

2015 Missouri River – Holter Dam Tailwater Monitoring

Status Report for PPL-Montana FERC Project 2188

Prepared by

Jason Mullen, Montana Fish, Wildlife & Parks Dylan Owensby, Montana Fish, Wildlife & Parks Gabe Madel, Montana Fish, Wildlife & Parks

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In 2015 Montana Fish, Wildlife & Parks received \$23,630 from Northwestern Energy for monitoring the Missouri River and the fishery below Holter Dam as part of FERC license 2188.

Missouri River trout populations

Two sections of the Missouri River downstream from Holter Dam were electrofished at night using aluminum jet boats. The Craig section is 5.6 miles long and located from river mile (Rm) 2.5 to 8.1. The Cascade section is 4.1 miles long and is located from Rm 24.2 to 28.3. Jet propelled boats were equipped with headlights and fixed boom-type electrofishing systems using stainless steel cable droppers suspended from each boom. Electricity from 240-VAC generators was converted to smooth DC using Coffelt or Smith-Root rectifying units. Brown trout estimates were conducted in each section in spring from the 22^{nd} of April to the 12^{th} of May. Two jet boats were used in the Craig section, and one boat was used in the Cascade section. Rainbow trout estimates were conducted in fall from the 5th to the 20th of October and two boats were used in each section. Data were analyzed using the Montana Fish, Wildlife and Parks (MFWP) FA+ statistical software (MFWP 2004). Population estimates were calculated using the partial Log-liklihood or modified Petersen's methods. The significance level for all estimates was $\alpha \leq 0.05$.

2015 Missouri River trout population summary

In spring 2015 in the Craig section, the estimate of brown trout 10 inches long and greater was 433 (SD 35) per mile (Figure 1). The mean for years when population estimates were calculated based on data since 1982 (n = 31) was 572 per mile. We sampled 14 walleye and 12 burbot. The largest burbot was 25.7 inches long and weighed 3.5 pounds. The largest walleye was 30.7 inches long and weighed 8.1 pounds.

A substantial number of rainbow trout were flushed into the Missouri from Holter Reservoir in 2011. Of the 5,787 rainbow trout handled in 2011 in the Craig section, approximately 19 percent (1,125) were hatchery fish. The number of hatchery trout has declined in each year since then to 101 hatchery rainbows in the Craig section in 2015 (2 percent of the total number handled).

In fall 2015 in the Craig section, the estimate of rainbow trout 10 inches long and greater was 4,073 (SD 144) per mile (Figure 1). The estimate of 4,073 fish per mile, was 123% of the long term average of 3,307 fish per mile based on annual estimates since 1982. We sampled 19 walleye and 51 burbot in fall 2015 in the Craig section.

In spring 2015 in the Cascade section, the estimate of brown trout 10 inches long and greater was 476 (SD 30) per mile (Figure 2). This was 120% of the long term average of 397 per mile. We sampled 1 walleye and 3 burbot. The walleye was 17.0 inches long and the burbot ranged from 8.3 to 14.2 inches long.

In fall 2015 in the Cascade section, the estimate of rainbow trout 10 inches long and greater was 1,862 (SD 108) per mile (Figure 2). This was 116% of the long term average of 1,600 per mile. We sampled 6 walleye and 34 burbot in the Cascade section. The walleye ranged from 6.2 to 19.7 inches long. The burbot ranged from 11.3 to 23.5 inches long.



Missouri River - Craig section

Figure 1. Estimated number of rainbow and brown trout greater than 10 inches per mile in the Craig section of the Missouri River 1982-2015.



Figure 2. Estimated number of rainbow and brown trout greater than 10 inches per mile in the Cascade section of the Missouri River 1981-2015.

Water flow

For the 2015 calendar year the Missouri River below Holter Dam had a mean discharge of 4,447 cfs, which was 84% of the 69 year mean (\bar{x} =5,322 [3,120-8,493]) (Figure 3). This flow year ranked in the 35th percentile for the 69 year period of record. The maximum discharge in 2015 was 6,160 cfs, which occurred on June 6th and 7th (Figure 4, Table 3).

Water temperature

When monitoring water temperature of the Missouri River, regional personnel rely on the information provided from the USGS gauging stations as the 'first line' of notification. When temperature reaches the critical threshold of 70° F, we switch to data monitored by several thermographs located at strategic locations in each of the Missouri, Smith, Sun, and Dearborn rivers. These thermographs are used in making management decisions that could include providing recommendations to the regional Fish, Wildlife & Parks Commissioner to institute time of day angling restrictions of certain fisheries to reduce stress from angling on the trout populations. It is the policy of MFWP that such closure requests may be made when "...daily maximum water temperature reaches or exceeds 73° F (23° C) for at least some period of time during three consecutive days..."

