# 2013 Missouri River – Holter Dam Tailwater Monitoring

Status Report for PPL-Montana
FERC Project 2188

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In 2013 Montana Fish, Wildlife & Parks received $20,341, from PPL-Montana 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 during the third week in April and the first week of May and two jet boats were used in the Craig section, but only one boat was used in the Cascade section. Rainbow trout estimates were conducted in October and two boats were used in each section. Data are analyzed using the MFWP FA+ statistical software (Montana Fish, Wildlife & Parks (MFWP), 2004). Population estimates are calculated using the partial Log-liklihood or modified Petersen's methods. The significance level for all estimates was $\alpha \leq 0.05$.

*2013 Missouri River Trout Population Summary*

In May 2013 in the Craig section, the estimate of brown trout ≥10 inches long was 745 (SD17) per mile (Figure 1). The 30 year mean is 560 per mile. We sampled 31 walleye and 24 burbot. The largest burbot was 28.4 inches long and weighed 3.58 pounds. The largest walleye was 29.8 inches long and weighed 10.3 pounds.

In October 2013 in the Craig section, the estimate of rainbow trout ≥10 inches long was 5,194 (SD 152) per mile (Figure 1). For the third year in a row there was a higher than normal number of hatchery fish in the Craig section which allowed us to calculate an estimate of hatchery fish for only the third time ever which was 394 (SD 165) per mile. The estimate of wild trout was 4,800 fish per mile which was 148% of the long term average and would be the fourth highest on record. We sampled 31 walleye and 24 burbot in October 2013 in the Craig section.

In May 2013 in the Cascade section, the estimate of ≥10 inch brown trout was 447 (SD 22.5) per mile (Figure 2). This was 116% of the long term average. We sampled 3 walleye and 12 burbot. The largest walleye was 23.9 inches long and weighed 4.74 pounds. The largest burbot was 24.8 inches long and weighed 2.10 pounds.

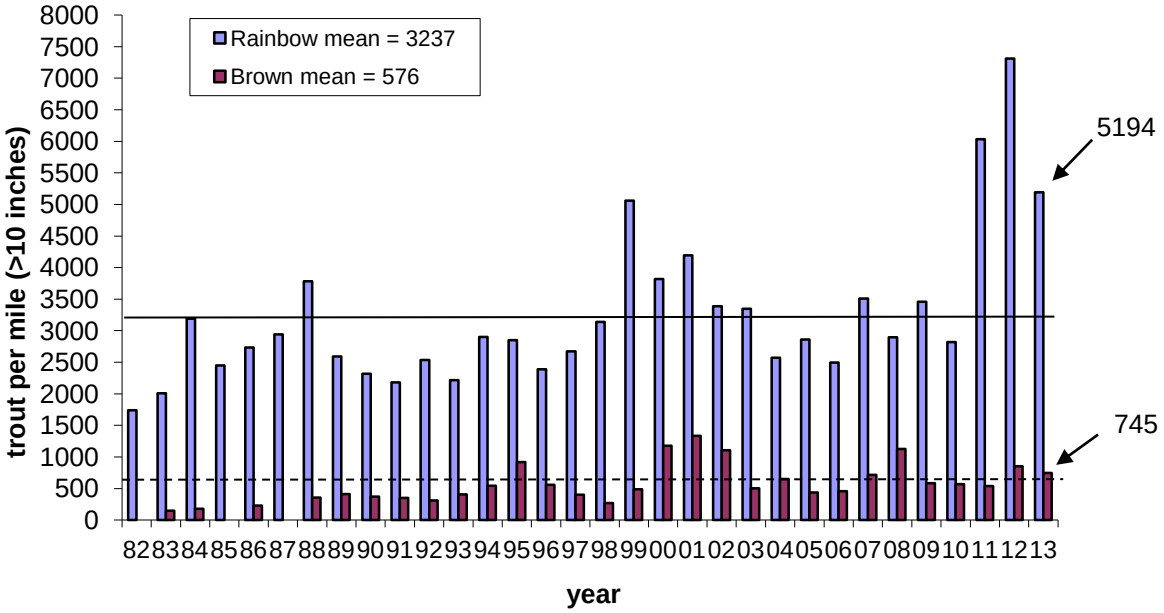


Figure 1. Estimated number of rainbow and brown trout greater than 10 inches per mile in the Craig section of the Missouri River 1982-2013.

