

Project Summary
Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Effects of the Changing Climate on Air Quality in the U.S. National Parks

Discipline: Natural
Type of Project: Research
Funding Agency: National Park Service
Other Partners/Cooperators: Colorado State University
Effective Dates: 9/15/2010 - 3/15/2013
Funding Amount: \$199,384

Investigators and Agency Representative:

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Project Abstract: The objective of this work is to undertake a holistic study of the effects of changes in meteorology and emissions on air quality in the national parks due to climate change. Modeling will focus on three critical issues: (1) Particulate matter (PM) and associated visibility degradation, (2) ozone, and (3) nitrogen deposition. Specific questions to be investigated include:

1. How does changing climate/meteorology impact ambient concentrations and deposition (e.g. via changing precipitation patterns, changes in the photochemical environment, changes in gas-particle partitioning)?
2. How do changes in natural emissions impact ambient concentrations and deposition? The following emission classes will be considered:
 - a. Biomass burning emissions (savannah burning and deforestation)
 - b. Biogenic volatile organic compounds (VOC) emissions
 - c. Dust emissions
3. How do changes in anthropogenic emissions compare to the effects of natural emissions and climate change on ambient concentrations and deposition? The following emission classes will be considered
 - a. Agricultural emissions (ammonia, oxides of nitrogen [NO_x])
 - b. Mobile emissions and point sources (e.g. coal fired power plants)

These results will help to understand the potential changes in air quality in the parks due to climate change and can be used by others in biological and ecosystem effects studies to better understand how the park ecosystems will respond to these changes. This information will help inform NPS management strategies for adapting to future change. The NPS is currently actively engaged with state and local air quality management agencies and the Environmental Protection Agency (EPA) to ensure that current and future emissions controls strategies will achieve the best protection for park air quality and resources. This study will provide information that the NPS can use in these discussions with regulatory agencies so that effective air management programs are continued.

Outcomes with Completion Dates: March 15, 2013

Keywords: Colorado State University, National Park Service, Air Resources Division, climate change, air quality, National Parks