Verification of Hydrologic Landscape derived Basin-Scale Classifications in the Pacific Northwest

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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. Catchment *function* was investigated through derivation of hydrologic signatures for catchments in the Pacific Northwest, which are attributes of long-term time series of water into and out of the catchment. To compare the PNW HL classification to hydrologic behavior, we developed methodologies to aggregate and interpret information provided by HLs to the catchment scale to compare signature values and trends with respect to aggregated HL classification. 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). Signatures include Runoff Ratio, Baseflow Index, Snow Ratio, and Recession Coefficients. We hypothesize that we will find: 1) a rational way to combine HL information to characterize catchment-scale areas 2) strong relationships between aggregated HLs and hydrologic signatures; 3) signatures related to water balance are explained by climatic conditions; and 4) signatures describing flow paths are predicted by terrain, soil, and aquifer permeability. This study examined 199 catchments to achieve objectives and test hypotheses stated.

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