

VALIDATION OF PACIFIC NORTHWEST HYDROLOGIC LANDSCAPES AT THE CATCHMENT SCALE

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The interaction between the physical properties of a catchment (*form*) and climatic forcing of precipitation and energy control how water is partitioned, stored, and conveyed through a catchment (*function*). Hydrologic Landscapes (HLs) were previously developed across Oregon and describe climatic and physical properties for over 5000 assessment units. This approach was then extended to the three Pacific Northwest states of Washington, Oregon and Idaho (PNW HL). The HLs were developed using the National Hydrography Dataset's WBD HU12 scale and are comprised of classification components describing climate, climate seasonality, aquifer permeability, terrain, and soil permeability. To compare the PNW HL classification to catchment hydrologic behavior, HLs were aggregated to catchment scale to compare against the input/output of water in the catchment. HL aggregation must preserve information on the location of the HL within the catchment outlet (upstream vs. downstream) and properties of that HL (i.e. water source vs. sink). Catchment *function* was investigated by use of hydrologic signatures, which are attributes of long-term time series of water into and out of the catchment. Signatures include Runoff Ratio, Baseflow Index, Snow Ratio, and Recession Coefficients. This study has three primary objectives: 1) derivation of hydrologic signatures to capture the hydrologic behavior for catchments in the Pacific Northwest; 2) development of methodology to aggregate HLs to the catchment scale; and 3) statistical analysis of signature values and trends with respect to aggregated HL classification. We hypothesize that we will find: 1) strong relationships between aggregated HLs and hydrologic signatures; 2) signatures related to water balance are explained by climatic conditions; and 3) signatures describing flow paths are predicted by terrain, soil, and aquifer permeability. This study examined 230 catchments to achieve objectives and test hypotheses stated.

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