All your Bow Valley news and information – in one place

Thursday, April 24, 2008

Rocky Mountain Outlook

45 AT A GLANCE
72 CAREERS
90 CLASSIFIED
18 COMMENTARY
47 ENTERTAINMENT
63 SPORTS
55 TV GUIDE

#$%@!* SPRING

After a mishap between snowplows and heavy spring snowfall, Claude Awad digs his car out at the Sunshine parking lot Saturday (April 19). Sunshine staff came to the rescue with a bobcat to help extract the car. MICHAEL BUCKLEY PHOTO

Banff seeks to eliminate plastic bags

CATHY ELLIS BANFF

Banff is in the early stages of investigating the possible elimination of plastic bags to try to reduce the national park town's waste and impact on the environment.

The town is putting out feelers to the business community to see if there is any buy-in for such a move in the future, as well as keeping a close eye on other North American towns, particularly tourist resorts, that have gone plastic bag-free.

Mayor John Stutz said Banff perhaps has higher priorities at this stage, saying the town is embracing several other environmental issues such as organics diversion and emissions reduction for the transit fleet.

"Plastic bags, although very visible, really are a minuscule part of the waste stream, but certainly we are not neglecting this one and it's certainly on our radar," he said.

"We're working with the economic sector to determine the viability of considering it. I think Banff is in a unique situation and we have to measure how this will affect our 3.5 million visitors."

In neighbouring Canmore, a grass-roots movement has asked that town council pass a bylaw eliminating plastic bags townwide. The issue is under review by Canmore's environmental advisory review committee.

There is passionate discussion on both sides of the debate worldwide, with cities and towns across North America, Australia, England and Europe eliminating

BAGS CONTINUED ON PAGE 7

Snow studies today measure stream flow for tomorrow

LYNN MARTEL BOW VALLEY

When John Pomeroy accepted a position at the University of Saskatchewan in 2003 as the Canadian research chair in water resources and climate change, he was excited to know the job came with a budget to conduct research on Saskatchewan's main rivers.

But after searching for suitable sites to conduct long-term research projects, he realized most potential sites in that province held little that would be attractive to the scientists and students who would need to monitor the sites on a regular basis.

But then Pomeroy asked himself, "where does our water in Saskatchewan come from?"

The answer, of course, was the Canadian Rockies.

Having spent time conducting experiments in the Rockies in 1991, he was aware of several research sites in the Marmot Creek area of Kananaskis Country that had been set up in the 1980s to study the effects of forest cover on stream flow and snow accumulation.

Those studies however, had been conducted by aggressively manipulating the landscape through thinning and clear cutting multiple patches of forest.

"That was the old way to do things," Pomeroy said. "We knew we could do some great research without manipulating the landscape."

Funded with $2.5 million from the Canadian Foundation for Climate and Atmospheric Sciences from 2006 through 2010, and headquartered at the University of Saskatchewan's Centre for Hydrology, IP3 – which stands for Improved Processes and Parameterization for Prediction in Cold Regions - is a research network conducting studies in Canada's cold regions.

For the past four years, 14 investigators have conducted studies at Lake O'Hara in Yoho National Park, Banff's Peyto Glacier and Marmot Creek in Kananaskis, as well as three sites in the Northwest Territories and one in the Yukon.

Raging in size from 10 to 200 square kilometres, the sites are located at low and high altitudes, and low and high latitudes, with Marmot Creek's 11 separate stations presenting the most densely instrumented area in the Rockies.

Last Saturday (April 12) Pomeroy and French student Anne Sabourin, who is pursuing an internship at the end of her engineering studies at Paris's École Polytechnique, hiked up a ski hill run at Nakiska (now closed for the season), to access a Marmot Creek study plot. After hiking uphill for just over an hour, they reached a small clearing approximately 60 metres in diameter, which was created as part of the Canadian Forest Service Marmot Creek study, which was halted in 1986.

Researchers with IP3 visit the site at least every two weeks to record measurements and collect data, and will continue until mid-June.

"We (Canada) used to have teams of snow surveyors doing this across the country from the 1950s through the 1980s, but there are very few now," Pomeroy said.

