



## **How will projected climate change impact stream temperature and water quality in the Sierra Nevada (CA)?**

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Water resources in California are critically dependent on snowmelt-derived mountain runoff. Thus many studies have assessed past and projected changes in surface runoff and streamflow associated with global change, while only a few have investigated how warmer climates could affect stream temperature and water quality. In this study, the Soil and Water Assessment Tool (SWAT) was used to assess the impact of climate changes as projected by general circulation models (GCMs) through 2100 on streamflow, stream temperature, dissolved oxygen, and sediment yield in the Sierra Nevada (CA). SWAT model calibration, validation, and uncertainty analyses were performed based on estimated natural flows and unimpaired gauging stations using an automated sequential uncertainty fitting algorithm. Output from 16 GCMs and two emission scenarios were downscaled to a 1/8-degree (approximately 12km) grid. These 32 future scenarios were used to force the SWAT model with an improved stream temperature representation, to assess the sensitivity of climate change on a sub-basin scale. The ensemble of projections was used to assess the range of plausible hydrologic responses to climate change. Results indicate that not only streamflow timing, but also stream temperature, chemistry, and sediment transport are affected by the climatic changes projected through 2100 to a degree that may significantly alter stream ecosystems.