2015 CHaMP Camp Workshop

CHaMP Hydraulic Modeling

June 4, 2015
10:45 a.m. – 11:30 a.m.

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Objectives: Introduce attendees to the CHaMP hydraulic modeling process and output

Software needs:
None

Additional Resources:

Abstract:

In support of efforts to quantify relationships between juvenile salmonid habitat and population dynamics, survey data from the Columbia Habitat Monitoring Program (CHaMP) have been used to develop hydraulic models for the majority of more than 600 reaches at which the CHaMP program collects habitat data. Hydraulic models are a key linkage being used in CHaMP to relate stream hydraulics to juvenile salmonid population dynamics.

The hydraulic modeling approach we've developed aims to provide hydraulic models capable of supporting CHaMP research, in terms of precision accuracy, as well as in the ability to generate unique hydraulic models for more than 600 CHaMP sites, at multiple flow conditions per site. To date, we have successfully modeled more than 900 CHaMP site / flow condition combinations.

Hydraulic model inputs include digital elevation models (DEM) developed from topographic surveys, estimates of surface roughness based on pebble size distributions, and discharge. Hydraulic model outputs include velocity vector and depth fields as well as information derived from these fields. All information used to generate model inputs are generated as part of default CHaMP data collection procedures.

Modeled velocities and depths are, in most cases, in excellent agreement with velocity and depth measured at a subset of sites for which validation data have been collected. There are exceptions, where certain topographic features such as undercut banks and porous structures, are not well represented in the DEM, resulting modeled values that fail to reflect measured values accurately. Impacts and strategies for improvement will be discussed.

Overall, CHaMP hydraulic models are precise and accurate, and adequately support efforts to link stream hydraulics to habitat conditions.