Missouri-Smith-Sun Rivers Fish Movement Study (2009) MOTAC project 771-09

Progress Report

Submitted to

PPL-Montana 336 Rainbow Dam Great Falls, Mt. 59404

Prepared by

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Introduction

In March 2009, Montana Fish, Wildlife & Parks continued evaluations of fish interactions in the Sun, Smith and Missouri rivers (Grisak 2009). Preliminary investigations in 2007 and 2008 showed walleye and brown trout tagged in the Sun River traveled as much as 89 miles into the Missouri River for spawning and overwintering. Brown trout tagged in the lower Missouri River, below the mouth of the Smith River, traveled upstream 63 miles and spawned in Little Prickly Pear Creek, then returned to the location where it was tagged. These findings raised questions about the importance of the lower Missouri River and its tributaries to the entire fish population in this area. In 2009 MFWP was awarded an \$17,800 from PPL-Montana MOTAC to purchase 40 radio transmitters to investigate these interactions.

Methods

The study design involved radio tagging ten trout from each of the Missouri, Smith and Sun rivers, and ten walleye from the Missouri/Sun confluence area. Fish were captured from the Sun River using four 4-foot diameter trap nets set between the 6th Street Bridge and the mouth of the river. Traps were checked every other day to tag target fish and to release non-target suckers. Fish were captured from the Missouri River using baited hoop nets, trammel nets and electrofishing. Fish were captured from the Smith River using baited hoop nets set near the mouth. We also included the results of one walleye tagged in 2008. Movements of radioed fish were monitored by truck, airplane, boat and remote receiver stations located throughout the study area. Fish locations were identified based on river miles in order to associate their locations with significant landmarks and calculate the total distance each fish moved (Figure 1, Table 1).

Results

Trapping the Sun River began on March 15 within days of the ice melting and continued through April 22. We sampled 253 fish from 9 species; rainbow trout (26), brown trout (8), walleye (21), burbot (7), stonecat (176), black bullhead (3), mountain whitefish (1), yellow perch (9) and carp (2). By the first week of April, water temperature had risen to 50°F and we began sampling white suckers by the thousands and longnose suckers by the hundreds.

Trapping in the Smith River was conducted using hoop nets on April 22 when the discharge doubled from two days earlier to almost 800 cfs. We captured and tagged 4 rainbow trout, one brown trout and one walleye.

Trapping in the Missouri River was conducted incidental to burbot monitoring. We captured all of the Missouri River trout involved in this study using hoop nets. All of the Missouri River walleye were captured by angling, trammel nets or electrofishing.



Figure 1. Map of the Missouri River study area from Holter Dam to Black Eagle Dam with associated landmarks and river miles (RM).

Landmark	River mile
Holter Dam	0.0
BLM Campground	0.3
Wolf Creek Bridge	2.4
Mouth of LPP Creek	2.7
Head of Billings Slough	5.0
Head of Sterling Slough	6.9
Mouth of Sterling Slough	7.4
Craig Bridge	7.9
Jackson Rock	9.3
I-15 Bridge	10.3
Mouth of Stickney Creek	11.2
Stickney FAS	11.7
Mouth of Dearborn River	13.5
Mid Canon FAS	15.0
Mouth of Andy Creek	17.7
Devils Kitchen FAS	18.3
Hardy Bridge	22.0
Prewett Creek FAS	22.5
Chestnut Valley irrigation intake	23.3
Mouth of Sheep Creek	23.6
Pelican Point FAS	26.2
End of Pelican Point electrofishing section	28.3
Mouth of Antelope Creek	30.6
Cascade Bridge	34.4
City of Cascade FAS	35.4
Wing Dam	36.5
Mouth of Bird Creek	41.4
Mouth of Little Muddy Creek	43.3
Castner Coulee	51.0
Dunes FAS	53.1
Ulm Bridge	56.4
Mouth of Smith River	58.1
Zahara Golf Course point	61.7
USGS Gauging station 06078200	66.8
Woodland Estates point	69.2
Big Bend FAS	75.0
KMON Radio Towers	79.3
Sand Coulee Creek	81.2
White Bear Island	82.0
Mouth of Sun River	84.7
Central West Bridge	85.7
Black Eagle Dam	88.5

Table 1. Notable landmarks and associated river miles for Missouri River between Holter Dam and Black Eagle Dam.

All but 9 of the radio tagged fish displayed movements greater than six miles from their location of implant. Overall, 42% of the tagged fish moved from the river they were tagged at into another river, 23% stayed in the river where they were tagged, 3% moved out of the river they were tagged, into another river, into a tributary, then back to the river (i.e Smith-Missouri-Sheep ck-Missouri) and 32% moved from the river they were tagged at into another river, then back (Table 2).

