

All Things Glacier

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As a kid growing up in Juneau, Alaska, Matt Beedle thought glaciers were commonplace. He could see one from his home: the Mendenhall glacier. But it wasn't until high school, when he participated in the Juneau Icefield Research Program and actually skied over the icefield to Atlin, BC, that he realized how magical they were. And perhaps it was the fact that this glacial traverse was all about *collecting data* that led Matt to where he is now: living in Terrace, BC, a PhD candidate at the University of Northern British Columbia (UNBC) studying glacier change in northern BC.

Let's start with three interesting glacier facts that Matt can tell you about glaciers:

- Although there are more than 200,000 glaciers in the world, there are only 30 “benchmark” glaciers that are regularly monitored, and on which we have more than 30 years of high-quality data. Most of those are in the Alps or Scandinavia.
- However, in our current climate change crisis, the melting of Pacific Northwest coastal glaciers has contributed *more to sea level rise* than any other glaciers—surpassing even the contributions from melting glaciers in Greenland and Antarctica.
- Farmers in Iceland have been motoring glaciers for generations, simply by building cairns near the toes of glaciers, and measuring each year how far the toe is from that cairn. “This is some of the best data we have,” says Beedle.

It's this gap, between what local people can see and measure about their glaciers, and the limited resources of the world-wide scientific community, that has motivated Beedle to launch a new kind of website this summer. It invites the public to contribute the anecdotal, artistic, historical and even quantitative knowledge that people who live near glaciers have, across northern BC, and indeed around the world.

That's right: artistic. GlacierChange.org has a loosely structured format that invites you to contribute *all things glacier*. It is equally well set up to host artwork and poetry about glaciers, as it is to host photographs or even measurements. “One of the intriguing things about this site,” Beedle says, “is that it will display different types of information that aren't usually displayed together.”

One of the featured glaciers already on the site speaks in particular to Smithers residents and visitors: the Hudson Bay Glacier, that beautiful field of ice you see over Lake Kathlyn as you drive into Smithers from the north. In the “Scrapbook” section Matt has posted some repeat photography of the glacier, as well as some stats on how it has shrunk since 1981.

Glaciers In The North

Glaciers are so commonplace in the North that we may not realize how unusual and special they are. British Columbia itself, due to our wet weather and high mountains, is one of the richest areas for glaciers in the world: it has over 16,000 of them. It's also a prime site for glacial loss as the climate warms: between 1981 and 2005, BC lost over three *thousand* square kilometres of glacier.

In the Skeena watershed (which would include the headwaters of the Morice, Bulkley, Babine and Skeena rivers), there are over 500 glaciers. Some of our rivers, like the Exchamsiks and the Kitsumkalum, have so much glacial ice in their headwaters that their flow would be significantly changed if these deposits of frozen fresh water disappeared. And further north, rivers like the Stikine and the Taku are even more dependent on glacial runoff.

Snow accumulates each year at the head of the glacier, and turns to ice as it compacts. Ice is slowly pushed down to the toe of the glacier, where melting dominates, and a lively, roaring stream issues forth. Across the North, our rivers rely on glacial melt in the late summer to keep river levels up, and also to keep the water at a cool temperature. Loss of glaciers in our area, therefore, would have a direct impact on fish, such as salmon and steelhead, which are adapted to these cool water temperatures.

If you love glaciers, if you have old photographs of them or stories about them, if you've been sketching or penning verse about them, GlacierChange.org is interested. Beedle is enthusiastic about the potential for cross-fertilization: "I don't want to limit the creative/collaborative opportunities." Contribute by emailing connect@glacierchange.org.

Repeat Photos

"One of the most valuable things people can contribute to this site are repeat photography series," explains Beedle.. "If you've driven past the Bear Glacier and stopped to take a picture, and you have an old shoebox of these snapshots under your bed, this could be a goldmine for glacier scientists."

Repeat photography is one of the primary tools of glacier research. A photo pair from the same vantage point, taken ten or fifty years apart, helps us estimate the speed of glacial retreat. It also helps us, in our workaday lives, to recognize that glaciers *are* shrinking. The loss of the ice giants is otherwise a slow and difficult thing to apprehend against the background of the busy world.

Beedle is quick to point out that despite the overwhelming trend of glacier shrinkage, each glacier is an individual. For example, between 1981 and 2005, the acreage of the Hudson Bay Glacier shrank 9%, yet that of the Toboggan Glacier, just around the corner on the north face of the peak, shrank 12%.

This also illustrates how complex measuring glacial shrinkage is. “We might note that the toe of a glacier remained in place over a series of years,” Beedle says, “but you can't conclude from that that you're not losing glacial mass. The body of the glacier could be thinning, or the sides drawing inward.”

Getting Involved On The Ice

Which brings us to community monitoring of glaciers right here in the north. Beedle is hoping to start volunteer-run glacier monitoring programs in northwest communities that have these gleaming, icy rivers literally in their backyards. In a way it's like a little Juneau Icefield Research Program: an opportunity for hikers, skiers and students to be involved in making a regular trek up to a glacier to take measurements that can help scientists tease apart the dynamics of how these creatures live and die.

Beedle explains why this kind of data is more valuable than getting a satellite picture every few years. “We need to monitor annual--and even seasonal--changes to understand the linkage(s) between glacier change and weather and climate. Without these annual records, we're left in the dark a bit as to how weather and climate force glacier change, and in trying to predict what will happen in the future.”

The simplest form of monitoring Beedle would like to foster would be cairn and distance measurement, such as the Icelandic farmers do. This gives good data on glacier length, and requires only a single visit per year. If volunteers are more enthusiastic, the next step in data collection will involve estimating changes in glacial mass. On trips in the winter, skiers can dig snow pits to estimate the volume and mass of the new snowpack; on trips in the early fall the mass lost can be estimated by placing rods in the glacial ice, and measuring how much more or less is sticking out the next year. Walks to points along the perimeter can be made with a GPS to estimate surface area.

Data collected will go to the World Glacier Monitoring Service at the University of Zurich in Switzerland, where it will be available to glacier researchers anywhere on earth.

If you're hooked on the exotic (yet close to home!) world of glaciers, and would like to learn more, the Resources page at GlacierChange.org is an excellent place to start. It provides links to sites where you can learn more about glaciers, connect with educational programs that take you onto glaciers themselves, find webcams of glaciers, see historic photographs and (for the truly hard core) look at glacial data.

The real question is whether these masses of ice will still be around for our grandchildren, providing, yes, a seasonal buffering of river flow, but also something massively elemental, something that stirs the heart and feeds the soul.