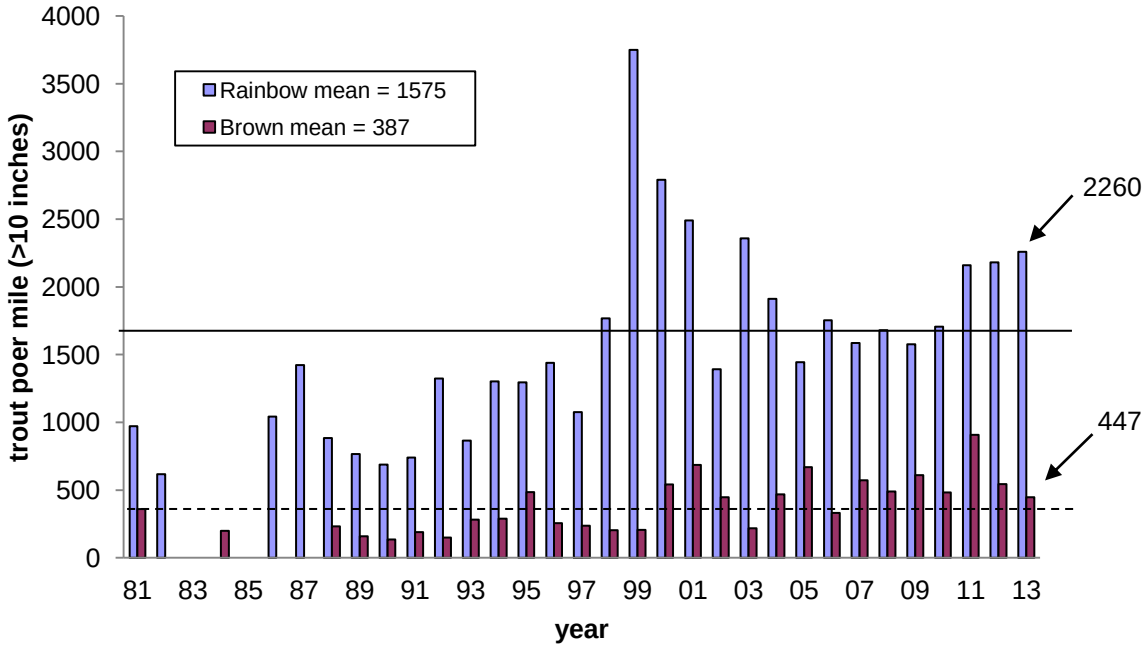


Figure 2. Estimated number of rainbow and brown trout greater than 10 inches per mile in the Cascade section of the Missouri River 1981-2013.

In October 2013 in the Cascade section, the estimate of ≥ 10 inch rainbow trout was 2,260 (SD 83) per mile (Figure 2). This was 146% of the long term average. We sampled 6 walleye and 16 burbot in the Cascade section. The largest walleye was 22.1 inches long and 4.89 pounds. The largest burbot was 24.4 inches long and weighed 2.57 pounds.

**Water flow**

For the 2013 calendar year the Missouri River below Holter Dam had a mean discharge of 3685 cfs, which was 69% of the 67 year mean ($\bar{x}$ =5332 [3125-8497]) (Figure 3). The maximum discharge in 2013 was 5,240 cfs, which occurred on March 1 (Figure 4, Table 3). This flow year ranked in the 12$^{th}$ percentile for the 68 year period of record.

