Southwest Alaska Network
Inventory & Monitoring Program

National Park Service
U.S. Department of the Interior

Alagnak Aniakchak Katmai Kenai Fjords Lake Clark

Weather and Climate

Resource Brief

October 2011

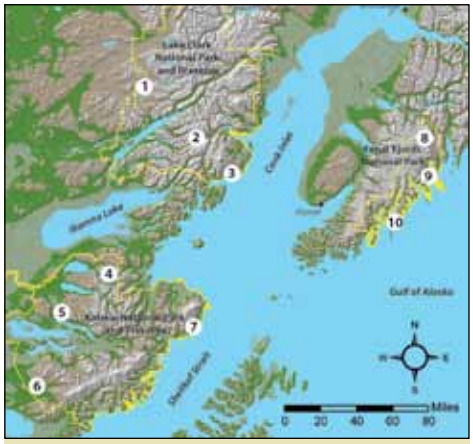
Importance

Climate is considered 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 is critical to understanding the changing conditions of park ecosystems. Potential effects in SWAN park units include a reduced snowpack, earlier lake ice break-up, warmer winters and wetter summers. These changes may affect the distribution, abundance, growth, and productivity of plants and animals.

This RAWS, located in the glaciated Lake Clark's Chigmit Mountains, has been in operation since June 2009 (left). Chuck Lindsay, SWAN physical scientist, replaces the anemometer on the Pfaff Mine RAWS, KATM (upper).

Long-term Monitoring

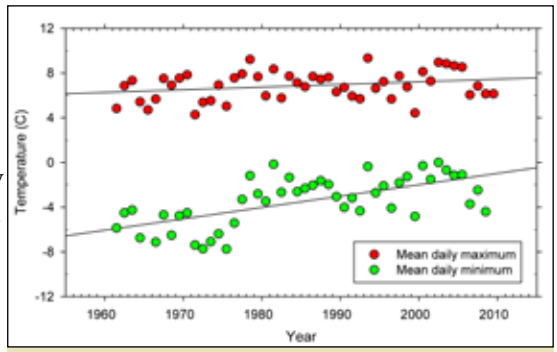
In order to address the scarcity of climate information from national parks in southwestern Alaska, the SWAN recently installed 10 remote area weather stations (RAWS) in three network parks. The objective is to record and archive weather observations in locations that are characteristic of the diverse landscape and topography within these parks. This effort will support real-time needs, identify natural variability in weather patterns and long-term climate trends, provide reliable climate data to researchers, and help interpret ecosystem changes. Real-time weather observations and links to archived data are available from the SWAN website at: http://science.nature.nps.gov/im/units/swan/index.cfm?theme=climate



SWAN weather stations are located along an elevation gradient across three park units. Station locations capture both maritime and continental climate regimes.

Discussion

The weather and climatic conditions of SW Alaska are largely influenced by the region's high latitude, proximity to oceans, complex topography, and interaction of these features with global atmospheric and oceanic circulation. Annual to decadal climate variability is primarily influenced by large-scale changes in atmospheric and oceanic circulation (e.g., El Niño/La Niña and Pacific Decadal Oscillation), whereas much of the seasonal climate variability is explained by the location and intensity of the Aleutian Low. Temperature data from long-term climate monitoring stations show a significant increase in both mean winter temperatures (Homer +3.3^0 C, King Salmon +4.4^0 C) and mean annual temperatures (Homer +2.1^0 C, King Salmon +2.1^0 C) for 1949-2009. Climate projections based on an intermediate climate change scenario suggest that mean annual temperatures for SWAN parks will increase by 0.5 - 0.6^0 C per decade. Seasonal precipitation is also generally projected to increase with 11-26% more snowfall in winter and 10-12% more rain in summer. Accurate, long-term climate data sets will be fundamental to understanding the effects of natural climate variability and global climate change.



Mean daily maximum and minimum temperatures for Port Alsworth (park headquarters for Lake Clark NPP) from 1961 to 2009. The increase in minimum temperature during 1976-1978 reflects a shift in the Pacific Decadal Oscillation (PDO) from cold to warm conditions.

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