

Foliar Ozone Injury Pilot Assessment Rocky Mountain National Park 2006

Measuring the status of ozone bioindicators, sensitive plants that display visible leaf damage resulting from ozone exposure, provides knowledge about the condition of park resources thus informing regional air quality policies. The recent development of the “Handbook for Assessment of Foliar Injury on Vegetation in the National Parks” by Dr. Robert Kohut of the Boyce Thompson Institute at Cornell University and NPS Air Resources Division, presents detailed methodologies for selecting plant species to monitor, establishing field plots, and performing assessments of foliar ozone injury. During the summer of 2006, a program to evaluate the implementation of the ozone injury assessment handbook was conducted in five national parks, including Rocky Mountain National Park (ROMO). The objectives of the exercise were to determine how well the handbook served the park staff as they designed a program and conducted the fieldwork to assess foliar ozone injury, and to compile observations and collect information that would be used to revise the handbook and increase its utility.

Using this newly-developed comprehensive guide, ROMO successfully established an ozone injury assessment program, collected one year of data, and documented the presence of foliar ozone injury. Foliar ozone injury assessment was conducted on vegetative plots of the bioindicators cut-leaf coneflower (*Rudbeckia laciniata v. ampla*), spreading dogbane (*Apocynum androsaemifolium*), quaking aspen (*Populus tremuloides*), and the ozone-sensitive plant showy milkweed (*Asclepias speciosa*). Aspen, dogbane, and milkweed plots did not exhibit ozone injury. In contrast, 21% of the coneflower leaves showed ozone injury in the form of black fleck; most affected leaves had less than five percent incidence on the leaf surface, with some leaves having up to 50% of the leaf surface affected. The black fleck was unlike the typical ozone injury on coneflowers in the East, but variations in the response could possibly be due to differences in ozone exposures, species varieties, or environmental conditions (e.g., relative humidity, elevation). Continued field assessments, supplemental observations, and analysis of ambient ozone monitoring data, along with controlled exposures on ROMO coneflowers, will offer more definitive answers as to the response of Rocky Mountain coneflower leaves to ozone exposure. Rocky Mountain National Park extensively tested the handbook, offering feedback that contributed to the final foliar ozone injury guide. The revised guide will be available at the end of summer, 2007, to all National Park Service units.