

Headwater Stream Flow, Climate Variation, and Riparian Buffers with Thinning in Western Oregon

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Poster Abstract

Headwater streams and adjacent riparian areas provide reproductive, foraging, and dispersal habitat for many forest-dependent species, especially amphibians. Although previous studies have shown that the composition of aquatic and riparian animal communities is associated with spatial and temporal patterns of stream flow, the relationships among stream flow, climate, and thinning are not well known. We characterized stream flow conditions associated with 78 headwater reaches in 13 managed forest sites in the Coast Range and western Cascade Range, Oregon, USA, tracked periodically over a 16-year period. Then, we retrospectively examined relationships among riparian buffers, stream flow characteristics, and climate variables over time. We tested the hypotheses that: 1) warmer and drier years would be associated with a shrinking of headwater streams (i.e., increased proportion of stream length in dry channels); and 2) such effects are associated with thinning upslope of riparian buffers, due to the effect of thinning to reduce interception and water uptake from the soil.

Stream flows were only weakly related to interannual climate variability. However, the relationship between climate and stream flow that was observed, although weak, supported the shrinking heads hypothesis (Hypothesis 1). Relationships between climate and stream flow classes were not related to riparian buffer treatments with upland thinning, thus no evidence was found to support Hypothesis 2. Our preliminary results suggest the effects of climate change scenarios on headwater streams, and dependent fauna, may not be mediated by harvesting within riparian zones.

Keywords: stream flow, climate change, thinning, shrinking heads, headwater streams.

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