

Detection of *Tetracapsuloides Bryosalmonae* in the Beaverhead River using Environmental Dna Analysis

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Tetracapsuloides bryosalmonae is a Myxozoan parasite that causes proliferative kidney disease (PKD) in Salmonid fish. An outbreak of PKD in the Yellowstone River in 2016 resulted in a significant kill of mountain whitefish (*Prosopium williamsoni*); however, the exact reason for this outbreak remains unclear. Researchers first suspected a recent introduction of the parasite, but the analysis of samples collected from the Yellowstone prior to 2016 revealed that the parasite was present before to this event. This led to the hypothesis that environmental conditions may have exacerbated the effects of infection leading to increased mortality. To obtain more insight into the effects of environmental conditions it would be helpful to compare the spatial and temporal distribution of *T. bryosalmonae* in the Yellowstone to other rivers where the parasite is known to occur. This comparison should include other freestone rivers with environmental conditions similar to the Yellowstone, as well as tailwaters with different parameters. We thought the Big Hole and Beaverhead rivers might be suitable for this purpose. The parasite was detected in the Big Hole in 2016, but there is no documented occurrence of the parasite in the Beaverhead. Therefore, we collected eDNA samples from five locations on the Beaverhead river in May, August and September and tested them by PCR using primers specific for *T. bryosalmonae* 18S rDNA. We detected parasite DNA at one of the five locations in two of the three samples collected from that location. To our knowledge, this is the first report of *T. bryosalmonae* in the Beaverhead River and it indicates that the Beaverhead may be suitable for a long-term study examining the spatial and temporal distribution of *T. bryosalmonae*. In addition, the positive samples will provide another source of parasite DNA from Montana that can be used in comparative genetic studies.