YUKON NEWS

Desktop science helps ‘people of the caribou’ prepare for change

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by The Yukon Research Centre
Friday September 5, 2014 »

Dave Gustine/USGS

A caribou on Alaska's North Slope in the winter of 2012.

Whatever else comes in its wake, climate change is forcing scientists and laypersons alike to take a closer look at how data is presented, read and interpreted.

The protocols of scientific research have always demanded verification of results and conclusions, and admission of uncertainties. These days, the barrage of information hitting us as our planet warms is making staggering demands on our critical faculties.

In July, the US Geological Survey and University of Alaska, Fairbanks, released a paper in the academic journal PLoS ONE: Climate-Driven Effects of Fire on Winter Habitat for Caribou in the Alaskan-Yukon Arctic. Following this study of possible future scenarios for migratory tundra caribou populations, scientists projected that the Porcupine caribou herd will lose

Icy Challenge

Orphaned bears

21 per cent of winter habitat to fire by the end of the 21st century.

They were not stating, however, that the caribou of this study, the Central Arctic herd and the Porcupine herd, are going to be extinct in 100 years or even that they are even definitely endangered. They are saying changes to climate could affect caribou availability in some traditional hunting areas over this century. That could affect hunters in Old Crow, Arctic Village, Fort Yukon, Venetie and Chalkyitsik and other northern communities that rely on the mammals, and whose cultures, spirituality and social mores have evolved over generations of caribou contact.

“We have a hard enough time determining what caribou are doing now, let alone what they’ll be doing in the future,” says David Gustine, a research wildlife biologist with the USGS and lead author of the study. “When we talk about influence to vegetation we’re a little more comfortable, particularly as pertains to lichen,” Gustine says.

“When we talk about caribou winter range, we’re really talking about the abundance of lichens. Lichen make up anywhere from 40 to 90 per cent of caribou winter diet.”

We also know that forest fires increase as systems warm up and dry out and that big burns destroy lichen populations. “Lichen take a long time to grow compared with vascular plants,” Gustine says. And therein lies the crunch, or lack of it. It takes 50 to 60 years for lichen to repopulate an area following a major fire. “If you have a big enough burn, caribou just avoid it in the winter.”

When one considers that 15 years is a long lifespan for a caribou, it’s obvious several generations would miss out on a traditional lichen source before it can regrow.

Biologist Todd Brinkman was another member of the team behind the report. Now an assistant professor with the Institute of Arctic Biology at University of Alaska, Fairbanks, Brinkman says, “One

thing I have to point out in this story is that we don’t necessarily know that it’s going to make things more difficult for hunters. It really depends on where these burns occur.”

If fire breaks out near a village in a traditional hunting area, this could create difficulties, he says. On the other hand, changing wintering grounds could bring caribou nearer to some villages.

“From the work that we’ve done with communities in the Arctic, they’re very adaptable,” says Brinkman. “They’ve undergone a lot of change. They have managed to maintain the key attributes of their culture.”

The conclusions scientists did draw were enabled by some serious number crunching by computer-savvy folks at SNAP, Scenarios Network of Alaska and Arctic Planning, at the University of Fairbanks. They fed current and historical data on climate, wildfire severity, frequency and behaviour into their machines to create a modelling framework. Into this they plugged possible climate-change scenarios for the future.

“The climate and burn data we do have on wildfires goes back about 100 years, but there’s only a systematic record for about 50 years,” says Brinkman. All in all, the past is a bit more clearly visible than the future. “When you dive into these models it can get very complicated very quickly,” he says.

Scientists must plug assumptions into them. “Some of these assumptions are based on how we think humans are going to behave in the future.” Some models assume that humans are going to continue on the trend we are now on - burning fossil fuels to drive the economy and generating more carbon dioxide in the process. Others assume that we’ll switch to alternative energies.

“The models that we’ve considered have been scrutinized and evaluated by an international team on climate change,” says Brinkman. They are global climate

models familiar around the world. “We use the top five that represent Alaska.”

The emissions scenarios used for the study are moderate ones, says Gustine. They are based on the assumption that “we’ll get our act together, but the trend was, regardless of which scenario was plugged in, there was less winter range likely to produce vegetation for caribou herds.”

For scientists like Brinkman and Gustine, working and living in the North provides a valuable opportunity and responsibility to study climate-change scenarios for the entire planet because so many changes are already taking place up here.

“We’re kind of past the stage where we had an opportunity to mitigate these changes that are on the way; the drivers of these changes are out of control,” says Brinkman. “The only option we have left is to adapt. And we’re so much better at adapting and responding to change if we have an idea what the change might look like.”

“We have a huge responsibility as scientists to be forthright about the limitations of our work,” says Gustine. “We need to be careful about what we say and what we do - beat the drum when we know we’re right, but back off when we’re not sure,” he says. “If you overstep your bounds you’re going to lose your capital with your public.”

This column is co-ordinated by the Yukon Research Centre at Yukon College with major financial support from Environment Yukon and Yukon College. The articles are archived at http://www.yukoncollege.yk.ca/research/publications/your_yukon