A MONITORING NETWORK FOR DETECTING CLIMATE CHANGE EFFECTS ON THE ECOLOGY OF SIERRA NEVADA STREAMS (7D)

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Sierra Nevada hydrographs are predicted to shift towards earlier snowmelt, reduced summer flows, erratic winter flows and floods, and more precipitation as rain than snow. What will be the responses of aquatic ecosystems to these hydrologic changes? Under the influence of climate change, the composition and diversity of aquatic invertebrate communities may be altered as species sensitive to temperature and altered flows are reduced or eliminated. Understanding how aquatic invertebrate indicators are affected by hydro-climatic change provides a means of tracking the health of Sierra stream ecosystems in different regions and ecological settings. Using VIC hydrologic model output linked to downscaled climate models we established a network of monitoring sites of varied climate risk and natural vulnerability. Twelve catchments were chosen from across the Sierra, each with a main reach and a nested headwater tributary reach. Habitat and biological surveys were conducted in 2010-2012 during average, and extremely wet and dry years, documented at each site by temperature loggers and stage-height pressure transducers. Results show invertebrate communities fall into distinctive southern and northern groupings. Streams differed by water chemistry indicative of greater groundwater inputs from silicate-rich volcanic aquifers in many northern streams, and low conductivity and alkalinity in snow-melt dominated southern streams. Diversity appeared to be limited by short upstream channels in streams without sustaining groundwater inflows subject to summer drying. High flow and late runoff in 2011 will be contrasted with low flows and early runoff in 2012, presenting an opportunity to compare the influence of climate change-related hydrologic regime on stream ecology.