

Weather and Climate

SOUTHEAST ALASKA NETWORK – PROTOCOL DEVELOPMENT SUMMARY

PARKS WHERE PROTOCOL WILL BE IMPLEMENTED: GLBA, KLGO

Justification/Issues Being Addressed

Climate – the average weather conditions over a long period of time – is widely recognized as one of the most fundamental drivers of ecological condition. Accordingly, SEAN identified weather and climate as an important Vital Sign. SEAN encompasses strong climate gradients driven by elevation and geography and driven by maritime influences. These climate gradients are intrinsic to the ecosystem patterns and vegetative and faunal communities found in network parks. In general, Alaska has a sparse dispersion of climate monitoring sites (Simpson et al. 2002). Currently, the few permanent long-term climate monitoring sites in SEAN region are biased towards low elevation areas of human habitation bordering the parks, and there are large regions within SEAN parks (particularly GLBA, due to size and topography) with no climate monitoring stations at all. Strategic deployment of climate stations in the SEAN parks will provide data not heretofore available on the climate patterns in the parks. This dataset is a covariate of fundamental importance when analyzing observed changes in the freshwater, marine, and terrestrial plant and animal communities. In addition, the climate stations may provide real-time weather data, which would be of immediate use in park operations. Climate data from the SEAN will also contribute significantly to understanding of Alaska climate by filling in some of the big gaps in the existing multi-agency climate monitoring station network, and by contributing to accurate measurement of winter precipitation.

Specific Monitoring Objectives to be Addressed by the Protocol

Main objectives of the monitoring strategy are to monitor and record weather conditions at selected sites; to identify long and short-term trends; to provide reliable climate data to other researchers; and to contribute to larger-scale climate monitoring and modeling efforts. The specific monitoring objectives of the Weather and Climate vital sign are to:

1. Record long-term trends in temperature and precipitation through fully instrumented sites placed in the SEAN parks to capture primary gradients in network climate.
2. Track total annual precipitation and daily accumulation patterns with high accuracy by establishing at least one recording precipitation gauge within or adjacent to each SEAN park.
3. Track hourly wind speed, solar radiation, and relative humidity at all climate stations established by SEAN to provide information on secondary climate drivers and localized climate.
4. Maximize the use of the SEAN climate data for use in analyses of climate and its affect on ecosystems at local to global scales, by making all climate data collected by SEAN available over the Internet in convenient formats in a timely fashion.

Basic Approach

The basic approach for meeting the objectives will be to (1) ensure that all existing long-term stations in and around the network continue to operate and produce high quality data; (2) add new climate stations in areas that are not currently represented, including year-round precipitation gauges; (3) ensure that the maintenance and calibration of the stations and sensors is a priority; (4) engage in partnerships with state and federal agencies involved in climate and weather monitoring in SEAN and also with university researchers interested in high latitude climate changes; (5) ensure that the data produced by the new SEAN stations is available for use by NPS staff, researchers, and the public via the internet, and (6) archive the digital data with the Western Regional Climate Center (WRCC).

The Alaska Region climate monitoring issues are consistent statewide and benefit from shared resources and established partnerships. SEAN will use foundation documents drafted by the WRCC (Davey et al. 2007) to design and develop a strategy that will focus on high latitude climate issues and remote operations. A robust, integrated Alaska NPS climate monitoring program will be more valuable and efficient and serve to describe the climate of Alaska holistically and provide a more complete understanding of the complexities of this system that affects Alaska National Parks.

The WRCC will archive and disseminate the data. The hourly data from the automated stations will be disseminated for public viewing and use (in near real-time) via the internet. WRCC maintains a dynamic website complete with data querying capacity. Data products available on the WRCC website are daily summary (with wind chill and heat index), monthly summary, time series graphs, wind rose graphs and tables, data lister, data inventory, and station metadata. We have entered into a MOU with WRCC through which they will develop web-based tools to develop reports and analysis that is specific each user's needs, as well as a standard template for annual reporting.

Principal Investigators and NPS Lead

Principal Investigators and Park Leads:

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Collaborator:

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Development Schedule, Budget, and Expected Interim Products

In 2008, SEAN will begin identifying candidate weather station sites (3-5 candidate sites in GLBA and 2-4 sites in KLGO) and will select equipment for purchase in 2009. The NWS station at the Sitka airport will meet the weather monitoring needs for SITK. Also in 2008, SEAN will draft the monitoring protocol and establish a partnership with the WRCC to formalize the implementation and data reporting processes. Final site selection will occur in 2009 and stations will be deployed in 2010.