



**TWELVEMILE CREEK PRECONNECTION
WHIRLING DISEASE ASSESSMENT**

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ABSTRACT

Sentinel rainbow trout were exposed at two sites in Twelvemile Creek and at a third site in the Salmon River immediately upstream of the confluence to determine if *Myxobolus cerebralis* is present prior to establishing a migratory reconnection imposed by a currently impassible barrier. The objective of this study was to establish the status of whirling disease prior to the reconnection. This and other reconnection efforts should provide an opportunity for future evaluation of the rate of natural introduction of the parasite through fish migration. None of the sentinel trout exposed at the three sites became infected with *M. cerebralis* including those exposed in the Salmon River. The Salmon River group was considered as a positive control and the negative results were not expected. Previous exposures made in the Salmon River (Cavender, et al 2003) and at Sawtooth Hatchery and Pahsimeroi Hatchery during 2000 and 2001 (Munson and Johnson 2003) indicated that those waters contained the infectious triactinomyxon (TAM) stage during the same time period as this sentinel trial was conducted. This same lot of sentinel trout were used in exposures made in the upper Salmon River upstream of Sawtooth Hatchery and were demonstrated to be highly susceptible. The water temperature profile of each site was conducive to infection.

The test demonstrates that the parasite was not present in Twelvemile Creek under the conditions of the test and this creek would be a good candidate to analyze at five-year intervals after migration connection is established to evaluate if the parasite becomes established and at what intensity.

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INTRODUCTION

Fisheries agencies have advocated removing barriers to provide for migration of bull trout and other salmonids and to restore connectivity to upper reaches of watersheds that have been either completely or seasonally disconnected. The primary mechanism used for these projects has been through more efficient use of water for irrigation. These projects provide an opportunity to examine the rate in which natural migration of salmonids may introduce *Myxobolus cerebralis*, the myxosporean parasite of whirling disease. There is a paucity of literature addressing the potential rate at which this introduction might occur. This information would have value in determining whether whirling disease is a factor to consider when establishing a migration reconnection of a tributary. These projects usually have a research and evaluation component associated with them to examine the existing salmonid species composition and numerical population abundance assessment prior to reconnection. This may also provide an opportunity to examine impact of the parasite over time if it becomes established.

STUDY SITE

Twelvemile Creek enters the Salmon River 19 rkm upstream of the town of Salmon, ID and drains an area of 5,751 hectares. The irrigation head gate migration barrier is located 1.8 km upstream of the mouth. Three sites (Figure 1) were used for exposure of sentinel groups:

1. Twelvemile Creek, upper site was situated 5.7 km upstream of the mouth (45°00.649N 113°53.796E)
2. Twelvemile Creek, lower site was 2.2 km upstream of the mouth (45°00.741N 113°54.585E)
3. Salmon River, on the south shoreline 2 km upstream of the mouth of Twelvemile Creek (45°00.058N 113°55.883E).

METHODS

Hayspur strain triploid rainbow trout *Oncorhynchus mykiss* (rbt) were obtained as eyed-eggs and reared at the Eagle Fish Health Laboratory wet lab to a mean size of 0.55 g. Sentinel groups of fifty trout were randomly selected from the main group and transported to and from the exposure site in plastic bags with water and oxygen. One group was kept in a vat inside the hatchery building as a control for the sentinel groups. At the exposure site, each group of fish was placed in a cylindrical aluminum live-box that measured 47 cm in length x 30.0 cm in diameter. Each live-box was equipped with a STOWAWAY XTI temperature logger to monitor water temperatures at 30 minute intervals. Fish were exposed at each sentinel location for a ten-day period beginning on August 26, 2004

Groups were returned to the wet laboratory at the Eagle Fish Health Laboratory and held in separate 37 l tanks supplied with 13°C flowing well water previously determined to be parasite free. Groups were fed three times weekly and checked daily for mortalities. Sentinel trout were lethally anesthetized and cranial tissues sampled on December 15th, 101 days post-exposure (1313 cumulative Celsius temperature units). Heads were split along the mid-sagittal line and half heads were analyzed with the quantitative pepsin/trypsin digest method.

RESULTS

No spores were detected in any of the fifty individual half heads of sentinels from each exposure site or the control group. There were also no signs of disease observed in any of the groups during the post-exposure holding period. Water temperatures at all of the exposure sites were permissive for infection (mean values site 1. = 8.28° C, site 2. = 7.89°C, site 3. = 13.1°C).

DISCUSSION

The lack of infection in the sentinel group exposed in the Salmon River was an unexpected result because previous exposures made in the Salmon River (Cavender et al, 2003; Munson and Johnson, 2004) had demonstrated a high prevalence and intensity of challenge in locations near the Salmon River exposure site used in this test. This observation demonstrates the need for having a location included in field exposure series with a high probability of infection. Individuals of the same rainbow trout group used in this test were demonstrated to be susceptible in challenges made in the upper Salmon River two weeks after this exposure was concluded. Consequently, resistance to infection of trout used as sentinels in this trial was not the reason why they failed to contract the parasite.