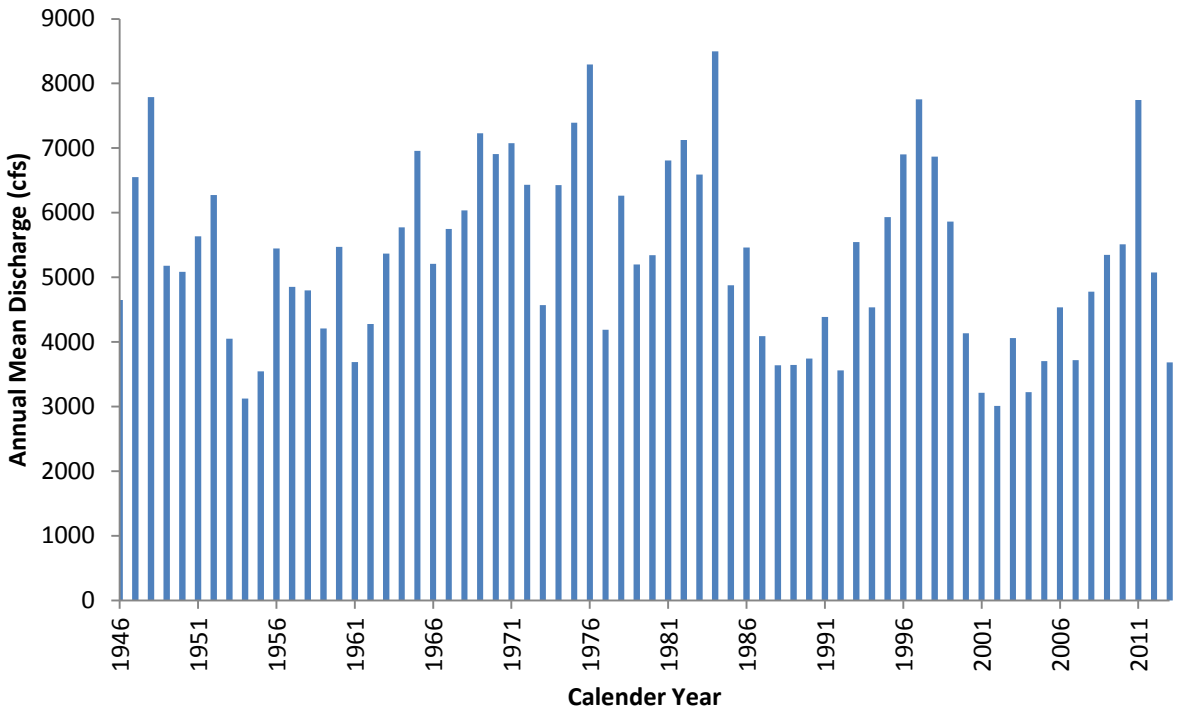


Figure 3. Mean annual flow for Missouri River below Holter Dam, 1947-2013.

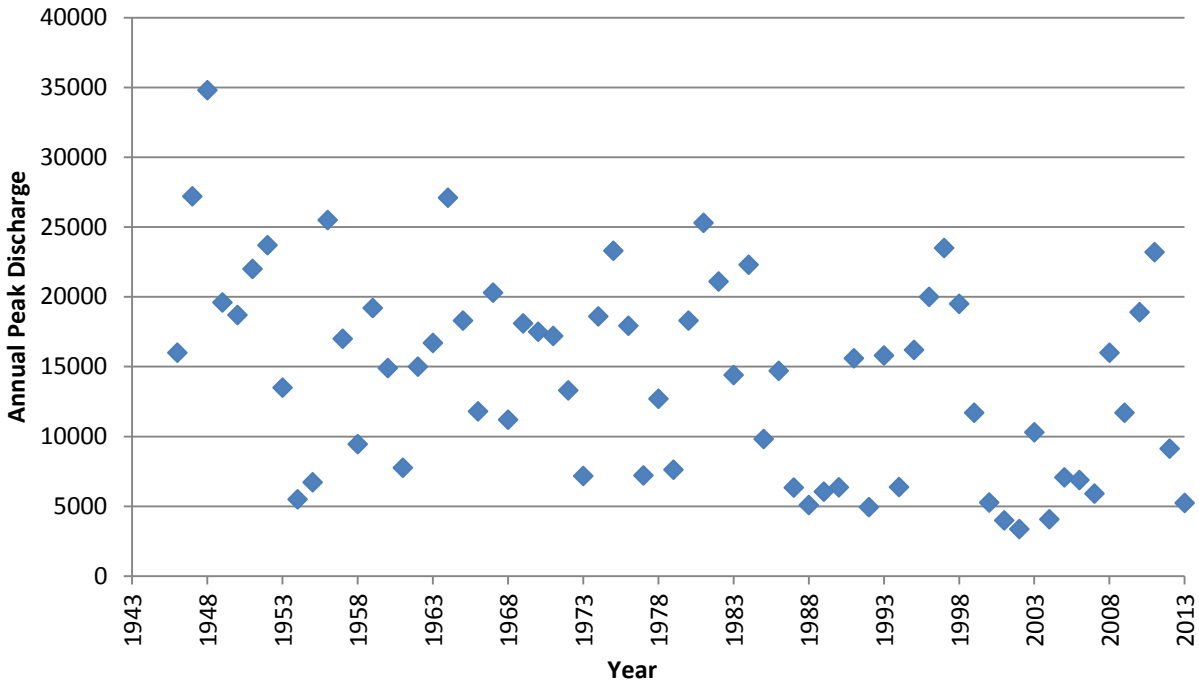


Figure 4. Maximum annual flow for the Missouri River below Holter Dam, 1946-2013

Table 3. River flow (cfs) and temperature ($^{o}$F) recorded at USGS station 06066500 (Missouri River below Holter Dam near Wolf Creek, Montana) for the calendar year 2013.

| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Missouri temp 2013** | mean | 34.7 | 35.6 | 37.4 | 42.1 | 50.0 | 56.8 | 64.0 | 65.1 | 63.3 | 52.5 | 44.2 | 35.6 |
| | min | 34.2 | 34.9 | 36.1 | 39.2 | 43.9 | 52.0 | 60.4 | 62.6 | 57.6 | 48.2 | 39.9 | 34.2 |
| | max | 35.1 | 36.5 | 39.7 | 44.4 | 55.9 | 64.0 | 67.6 | 68.5 | 68.2 | 57.9 | 48.4 | 40.3 |
| | | | | | | | | | | | | | |
| | | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** |
| **Missouri flow 2013** | mean | 4189 | 4711 | 4485 | 4182 | 4073 | 3178 | 2859 | 3004 | 3044 | 3177 | 3164 | 3435 |
| | min | 3630 | 4240 | 4180 | 3960 | 3760 | 2720 | 2550 | 2930 | 2750 | 3050 | 3050 | 3030 |
| | max | 4600 | 5100 | 5240 | 4450 | 4330 | 4010 | 3170 | 3100 | 3240 | 3300 | 3300 | 4380 |
| | | | | | | | | | | | | | |

## 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$^{o}$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 to request such closures when "…daily maximum water temperature reaches or exceeds 73° F (23° C) for at least some period of time during three consecutive days…"

In 2013 the USGS Wolf Creek Bridge site below Holter Dam recorded a maximum daily temperature of 68.5$^{o}$F in August (Table 3). While water temperatures from June to September were elevated compared to 2011 and 2012 they did not warrant recommending angling restrictions on this valuable fishery.

**Missouri River YOY walleye survey**

We conducted 39 seine hauls in 2013 to evaluate YOY walleye abundance at 10 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 five years. Overall abundance of YOY in 2013 was less than the previous four years. (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.

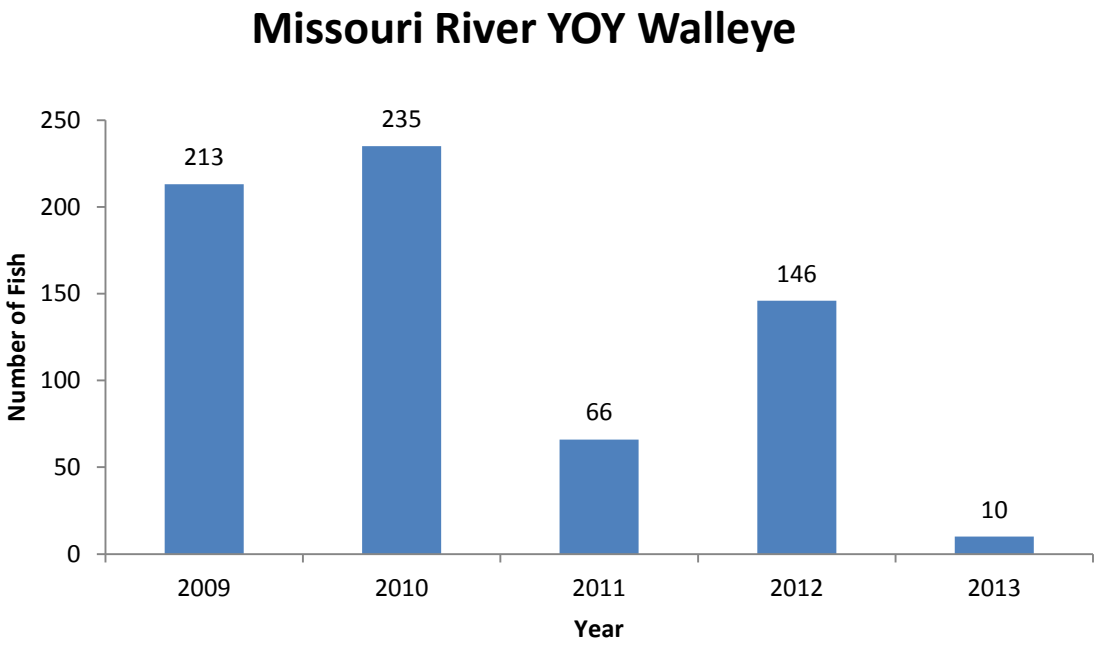


Figure 6. Walleye YOY seine survey sites and results 2009-2013, Missouri River, Montana.

