



WETLANDS MONITORING

IMPORTANCE – Wetlands provide many important ecological functions and recreational values in Sierra Nevada Network (SIEN) parks. Relative to the small land area they occupy (<10%), they support a disproportionate amount of biodiversity in the Sierra Nevada. Wetlands provide critical habitat for a variety of wildlife and a wide variety of ecosystem services such as nutrient retention, flood control, and sediment storage. SIEN wetlands may be affected by both local impacts from recreation, water use, and non-native species as well as large-scale anthropogenic stressors like climate change and air pollution.



*Reading a wetland vegetation plot.
Photo by Peggy E. Moore.*



*An aquatic insect (backswimmer)
from a Yosemite National Park wet-
land. Photo by Jeff Holmquist.*



*PVC pipe well for monitoring water
levels in a Yosemite National Park
wetland. NPS photo.*

LONG-TERM MONITORING – We will monitor wetland plant communities, invertebrates, and water dynamics in two Sierra Nevada wetland types – wet meadows and fens. Fens are perpetually saturated or flooded from various sources of groundwater. Wet meadows depend on precipitation, and they can be dry for much of the year. Fens accumulate peat, sequestering carbon; wet meadows do not. Differences in hydrology underlying these two wetland types are likely to result in different responses to stressors that affect the delivery of water, either as snow or rain. We randomly selected sampling sites—one set of sites is visited each year and four other sets of sites are visited every four years. We also include a small set of accessible index sites that can be sampled more intensively.

DISCUSSION – Pilot monitoring was conducted from 2007-2008 to test monitoring methods and to estimate variability of vital sign metrics. Across Sequoia, Kings Canyon, and Yosemite, 47 wet meadows and 38 fens were sampled, and analyses indicated that numerous metrics for vegetation, invertebrates, and groundwater have sufficient power to detect trend in the annually sampled sites within 15 years. Further analyses of the invertebrate data (Holmquist et al. 2011) indicated that the terrestrial invertebrates accounted for most of the diversity in the wetland invertebrates.

The ephemeral waters of sampled wetlands harbor a simpler animal assemblage than what is found in more persistent waters, and one where few vertebrates were observed. Wetland type influenced abundance and diversity of terrestrial invertebrates, but aquatic invertebrate diversity was more strongly influenced by the presence or absence of slow flow in wetland waters. Future analyses that integrate vegetation, water, and invertebrate data will enhance our ability to understand and interpret change in wetland systems

WHERE MONITORED – Devils Postpile National Monument and Sequoia, Kings Canyon, and Yosemite National Parks

CONTACTS –

Jonny Nesmith, jonathan_nesmith@nps.gov

Alice Chung-MacCoubrey, alice_chung-maccoubrey@nps.gov

REFERENCES –

Holmquist, J. G., J. R. Jones, J. Schmidt-Gengenbach, L. F. Pierotti, and J. P. Love. 2011. Terrestrial and aquatic macroinvertebrate assemblages as a function of wetland type across a mountain landscape. *Arctic, Antarctic, and Alpine Research* 43(4): 568-584.