Report of 2008 Field Activities and Preliminary Results: Cape Bounty, Melville Island

Dr. Scott Lamoureux
Department of Geography
Queen's University, Kingston, ON K7L 3N6
Phone 613-533-6033
Email: scott.lamoureux@queensu.ca

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Field and Community Activities

Our group camped at Cape Bounty, Melville Island from May 23 until August 13, 2008. Cape Bounty consists of two small rivers (8-12 km^2) and lakes on southern Melville Island (74^o $55'$ N, 109 35^o W). We are trying to understand how the landscape will respond to climate change. In particular, we are measuring river flow, the amount of sediment that the river carries, how sediment is transported and deposited in lakes, the weather, the amount of snow, vegetation communities, permafrost conditions, and char in the lakes. We arrived and left Cape Bounty by Twin-Otter, and got around at the site on foot.

One of our team members (Linda Lamoureux) is a school teacher. She visited Resolute and Iqaluit several times along with some of our scientists in 2008 and they recently visited in January 2009. They showed school children what we are doing at Cape Bounty with lessons and activities, and she making a book with pictures describing our work. We also made a website to show the public what we are studying: http://geog.queensu.ca/cbawo/.

Preliminary results

We have been studying Cape Bounty since 2003. Each year that we work there, we learn new things about the landscape, and how it will be affected by climate change, and this knowledge is special and unique.

When we left the site in 2007, it had just experienced a month of extremely warm temperatures, much like what we expect in the future with climate warming. The permafrost melted and large areas of the landscape were disturbed when the soil moved down slopes. These disturbances allowed large amounts of sediment to be transported into the rivers and lakes. Because this happened near the end of the 2007 field season, we weren't sure how the landscape would be affected in 2008 and beyond. This is very important to know, because if the rivers carry too much sediment, it may affect the ability of char to live in the lakes. The disturbances could also affect the ability of caribou and muskox to find food.

Preliminary results from 2008 show that the river did transport much more sediment than is usual because of the disturbances, although not as much as we expected. Many of the disturbances occurred far from the river and the sediment from these sites stayed close to the disturbances. Where large disturbances connected with the main river, extremely large amounts of sediment were transported. Therefore, we learned that connections to the main river are important.

Another surprising aspect of the 2008 field season was the amount of rain that fell. In early August, it rained continuously for several days. Before the rain, there was no snow in the watershed, so the rivers were hardly flowing at all. However, the rain made the rivers flow as strong as they do when the snow is first beginning to melt in spring. Observations taken at this time are important, because we expect that rainfall will increase along with temperatures when the climate changes.

We are also studying how the lakes at Cape Bounty formed, and how they will be affected by climate change. In 2008, we had an instrument for measuring flow at the very bottom of lakes. These very low flows are extremely important for determining whether lakes contain saltwater or freshwater. We were able to measure these flows for the first time in 2008.

We had two Inuit fishers from Resolute stay at Cape Bounty for a week in July. They caught char, which will be analysed for mercury and other pollution.

Proposed activities for 2009

We will continue to measure the same things we have measured at Cape Bounty since 2003. However, we will have fewer people at Cape Bounty, and stay there for less time. We will likely arrive in late May and leave in late July. We plan to hire several Inuit to fish the lakes again in July and are working with the school and Hamlet to try and find several students to come to Cape Bounty in July to work and learn about what we are studying.