

Glaciers in Western Canada still receding despite cold, snow

By Colette Derworiz, Calgary Herald: 16th March, 2014

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CANMORE — Despite cold and snowy winters for the past few years, scientists say it hasn't helped to slow the retreat of the glaciers in Western Canada.

Experts from Natural Resources Canada and several universities monitor annual fluctuations of glaciers in the western and northern Cordillera, which includes the iconic icefields in the Rocky Mountains.

Shawn Marshall, a glaciologist and climatologist at the University of Calgary who's studying the Haig glacier, said the snowpacks in 2011 and 2012 were higher than he's ever seen as a researcher.

"We've had a few really good winters," he said in an interview from Geneva, where he's on a sabbatical year. "It was better skiing but, come summer, it just caught up."

"Last year was the same. The big rain event dumped snow at the glacier. It dumped snow, but then it went back on the melting trajectory."

Marshall's work is part of the seasonal and annual tracking of glacier mass balance by the federal government to help determine future water supply in major rivers.

There's about 50,000 square kilometres of glacier ice in Western Canada.

Mike Demuth, research scientist and glaciologist with Natural Resources Canada, monitors select glaciers through the Climate Change Geoscience Program.

"We haven't seen glaciers in the Rocky Mountains or the interior of British Columbia as small in several thousand years," he said. "They are rapidly converging on a configuration we haven't seen in the record for a number of years."

Similarly, monitoring in the High Arctic shows the shrinking ice caps have accelerated rapidly, raising questions about what it means for the country's economy and environment in the future.

Water experts said it's important work.

"This ongoing research is going to tell us what winter precipitation trends might be and, most importantly, how that will be reflected in glacier mass balance, which is the absolute signature criteria for water security in the future," said Robert Sandford, Canada's representative for the United Nations Water for Life initiative.

The monitoring, he said, provides a clearer picture on climate change.

"When people say it's cold out so that doesn't mean global warming is happening, that is a suggestion that they don't understand the integrated relationships between all of these changing parameters."

Demuth said tracking the glacier retreat is a good indicator of climate, because it integrates precipitation, air temperature and cloud cover.

They provide a regulatory effect.

“When the climate is cool and moist, glaciers tend to gain mass; when the climate is warm and dry, glaciers tend to lose mass,” he explained. “They are kind of like a reservoir, when they exist, and they provide some resilience to the water supply.”

As glaciers retreat, Demuth said the resilience is reduced, affecting both natural systems such as the way ecosystems function and human systems such as irrigation, hydropower and water for mining projects.

“The reliability of that water is not as reliable in some regions,” he said. “If planners in some regions — the public, various Canadian institutions and industry are aware of this — it’s good.

“It reduces their risk to these kinds of trends in our hydrological system.”

Data collected so far shows many of the smaller glaciers have reached a tipping point or are already beyond it. Larger ones, such as the Athabasca Glacier at the Columbia Icefields, are still holding on.

“Our current work is trying to establish whether those glaciers have reached a tipping point yet and we don’t think so,” said Demuth. “We will probably get more water out of the large systems still, until they start to really dramatically reduce.”

Both he and other scientists such as John Pomeroy, a hydrologist with the Changing Cold Regions Network, said glaciers are extremely important in a drought.

“Glaciers melt most rapidly in the hot dry late summers when all of the other water sources tend to be depleted so that’s when they are important for mountain streams and eventually the water supply of large rivers,” said Pomeroy. “We don’t worry about glaciers during a flood but we worry about them during severe droughts.

“A glacier can carry us through a multi-year drought whereas lakes and groundwater and wetlands dry out within a year or two. So having them big and healthy is ideal from that standpoint.”

However, many are no longer big and healthy.

Pomeroy and his team are studying the reasons why the glaciers are continuing to shrink.

“We have had some colder springs and snowier (years) than recent memory, but these are still not cold and snowy enough to stabilize the glaciers or cause an increase,” he said. “Part of this is because, as the glaciers shrink, their edge area increases and they can have warm air blown on to them from surrounding warm terrain.”

Some have retreated into pockets, where they appear to be stable.

“Of course, the climate is continuing to warm so we expect even those hideouts that they have will eventually not be suitable,” he added.

Marshall agreed it’s proving difficult to reverse the trend.

“It’s less reversible than I thought,” he said. “I used to think you could get a cold year and it would be good to go again.

“One good year is not enough.”



Scientists Natural Resources Canada's Mike Demuth, left, and the University of Calgary's Shawn Marshall have been performing a complete analysis of the volume of ice contained within the glaciers of the Rockies. Photograph: Colleen De Neve, Calgary Herald



Canadian national cross-country ski team village at the Haig Glacier Photos. Photograph: Dave Buston/CODA



University of Calgary researcher Shawn Marshall along with Mike Demuth with Natural Resources Canada are studying the volume of ice contained within the glaciers of the Rockies. Photograph: Colleen De Neve, Calgary Herald



The Athabasca Glacier is among the areas scientists are studying to help to help determine future water supply in major rivers. Photograph: Colleen De Neve, Calgary Herald