

How's the Weather?

Remote Automated Weather Stations at National Parks in Southwest Alaska



Background

Climate is considered the most important broad-scale factor influencing ecosystems. For this reason, climate monitoring is critical to understand changing conditions of park ecosystems.

Weather and climate information from National Parks in Southwest Alaska is limited. In order to monitor weather and climate, the NPS Inventory & Monitoring Program is developing a network of remote automated weather stations.

Objective

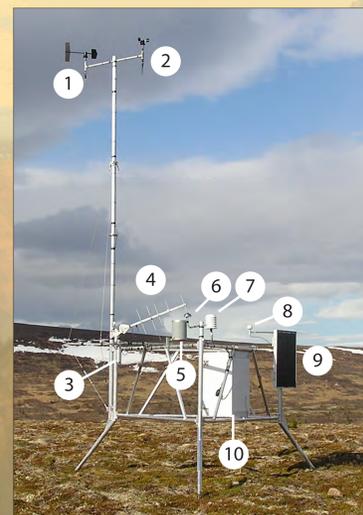
The objective is to record and archive weather observations at representative locations. This effort will support real-time needs, identify natural variability in weather and long-term climate trends, provide reliable climate data to other researchers, and help understand ecosystem changes.

Progress

The Southwest Alaska Network has set up seven remote automated weather stations in Katmai National Park and Preserve, Kenai Fjords National Park, and Lake Clark National Park and Preserve. Two more weather stations will be set up in 2009. Station maintenance is conducted each year.

Design

Weather stations are fully automated and are powered by solar panels. Data is transmitted hourly to a weather satellite and is available online. Weather observations include temperature, wind speed, and direction, precipitation, snow depth, relative humidity, and solar radiation.



1. Wind Direction
2. Wind Speed
3. Snow Depth
4. GOES Antenna
5. Rain Gauge
6. Solar Radiation
7. Temperature & Relative Humidity
8. GPS Antenna
9. Solar Panel
10. Equipment Enclosure

Weather station at Coville Lake, Katmai National Park & Preserve



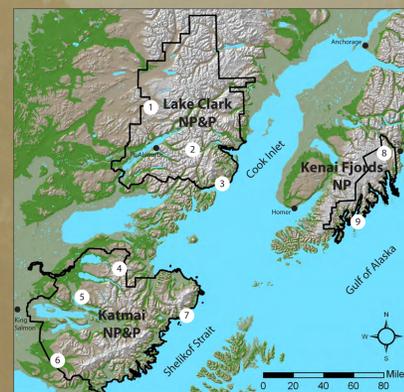
Precipitation gauge at Harding Icefield, Kenai Fjords National Park

Locations

Site selection was a comprehensive process that involved identifying potential sites based on gaps in existing weather station locations. Factors including physiography, climate, ecoregions, vegetation, land management, accessibility, and impact were considered. Site visits were conducted in 2006 and 2007. Priority-ranked sites were then identified and made available for review and public comment.

Weather station locations are:

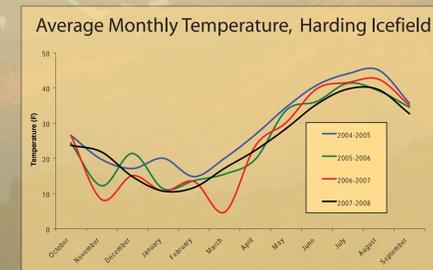
- Regionally exposed with minimal local influence.
- Representative of varied ecoregions and elevations.
- Reasonably accessible.



Southwest Alaska Network weather and climate monitoring stations: 1) Snipe Lake, 2) Chigmit Mountains*, 3) Hickerson Lake, 4) Pfaff Mine, 5) Coville, 6) Contact Creek, 7) Fourpeaked*, 8) Harding Icefield, 9) McArthur Pass. *Set up scheduled for summer of 2009.

Observations - Harding Icefield

The Harding Icefield weather station is now in its fifth year of continuous operation in a harsh environment. This station is located seven miles southwest of the Exit Glacier Nature Center at a rocky ridge (4,200 feet elevation) on the Harding Icefield. Analysis of four years of weather observations (2005-2008) supports the following general observations. Average temperatures are below freezing October through April or May. Winter temperatures are more variable than summer temperatures. Winds are persistent (78% of observations exceed calm) and usually blow from the southeast or northwest. Precipitation proves difficult to measure - wind causes significant undercatch at the all-season precipitation gauge (the station was deliberately placed at a location where it would not be completely buried by snow).

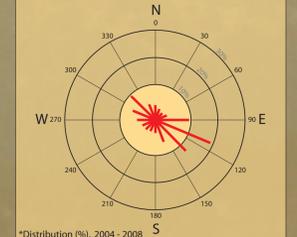


Harding Icefield Weather Station

Temperature and Wind Speed, Harding Icefield

Water Year (Oct 1 to Sep 30)	Temperature (F)			Wind (mph)
	Max	Min	Avg	Max
2004 - 2005	71.7	-14.6	28.8	99.5
2005 - 2006	61.3	-17.5	25.4	116.9
2006 - 2007	68.1	-21.4	24.3	105.1
2007 - 2008	61.7	-13.5	24.8	115.2

Wind Direction Frequency Distribution*, Harding Icefield



*Distribution (%), 2004 - 2008

Data Access

Current weather observations:

http://science.nature.nps.gov/im/units/swan/index.cfm?theme=weather_stations

Archived data, summaries, and downloads:

www.raws.dri.edu/akF.html