Project Progress Report for ECHYDR11
Report on Activities

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Environment Canada's contribution to the project ECHDR11 enables the Aurora Research Institute (ARI) to facilitate field and laboratory support for the Arctic Research and Monitoring program on Water Quality and Aquatic Ecosystems Health. This project assesses the effects of climate change and resource development on the hydrology, geochemistry, and ecology of freshwater systems in the western Canadian Arctic. New knowledge and data produced during this project will contribute to the conservation and restoration of water resources and aquatic ecosystems. The information gathered for this project will also be used to obtain baseline information in support of regional environmental and cumulative impacts assessment processes.

During the summer of 2010, two ARI summer students (Kate Snow and Jasmine Brewster) and both ARI technicians (William Hurst and Donald Ross) worked on this project under the supervision of employees and graduate students from Environment Canada's Water and Climate Impacts Research Group (W-CIRC), based in Victoria BC. Most field work completed during summer 2010 was in support of Paul Moquin's MSc project, which examined the affects of permafrost degradation and shoreline slumping on the quality of lake water and lake sediments.

Each field day began with a short helicopter ride to the study site, Lake 5A, which is located close to Noel Lake in the upland region northeast of Inuvik. In order to study the effects of permafrost degradation and slumping, Paul had built 12 enclosures that were installed in Lake 5A. Different amounts of lake sediment were added to each enclosure in order to simulate different degrees of shoreline slumping and sediment loading. The conditions in the enclosures were compared to those in the lake, where no sediments were added. Therefore, the lake served as a control system.

Upon arrival at the lake, the field team would set up the field gear, including an inflatable boat, water sampling equipment, and coolers for the sample bottles. Eight water samples were taken from each of the 12 enclosures, with samples taken from several different depths within each. These samples were later used in laboratory analyses that examined the geochemical differences between lakes with permafrost slumping along their margins, and lakes with intact shorelines.

A light meter was used to measure the amount of light received at sequential depths within each enclosure. These data were used to determine the underwater light environment in each enclosure, and to calculate how much photosynthesis each supported. Samples of the benthic sediments were also taken from each enclosure.

One summer student, Jasmine Brewster, also worked closely with Paul in the laboratory. Some of Jasmine's lab responsibilities were sample filtration, dish washing and sterilization, preparing equipment for future field and lab work, and sample preservation. Some of the water samples that were collected in the field were used later in the lab to study how bacterial abundance and production changed in response to shoreline slumping. Jasmine was able to help Paul process and measure some of these bacterial samples as well.

Both Jasmine and Kate learned a great deal about proper scientific methods and field sampling protocols during their time working on ECHYDR11. The experience that the summer students gained while working on this project will be invaluable should they pursue graduate studies or a career in environmental research and monitoring.

In addition to the work done in support of Paul Moquin's MSc project, ECHYDR11 activities also included snow surveys and hydrological measurements during the late winter and early spring of 2010, fish sampling in the fall of 2010, and deployment of an oceanographic buoy in Noel Lake in the fall of 2010. This buoy will be left in Noel Lake year-round for the next several years, and will transmit various measurements (including chlorophyll and turbidity) via satellite. Both ARI technicians were heavily involved in all fieldwork in support of ECHYDR11.