Hydrologic Response of Sub-Alpine Wetlands to Climate Change, Tahoe Basin

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Annual Accomplishments Update (October 1, 2008-September 30, 2009)[†]:
Field investigations have revealed six locations where groundwater discharges along the southern margin of Grass Lake. Measurements of temperature and electrical conductivity have been taken at 40 locations and thirty temperature loggers have been installed. Pools with visually apparent groundwater discharge have fairly constant temperature (5.5-7.0 °C) and high specific conductance (30-75 $\mu S/cm^{-1}$). Temperatures in these pools remained constant from late June through late September. Groundwater discharge was observed through August. Pools with similar values of temperature and specific conductance are inferred to be locations of groundwater discharge. Pools with higher temperature (10.0-15.0 °C), lower specific conductance (15-30 $\mu S/cm^{-1}$), and distinct diel temperature fluctuations are assumed to be surface water. Water samples from 12 locations have been submitted for chemical analysis. These measurements will be used to identify distinct sources of ground water and to select the locations of piezometers and temperature probes.

Conceptual models of groundwater flow have been constructed to investigate the effects of preferential pathways on groundwater temperature. Preliminary models have explored the potential effects of various steady-state and transient boundary conditions on the flow and temperature of groundwater discharging into Grass Lake. These simulations suggest that groundwater discharge will be limited to within 50 meters of the hillslope-wetland interface. Simulated groundwater temperatures in the upper 5 meters of the surface range from 2 to 18 °C, with higher temperatures resulting from deeper circulation paths. The results of these simulations are supported by field observations of groundwater discharge in Grass Lake.

[†] This document is an intermediate progress report, not a final report; consequently, any results should be considered preliminary and should not be cited. Please contact the principal investigators or the Tahoe SNPLMA Science Program Coordinator if you have questions.