Montana Fish, Wildlife & Parks

2005 Holter Dam Tailwater Monitoring

A Report to PPL Montana

by

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ABSTRACT

In 2005, the brown trout estimate in the Craig section, of the Missouri River was 80% of the long-term average. The average catch rate for mountain whitefish in the Craig section was 91.6 fish per pass. For the first time in 4 years, the estimated number of 10 inch and longer rainbow trout per mile increased, and the estimate was 98% of the long-term average. The number of large (17-inch long) rainbow trout increased in 2005, halting a decline that started in 2001. Brown trout in the Pelican Point section were up from 2004 (to 670, fish 10 inch and longer per mile), but high flows and turbid water during the sampling period in the lower river likely caused the estimates to be inflated. Similar to the Craig sections, rainbow trout densities were 98% of the long-term average in the Pelican Point section.

PROCEDURES

Coldwater Stream Ecosystems

In 2005, two sections of the Missouri River downstream from Holter Dam [Craig section (rm 2.5 to 8.1) and the Pelican Point section (rm 24.2 to 28.3)] were electrofished at night using aluminum jet boats. Boats were equipped with headlights and fixed booms with stainless steel droppers suspended in front of the bow. Electricity from 240-volt portable generators was converted to pulsed or straight DC using Coffelt rectifying units. Population estimates for brown trout and mountain whitefish (mountain whitefish were only sampled in the first 1.75 miles of the Craig section) were conducted during the spring (April and May), and rainbow trout estimates were conducted in the fall (September and October). Missouri River population estimates were calculated using the log-likelihood method (FA+ Program; MFWP 2004), which generates recapture efficiency curves for discrete length groups. All sampled fish were measured to the nearest 0.1-inch and weights (to the nearest 0.01 pound) were obtained on a minimum of 15 fish from each ½ inch group. A maximum of ten scale samples were collected from rainbow trout and brown trout from each ½ inch length group for age determination. Water temperature was monitored throughout the Missouri River Basin using Optic StowAway® temperature loggers. Temperature loggers recorded water temperature every 0.5 h. Temperature monitoring varied from year-round to summer only.

RESULTS

Missouri River

In 2005, the estimated number of 10 inch and longer brown trout was 438 per mile in the Craig section of the Missouri River (Figure 1). This estimate is 80% of the long-term (1982-2005) average, and is a slight decrease from the 2004 estimate (Horton and Hamlin 2006). Overall, 1,112 brown trout were sampled varying from 6- to 24.1-inches long. The average length of sampled brown trout was 15.2-inchs long, which was identical to the average length in 2004 (Horton and Hamlin 2006). The heaviest brown trout sampled weighed 4.07 pounds (average weight was 1.44 pounds), and mean relative weight was 91. The mountain whitefish population was surveyed again in the upper 1.75 miles of the Craig section, in the fall of 2005. Similar to 2004, recapture efficiencies were too low to calculate a reliable population estimate, so catch per unit effort (CPUE) was used to monitor relative abundance of mountain whitefish in the section. The average CPUE of mountain whitefish was 91.6 (SD = 11.3) per pass, which was similar to

the 2004 CPUE of 102.6 per pass. The size of sampled mountain whitefish was similar to those sampled in 2004 (Horton and Hamlin 2006). For example, the average length of mountain whitefish in 2004 was 16.4-inches long, compared to 16.3-inches long in 2005. Overall, 733 mountain whitefish were sampled varying from 6.3- to 19.5-inches long. The average weight of sampled mountain whitefish was 1.63 pounds, and average relative weight was 101. For the first time in 4 years, the estimated number of 10 inches and longer rainbow trout per mile increased in the Craig section (Figure 1). The 2005 estimate for 10 inch and longer rainbow trout was 2,860 per mile, which is 98% of the long-term (1982-2005) average. In addition, the number of large (17 inch and longer) rainbow trout increased in 2005 (Figure 2), halting a precipitous decline, which started in 2002. Overall, 4,165 rainbow trout were sampled varying from 6- to 22-inches long. The average length of sampled rainbow trout was 15.6-inches long, and was similar to the average length of sampled rainbow trout in 2004 (Horton and Hamlin 2006). The heaviest rainbow trout sampled weighted 4.49 pounds, and average weight was 1.27 pounds. Finally, average relative weight of sampled rainbow trout was 98 in 2005, which indicates good body condition.

