

ALLUVIAL FAN HYDROPERIOD AS A CONTROL ON MIGRATORY FISH PASSAGE, KICKITAT RIVER SUBBASIN, WASHINGTON STATE, USA

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The Klickitat River Subbasin is located along the margin of the Columbia River Basalt Province and Cascade Mountains in southern Washington State, USA. Given structural influences of the Yakima Fold Belt, tributary catchment morphology in the lower Klickitat subbasin tends to have relatively flat-lying headwaters drained by seasonal channels that feed incised, bedrock-controlled reaches of largely seasonal and/or spatially discontinuous hydroperiod. Alluvial fans at the interface with the moderately confined Klickitat River valley are small (<25 ha), composed primarily of granular cobble and boulder sized materials, and largely inactive with infrequent (decades or centuries) debris flows likely driving their form.

Salmonid fishes of various species and migratory forms (steelhead/rainbow trout (*Oncorhynchus mykiss*) and coho salmon (*O. kisutch*)) utilize these small tributaries (typically <20km²) for various life-history purposes. Surface flow seasonality, duration, and frequency across alluvial fans are key elements in the nature and duration of fish use. Given the cultural importance of these fish species to the Yakama People, studies are underway to increase understanding of the significance of these largely seasonal and spatially discontinuous habitats.

Several tributaries are in their fourth year of study, inclusive of stream gages and fixed Passive Integrated Transducer (PIT) tag interrogation stations. Stream gage data has been correlated with field mapping of hydrographic conditions using high-resolution (1m) GPS to determine which portions of each stream are accessible at a given stage. PIT-tag stations permit detection and identification of unique individuals that have been tagged both upstream in each tributary (typically juveniles), in the mainstem Klickitat River (typically adults), and, in some cases, other tributaries. Pairing of these data have provided insights into habitat utilization by documenting timing, frequency, and duration of fish movements which tend to be strongly correlated with freshets.

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