

Assessing the Feasibility of Monitoring Aquatic Ecosystems on a Landscape Scale in Central Alaska

Amy S. Larsen¹ and Maggie C. MacCluskie²

¹Aquatic Ecologist, National Park Service, 201 First Avenue, Fairbanks, AK 99701

²Central Alaska Network Coordinator, National Park Service, 201 First Avenue, Fairbanks, AK 997011

Biographical Sketches of Authors

Amy is an aquatic ecologist with the National Park Service. She has been monitoring aquatic ecosystems in Alaska for over 10 years. For the past three years she has been working with the Central Alaska Network Parks to develop a long-term monitoring strategy for lotic and lentic ecosystems. Prior to her work with the National Park Service she worked on the effects of flooding on wetland ecosystem dynamics in subarctic and arctic Alaska.

Maggie MacCluskie coordinates the Inventory and Monitoring program for the Central Alaska Network. Her network of parks encompasses the Yukon-Charley Rivers National Preserve, Denali National Park and Preserve, and Wrangell-St. Elias National Park and Preserve. Prior to joining the National Park Service her research work focused on waterfowl nesting in the boreal forest of Alaska and Canada. She resides in Fairbanks, Alaska where she enjoys taking part in as many outdoor activities as possible with her family.

Abstract

We developed a preliminary strategy for long term monitoring of aquatic ecosystems in National Parks in the central portion of Alaska. This strategy focuses on collecting data on a small suite of physical and chemical conditions, and biodiversity and community structure of biologic organisms. Because little is known about the waters in central Alaska we chose to focus our efforts on characterizing the full range of conditions and variation rather than on understanding specific ecosystem processes within our Parks. Our primary goal is to detect landscape scale change. Here we describe the results from a 1-year pilot study to test the feasibility of a large scale sampling regime and share our insights into developing a long-term monitoring program designed for relatively pristine ecosystems. During the pilot study we collected water quality, macroinvertebrate and vegetation data from 10 ponds and 5 streams within Yukon-Charley Rivers National Preserve. We analyzed water samples for basic water quality parameters including temperature, DO, specific conductance, pH, total N and P, NO₃/NO₂, and alkalinity. We also collected macroinvertebrate/zooplankton samples from each site to determine community structure and biodiversity. We estimated species composition and percent cover of riparian and littoral vegetation for each site. Basic diagnostic statistics and trend analysis were used to detect patterns among the data. We evaluated these data for trends and determined what measures would be good indicators of landscape scale changes. Specific conductance and NO₃/NO₂ were successfully linked to landscape scale disturbances.