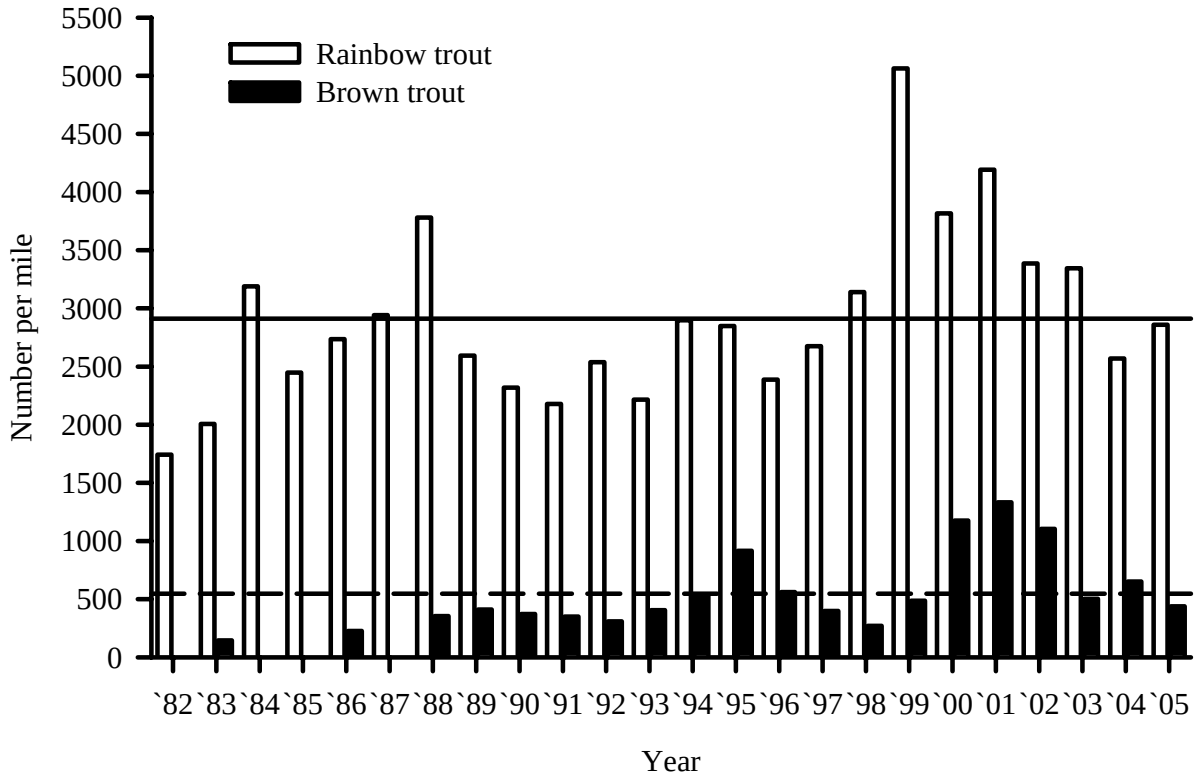

Figure 1. Number of rainbow trout and brown trout 10 inches and longer per mile in the Craig section of the Missouri River, from 1982 to 2005. The solid horizontal line and the dashed horizontal line represent the 1982-2005 average for rainbow trout and brown trout, respectively.

The 2005 estimate for 10 inch and longer brown trout in the Pelican Point section was 670 per mile (Figure 3)—which was 205% of the long-term average—however; the estimate was influenced by poor sampling conditions (high and turbid water) during the recapture sampling runs. Floods in Little Prickly Pear Creek and the Dearborn River created the sampling

conditions experienced. For example, flows in the Pelican Point section of the Missouri River during the mark runs were approximately 3,800 cfs. Flows increased to approximately 7,150 during the recapture runs. These flow conditions decreased sampling efficiency, which likely resulted in an increased estimate of brown trout.