I.D.	Species	Length	Weight	Movements	Total miles	Comment
		(in)	(lbs)		traveled	
720-80	Brown trout	17.1	1.44	Missouri River	10.5	
720-87	Brown trout	22.4	3.36	Missouri River	61.4	
720-86	Rainbow trout	18.7	2.17	Missouri River	14.1	
720-89	Brown trout	19.8	2.31	Missouri River	1.2	
800-57	Walleye	21.2	3.08	Missouri River	3.7	
720-70	Rainbow trout	15.1	1.29	Smith to Missouri	2.3	
720-71	Rainbow trout	18.1	1.74	Smith to Missouri	14.1	
720-74	Brown trout	15.8	1.09	Smith to Missouri	29.1	
720-72	Rainbow trout	15.0	1.19	Smith River	0.5	
720-73	Rainbow trout	15.4	1.17	Smith River	0.5	
720-80	Brown trout	17.1	1.44	Missouri-Sheep-Missouri	38.5	
720-99	Brown trout	23.5	3.76	Sun-Missouri-Sheep-Missouri	62.3	
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720-82	Rainbow trout	16.2	1.45	Missouri-Smith-Missouri	55.8	
720-85	Rainbow trout	17.8	1.81	Missouri-Smith-Missouri	70.7	
800-12	Walleye	28.5	11.8	Missouri-Smith-Missouri	58.1	'08 implant
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720-84	Rainbow trout	17.4	1.52	Missouri Dearborn-Missouri	113.5	
720-90	White sucker	15.5	1.78	Sun-Missouri-Sun	59.1	
720-92	Walleye	18.7	2.57	Sun-Missouri	84.9	Harvested
720-94	Brown trout	19.5	2.20	Sun-Missouri	84.9	
720-95	Brown trout	20.5	2.82	Sun-Missouri-Sun	127.5	
720-97	Brown trout	20.3	2.81	Sun-Missouri	11.4	
720-98	Brown trout	21.6	3.21	Sun-Missouri	10.4	Harvested
800-50	Walleye	18.1	2.10	Sun-Missouri	5.7	
800-51	Walleye	17.8	1.17	Sun-Missouri	1.2	
800-52	Walleye	18.3	2.51	Sun-Missouri-Sun	13.5	
800-54	Walleye	17.9	2.10	Sun-Missouri	84.9	Harvested
800-55	Walleye	16.0	1.34	Sun-Missouri-Sun	31.1	
800-56	Walleye	16.1	1.31	Sun-Missouri-Sun	60.9	
800-58	Walleye	18.2	2.65	Sun-Missouri	0.7	
800-59	Walleye	17.5	2.18	Sun-Missouri	16.1	Harvested
800-60	Carp	16.0	2.21	Sun-Missouri	2.7	
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Table 2. Movements of radioed fish implanted with radio transmitters in 2008-09.

Highlighted fish discussed in text

There were several notable examples of fish movement and behavior. The greatest distance traveled by any one fish was 127.5 miles as displayed by brown trout 720-95. This fish was tagged in the Sun River on April 10. Shortly afterwards it moved into the Missouri River and progressively moved upstream 63.5 miles where it was believed to have spawned near the Mountain Palace near the first of October. During a flight on October 16, this fish was found 0.7 miles from it implant site near the mouth of the Sun River.

Rainbow trout 720-84 was tagged in the Missouri River on March 26 at river mile 63.9. Over the next month it progressively moved upstream and was located at the remote station at the mouth of the Dearborn River on April 21. It entered the Dearborn River near April 25 and was located three times during flights between 4 and 6 miles up the Dearborn River. We believed it spawned in the area of river mile 5 on May 12. On June 26 it was located at the Pelican Point FAS and by September 18 it was located at river mile 69, in the general vicinity of its implant location. This fish was tagged in the lower Missouri River, spawned in the Dearborn River and returned to the lower river near the location it was tagged in 6 months time.

White sucker 720-90 was tagged in the Sun River at river mile 0.7 on March 30. The next relocation was on April 20 at the mouth of the Smith River. On June 11 it was located at the Ulm Bridge. Over the next 4 moths it progressively moved downstream and was located at the mouth of the Sun River on September 18. Although the movements of this fish are consistent with the sucker spawning season, no conclusions can be made about where or when it spawned.

Brown trout 720-94 was tagged in the Sun River at river mile 0.7 on April 10. The next relocation was on April 22 upstream of the Mid Canon FAS. On June 4 it was found at the BLM Campground and stayed in this area through the last tracking sequence on October 14. Based on the movements of this fish it is likely it spawned in the mainstem Missouri in late October. During a helicopter flight on November 5, numerous brown trout redds were counted in the Missouri River near the BLM Campground.

Brown trout number 720-99 was tagged in the Sun River on April 17. The next relocation was on May 5 when it was found 56.4 miles upstream the Missouri River near the lower boundary of the Pelican Point electrofishing section. Over the next month this fish moved upstream to the confluence with Sheep Creek and staged there for three months before entering the stream on October 30, where it was believed to have spawned shortly afterwards. It returned to the Missouri shortly afterwards and stayed in that general vicinity.