**Missouri River rainbow trout spawning**

In an effort to evaluate rainbow trout production in the main stem Missouri River, trout spawning redds are counted when flows conditions are suitable for viewing and counting redds by helicopter. In 2010 and 2013 visibility was adequate to conduct 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 we counted 1,644 redds in this reach of river, and in 2013 we counted 3,113 redds which was almost twice the number of redds counted in 2010 (Figure 7).

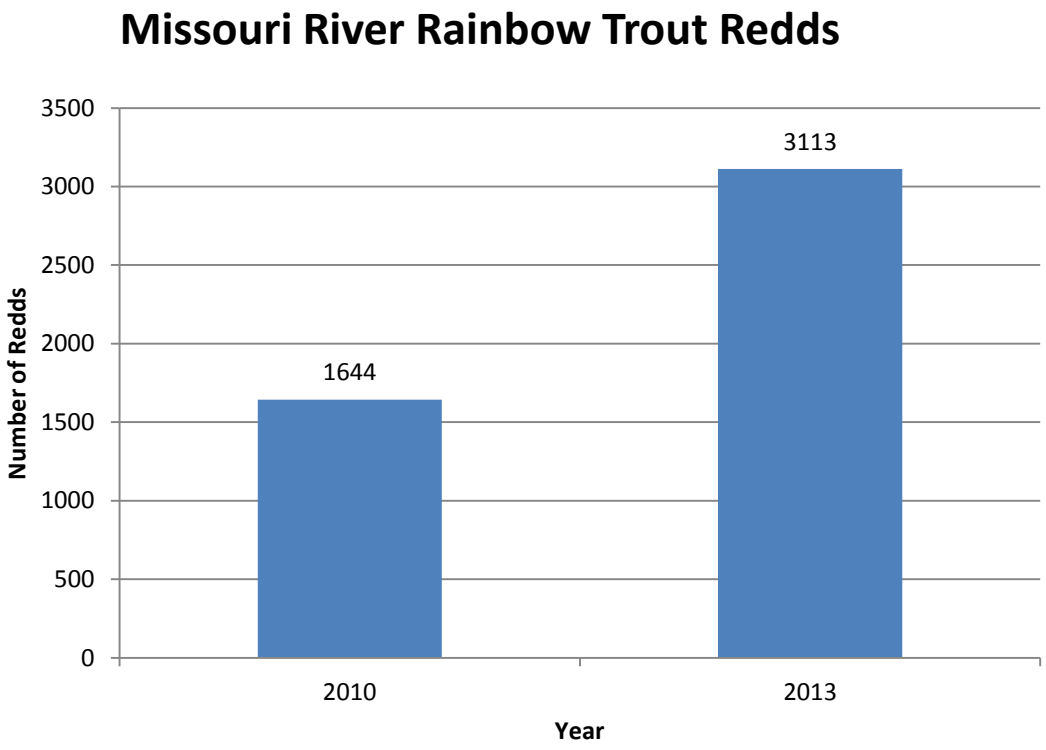


Figure 7. Rainbow trout redd counts from the Missouri River near Craig, Montana 2010, 2013.

Submitted by; Grant Grisak July, 2014

## REFERENCES


Grisak, G., B. Tribby and A. Strainer. 2012. An Evaluation of walleye in the Missouri River between Holter Dam and Great Falls, Montana. PPL-Montana MOTAC projects 771-09, 771-10, 759-11, 771-11 and Fisheries Bureau Federal Aid Job Progress Report Federal Aid Project Number F-113-R9, R10, R11, R12. Montana Statewide Fisheries Management. Great Falls.

Grisak, G. and B. Tribby. 2011. 2010 Missouri River – Holter Dam tailwater monitoring report. Status report for PPL-Montana FERC Project 2188. Montana Fish, Wildlife & Parks, Great Falls.

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