

MANAGEMENT BRIEF

Efficacy of Portable PIT Detectors for Tracking Long-Term Movement of Colorado River Cutthroat Trout in a Small Montane Stream

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Abstract

We evaluated the efficacy of portable PIT detectors for tracking long-term fish movement in an open stream environment. In June and October of 2012, we PIT-tagged a total of 190 Colorado River Cutthroat Trout *Oncorhynchus clarkii pleuriticus* (CRCT) in a 1.7-km segment of a small, montane stream. In the summers of 2012–2013 (15 total occasions), we relocated PIT-tagged trout using portable PIT detectors. The maximum detection distance of 23-mm PIT tags ranged from 6 to 56 cm and varied with detector, detection plane, and tag orientation. Of the CRCT tagged, 38% were never detected and 43% were detected on two or more occasions. Mean detection efficiencies of PIT-tagged trout were 34% and 45% in 2012 and 2013, respectively, and were generally lower than in evaluations of closed systems and less mobile fishes. We observed a smaller range of CRCT than has been observed by others using radiotelemetry, a difference that could be explained by the spatial and temporal limitations of portable PIT detection we encountered. We conclude that portable PIT detector surveys have value but also drawbacks for tracking the movement of relatively mobile fishes in montane streams.

Lucas and Baras 2000). Because PIT tags do not require batteries and are relatively small, they provide substantial benefits over larger, battery-powered transmitters (e.g., radio tags) for long-term movement studies and studies of movement in small fishes (Lucas and Baras 2000; Cucherousset et al. 2010). However, the short detection range of PIT tags originally required that fish be physically handled or passed through a fixed and confined point of capture to be scanned for tags (Morhardt et al. 2000).

Passive integrated transponder technology progressed with the advent of portable PIT detectors—mobile reader antenna units that can be used to passively recapture PIT-tagged fish in small stream environments (Morhardt et al. 2000; Roussel et al. 2000). Several studies have reported relatively large read ranges and high detection efficiencies (% of tags recovered) with portable PIT detectors (e.g., Roussel et al. 2000; Cucherousset et al. 2005; Linnansaari et al. 2007). For example, Roussel et al. (2000) reported a read range of up to 1 m and a detection efficiency >80% using a portable detection unit and 23-mm PIT tags, and Linnansaari et al. (2007) reported a read range of up to 90 cm and a detection efficiency of 63–100% using a portable detection unit and 23-mm PIT tags. Other studies suggest that detection efficiency can vary with a number of factors (e.g., fish size, tag size, and environmental

Passive integrated transponder technology has provided a valuable method for tracking individual movements of freshwater fishes (Prentice et al. 1990; McCutcheon et al. 1994;

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