BEAVER RESEARCH

BARIN NEWSLETTER

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BARIN BEAVER PROJECT: UPDATE

By Helen Wheeler (on behalf of the BARIN Team)

The last few months have been a busy time for the beaver project. Members of the BARIN team helped to organise, presented at, and participated in the Arctic Beaver Observation Network (A-BON) meeting in Fairbanks, Alaska. Thanks to all who got involved, including Herb Nakimayak, Shannon O' Hara, Kirt Ruben, Max Kotokak Sr., Lennie Emaghok, Kevin Arey, Charles Klegenberg and J.D. Storr. It was interesting to hear perspectives from different regions on beavers and about the research happening in Alaska and elsewhere in Inuit Nunangat. People at the meeting were also interested to hear about the work happening in the ISR and research partnerships.

We are now entering our third year of funding for BARIN and looking how to create useful products from the research and finish up our analyses. We are also looking for ways to continue the research in the coming years. This will require us to apply for new funding and we are keen to hear of new and emerging priorities that we should focus on.

As part of this, I am exploring ways to collate information related to people's priorities for beaver research from across the Arctic. This is something we discussed at the A-BON meeting and people had the opportunity to sign up to be involved. Please email me or contact me on Facebook, if you have any questions or would like be involved. Email: helen.wheeler@aru.ac.uk

We look forward to continuing work and returning to the ISR in the summer. Thanks again to everyone for their support and involvement in the project.

Helen Wheeler

BARIN researchers conducting field work (photo by Georgia Hole)

BEAVER IMPACTS ON LAKE CHEMISTRY

By Katie Bennett (University of Montreal)

In February the lake biogeochemistry team completed our lab analysis of almost 1000 gas samples that we collected from lakes in the Trail Valley Creek and Hans Creek area. We are working on processing this data to connect with the water nutrients data we analyzed in autumn to understand the link between beavers, water nutrients, and emissions of carbon dioxide (CO_2) and methane (CH_4).

To determine gas emissions from samples we plot the gas concentration inside a floating chamber over time to see how methane or carbon dioxide concentration changed from the beginning to the end of a measurement (see photo) – did it increase, decrease, or stay the same? We have multiple of these types of measurements from each lake on a particular day. The data is then averaged by day at each lake to understand changes over the summer and compare lakes with beaver activity to lakes without.

In addition to measurements from lakes, our team measured gas emissions and soil nutrients from the tundra and thawing permafrost slopes immediately next to lakes. I have been processing this data to connect tundra conditions and permafrost thaw to lake chemistry, in addition to beaver activity. In many of the lakes that our team sampled there is both beaver activity and land disturbance from permafrost thaw, making this an important component to consider.

Katie measuring gas emissions from the lake. Gas collects in the clear chamber and concentrations are measured by the black analyser on the left.

Floating chambers collect gas from the lake surface. Gas samples are taken for lab analysis. (Photos by Katie Bennett)

Jackson Seto sampling at a gap flow dam (photo by Branden Walker)

Beaver swimming at Fairbanks, Alaska (photo by Jackson Seto)

BEAVER IMPACTS ON HYDROLOGY

By Jackson Seto (Wilfrid Laurier University)

Since the last newsletter, I attended the Arctic Beaver Observation Network meeting in Fairbanks, Alaska. It was a great experience, as well as finally getting an opportunity to meet in person many of the collaborators from the ISR and see others working on the BARIN project.

My BARIN science efforts for my thesis have continued to focus on processing the lake elevation data we have for the summer of 2023. We've been looking at how influential beaver dams are for controlling lake water level and its effects on streamflow. Also, we have been classifying all the dams that we observed into various types following the hydrologic classification of Woo and Waddington: overflow, gap flow, throughflow, and underflow. This allows us to get an idea of which dams have been built more recently or continue to be maintained, while others may be considered older or abandoned dams. This will help us improve the understanding of the impact of beaver activity on two typical ISR watersheds, Trail Valley Creek and Hans Creek.

