

Water Quality

RESOURCE BRIEF

Importance

Water quality is an important indicator of overall ecosystem health, and the National Park Service aims to have unimpaired water quality in its parks. Alpine/sub-alpine ecosystems in Grand Teton National Park (NP) and the John D. Rockefeller, Jr. Memorial Parkway are vitally important not only as habitat, but because they form the headwaters that supply water for human recreation, consumption, agriculture, and industry throughout the region. Under the auspices of the Clean Water Act, all surface waters in these units have been designated as Outstanding Natural Resource Waters, where no degradation is allowed. In March 2009, Congress designated the Snake River and its tributaries, Pacific Creek and the Buffalo Fork River, for protection under the Wild and Scenic Rivers Act. Many of the nearly three million people who visit the park and parkway each year come primarily to enjoy the lakes, rivers, and streams, which support a wide variety of recreational activities and a world-class trout fishery.

Status and Trend

A 2003 review of historical data concluded that water quality is very high when compared to state and Environmental Protection Agency standards, with limited impacts from human activity in the park/parkway and in upstream watersheds. Sampling conducted by the U.S. Geological Survey on five eastern tributaries of the Snake River in 2002 and 2003, and of five western tributaries in 2006, indicates that water chemistry and nutrients vary in response to natural differences in geology and precipitation regimes. Chemical



Technician Elise DeLuna prepares to sample at the outlet of Delta Lake, one of Grand Teton's sensitive high alpine lakes.



Snake River, Grand Teton National Park.

constituents tend to vary in concentration based on underlying geology, which conveys a particular chemical signature to these rivers and streams. Since 2006, the Greater Yellowstone Network has monitored surface water chemistry (major ions and nutrients, conductivity, dissolved oxygen, pH, water temperature), in discharge in selected rivers and streams, and in the acid neutralizing capacity at three known high-risk alpine lakes. Laboratory results confirm that to date, water quality meets the non-degradation requirements of the Clean Water Act.

Headwater lakes in Grand Teton NP have been found to be potentially sensitive to the atmospheric deposition of sulfur and nitrogen compounds, by-products of regional oil and gas development. Two years of monitoring data show that the acid neutralizing capacity—an indicator of sensitivity to atmospheric deposition—of three high-risk alpine lakes is within natural ranges.

Discussion

Discharge, or streamflow, measurements recorded at U.S. Geological Survey gauging stations aid scientists in interpreting stream chemistry data, and provide a comprehensive temporal data set upon which to document correlations, possible cause-and-effect relationships, and differentiate natural variability from anthropogenic-induced change to aquatic systems. Baseline water quality data will be used by resource managers and planners to assess impacts of potential stressors (both anthropogenic and natural) such as road construction, hazardous material spills, increased deposition of sulfur and nitrogen, and climate change on the surface waters in the park and parkway.