

## Air quality monitoring capabilities improve thanks to Challenge

by Mark Scruggs

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The Natural Resource Challenge enabled the National Park Service in 2002 to begin surveying western U.S. national parks for toxic compounds in food webs. As part of the Western Airborne Contaminants Assessment Project (WACAP), NPS staff undertook a lake bathymetric assessment at Rocky Mountain National Park, Colorado.

THE AIR RESOURCES DIVISION OPERATES a network of ambient air quality monitoring sites in many units of the National Park System. The parameters measured include ozone, dry deposition (gases and particles), wet deposition (precipitation chemistry), visibility, and particulate matter. The multiyear Natural Resource Challenge called for expanding the network to improve geographical representation, with emphasis on parks most threatened by air pollution or most vulnerable to air pollution degradation. As a result, the National Park Service began new monitoring in FY 2002 and is phasing in additional sites in FY 2003 and FY 2004. The expanded monitoring network now includes all parks classified under the Clean Air Act as Class I areas and a select number of Class II area parks.



The Challenge also facilitated new monitoring themes of mercury and toxic organic pollutants and new ecological effects studies. Ambient concentrations of mercury are usually low, but deposition of human-related sources of mercury into lakes and streams can trigger biological processes that chemically transform this element into a toxic form that can accumulate in fish and mammals. This occurrence can be harmful to the host and any organism that consumes it. The Air Resources Division initiated mercury sampling in four parks in FY 2002, with an additional site to be added in FY 2003, to determine the amount, extent, and seasonality of mercury deposition in national park ecosystems.

In 2002 the Air Resources Division initiated several projects addressing the ecological effects of air pollution in national parks. One study analyzes total deposition (cloud, fog, dry, and precip-

itation) patterns of pollutants such as nitrogen and sulfur, while another links ecosystems and nitrogen cycling models to estimate the threshold of nitrogen deposition when sensitive lakes become acidic. A third study examines ozone pollution damage to the growth and physiology of native trees and wildflowers. A related project correlates remote sensing of tree condition with field measurements of ozone concentration, tree condition, and soil moisture to develop large-scale predictive techniques for determining where forest stands will be at high risk for ozone injury.

The National Park Service is also concerned about risks to park food webs from airborne contaminants. Toxic airborne compounds pose serious health threats to wildlife and humans, affecting reproductive success, growth, behavior, disease, and survival. Consequently, the Air Resources Division initiated the Western Airborne Contaminants Assessment Project, a five-year program funded by the Challenge to inventory contaminants in western U.S. national parks and to develop scientific information on the exposure, accumulation, and impacts of toxic compounds in the food chain. Inventories of contaminants from snow, water, sediment, lichen, bark, and fish will be conducted in seven key parks in the West and Alaska. Contaminant concentrations in wild foods consumed by subsistence users will also be assessed in Alaska.

In addition to funding new monitoring and studies, the Natural Resource Challenge supported long-established air quality monitoring efforts in national parks and augmented data management, reporting, and interpretation. The National Park Service is now able to fill in data gaps in the existing monitoring network, expand the scope of air quality monitoring activities, and maintain sites, improving our understanding and interpretation of air pollution transport, concentrations, and effects. The Challenge funding also added to the professional expertise of the Air Resources Division to better serve local and regional resource management needs. This initiative enhances the opportunity for the National Park Service to engage fully and effectively in external arenas where decisions regarding pollution control programs are being made. ■

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