## EXPOSURE TO WIDESPREAD AIR POLLUTION ACROSS THE SIERRA NEVADA, <u>CA</u> SPATIAL MAPS OF OZONE C<u>ONCENTRATIONS COVERING BROAD AREAS OF</u> VULNERABLE TERRAIN (3F) Jeanne A. Panek<sup>1</sup>, David Saah<sup>2</sup>, Annie Esperanza<sup>3</sup>, Andrzej, Bytnerowicz<sup>4</sup>, Witold Fraczek<sup>5</sup>, and Ricardo Cisneros<sup>6</sup> <sup>1</sup>University of California, Berkeley <sup>3</sup>Sequoia and Kings Canyon National Parks <sup>5</sup>Environmental Systems Research Institute <sup>4</sup>USFS-Pacific Southwest Research Station <sup>6</sup>Sierra National Forest

Ozone concentration patterns across the extensive wilderness areas in the Sierra Nevada, CA, remain largely uncharacterized, despite being downwind of major pollution sources. These natural areas, including four national parks and four national forests, contain ecosystem types that have been documented as being vulnerable to ozone injury. While significant direct injury to these forests from ozone pollution has been reported, forests stressed by ozone are also more vulnerable to other agents of mortality, including insects, pathogens, climate change, and ultimately fire. Here we analyze three years of passive ozone monitor data from the mid- to southern Sierra Nevada to show spatial and temporal patterns during the summer-fall high ozone concentration period. Segmentation analysis revealed three types of ozone exposure sub-regions in the southern Sierra Nevada: high, low, and variable exposure. Consistently high ozone exposure regions are most vulnerable to forest mortality from other stressors. One such area is identified in the southern Sierra Nevada, where three stressors overlap to create a highly vulnerable forest landscape: 1) high ozone exposure; 2) increasing soil drought due to decreased snowpack; 3) extreme fire frequency departure index. Agencies with jurisdiction in this area might choose to prioritize management of forests here to ameliorate stress to reduce potential for greater mortality. The ozone vulnerability analysis method outlined in this paper is applicable to any landscape where ozone exposure characterization is warranted, but is particularly useful for remote and/or mountainous terrain with no access to power.

Key words: ozone, forest stress, spatial analysis