



Weather and Climate

Resource Brief



Gates of the Arctic

Noatak

Kobuk Valley

Cape Krusenstern

Bering Land Bridge

Importance

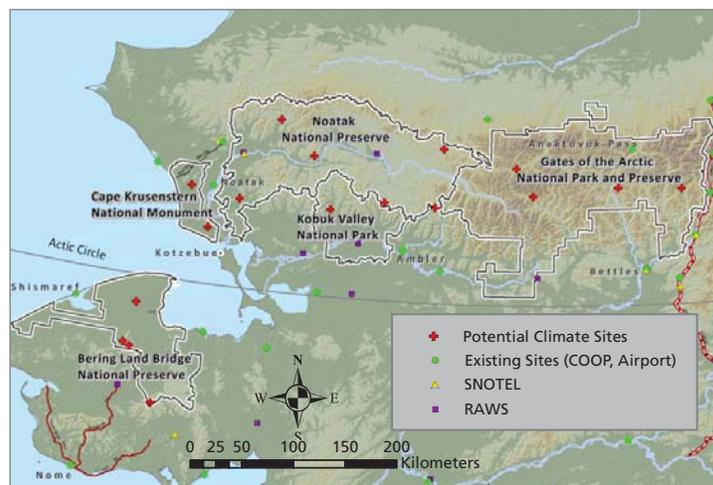
Climate is considered to be the most important broad-scale factor influencing ecosystems. Because global climate models indicate that climate change and variability will be greatest at high latitudes, climate monitoring will be critical to understanding the changing conditions of park ecosystems.

Potential effects in the Arctic parks include a reduced snowpack, earlier ice break-up on lakes, warmer winters, and wetter summers. These changes may affect the distribution, abundance, growth, and productivity of plants and animals.

Climate Monitoring

The mission of the Arctic Network Inventory and Monitoring Program (ARCN) is to collect, compile and synthesize scientific information about the arctic network of parks in order to manage park resources "unimpaired for the enjoyment of future generations". The Inventory and Monitoring Program is a major component of the National Park Service's strategy to improve park management through greater reliance on scientific information.

In an attempt to better understand climate variation as well as long-term changes in park ecosystems, several new long-term climate monitoring stations are being proposed in the Arctic parks. The objective of the climate monitoring program is to monitor and record weather conditions at representative locations in order to identify long and short-term trends, provide reliable climate data to other researchers, and to participate in larger scale climate monitoring and modeling efforts beyond park boundaries.



Program Development and Site Evaluation

In 2006, the Western Regional Climate Center completed an inventory of weather stations in and around the ARCN parks. This document along with the results of a weather and climate scoping meeting held in late 2006 provided the baseline information needed for the site evaluation phase of the climate monitoring program. Over the past two summers, ARCN staff traveled to the parks to evaluate potential sites for long-term climate monitoring stations. A basic set of site criteria was used in the evaluation process, including ecoregion representation, vegetation and soil type, known precipitation and temperature trends, spatial gaps, access to site, elevation, land management issues, use patterns (hiking, river use, etc.), and exposure (solar and satellite capabilities).



Killik Pass in Gates of the Arctic



Salmon River in Kobuk Valley



Kugururok Valley in Noatak

Repeater sites, ranger stations, existing airstrips, and other disturbed areas within the parks were considered in the evaluation process. Approximately 30 sites were evaluated and 17 were chosen as potential sites based on the criteria mentioned above. Due to the remote nature of the Arctic parks co-location with other ARCN monitoring components was emphasized to minimize the impact of access via aircraft. Sites were evaluated for climate, vegetation, soils, permafrost, and fire weather monitoring.

Building on a Foundation

Many of the communities in and around these parks have existing weather stations. These sites, as well as the existing Remote Automated Weather Stations (RAWS) used for fire weather indices, are extremely valuable and will be included as part of the ARCN climate monitoring program. Most of these existing sites are located at low elevations along the coast, or in the river valleys. Our plan is to complement the existing low elevation sites by adding sites at higher elevations in order to get a better representation of climate variations within the parks and across elevation gradients.



Hoo Doo Hill RAWS in Bering Land Bridge

Partnerships

The ARCN climate monitoring program staff works collaboratively with many state and local agencies involved in weather and climate studies, including university researchers, the National Weather Service, the National Oceanic and Atmospheric Administration, the Western Regional Climate Center, and the Natural Resources Conservation Service. Through interagency agreements and partnerships we hope to efficiently manage and obtain climate data from both inside the park boundaries and the surrounding land areas to provide a spatially relevant climate network.

Stations

The climate stations consist of research grade equipment that is fully automated and powered through a battery and solar panel system. They record temperature, wind speed and direction, precipitation, snow depth, relative humidity, soil temperature, and solar radiation on an hourly basis. Once installed, data will be transmitted by satellite, and disseminated and archived through the Western Regional Climate Center. The real time data will be available on the ARCN website at <http://science.nature.nps.gov/im/units/arcn/index.cfm?rq=12&vsid=5>.



Example of climate station: Yukon-Charley Rivers



Upper Charley site from the air directly above site

Status

The installation of climate stations will require an Environmental Assessment which will be initiated in the fall of 2009. The documentation from the site evaluation, including site descriptions, photos, and recommendations from an expert review panel which includes local and regional climatologists, will be compiled and included in the document. Comments and suggestions on this project are always welcome.

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