BEAVER POPULATIONS AND TREE RINGS

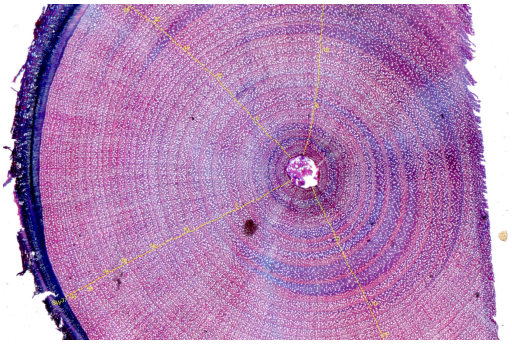
By Georgia Melodie Hole (Anglia Ruskin University)

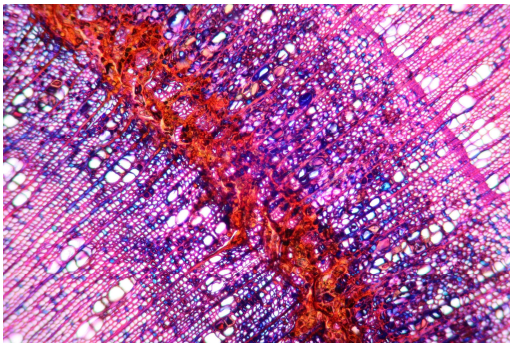
Since the last newsletter my focus has been on analysis of a 'reference' subset of the shrub samples that we collected from the Inuvialuit Settlement Region. The yearly growth rings have been measured for willow and alder species to create site chronologies (time series of growth ring widths) that after visual and statistical cross-dating and detrending form growth curves that reflect the growing patterns in this region.

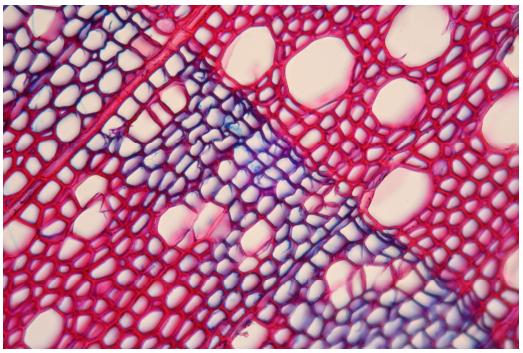
These are now being compared to regional climatic data to look at climate-growth relationships, to glean information about controls on shrub growth in this region, and also therefore what influence there may be on this growth by beavers and their impacts. Results indicate correlation between June and July temperatures and shrub growth, which is expected for high latitude shrubs, but with a possible weakening of this link in recent years. If this signal is indeed present, the causes will be interesting to explore.

Willow and alders with beaver browsing scars will then undergo the same analysis, with the growth ring chronologies then cross-dated with the regional reference chronology data to create the map of historical beaver presence in the study region, which is the overall goal with these shrubs.

Many members of the BARIN team also came together at the Arctic Beaver Observation Network (ABON) meeting in Fairbanks, Alaska, where it was great to catch up and share updates with Inuvialuit Settlement Region-based colleagues, and to hear and share diverse perspectives on changing beaver populations from across multiple communities in the north.







Images above: shrub growth rings at increasing magnifications (from top to bottom). The bottom image shows a 'blue ring' indicating cold or harsh conditions. (photos by Georgia Hole)

Beaver cut marks on willow shrub (photo by Georgia Hole)

BEAVER IMPACTS ON COMMUNITIES

By Callum Pearce (Anglia Ruskin University)

In February I visited Akłarvik, where people shared their knowledge with me about how harvesting activities have been affected by beavers. Beavers have been a real concern in Akłarvik, and it was very important to hear from the perspectives of people there as well as from people in Inuuvik and Tuktuyaaqtuuq.

I owe thanks to many people, but especially to Kevin Arey for driving me over the ice road from Inuuvik to Akłarvik and back again, to JD Storr for taking me out to Jackfish Creek and Martin's Creek (where beavers have been a problem for fishing), and to Michelle Gruben for all her help and advice with reaching out to people for interviews. Quyanainni!

At the end of February, I went to Fairbanks for a meeting of the Arctic Beaver Observation Network. I joined other researchers from BARIN and a group representing Inuvialuit concerns: Herb Nakimayak, Charles Klingenberg, Kirt Ruben, Shannon O'Hara, JD Storr, and the Imaryuk monitors Lennie Emaghok, Max Kotokak Sr., and Kevin Arey. This was a good opportunity to hear from people dealing with similar issues in Alaska and Nunavik, and to learn more about the ways beavers affect water and fish.

Jackfish Creek
(photo by Callum Pearce)

Martin's Creek
(photo by Callum Pearce)

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The BARIN Newsletter is edited by Jennifer Ramsay. Please send any contributions or suggestions to jennifer.ramsay@aru.ac.uk