9
Emerald Shiner	68	3.2	2.5	3.7
Flathead Chub	17	2.8	1.5	5.9
Goldeye*	1	13.8	13.8	13.8
Sand Shiner	45	1.7	1.3	2.4
Shorthead Redhorse*	8	4.6	2.2	6.5
Spottail Shiner*	5	2.6	2.3	2.8
White Sucker	24	3.5	2.1	6.0
Western Silvery Minnow	1	4.4	4.4	4.4

Table 10. Summary of 2016 seining data for the Redwater River. Data are broken into upstream and downstream of Nickwall Crossing. Asterisks (*) indicate that the particular species was only found in that site.

2016 Bag Seining Redwater River Upstream of Nickwall Crossing				
Species	# Sampled	Length Avg. (in)	Min Length (in)	Max Length (in)
Common Carp	1	5	5	5
Flathead Chub	3	2.17	1.3	3.3
Fathead Minnow	1	1.7	1.7	1.7
Longnose Dace*	4	2.15	2	2.3
Sand Shiner	113	1.76	1.3	2.2
White Sucker	3	3.37	3.2	3.6
Downstream of Nickwall Crossing				
Species	# Sampled	Length Avg. (in)	Min Length (in)	Max Length (in)
Common Carp	2	1.8	1.7	1.9
Emerald Shiner	57	2.99	2.6	3.4
Flathead Chub	1	3.4	3.4	3.4
Fathead Minnow	5	1.8	1.7	2
Sand Shiner	22	1.62	1.4	2
Smallmouth Buffalo*	2	1.4	1.2	1.6
White Sucker	1	2	2	2

Table 11. Summary of 2015 seining data for the Redwater River. Data are broken into upstream and downstream of Nickwall Crossing. Asterisks (*) indicate that the particular species was only found in that site.

2015 Bag Seining Redwater River				
Upstream of Nickwall Crossing				
Species	# Sampled	Length Avg (in)	Min Length (in)	Max Length (in)
Common Carp	36	2.21	1.8	2.8
Flathead Chub	8	2.59	1.5	5
Fathead Minnow	1	2	2	2
Plains Minnow*	1	2.5	2.5	2.5
Sand Shiner	118	2.04	1.8	2.5
Shorthead Redhorse	2	2.85	2.2	3.5
White Sucker	17	2.21	1.8	2.5
Downstream of Nickwall Crossing				
Common Carp	6	1.85	1.5	2.2
Emerald Shiner*	69	2.91	2.5	3.8
Flathead Chub	1	1.2	1.2	1.2
Fathead Minnow	2	1.1	1	1.2
Northern Pike*	1	14	14	14
River Carpsucker*	10	3.66	1.5	8.5
Sand Shiner	4	1.75	1.5	2
Sauger*	1	13	13	13
Shorthead Redhorse	1	7.8	7.8	7.8
White Sucker	13	2.09	1.2	2.5
Western Silvery Minnow*	1	3.5	3.5	3.5

Missouri River Dredge Cut Paddlefish Fishery

Montana Fish, Wildlife and Parks administers an archery paddlefish season in the Missouri River Dredge Cuts from July 1 to August 31. There is a one fish per season limit and a blue harvest tag is required. Blue harvest tags can be obtained through FWP and currently there is no limit on the number of Blue tags distributed. However, within the State, an angler can only hold one valid tag, either a Blue archery tag, a White tag (Missouri River above Fort Peck) or a Yellow tag (Lower Missouri and Yellowstone Rivers). A phone survey is conducted on paddlefish harvest, which is currently the best available data on harvest for the archery fishery.

From 2011 to 2017 harvest has been estimated at between a low of 7 fish in 2011 to a high of 55 fish in 2018. Since 2013 harvest has remained relatively stable ranging from 43 to 55 fish (Table 12). Although harvest has remained relatively stable, catch rates vary greatly. During 2017 archers had an estimated catch rate of 0.08 fish/day, which was the similar to 2015 and 2014. The highest catch rates observed were during 2016 at 0.29 fish/day and 2013 at 0.15 fish/day.

The paddlefish archery fishery seems to be gaining popularity, with the highest number of tags sold in 2017 (297). It will be interesting to see if harvest continues to stay similar in past years. There is some at this point anecdotal information that suggests catch rates may be positively tied to Milk River discharge. During both 2016 and 2013 the Milk River had sustained flows during mid-June to mid-July. Both years had high catch rates for paddlefish in the Dredge Cuts. However, 2011 had extremely high flows in the Milk and catch rates were estimated to be the lowest in the past 7 years. During years that the Milk River is flowing at above 1,000 cfs during mid-June to mid-July, paddlefish may be drawn into the Fort Peck area at a higher rate than other years where they may stop and spawn near Frazier (a known congregation area). In 2011, visual observations of a lot of paddlefish occurred in the Fort Peck Dam tailrace, an area off limits to archery paddlefish anglers. High flows out to the powerhouse and spillway may have actually drawn fish out of the Dredge Cuts during 2011. This is all just a theory, since actual data on Dredge Cut paddlefish is currently limited.

Table 12. Missouri River Dredge Cuts archery paddlefish survey summary (2011-2017).

Year	Tags Sold	# Respondents	Response rate	Percent bow hunted	# anglers bow hunted	Average days fished	Total angler days	# fish harvested	catch rate (pf/day)
2017	297	195	65.6	80.5	239	3.59	859	55	0.08
2016	239	149	62.3	89.9	215	0.78	168	43	0.29
2015	260	174	66.9	82.8	216	3.45	742	46	0.07
2014	212	132	62.3	89.4	190	3.79	718	50	0.08
2013	162	113	69.8	86.7	140	2.86	401	51	0.15
2012	173	120	69.4	70	121	2.28	390	26	0.05
2011	111	79	71.2	65.8	73	2.79	204	7	0.02

Prepared by: Tyler M Haddix

Date: May 2018

Waters referred to:

Box Elder Creek Reservoir	16-4495
Missouri River Section 05	16-00AK
Missouri River Dredge Cuts	
Milk River	
Redwater River	

Keywords

Small ponds	Shovelnose sturgeon
Yellow Perch	Largemouth bass
Northern pike	Bluegill
Rainbow trout	Walleye
Black bullhead	Fathead minno