Thanks to some of that earlier research, one of Pomeroy's students was able to reconstruct stream flow in the region back to 1962.

"We learned peak flow now starts earlier, the size of the peak flow is the same and the summer flows are lower," Pomeroy said. "Overall there's less stream flow over the year now, than during the 1960s and '70s. That's climate change. We think that's because summer evaporation is becoming higher and we're experiencing warmer temperatures, especially at night."

With several 27-metre meteorological towers standing in the open clearing and tucked in the forest, the area hosts a variety of instrumentation, including solar panels, rainfall and windspeed gauges, and a data logger containing a micro-computer that controls instruments taking regular measurements of air temperature, solar radiation and soil moisture content.

By regularly measuring the density and depth of the snowpack, researchers are provided with information about how much water to expect from the snowpack once it melts. For example, Pomeroy explained, a one-metre deep snowpack with a density of 200 kilograms per cubic metre would produce the equivalent of 200 millimetres of rainfall.

"That tells us if that snow were to melt quickly, how much snow would be put into the basin," Pomeroy said.

The information is important for downstream users, including municipalities such as Calgary, as well as smaller towns and the region's farmers. As the researchers become more certain with their results, they are able to create scientific computer models to be more accurate in their predictions.

Using a snow tube – a Canadian invention consisting of a Plexiglas tube about 1.5 metres long – Pomeroy pulled core samples from the snowpack and weighed them. With varying density, the snowpack in the clearing, 61 centimetres in depth, would provide the equivalent of 141 millimetres of rainfall, while at only 38 centime-

Above, Hydrologist John Pomeroy checks on instrument readings at one of the IP3 Marmot Creek study sites in Kananaskis on Saturday, April 12.

Left, Pomeroy, front, and student Anne Sabourin, use a snow tube to measure snow depth and density at the IP3 Marmot Creek snow study site.

LYNN MARTEL PHOTOS

tres, the snowpack under the forest canopy would provide the equivalent of 80 millimetres.

In 2005, the snowmelt reached a level of about 250 millimetres in a single day, a factor which helped create widespread flooding through Southern Alberta.

Under the forest canopy, the researchers have created a hanging tree – a single spruce tree which is suspended vertically about three metres above the ground, held in place by two arms protruding from a meteorological tower. Hanging on an electronic scale, the tree's weight is recorded every few seconds. In mid-winter it can hold five or six kilograms of snow, providing an excellent representation of what the other trees in similar forest are holding.

"When we weigh the snow in the tree, we compare that to any snow missing that we'd expect to see on the ground," Pomeroy explained. "It gives us rapid information as to any gain or loss of snow in the canopy. Very little falls from the tree, we know it's sublimated. That's typical of the dry Rockies. In a coastal forest up to three-quarters will fall from the tree to the ground. These guys – spruce, pine, Douglas fir, they hang on to the snow quite well. Consequently, the Rockies end up with a lot less snow on the ground. In this location, there's two thirds less in the forest than in the clearing. Because it's trapped in the canopy, it's sublimating. It's cooler under the forest canopy, so there's a much slower melt rate in the forest than in clearing. Plus there's little wind and little solar radiation."

In a naturally diverse forest, some areas with deep snow might melt quickly, while other areas with less snow melt more slowly, providing a continuous stream flow through the summer. Factors such as the pine beetle or forest fire in an area where there has been long-term suppression, (such as the 2003 Kootenay fires) result in rapid shifts the season immediately following, with higher flow in the spring that dries out sharply in the summer. Dead, bare trees conduct more heat and melt the snow around their bases all the faster.

Once believed that energy exchange happened only at the surface, scientists now know a natural snowpack to be porous and subject to effects such as wind.

"A packed trail melts more slowly than loose snow," Pomeroy said. "The packed trail doesn't allow air to move through it as it does through snow that has been left in its natural state."

So far, this season's research is pointing to a lower stream flow than last year.

"Up higher in the alpine it's a lower snowpack than last year, but down low the snow has held on longer than last year," Pomeroy said. "The indication is that it will be drier than last year, but that will depend on what rains come in May and June. But so far, we're slightly below average."

To learn more, visit http://www.usask.ca/ip3