

ABSTRACT

EFFICIENT SMOLT TRAP FOR SANDY AND DEBRIS LADEN STREAMS

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JUSTIN SCACE

M.S., UNIVERSITY OF MASSACHUSETTS AMHERST

Directed by: Dr. Benjamin Letcher

Tripod weir and box traps traditionally are used to capture and enumerate outmigrating salmonid smolts in short-term studies, or in streams where temporary or portable traps are the only practical option. Although traditional traps can be effective when conditions are ideal, they are often unable to withstand high discharge events in streams containing a large amount of debris or sandy substrates. We created a rotary-screw trap and resistance board weir hybrid design that we evaluated along with a tripod weir and box trap, both in a 6.1 m wide flume and in the field. The new design outperformed the tripod weir in both situations. The tripod weir failed in 10 minutes in the flume trial, whereas the new design was still operating at the conclusion of an 8-hr trial under the same conditions. The new design operated continuously in the field during a high discharge event that caused the tripod weir to fail. The new design also required less frequent cleaning than the tripod weir. Trap efficiency of the new design was estimated using passive integrated transponder (PIT) tag antennas and radio telemetry. The trap was 80% efficient (n=40) in capturing migrating PIT tagged individuals detected at an antenna upstream of the trap and 87.5% efficient (n=48) at recapturing fish that were tagged and released upstream. With its high efficiency and increased resiliency over the tripod weir, the new trap design will benefit management and research efforts in streams where traditional traps are unsuitable.

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