Topic: EFN and fisheries

Title:
Escaping the heat: Stream temperature as a critical environmental flow need in the BC Interior

Description:
Salmonid survival and spawning potential is dependent on stream temperatures not exceeding critical limits during the hot, late summer season.Climate warming, however, is pushing streams to these limits in the Southern Interior of British Columbia.

A study was conducted to determine whether deep pools in three well-known salmon spawning streams (Bessette Creek, Duteau Creek, and Creighton Creek, near Lumby, BC) provide thermal refugia for fish during extremely hot days. Continuous water temperature measurements were taken in pool-glide pairs at 10 sites from June to September, 2018. Detailed surveying of each pool yielded estimates of pool volume and depth-to-volume ratios in order to compare and contrast pool types.

It is hypothesized that the deeper pools will remain thermally stratified, with cooler water at the bottom, even if water temperature in the glides approaches or exceeds lethal temperatures. In this case, the pools can provide thermal refugia for fish. Vertical velocity profiles were measured in the pools to determine whether the flow was sufficient to continually flush out the pools or whether the flow was stagnant and likely stratified. Preliminary results suggest that the deeper pools are stratified and that the diurnal temperature response is lagged in time and muted relative to the glide temperature. Shallow pools, in contrast, tend to be flushed out quickly and have the same temperature as the rest of the stream. The study results suggest that it may be important to consider the channel morphology of the stream, in addition to the discharge regime, when assessing environmental flow needs for the purposes of the Water Sustainability Act. This also speaks to the importance of managing sediment in concert with water discharge so that hydraulic complexity, ideal spawning, and rearing habitats are sustained in streams and rivers of the BC Interior.

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