



Freshwater Quality

Glacier Bay National Park
Klondike Gold Rush National Historical Park
Sitka National Historical Park

Importance

Rivers are a major feature of the southeast Alaska landscape. As rivers flow from mountains to sea, they are influenced by multiple environmental forces. Glaciers cause rivers to run cooler. Geology shapes the chemical composition and physical appearance of water. Climate influences patterns in glacial melting and sedimentation. The unique characteristics of individual rivers lead adult salmon from the ocean to their birth place and support a diverse community of organisms adapted to thrive in each river's seasonal changes.

Freshwater quality is critical to understanding and tracking the health of aquatic and terrestrial ecosystems. Park managers in the Southeast Alaska Network (SEAN) are concerned with potential threats to water quality from climate change, visitor impacts, and atmospheric contaminants. Current and historical water quality data for SEAN parks are limited. The main objective of this monitoring program is to collect continuous data on core water quality parameters in order to describe seasonal and annual variation and long-term trends. This data will also inform management decisions, assist researchers, and help determine compliance of freshwater with state and federal regulations.

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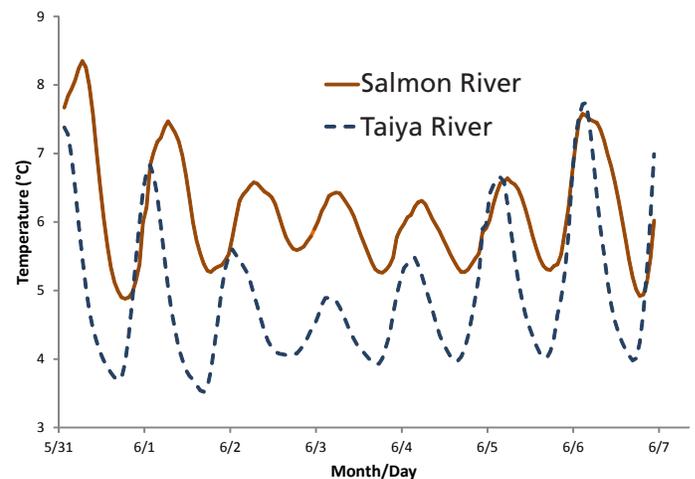


Photo: Chris Sergeant/NPS

This image of the Indian River, located in Sitka, shows a black plastic tube (left, foreground), which holds the data logger and sensors that record water temperature, dissolved oxygen, pH, and conductivity. The logger sits at the bottom of the tube, which is perforated to allow continuous flow across the sensors at all water levels.

Program Design and Status

Freshwater quality monitoring is a well-developed field. This SEAN program was informed by published protocols and by a SEAN-specific inventory of existing water quality data. One data collection site has been established in each park unit: the Indian River at Sitka, the Taiya River outside Skagway, and the Salmon River near Gustavus. At each site, four core parameters are measured hourly from May to October: temperature, pH, specific conductance, and dissolved oxygen. Hourly turbidity data is collected at the glacially influenced Taiya River. Monitoring sites were fully operational as of summer 2011, and the monitoring protocol will be finalized in late 2011. Data from this monitoring program will be integrated with results from related programs, including streamflow, freshwater benthic macro-invertebrates and algae, freshwater contaminants, and climate monitoring. Example data is shown in the figure (right). Over the period of one week, the Taiya River was, on average, 19% colder and had a 48% greater range between daily high and low temperatures. These differences in temperature regimes have distinctly different effects on the organisms experiencing them.



Water temperature monitoring in two parks demonstrates that a glacially-influenced river (Taiya River - Klondike Gold Rush, dotted line) is cooler and exhibits greater daily temperature fluctuations than a non-glacially influenced river (Salmon River - Glacier Bay, solid line).

Reports and Data Access:

http://science.nature.nps.gov/im/units/sean/FQ_main.aspx

Updated September 2011