Lake Sediments

Resource Brief

Importance

As sediment and other material settle on the bottom of lakes, an excellent historic record of natural events is deposited. Scientists are able to collect lake sediment cores and precisely date the various layers, providing a timeline of past events, such as volcanic eruptions marked by the presence of ash. Much as water samples are analyzed to provide an assessment of current nutrient and contaminant levels, lake sediments can be analyzed to provide an historic perspective. There is a growing concern over contaminants, such as mercury, in the environment and SWAN is monitoring for the presence of contaminants through the Air Quality vital sign and by analyzing accumulations in resident lake fish and plant tissue. However, to achieve a long-term historical perspective on contaminant concentrations, SWAN has turned to lake sediment analysis.

Long-term Monitoring

In order to assess the impacts of the modern day industrial era, scientists must first have a good estimate on the historic levels of contaminants that occurred naturally. Mercury, for example, can occur naturally through the weathering of rocks. By using sediment cores, researchers can provide an estimate of contaminant levels dating back on the order of hundreds of years prior to the modern day industrial era - a period often linked to significant increases in atmospheric contaminant levels. Pacific salmon are known vectors of contaminants, transporting material accumulated during residence time in the ocean to freshwater spawning grounds. A comparison of sediment cores between anadromous and non-anadromous lakes allows researchers to evaluate the role Pacific salmon play in transporting contaminants into SWAN park units.

NPS

Sediment cores collected from ponds in LACL. Light gray color bands are volcanic ash deposited from past eruptions.

NPS

University of Alaska researchers, Dr. Bruce Finney and Andrea Krumhardt, collect a sediment core from Meshik Lake (ANIA).

Discussion

Between 2003 and 2005, researchers at the University of Alaska collected lake sediment cores from a range of lakes in Aniakchak NMP (ANIA), Katmai NPP (KATM), and Lake Clark NPP (LACL) as part of a research project to document the magnitude of Pacific salmon runs over time. Those archived sediment cores are now being used by University of Alaska researchers to measure historic levels of mercury, copper, lead, and several other elements in SWAN lakes. Sediment cores from lakes listed in Table 1 were selected for analysis to provide a comparison between lakes with and without a historic record of Pacific salmon runs and glacial inputs. The results should provide a good background record against which future contaminants studies can be compared.

Table 1. Lakes in KATM and LACL in which sediment cores were selected for contaminant analysis.

Lake	Geology	Fishery
Idavain (LACL)	non-glacial	non-anadromous
Kontrashibuna (LACL)	glacial	non-anadromous
Clark (LACL)	glacial	anadromous
Brooks (KATM)	non-glacial	anadromous
Naknek (KATM)	glacial	anadromous

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