In 2015 the USGS Wolf Creek Bridge site below Holter Dam recorded a maximum daily temperature of 67.1°F in August (Table 3). While temperatures were relatively high in August they did not warrant recommending angling restrictions on this valuable fishery.



Missouri River below Holter Dam

Figure 3. Mean annual flow for Missouri River below Holter Dam, 1947-2015.



Figure 4. Maximum annual flow for the Missouri River below Holter Dam, 1946-2015.

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		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Missouri temp 2014	mean	34.0	35.2	36.7	43.9	49.9	58.4	61.0	63.6	60.4	56.1	46.9	36.1
	min	33.4	34.3	34.3	40.5	45.1	52.9	32.0	59.4	58.6	52.7	39.7	33.4
	max	34.7	36.5	42.4	48.6	57.4	64.4	65.8	67.1	63.7	59.9	53.1	39.7
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Missouri flow 2014	mean	4905	4977	4511	3862	3817	4717	4003	4012	4062	3393	3299	3387
	min	4620	4690	4000	3470	3630	3850	3860	3810	3710	3320	3200	3210
	max	5130	5180	5160	4300	4170	6160	4290	4230	4390	3530	3520	3520

Table 3. River flow (cfs) and temperature (°F) recorded at USGS station 06066500 (M	lissouri
River below Holter Dam near Wolf Creek, Montana) for the calendar year 2015.	

Missouri River YOY walleye survey

We conducted 48 seine hauls in 2015 to evaluate young of the year (YOY) walleye abundance at 12 sites in a 47 mile-long reach of the Missouri River between Cascade and Great Falls. The protocol and site descriptions have been described by Grisak and Tribby (2011). Young of the year walleye abundance has been variable at these sites over the past seven years. Abundance of YOY in 2015 was much less than in all the previous years, with only one YOY walleye collected in 2015 (Figure 6). In 2009 and 2010, YOY abundance was highest in the upper sites (1-4). In 2011 there was a change in abundance where YOY walleye numbers were highest in the middle

sites (6-9). In 2012 the highest abundance of YOY walleye occurred at sites (1-4). In 2013, YOY walleye were found only at sites 3 and 12. In 2014, YOY walleye were collected from 6 of the 12 sites; however, 51 of the 60 walleye were collected from sites 2, 6, and 9. A general decline in YOY walleye abundance has been observed over the monitoring period with the highest abundance in the first two years of sampling and the lowest abundance in the last three years of sampling.



Figure 6. Total abundance by year, of young of the year walleye from seining sites along the Missouri River from Cascade to Great Falls, Montana.

Missouri River trout spawning

In an effort to evaluate trout production in the main stem Missouri River, trout redds are counted when flows conditions are suitable for viewing and counting redds by helicopter. In 2010, 2013 and 2015, visibility was adequate to conduct rainbow trout redd counts. The protocol follows that described by Grisak et al. (2012) and the survey area spans from Holter Dam to the Pelican Point FAS (26.2 miles). In 2010, 1,644 rainbow trout redds were counted in this reach of river, 3,113 rainbow trout redds were counted in 2013, and 2,793 rainbow trout redds were counted in 2015 (Figure 7). The general abundance of rainbow trout redds counted in these three years corresponds with the rainbow trout abundance estimates conducted in the prior fall. Rainbow trout redds counts were also conducted in all major spawning tributaries in 2015, except the Dearborn River. The amount of rainbow trout tributary spawning in 2015 was within the range of counts conducted in two or three years from 2007 through 2010 for all tributaries, except Lyon Creek where the number counted in 2015 was less than previous counts. Triburary spawning was estimated to account for 61% of the total spawning with 39% of the spawning in the Missouri.

Conditions were not conductive to conduct brown trout redd counts in the same stretch of the Missouri River in 2015; however, redd counts were conducted on the major spawning tributaries with exception of the Dearborn River. Brown trout redd counts in Little Prickly Pear Creek, Wolf Creek, Lyons Creek, and Sheep Creek were less than previous brown trout redd counts conducted in 2007 through 2009.



Missouri River Rainbow Trout Redds

Figure 7. Rainbow trout redd counts from the Missouri River near Craig, Montana 2010, 2013, and 2015.

Submitted by; Jason Mullen

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