Walleye number 800-12 was tagged with a radio programmed for 6 months on 6 months off. The tag was implanted in the fish in the Missouri River near Bird Creek on April 11, 2008 and stayed in a 12 mile reach of river until its radio shut off in September. In March 2009 it was found near the mouth of Little Muddy Creek within days of the radio turning on. Over the next 40 days this fish progressively swam upstream where it staged with two other radioed walleye and was believed to have spawned just upstream of the Cascade Bridge around May 1st. From May 5 through May 13, this fish swam downstream to the mouth of the Smith River where it staged at this confluence for three days before entering

the Smith River. On July 1 it was located 1.3 miles up the Smith River. It returned to the mouth of the Smith River in September and stayed in the general vicinity until it's radio shut off in September.

Walleye 720-92 was tagged in the Sun River on April 8. It entered the Missouri River on May 1 and progressively traveled upstream to the Wing Dam where it stayed for most of the summer. On September 18 it was located at the BLM campground below Holter Dam and was eventually harvested by an angler on November 17. Over this time it traveled 84.9 miles in 223 days.

Brown trout 720-98 was tagged in the Sun River on April 17. This fish was harvested by an angler only two days later at the Big Bend FAS located 10.4 miles away from the tagging site. This suggests that the surgical procedure and radio implant has little effect on fish mobility or desire to feed.

Rainbow trout 720-82 was tagged in the Missouri River on March 26 approximately 4 miles downstream of the mouth of the Smith River. It passed through the ground station at the mouth of the Smith River on May 1 and was found 19.1 miles upstream on May 7 where it was believed to have spawned. It progressively moved down stream in the Smith River and exited on May 18. During a flight on October 16, it was found in the Missouri River 13.6 miles downstream of the mouth of the Smith River.

Walleye 800-54 was tagged in the Sun River on April 10 at river mile 0.7. There was one relocation of this fish near the Riverdale subdivision (river mile 49.7) on July 11. On October 12, it was harvested by an angler at the BLM campground.

Walleye 800-56 was tagged in the Sun River on April 13 at river mile 0.7. During a tracking sequence by boat on July 11 it was found upstream of the Ulm Bridge (river mile 54.6) By October 10 it was located at the mouth of the Sun River (mile 84.7) with five other radioed walleye. No conclusions can be made about its summer habits.

Walleye 800-59 was tagged in the Sun River on April 10 at river mile 0.7. Over the next two months it stayed in the general vicinity of the Sun River mouth and was detected by the remote receiver stationed there several times. On June 11 it was discovered upstream in the Missouri River near the Big Bend FAS (river mile 77). It was found at the mouth of the Sun River again on October 16 with five other radioed walleye. This fish was harvested on November 21 by a shore angler fishing under the Warden Bridge.

During a flight on October 16, 2009 there were 6 radioed walleye located in the Missouri River between the short reach of river (0.2 mile) between Park Island and the mouth of the Sun River.

We tagged 127 fish with Floy brand T tags in 2009; rainbow trout (26), brown trout (17, yellow perch (4), burbot (63), and walleye (17). Only one fish, a burbot, tagged with T-tags in 2009 was harvested by anglers. This fish was harvested within one mile of the tagging site.

Conclusions

In 2009 we continued to document the importance of the lower Missouri River to trout. In one case a rainbow trout tagged below the moth of the Smith River traveled to the Dearborn River where it spawned then returned to the lower Missouri near its tagging site. A brown trout tagged in the Sun River traveled up the Missouri, likely spawned in the main stem, then returned to its tagging site. Previous studies in 2007 and 2008 showed the ability of trout tagged in the lower Missouri River to travel as many as 85 miles upstream. Our findings in 2009 showed that some of these trout are returning to the lower Missouri River and could be considered residents of the lower system.

One brown trout tagged in the Sun River was harvested by an angler 10.4 miles away in the Missouri River only 48 hours after it was surgically implanted with a radio. These findings suggest that the surgical procedure and radio implant have little affect on the desire to feed or ability to travel long distances.

This year we documented the first conclusive case of a rainbow trout from the Missouri River using the Smith River to spawn, then returning to its tagging site in the Missouri River. The tagged of several more fish in the fall of 2009 will help define the level of interaction of Smith-Missouri River fish.

Walleye tagged in the Sun River and harvested in the Missouri River below Holter Dam also proves their use of the entire 90 mile reach. The lower Smith River is used by walleye in the early summer when high flows in the Missouri River create a backwater effect in the lower Smith River. The three radioed walleye were tracked to an apparent spawning site near Cascade around May 1 which is the first identifiable walleye spawning location in the Missouri River. The concentration of six radioed walleye near the mouth of the Sun River in October 2009 indicates these fish stage in the lower reaches for over wintering. Further investigations will help determine if these fish are following a forage base of if these fall concentrations of fish are keying into specific habitat features. References

Grisak, G. 2009. Missouri-Smith-Sun Rivers Fish Movement Study. PPL-Montana MOTAC project 771-09. Progress report. Montana Fish, Wildlife & Parks. Great Falls.