

Topic: EFN science and applications

Title:

Implementing an Instream Flow Assessment in the Crowsnest Pass

Description:

A detailed Instream Flow Assessment (IFA) was recently conducted for a proposed coal mine in the Crowsnest Pass region of Alberta, to evaluate the potential for flow-related effects on Westslope Cutthroat Trout (WSCT) and their habitat in two affected watercourses. Alberta populations of WSCT are listed as *Threatened* under the federal Species at Risk Act (SARA), which prohibits activities that may harm or destroy their critical habitat.

The local study area presented meaningful complexities within the biophysical environment, which were integrated into the IFA as follows:

- Presence of multiple fish barriers and isolated WSCT populations;
- Large differences in mainstem unit flow contributions from alpine versus forested headwater drainages;
- Presence of rock-drains related to former mining activities, leading to large channel flow losses underground;
- Contrasting winter flow regimes (one primarily-open watercourse maintained by larger aquifer contributions of warmer groundwater, versus one primarily-frozen watercourse with low flows); and
- Drought conditions experienced throughout the entire period of IFA field data collection.

Habitat models for each defined study reach were calibrated using System for Environmental Flow Analysis (SEFA), a contemporary version of PHABSIM. The poster will highlight challenges encountered during the characterization of existing conditions and predictive analyses as well as underscore lessons learned that are being integrated into an Adaptive Aquatic Monitoring Program aimed to validate predictions and mitigate confirmed habitat alterations to critical habitat under complex and evolving conditions.

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