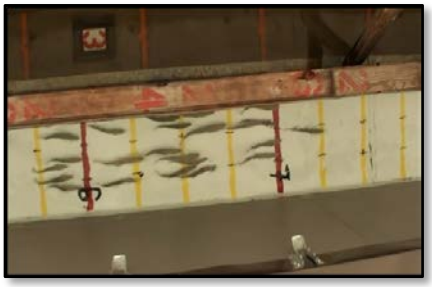
PROJECT DESCRIPTION

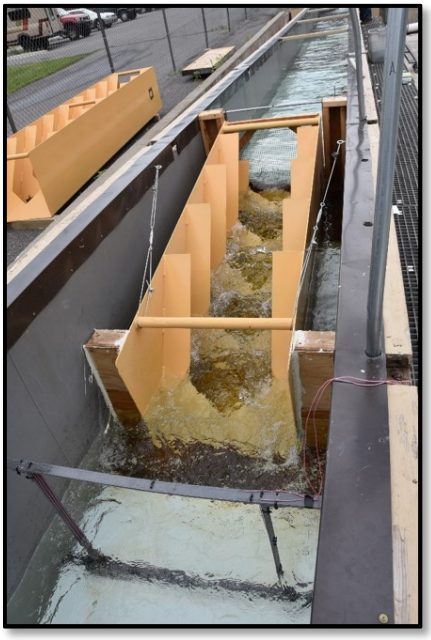
RESTORATION ENGINEERING LLC
Aquatic Restoration and Environmental Hydraulics

Fish Passage Study / Research

Fish Swimming and Passage Studies

Development of Engineering Design Criteria for Fish Passage at Hydraulic Structures





Location: Bozeman Fish Technology Center, Bozeman, Montana

Key Project Elements:

- Fish Passage Studies
- Hydraulic Structure Studies
- Fish Swimming Ability Characterization
- Development of Engineering Design Criteria for Fish Passage Assessment and Design

Project Description:

RE, LLC Principal, Matt Blank, in his work at the Western Transportation Institute at Montana State University, is co-lead of a research facility and group that is characterizing the swimming abilities of native species in the Pacific Northwest and Northern Rocky Mountain Ecosystems. The group has studied several native species including rainbow trout, shovelnose sturgeon, Arctic grayling, longnose dace, sauger and westslope cutthroat trout. One key purpose of these studies is to characterize both volitional and coerced swimming abilities of different age classes of key fish species. And, the research is aimed at establishing swimming and structure performance criteria (such as optimal water depths or velocities) to promote passage of fish.

Dr. Blank's team of researchers has refined a series of fish swimming methods that use a combination of detailed hydraulic characterizations (both one-dimensional measurements with traditional flow meters and three-dimensional characterizations using acoustic Doppler velocimeters {ADV}), passive integrated transponder monitoring, and high-speed video capture technology. Hydraulic characterizations are combined with detailed 1-D and 3-D modeling to validate computational methods and provide high end mapping of flow, velocity and water depth. The state of the art methods allow for tracking individual fish movements and behaviors to develop swimming speed - fatigue time curves and related swimming performance criteria such as maximum distance of ascent.

Over the past decade, these projects have developed a state of the art swimming laboratory that can evaluate the swimming performance of both small and large bodied fish over a range of hydraulic conditions and temperatures. Methods continue to be developed to transfer swimming ability information derived in laboratory settings to direct application in the field for fish passage evaluations and design purposes. The facility and its research are training both engineers and ecologists to be fish passage practitioners and to work together to solve engineering and ecology problems.