
USING FIXED AND PORTABLE HALF-DUPLEX PIT TAG ANTENNAS TO EVALUATE FISH MOVEMENT IN A STREAM NETWORK: A CASE STUDY IN THE UPPER BIG HOLE RIVER BASIN

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Passive integrated transponder (PIT) technology is commonly used to evaluate the movement, habitat use, and dynamics of stream fish populations and assemblages. One distinct advantage of this technology is the ability to collect information over the life span of individually identifiable fish using passive monitoring sensors. In the upper Big Hole River basin, we used a combination of fixed and portable half-duplex PIT tag antennas to evaluate salmonid movement and habitat use at multiple spatial and temporal scales. In the summer and autumn of 2009, we used a network of 15 fixed stations and a series of portable antenna surveys to relocate PIT-tagged fish in the mainstem Big Hole River and tributaries within the valley-bottom. We used multiple antenna designs to account for the considerable range in stream size (~ 2-60 m wetted width). We directly evaluated the detection efficiency of our portable antennas in five tributaries and one reach of the mainstem. Overall, we conservatively estimated a 54 percent ($n = 6$, $SD = 0.13$) detection efficiency for one-pass surveys, with detection efficiencies varying among fish species and, to a lesser extent, among sites. Detection efficiency estimates for shed tags were consistent among sites and averaged 93 percent ($n = 4$, $SD = 0.10$). Challenges, successes, and failures in implementing these antennas will be discussed. Overall, using a combination of fixed and portable antennas proved a useful and efficient approach to evaluating fish movement in this stream network.