ACKNOWLEDGEMENTS

Greg Lowell and Patrick Murphy of the IDFG Salmon Region provided valuable assistance in selection of the sites used in this test. Quantitative infection intensity measurements were made by Carla Hogge, Sharon Landin, and Roberta Scott, Fish Health Technologists of the Eagle Fish Health Laboratory. The assistance provided by the staff of the Eagle Hatchery in rearing the groups in the wet lab was appreciated.

LITERATURE CITED

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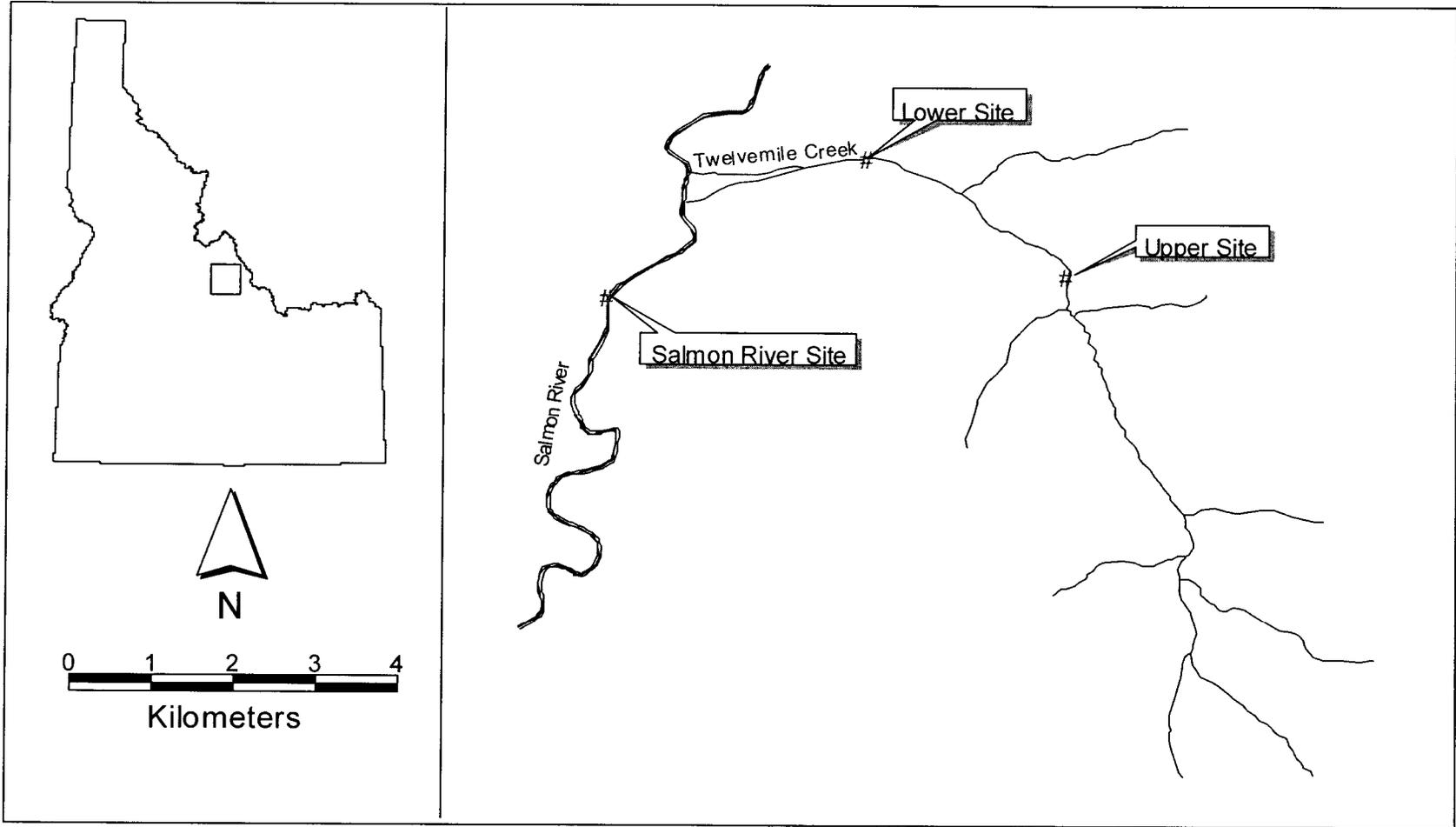
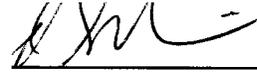


Figure 1. Locations of Sentinel Group Placement in Twelvemile Creek, Salmon River drainage near Salmon, Idaho for *Myxobolus Cerebralis*, Sept. 2004.

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