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Glacier talk turns to technology

Recent advances in understanding the extent of glacial retreat should guide us in our decision-making: Sandford

Posted By Hamish MacLean/hamish@canmoreleader.com

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With a backdrop provided by Canmore's Jan Kabatoff's exhibition, Glacier: A Journey, at the Whyte Museum, two experts on glaciers and climate change gave the crowd in Banff cause for some hope when coming to terms with the area's "downwasting" glaciers — a clearer picture.

The work being done now by Mike Demuth and other glaciologists, by presenting a more accurate representation of what's happening to the ice nestled atop the mountains of the Canadian Rockies, could be used to influence public policy by creating a more complete understanding of what's happening to the ice that keeps our region cool, the night's first presenter Bob Sandford said.

Sandford, Canadian chair of the United Nations' International Decade for Action "Water for Life" and director of Western Watersheds Climate Research Collaborative, laid out some basic points of the important but simplified modelling that scientists have been doing in the area in recent times.

Sandford introduced the work of several scientists and keyed on some of their most important findings, his message was simple: under the current climate models, "by the end of this century, the Canadian West is going to be a very different place," he said.

"And this is going to have an impact certainly on recreation and tourism, but it is also going to have impacts on western hydrology, and also those changes associated with warming and climate will probably have quite significant impacts on the ecosystem."

Presenting the "extraordinary research outcomes" of two research networks —

Improved Processes and Parameterisation for Prediction of Climate Change Impacts in Cold Regions (IP3) and Western Canadian Cryospheric Network (WC2N) — Sandford touted the work of those who could give a mass/volume account of the region's glaciers and show how extreme the retreat, or disappearance, of our glaciers really is.

It is, he said, interesting to see how past and current research develops, but also the night's exploration of new research being conducted by the second speaker Mike Demuth was of the utmost importance for Sandford as well.

Parameterisation involves the refinement of modeling or simulations and with the increased accuracy from Demuth's work one could expect a better picture of what the glaciers in this area can be expected to do over the years ahead, but should also inform our public policy and the adaptation strategies we will have to develop, Sandford said.

Glacial melt, he said, will affect snow cover and snow pack; it will affect the timing and nature of precipitation. "And this is something we want to know an awful lot more about."

Sandford called the Canadian Rocky Mountain Parks UNESCO World Heritage Site one of the most important public policy achievements in the entire Canadian West. And said as we developed human infrastructure across the mountains in the West, we decided not to do what we have done elsewhere and have now begun to piece back together the essential elements of this ecosystem through the work of provincial and national parks.

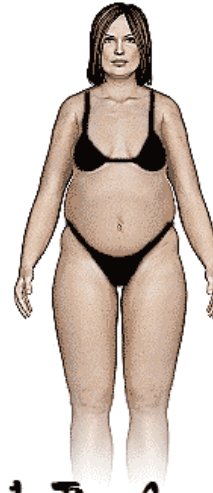
One of the big questions we still face is "how to build a culture worthy of this monumental landscape," he said.

He said that it is important to recognize how this landscape is a major source for a resource that's becoming increasingly scarce: western Canadian water.

But Sandford looked further too to the temperature dependent niches that wildlife has carved out in the Canadian Rockies, which are also disappearing.

It's not the large species that are most affected by the changes in temperatures exacerbated by the loss of these large chunks of ice, it's those species — primarily bacteria, pathogens, insects and fungi — "that have been on or near a thermal boundary." (Sandford called attention to Didymosphenia geminata, also known as rock snot, an invasive species of algae thriving in increasingly warmer water farther upstream than it had been found previously.)

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Demuth's expertise runs from climate change detection, glaciology and cold regions hydrology to snow and ice hazards mitigation, snow and ice remote sensing and radar geophysics. The work he's currently doing, which Sandford stressed we ought to be excited about, is the mapping of Western Canadian glaciers using laser surveys over a period of time. With the support of funding from the Canadian Space Agency, Demuth creates photographic-like presentations of the data.

His aerial surveys, tracked over time, give an astounding picture of the changes in the area's glaciers.

Demuth's work now focuses on the Columbia Icefield Research Initiative, on an area he called the hydrological apex of Western Canada, he said the hope is to do work similar to that being done on the Greenland ice sheet.

It is not only the poles, but the higher elevations that offer signposts of change indicating how the world is experiencing warmer temperatures. But due to their relative inaccessibility there is yet very little record taking.

Downwasting, or the deterioration of our glaciers, is resulting in less water for our rivers, Demuth said. But also weakens the area's natural resilience to drought.

In explaining the dramatic loss of glacier ice in the area, he noted that glaciers are nourished by snowfall.

"I think we're all pretty familiar with the big regime shift that happened in 1976," Demuth said. "Pretty excellent skiing, lots of avalanches in the early '70s . . . and since 1976 we've been experiencing a snow drought."

The newer tools that experts like Demuth have at their disposal will as they are used over time create far more accurate data and predictive, usable models.

"The key lesson here is not to overreact to this," Sandford said. "The further loss of mountain glaciers on this side of the Great Divide may not be of that great a significance hydrologically — in terms of how much water flow there is."

Glacial melt contributes only one per cent of the annual average flow of the Bow River in Calgary and glaciers are no longer significant contributors volumetrically to water flow in these parts.

What scientists now believe is that the glacial melt believed to accompany global warming happened as early as the 1970s, Sandford said. He reiterated the message of a colleague by saying, "Glaciers were once canaries in the climate change coalmine, but now they're dead."

It is really the trend that matters, he said. Rising temperatures and the effect on snowmelt could have a significant impact on water supply.

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