

CURRENT CONDITIONS AND TRENDS IN OZONE INJURY TO PINES IN THE SOUTHERN SIERRA NEVADA (3B)

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Air pollution is a major ecosystem stressor in the Southern Sierra Nevada. Managers and researchers in the region have long known that ozone, an important component of this pollution, is injurious to key forest species. But how are the forests responding to severe and prolonged ozone pollution? What are current pollution injury conditions across the region? And finally, what management and planning questions might these trends raise, particularly as this stressor interacts with others in the changing ecosystem? To investigate these questions, our study builds upon a long term ozone and tree injury monitoring network that spans the region. In 1991, an interagency project called the Forest Ozone Response Study set out to understand how ambient ozone and tree injury were distributed on the western slope of the Sierra Nevada. By examining these same trees and expanding the network to additional sites, we update and extend this long term study. This report encompasses assessments conducted at nine sites in Sierra National Forest and Sequoia and Kings Canyon National Parks using the Ozone Injury Index method on ponderosa and Jeffrey pines. Early results from 2011-2012 indicate that pines in polluted sites continue to exhibit substantial ozone injury. Sites with low predicted ozone levels have less evidence of injury, but do vary somewhat in their current foliar condition. In further analysis, we plan to combine this extensive injury data with matched tree ring series to understand the effects of ozone and drought, both important ecosystem stressors, on tree growth in the region. Detailed and up to date information on forest condition will be essential to clearly describe the vulnerability of Southern Sierra ecosystems to changing environmental and anthropogenic risks. In the future, such data may also be helpful in assessing the on-the-ground effectiveness of air pollution management measures and in other decision support roles. A detailed understanding of how the forest ecosystem responds to prolonged stress will be important as we plan for the future of the region's forests.

Key words: pollution, ozone, stressor, monitoring, Pinus