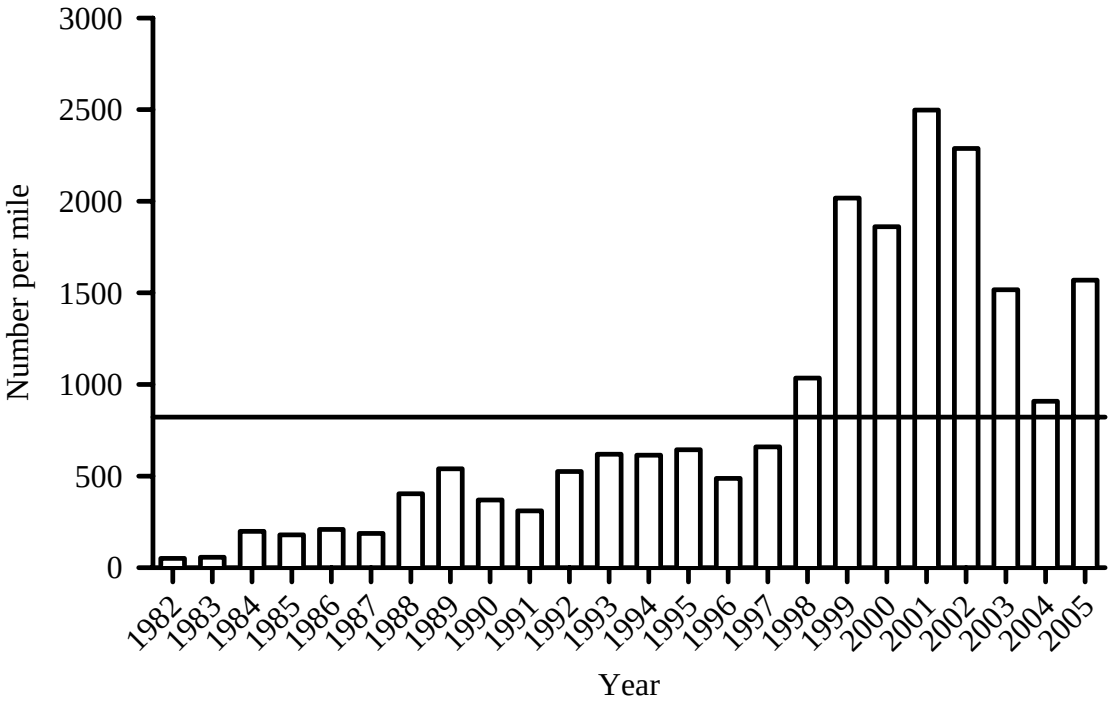

Figure 2. Number of rainbow trout 17 inches and longer per mile in the Craig section of the Missouri River, from 1982 to 2005. Horizontal line represents the 1982-2005 average.

Overall, 529 brown trout were sampled in the Pelican Point section in 2005. The average length of sampled brown trout was 15.1 inches (length varied from 6.0- to 23-inches long). The heaviest brown trout sampled weighed 4.26 pounds (mean length was 1.37 pounds), and relative weight was 90. The estimated number of 10 inch and longer rainbow trout in the Pelican Point section was 1,445 per mile in 2005 (Figure 3). The estimate was 98% of the long-term (1981-2005) average. Overall, 2,537 rainbow trout were sampled varying from 6.1- to 20.9-inches long (average length was 13.0 inches). The average weight of sampled rainbow trout was 0.98 pounds (varying from 0.07 to 3.31 pounds), and average relative weight was 94.

Water temperature was monitored throughout the Missouri River Basin, including major spawning tributaries in 2005. These data are summarized in Table 1.

