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MARIAS RIVER - TIBER DAM TAILWATER STUDY

ABSTRACT

The Tiber Dam tailwater trout fishery was evaluated for population improvements that have been anticipated since the Bureau of Reclamation began maintaining minimum instream flows in 1985. The rainbow trout standing crop was estimated at only 12 fish/mile, an 88% decline from the 1994 estimate. The brown trout standing crop was estimated at 22 fish/mile, slightly higher than the 1994 estimate. It appears the previous stocking of rainbow trout fingerlings provided minimal improvements in trout numbers.

OBJECTIVES AND DEGREE OF ATTAINMENT

1. **To enhance trout populations and trout fishing opportunity in Marais River immediately downstream from Tiber Dam.** Trout populations and previous rainbow trout stocking results in the Marias River were evaluated.

PROCEDURES

The electroshocking system used to capture trout and whitefish was adapted from the system described by Novotny and Priegal (1974). The electroshocking apparatus was a boom-type and mounted on a 14-foot aluminum McKenzie style driftboat powered by a 10 hp outboard motor. Power was supplied by a 4000-watt AC generator. The alternating current was delivered to a Coffelt Model VVP-10 rectifying unit which changes the alternating current to continuous direct current. The positive electrode consisted of two circular hoops with twelve 16-inch stainless steel droppers fastened on each hoop. These electrodes were supported by fiberglass booms and were positioned about six feet in front of the boat. The hull of the boat served as the negative. The unit was typically operated at 2-5 amps, 100-215 volts and continuous direct current.

The Petersen mark/recapture technique was used to estimate the trout populations in the Marias River. The following formula, Chapman's modification, was used (Ricker 1975):

$$N = \frac{(M+1)(C+1)}{(R+1)}$$

Where:

N = population estimate

M = number of marked fish

C = number of fish in the recapture sample

R = number of marked fish in the recapture sample

DESCRIPTION OF STUDY AREA

The study area for the Tiber Dam tailwater study is a 21 mile reach of the Marias River extending from the dam near Chester to the Circle Bridge at Highway 223. Tiber Reservoir is a water storage reservoir and the dam has no hydroelectric power generation. Flows in the river downstream are completely controlled by discharges from the dam.

Marias River - Tiber Dam Tailwater

A trout fishery in the 21 mile reach of Marias River immediately below Tiber Dam is maintained by coldwater release. Prior to 1985 the coldwater fishery existed far below its potential because of inadequate instream flows and periodic surface warmwater releases from the dam (Gardner and Berg 1983). The Montana Fish Wildlife and Parks has recommended a minimum instream flow of 500 cfs be maintained in the river below Tiber Dam for the trout fishery.

The trout fishery had improved substantially from 1985 to 1988, most likely in response to better flow and temperature conditions (Gardner 1988). Field studies in 1987 showed marked improvements in trout numbers, sizes and reproductive success. However, results from the 1989-96 surveys indicated that the trout populations had stabilized and later declined, and did not continue to improve as anticipated.

A number of mountain whitefish, brown and rainbow trout were sampled while conducting the population estimates (Table 1). Comparisons of these size statistics show that sizes for all three

species of salmonids measured in 1996 were considerably larger than the previous year sampled and the 5-year average. The larger average sizes for 1996 is attributed to the lack of young fish in the sample, probably resulting from poor survival of the young-of-year and yearling fish. Trout standing crop estimate statistics for 1996 show that rainbow trout 11 inches and greater have declined 37% from that reported for 1994 (Table 2). Also, very few yearling rainbow trout were sampled in 1996 compared with the 1994 estimate of 336 for the 4-mile section. Adult brown trout numbers increased 38% from that reported in 1994, however, numbers of yearling browns, like the rainbows, appeared to be considerably less than that sampled in 1994. A total of 6 yearling brown trout were sampled in 1996 compared with 33 in 1994 for a similar effort.

Both rainbow and brown trout numbers are considered to be at less than the potential for this stream. Several chronic environmental factors have limited trout numbers in the section over the years. During 1991 warm water was inadvertently released from Tiber during July and August. This elevated downriver water temperatures above 70 degrees for a two month period which probably stressed the trout population here. Low flows in the section were experienced in 1992 and 1993. During these years water releases were less than the minimum instream flow of 500 cfs 67% and 25% of the time, respectively. Cover habitat appears to be limiting especially for juvenile trout. This probably makes young trout especially vulnerable to predation. Northern pike are present in the section and pike numbers soared from only 1 in the 1994 sample to 23 in 1996 for a similar sample effort.

Over the past seven years fisheries management for the Tiber Dam tailwaters has been directed at improving rainbow trout numbers with limited success. A total of 47,785 fingerling and advanced fingerling rainbow trout have been stocked in this section since 1990. In spite of this effort rainbow trout numbers continue to decline. Better results may be accomplished by managing for brown trout. Brown trout numbers have not declined as drastically as the rainbows and the brown trout appear to have a more even age distribution without year-class failures as depicted in length-frequency histogram (Figure 1).

RECOMMENDATIONS

1. Stock the Marias tailwater section with both brown and rainbow trout fingerlings for 4 years. The intended results are to increase brown trout numbers, maintain a two species trout fishery and provide a forage fish (rainbow trout) for the brown trout.
2. Monitor trout population trends, success of brown and rainbow trout fingerling plants, and extent of natural reproduction in Tiber Dam tailwater section by obtaining biannual standing crop estimates at least through 1997. Develop management

recommendations (such as changes in Tiber Dam operations or habitat improvements) to address limiting factors and enhance the rainbow trout population.

LITERATURE CITED

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Table 1. Comparison of size statistics for mountain whitefish and trout sampled in the Marias River below Tiber Dam during 1988-96.

Year	Number	Avg. Length (inches)	Avg. Weight (pounds)	
<u>Mountain</u>				<u>whitefish</u>
5-yr Avg *	621	13.3	1.01	
1994	101	12.1	0.81	
1996	105	13.6	1.34	
<u>Rainbow trout</u>				
5-yr Avg *	447	11.8	0.86	
1994	110	11.0	0.69	
1996	37	16.1	2.13	
<u>Brown trout</u>				
5-yr Avg *	499	16.2	1.58	
1994	84	13.9	1.38	
1996	57		17.1	2.45

* - the years 1988, 1990-93

Table 2. Standing Crop estimate statistics of trout populations in a 4 mile reach of the Marias River below Tiber Dam during 1987- 1996.

Size Group	1996	1994	5 Year * Average	Maximum	Minimum
Rainbow					
(6.0 - 10.9)	--	336	100	336	10
(11.0 - 20.6)	48	76	108	225	48
Brown					
(6.0 - 10.9)	--	- **	31	55	3

(11.0 - 32.0)	88	64	137	195	64
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* - the years 1987, 1990-93

** - no estimate could be made due to the absence of marked fish in the recapture sample, but based on the number sampled, it is believed there was more than 100.