

## Human Activities

**Protocol:** Visibility and Particulate Matter

**Parks Where Protocol Will Be Implemented:** ANIA, LACL, KATM

**Justification/Issues Being Addressed:** Federal land managers must protect air quality and related values (including visibility) of Class I lands, including all wilderness > 500 acres (202 ha), and consider, in consultation with the U.S Environmental Protection Agency, whether proposed facilities will have an adverse impact on these values (42 U.S.C. 7475(c)). Air quality in SWAN parks is considered pristine by national standards, but airborne pollutants associated with increasing global and regional industrialization, and increased particulate loads associated with wildfire and volcanic activity, have the potential to affect climatic conditions and ecological processes in the Network (Bennett et al. 2004). Effects of anthropogenic nitrogen deposition alone may include soil acidification, changes in plant community composition, increased emissions of greenhouse gases, and diminished water quality (Fenn et al. 1998). Aerosol sampling conducted in King Salmon (1987-1992) indicated that elements associated with anthropogenic sources were proportionately greater at that site than in other parks surveyed in Alaska (Polissar et al. 1998), and with continued industrial development in the region, atmospheric inputs are expected to increase.

### **Specific Monitoring Questions and Objectives to be Addressed by the Protocol:**

#### *Questions:*

- Are particulate loads and chemical composition of aerosols changing through time in or near SWAN parks?

#### *Objectives:*

- Develop a protocol to acquire aerosol data and summary reports from the Interagency Monitoring of Protected Visual Environments (IMPROVE) Network sites in southwest Alaska.

**Basic Approach:** The IMPROVE Network consists of optical and aerosol samplers that measure a range of particulates, including nitrate, sulfate, and organic and elemental carbon. Although SWAN does not currently support an air quality monitoring program, IMPROVE sites administered by the USFWS in the Tuxedni and Simeonof Wilderness Areas (Sand Point) provide data relevant to LACL and ANIA, respectively. Summary data (2002) are currently available online (<http://vista.cira.colostate.edu/improve/Data/data.htm>). Integration of these data into SWAN reports will be done in consultation with the IMPROVE program manager and SWAN data manager.

### **Principal Investigators and NPS Lead:**

- Amy Miller, NPS-SWAN (NPS Lead)
- Dorothy Mortenson, NPS-SWAN
- Ellen Porter, NPS-WASO

### **Development Schedule, Budget, and Expected Interim Products:**

Aerosol sampling sites are administered through the IMPROVE Network and are maintained by USFWS, with no cost to NPS for development or implementation of the sampling protocol.

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| 2006 | Develop a protocol to acquire annual IMPROVE summary data. |
| 2007 | Test and implement IMPROVE data acquisition protocol.      |

**Literature Cited:**

- Bennett, A. J., K. L. Oakley, and D. C. Mortenson. 2004. Phase II vital signs monitoring report, Southwest Alaska Network. National Park Service, Anchorage.
- Fenn, M. E., M. A. Poth, J. D. Aber, J. S. Baron, B. T. Bormann, D. W. Johnson, A. D. Lemly, S. G. McNulty, D. F. Ryan, and R. Stottlemyer. 1998. Nitrogen excess in North American ecosystems: Predisposing factors, ecosystem responses, and management strategies. *Ecological Applications* **8**:706-733.
- Polissar, V., P. K. Hopke, P. Paatero, W. C. Malm, and J. F. Sisler. 1998. Atmospheric aerosol over Alaska. 2. Elemental composition and sources. *Journal of Geographic Research* **103**:19045-19057.