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Non-technical summary

Water quality and environmental change at Cape Herschel and Stygge Nunatak Pond, Ellesmere Island.

Lakes and ponds are sensitive repositories of environmental information. We (J.P. Smol, and M.S.V. Douglas) have been monitoring 45 lakes and ponds at Cape Herschel, Ellesmere Island, approximately every 3 years since 1983. This area has become a critical reference site for limnological data. Although we normally only return every 3 years to Cape Herschel, in 2006 we recorded remarkable changes in the ponds. Several had dried up, which we believe is linked to climate warming. Therefore, we propose to return to Cape Herschel in 2009 and determine if the shallow ponds are still dry. If they are no longer dry, we plan on determining what changes have occurred in the ecology of these sites with the drying in 2006. We will also determine what changes are happening in the deeper ponds that are not dry, but have reduced water levels.

We will collect present-day water quality data (perhaps now in only the deeper sites if the shallow ones are dry again) and mud samples during approximately 10 days in July from lakes and ponds within walking distance of Cape Herschel. We will remove a small sample of water (~ 2 L) from each pond, as well as a small amount of mud (a few cm<sup>3</sup>) for analysis of indicators of environmental change. We do not sample or disturb any wildlife or fish.

Pending the availability of PCSP chartered helicopters and weather, we would also like to sample a few sites on nearby Pim Island, Bache Peninsula, Knud Peninsula, Alexandra Fiord and Stygge Nunatak region. This increases our range of sites in which to assess past environmental changes. In addition, while based at PCSP (Resolute), we sample about 10 ponds and lakes as part of our long-term water quality assessments.

As we have done in the past, we will continue to communicate our results using published literature, which we distribute to the Arctic and local hamlet offices, as well as talks and seminars in the Arctic, as well as media interview on the radio and newspapers.