Field Report – 2018

Project Title: NEIGE (Northern Ellesmere Island in the Global Environment)

Permit Numbers
Nunavut Research Institute (NRI): **02 021 18R-M**
Parks Canada Agency and collection permit: **QUT-2017-24479**
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Person nights
May 28: DA, YK, CM & KT arrive at Stuckberry
June 4: DA, YK, CM & KT depart Stuckberry (4 x 7 = 28 person nights)
July 17: AC, CG, EI, YT, DS arrive at Ward Hunt Island
July 24: YT departs Ward Hunt Island (= 7 person nights)
July 29: AC, CG, EI, DS depart Ward Hunt Island (4 x 12 = 48 person nights)
Total = 83 person nights

Aircraft Hours
Twin Otters chartered by PCSP and based in Resolute Bay were used to carry participants to Stuckberry Lakes and Ward Hunt Island for an estimated total of 32 hours flight time (four round trips). We made a brief helicopter excursion (several round trips to Thores Lake, 28 July; approximately 4 hours total).

Fieldwork Location
Part of the work took place at Stuckberry Point and vicinity, while the rest was on or near Ward Hunt Island, with a day of operations at Thores Lake.

Field Activities and Accomplishments
There were six aspects to our research (please also see the photographs, below):

1. Environmental monitoring. We continued our long-term measurements from climate stations, permafrost monitoring and automated cameras on Ward Hunt Island. We are making these data available to all stakeholders including northern communities by publication in the online, open access data report series Nordicana D: www.cen.ulaval.ca/nordicanad/dpage.aspx?doi=44985SL-8F203FD3ACCD4138. We also retrieved another 1-year record of lake temperatures and underwater light at Ward Hunt Lake, and reinstalled the instruments for retrieval next year. We downloaded the new high resolution automated camera at Ward Hunt Lake to track the changes in ice cover more precisely. (See Figure 1 below)

2. Lake profiling. We continued our measurements tracking water column change, with profiling of Ward Hunt Lake. These data are also available through Nordicana D (See Figure 2 below):
http://www.cen.ulaval.ca/nordicanad/dpage.aspx?doi=45445CE-7B8194DB81754841;
http://www.cen.ulaval.ca/nordicanad/dpage.aspx?doi=45436CE-0E0A89CB98C148F4.

3. Microbiological research. This summer, we made ongoing progress with high resolution sampling of Ward Hunt Island Lake and Thores Lake. We were able to sample for viruses, other microbes, pigments and a wide range of physical and chemical measurements. We anticipate that these data will provide us with a baseline from which to study future change in these sensitive environments. (See Figure 3 below)

4. Air sampling. This summer, we collected aerosol samples by concentrating large volumes of air onto filters. Samples were collected across Ward Hunt Island and on the Ward Hunt ice rise, as well as at Thores Lake and Thores Glacier. We are expecting to describe viruses and microbes in the atmosphere for these environments. This type of research has never been conducted in the Arctic, and we expect our results to inform us on the connectivity of microbial habitats in the North. (See Figure 4 below)

5. Ice sampling. Ice cores were collected at Ward Hunt and Thores Lake to assess the microbial populations of frozen freshwater environments. We collected ice from the surface at the air-ice interface (to understand microbial contributions from the atmosphere) and from the bottom at the ice-water interface (to understand microbial exchanges between the ice and water column). Ice cores were

also collected at a depth of 30cm at Thores Glacier, to describe the surface microbes this glacier may be contributing to downstream environments through its thawing. (See Figure 5 below)

6. We had a very successful sampling trip to the Stuckberry Point lakes and obtained all sediment cores and water samples from four lakes, as planned.

Preliminary Results: All samples are currently being analysed.

Community consultation and Involvement

Quttinirpaaq National Park and Ward Hunt Island are located in a remote region, far from northern communities. Our interactions are through community consultation, Parks Canada and NRI license applications, interactions with Parks Canada staff, public media interviews, and by meetings with Resolute Bay and Grise Fjord residents at ArcticNet workshops and other events. We also hired a local field guide from Resolute Bay for the portion of our work centered outside Quttinirpaaq (around Resolute Bay). We will continue to provide images, videos, publications and interview concerning our work at Ward Hunt Island to the Parks Canada communications department for their website.

Challenges:

Logistics funding continues to be our greatest challenge. We had hoped for 4 days of helicopter time but because of bad weather, had less than 4 hours of helicopter time. We appreciate the Parks Canada camp facilities and laboratory, which greatly facilitated our work, and PCSP logistics.

Plans for next season:

We would like to return in May-August 2019 to continue each of these projects, with the possibility of a return visit to Thores Lake (82.65N; 73.68W), a long proglacial lake near Disraeli Fiord.

Photos with short captions

Figure 1. Mooring being retrieved by YT & DS from Ward Hunt Lake. The mooring was reinstalled in the lake to continue monitoring year-round. Photo credit YT.

Figure 2. A) Sampling team collecting data using a probe at Ward Hunt Lake. B) Example of data collected throughout the water column of Ward Hunt Lake, for temperature, conductivity, dissolved oxygen (DO), chlorophyll, phytocyanin and fluorescent dissolved organic matter (FDOM). Photo credit YT, figure CG.

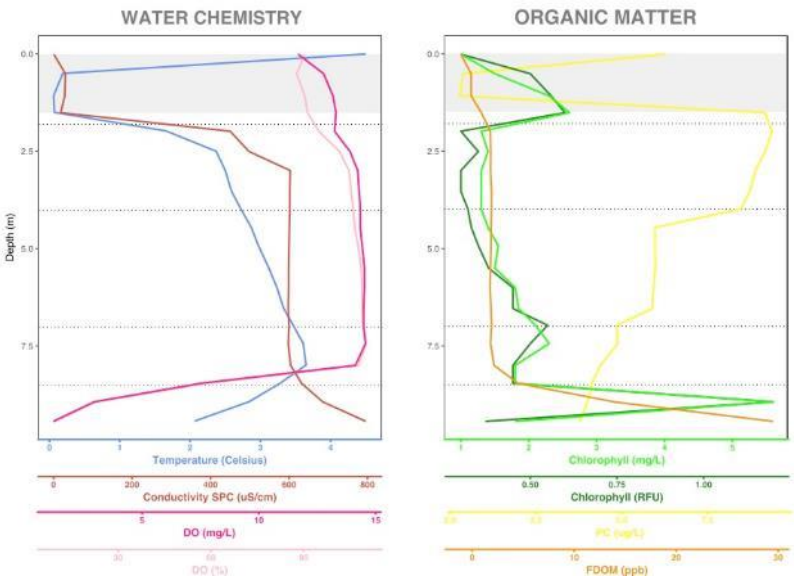

Figure 3. Laboratory at Stuckberry Point to assess limnological variables, in support of microbiological data collected on the field.
Photo credit YK.

Figure 4. Air concentrator which allowed us to collect aerosols (including airborne viruses and microbes) and a temporary weather station collecting local weather data on the NE coast of Ward Hunt Island. Photo credit CG.

Figure 5. EI collecting ice cores using a drill-powered corer at Thores Lake. Ice was collected from the air-ice interface, as well as from the ice-water column interface. Photo credit CG.