

# Landscape Dynamics and Terrestrial Vegetation

**Protocol:** Volcanic and Earthquake Activity

**Parks Where Protocol Will Be Implemented:** ALAG, ANIA, KATM, KEFJ, LACL

**Justification/Issues Being Addressed:** Earthquake occurrence is common in the SWAN parks and region. This is a result of the Pacific plate moving in a northwest direction and subducting beneath the North American plate in southern Alaska, the Alaska Peninsula, and the Aleutian Islands. This plate boundary is responsible for most of the earthquakes occurring in this region. The location and magnitude of seismic events could be significant in terms of human health and safety and landscape change (mass movement).

There are 17 active volcanoes within the SWAN parks and region. Explosive volcanic eruptions, such as Katmai's Novarupta in 1912, can catastrophically disturb hundreds to thousands of square miles of landscape, profoundly affecting fluxes of water and sediment. Vegetation can be defoliated, buried, or removed, and the landscape can be mantled with tephra (airborne volcanic ejecta ranging from ash to small blocks of rock). Rivers, lakes, and valleys can be partly or completely filled with pyroclastic debris, or massive deposits from debris avalanches and pyroclastic flows.

## **Specific Monitoring Questions and Objectives to be Addressed by the Protocol:**

### *Questions:*

- Where are the epicenters and hypocenters of earthquakes occurring in the SWAN parks and region?
- What are the magnitudes of earthquakes occurring in the SWAN parks and region?
- How many earthquakes occur in the SWAN parks and region on an annual basis?
- Where are the eruptive volcanic events occurring in the SWAN parks and region?
- What is the frequency and magnitude of volcanic events occurring in the SWAN parks and region?
- Where are the origins of ash clouds affecting the SWAN parks and region?

### *Objectives:*

- Record the occurrence and magnitude of seismic events (earthquakes) in the SWAN parks and region.
- Record the occurrence and magnitude of volcanic events (eruptions and/or ash deposition events) in the SWAN parks and region.

## **Basic Approach:**

- On an annual basis SWAN will acquire seismic data from the Alaska Earthquake Information Center, Geophysical Institute, University of Alaska Fairbanks ([http://giseis.alaska.edu/Seis/html\\_docs/db2catalog.html](http://giseis.alaska.edu/Seis/html_docs/db2catalog.html)).
- On an annual basis SWAN will acquire volcanic event data from the Alaska Volcano Observatory (AVO) (<http://www.avo.alaska.edu/>). AVO is a joint program of the United States Geological Survey, the Geophysical Institute of the University of Alaska Fairbanks, and the State of Alaska Division of Geological and Geophysical Surveys.
- If available, acquire remotely sensed data (i.e., Moderate Resolution Imaging Spectrometer (MODIS)) for ash events occurring in the SWAN parks and region.

## **Principal Investigators and NPS Lead:**

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- Dorothy Mortenson, NPS-SWAN

**Development Schedule, Budget, and Expected Interim Products:**

- 2006 Draft SOPs (\$ to be determined).
- 2007 Test protocol.
- 2008 Implement protocol (\$ to be determined).