



Air Quality Related Values Inventory Status: Complete

Introduction

The National Park Service defines air quality related values (AQRV) as resources sensitive to air quality, including vegetation, soils, water, visibility, fish, and wildlife. The AQRV inventory provides park-specific information on the location, distribution, and relative sensitivity of AQRVs as well as information on the types and amounts of air pollutants that cause harmful changes to AQRVs.

There are five NADP/NTN wet deposition monitoring sites in Alaska: Poker Creek located near Fairbanks, Juneau, Denali National Park visitor center, Gates of the Arctic National Park at Bettles, and Katmai National Park. In addition, there are Clean Air Status and Trends Network (CASTNET) dry deposition measurements taken at Denali and Poker Flats.



The NADP/NTN wet deposition air quality monitoring station in Gates of the Arctic—located in Bettles—is one of five monitoring stations in the state of Alaska. NPS photo

Acidification Effects of Nitrogen and Sulfur

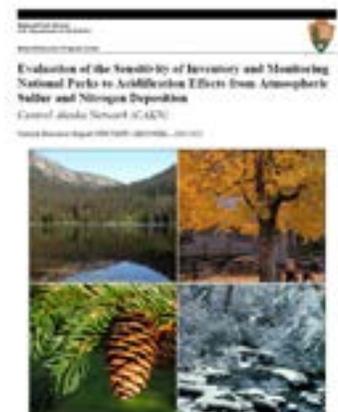
Reports for each of the four networks summarize the sensitivity of Alaska national park units to the acidification effects of nitrogen and sulfur. Total N emissions are less than 1 ton/m²/yr in all areas of Alaska. Total S emissions are also less than 1 ton/m²/yr across Alaska. Regional deposition data is not available for total deposition of S or N for Alaska but is expected to be low—about 1 to 2 kg/ha/yr for each. There are few point sources of N or S emissions throughout the state and all emit small amounts of sulfur and nitrogen.

All parks and networks rank ‘very low’ for pollutant exposure. Based on the occurrence of sensitive ecosystem types, such as high-elevation streams in Arctic parks, and expansive wilderness areas, the ranking for ecosystem sensitivity and park protection level varies from low to high.

Nutrient Enrichment Effects of Nitrogen

As with the reports on potential acidification effects, low levels of pollutant exposure were found across the state. However, for park units in the Arctic and Central Alaska Networks, it is noted that continued warming and the resulting permafrost melt may lead to higher levels of atmospherically deposited N, which may in turn lead to higher eutrophication effects.

Four of the five categories of sensitive vegetation types occur in Alaska park units. Arctic herbaceous, alpine, grassland meadow, and wetlands are all sensitive to the effects of nutrient N enrichment. Wilderness areas were also considered when assessing rank for ecosystem sensitivity and park management. The summary risk levels range from very low to moderate based on pollutant exposure, ecosystem sensitivity, and park protection levels.



Reports on the sensitivity of parks to the acidification effects of nitrogen and sulfur as well as the effects of nutrient nitrogen enrichment for each I & M Network in Alaska are available via <http://irma.nps.gov>.

Status

Three series of reports identify and summarize AQRVs:

- Sensitivity to the acidifying effects of nitrogen and sulfur deposition
- Sensitivity to nutrient enrichment effects of nitrogen deposition
- Sensitivity to ozone injury and occurrence of plant species sensitive to ozone exposure

In Alaska, reports on acidifying effects and nutrient enrichment effects were completed for all four Alaska including all parks in 2011. All reports are available via IRMA. Work is ongoing in the Ft Collins, CO office to develop an interactive web mapping feature describing risk from atmospheric mercury. In addition, work continues to develop thresholds and critical loads for effects on vegetation, soil, lakes, and streams from pollutant deposition.



The air quality monitoring station at Denali has been collecting NADP/NTN wet deposition data since 1980. It also collects CASTNET dry deposition data. Real-time data as well as a visibility web cam are available to the public via the park's website.

	Pollutant Exposure		Ecosystem Sensitivity		Park protection		Summary Risk		
	Acidification	Enrichment	Acidification	Enrichment	Acidification	Enrichment	Acidification	Enrichment	
Arctic	Bering Land Bridge	very low	very low	moderate	moderate	moderate	moderate	low	very low
	Cape Krusenstern	very low	very low	low	very high	moderate	moderate	low	very low
	Gates of the Arctic	very low	very low	very high	moderate	very high	very high	high	moderate
	Kobuk Valley	very low	very low	high	moderate	very high	very high	moderate	low
	Noatak	very low	very low	high	moderate	very high	very high	moderate	moderate
Central Alaska	Denali	very low	very low	very high	low	very high	very high	high	low
	Wrangell-St. Elias	very low	very low	very high	low	very high	very high	high	low
	Yukon-Charley Rivers	very low	very low	high	moderate	moderate	moderate	moderate	very low
South east Alaska	Glacier Bay	very low	very low	high	low	very high	very high	moderate	low
	Klondike Gold Rush	very low	very low	high	high	moderate	moderate	moderate	very low
	Sitka	very low	very low	low	moderate	moderate	moderate	low	very low
South west Alaska	Alagnak	very low	very low	low	moderate	high	high	low	low
	Aniakchak	very low	very low	high	moderate	moderate	moderate	moderate	very low
	Katmai	very low	very low	very high	moderate	very high	very high	high	moderate
	Kenai Fjords	very low	very low	high	low	high	high	moderate	very low
	Lake Clark	very low	very low	very high	low	very high	very high	high	low

The table above summarizes the findings from eight reports by Sullivan et al. in 2011. Pollutant exposure is low for both acidification and enrichment effects across the state. However, because of the expansive wilderness areas and sensitive areas, ecosystem sensitivity and park protection rankings are higher for individual parks.

Summaries come from the following citation as well as seven other sister reports: Sullivan, T. J., G. T. McPherson, T. C. McDonnell, S. D. Mackey, and D. Moore. 2011. Evaluation of the sensitivity of inventory and monitoring national parks to acidification effects from atmospheric sulfur and nitrogen deposition: Arctic Network (ARCN). Natural Resource Report NPS/NRPC/ARD/NRR—2011/351. National Park Service, Denver, Colorado.

Air Quality Inventory

The Air Quality Inventory focuses on indicator pollutants regulated under the Clean Air Act. To date, the air quality inventory has only been completed for the contiguous 48 states. Data from this inventory are available via Air Atlas, an online information portal. To access Air Atlas, visit science.nature.nps.gov/im.