



Air Quality and Contaminants

Resource Brief

Importance

Air quality in SWAN park units 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 ecological processes in the Network. Increased nitrogen deposition associated with human activity may result in soil acidification, changes in plant communities, and increased emissions of greenhouse gases. Particulate sampling conducted in King Salmon (1987-1992) found that elements associated with anthropogenic sources were proportionately greater than in other parks surveyed in Alaska. In addition, current-use and historic-use pesticides as well as some heavy metals (e.g., mercury) were found in low concentrations in most Alaskan parks in the Western Airborne Contaminants Assessment Project. These contaminants are stored in lake sediments, vegetation, fish tissue and snowpack.

Status

The US Fish and Wildlife Service (USFWS) currently administers two IMPROVE (dry deposition) sites in the Tuxedni and Simeonof Wilderness Areas, which measure a range of particulates, including nitrate, sulfate, and carbon. These sites are located at the northern and southern boundaries of the SWAN and will be an important source for understanding deposition trends in SWAN park units.

Stair step moss (*Hylocomium splendens*) was collected in several SWAN park units in 2008 to estimate baseline concentrations of metals, sulfur and nitrogen. This moss is used to assess airborne contaminants because annual growth increments are easily observed, it is widely distributed, and, like all mosses, it lacks a vascular system; thus, deriving most of its nutrients from wet and dry deposition sources. The results will be used to design a more complete study to assess how contaminants move through and accumulate in the terrestrial environment.

SWAN will establish a wet deposition collection site in King Salmon as part of the National Atmospheric Deposition Program (NADP) in spring 2009. A seven-day composite sample will be collected and analyzed for a suite of chemical parameters including sulfate, nitrate, ammonium, phosphate, and pH. NADP is a long-term program that has been monitoring wet deposition for over 20 years. Collection sites are located throughout the U.S.; many are located in national parks.

Other projects include contaminants analysis in fish and mussel tissue and lake sediment analysis.

Hylocomium splendens is a common moss found throughout the Network.



http://www.flickr.com/photos/maximilian_millipede/2320124870



NADP site in Denali NPP includes a wet deposition collector and electronic rain gage. A similar system will be installed in King Salmon in spring 2009.

Long-term Monitoring

Pollutants associated with regional and global industrialization are known to travel great distances and are deposited through wet and dry deposition to terrestrial and aquatic environments. SWAN scientists are in the early stages of incorporating air quality and contaminants monitoring into existing Vital Signs monitoring. Due to the complexity associated with air quality monitoring, SWAN will also partner with state and federal agencies currently monitoring air quality and contaminant concentrations within the vicinity of SWAN park units.

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