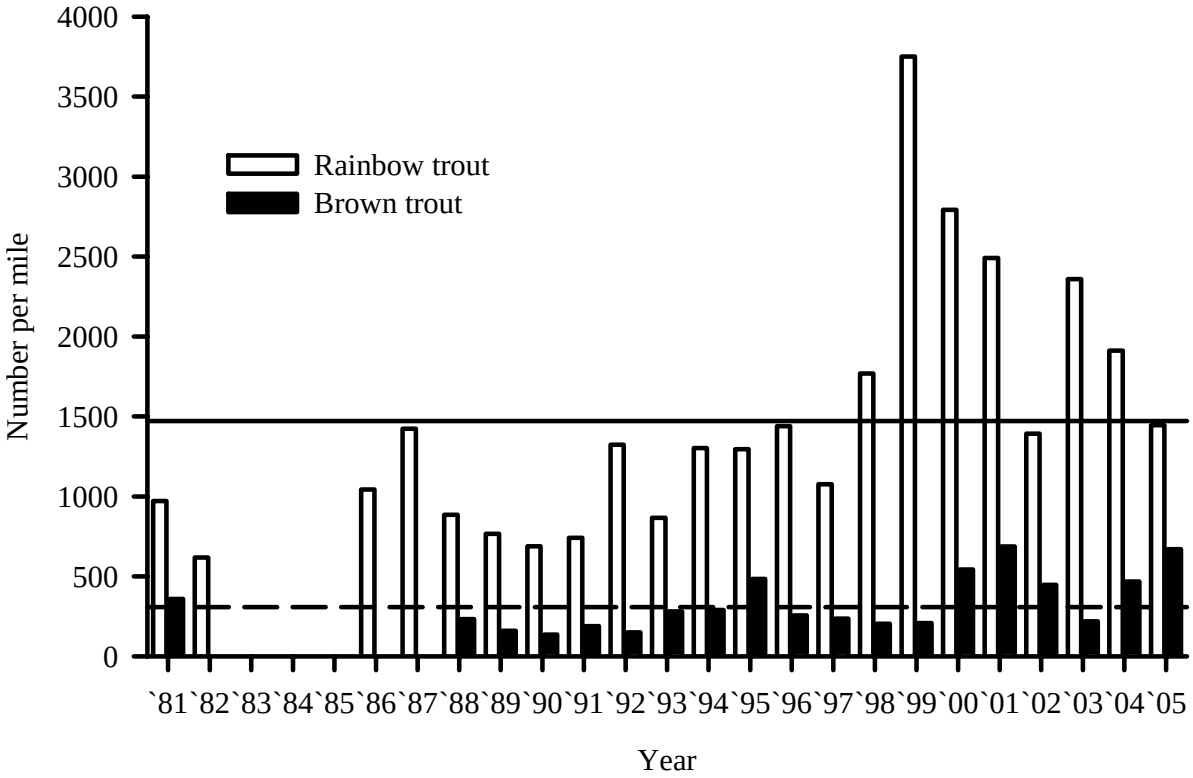

Figure 3. Number of rainbow trout and brown trout 10 inches and longer per mile in the Pelican Point section of the Missouri River, from 1981 to 2005. The solid horizontal line and the dashed horizontal line represent the 1981-2005 average for rainbow trout and brown trout, respectively.

Table 1. Mean, standard error, maximum, and minimum water temperatures recorded in 2004 on the Missouri River and tributaries to the Missouri River, by site (sampling time period) and month.

	Month							
Site	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Holter (3 May – 14 July)								
Mean	49.7	56.8	59.9					
SE	0.52	0.28	0.32					
Min	44.7	53.6	55.9					
Max	57.5	62.6	63.5					
Craig (1 Jun – 31 Dec)								
Mean		57.1	62.2	64.0	60.0	53.2	45.7	35.2
SE		0.35	0.34	0.23	0.44	0.21	0.52	0.29
Min		52.6	55.1	59.6	54.3	49.6	39.2	32.4
Max		64.2	68.6	70.3	66.5	58.2	52.6	39.8
Mid Cannon (27 Jun – 31 Dec)								
Mean		60.6	63.0	64.4	59.9	53.1	45.4	34.7
SE		0.44	0.33	0.26	0.46	0.23	0.53	0.29
Min		57.7	54.9	59.1	54.0	49.3	38.9	31.8
Max		64.8	69.5	70.4	66.3	57.4	52.4	39.2
Pelican Point (3 May –2 Nov)								
Mean	51.4	57.7	63.5	64.6	59.7	52.9	50.1	
SE	0.62	0.47	0.34	0.30	0.49	0.25	0.43	
Min	43.2	52.1	55.2	59.6	53.5	48.5	48.5	
Max	58.2	65.1	68.9	69.2	65.1	58.2	51.6	
Lyons Creek (3 May – 2 Nov)								
Mean	45.8	49.1	54.7	54.7	50.7	46.6	44.5	
SE	0.29	0.44	0.25	0.30	0.34	0.27	0.48	
Min	39.7	42.5	46.7	48.3	44.7	41.9	42.8	
Max	54.5	61.0	63.3	62.4	57.6	53.1	46.7	
Wolf Creek (3 May – 2 Nov)								
Mean	46.5	51.0	55.9	55.4	52.3	49.1	47.2	
SE	0.40	0.47	0.21	0.24	0.30	0.25	0.82	
Min	40.5	44.4	48.3	49.4	46.3	44.7	45.2	
Max	54.7	62.3	63.5	62.9	58.9	54.7	49.7	

Table 1. Cont.

Site	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
				Month				
Little Prickly Pear Creek (2 Nov – 31 Dec)								
Mean							39.0	33.7
SE							0.48	0.31
Min							31.9	31.9
Max							45.0	38.5
Dearborn River (3 May – 2 Nov)								
Mean	48.0	54.6	65.1	64.3	55.8	47.9	42.8	
SE	0.56	0.87	0.45	0.59	0.83	0.48	1.12	
Min	39.9	44.9	53.3	51.0	42.7	38.5	39.3	
Max	58.5	70.1	77.7	77.7	70.4	57.4	49.1	
Sheep Creek (3 May – 14 July)								
Mean	48.5	52.8	61.4					
SE	0.54	0.73	0.56					
Min	40.6	45.0	52.0					
Max	61.5	67.6	73.5					

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