

Researchers highlight bears' use of Banff highway crossings

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Within sight of the Trans-Canada Highway, a team of ecologists with the Western Transportation Institute at Montana State University set out on foot for a nearby site where they'd strung wire snags to catch the fur of passing bears.

In the short distance they walked, with Canada's busiest transportation artery paralleling a prime patch of buffalo berries in the Bow River bottomland, the team spotted five grizzly [bears](#), including a sow with two cubs.

Since counting and genetically identifying bears was critical for Mike Sawaya, Tony Clevenger and Steven Kalinowski's three-year field study on the effects of the highway's wildlife crossing structures on Banff National Park bear populations, it was all in a day's work, Sawaya said.

"We spent a ton of time in the backcountry and had a lot of really great days out there," said Sawaya, a 2012 graduate of MSU. "Fortunately we never had any really scary experiences. But seeing those particular bears, thankfully from a safe distance, did illustrate that the Trans-Canada Highway wildlife crossings allow safe access to that low-elevation Bow River habitat."

Sawaya said roads are the most common form of man-made disruption to wildlife habitat and, in the case of the Trans-Canada Highway, pose a direct threat to a threatened Alberta grizzly bear population. The study of how bears use wildlife crossings was part of Sawaya's doctoral work,

for which he teamed up with Alberta-based wildlife biologist Clevenger, a senior research scientist at WTI, and Kalinowski, an associate professor of ecology at MSU who was Sawaya's adviser.

The 25 wildlife crossings in Banff were installed during the 1990s, to keep motorists and wildlife safe. Two of the crossings are overpasses built with enough width and vegetation to resemble the surrounding forest. The rest of the structures are culverts or bridges. The crossings work in conjunction with high fencing installed along the roadway to keep wildlife out of a stream of traffic that brings millions of vehicles to Banff and through the Canadian Rockies. In addition to bears, the crossings have seen documented use by deer, elk and moose, as well as wolves, wolverines, lynx, cougars and a host of other animals.

Last week, coinciding with the Society of Conservation Biology's biennial international conference, Sawaya, Clevenger and Kalinowski published a paper in the journal *Conservation Biology* detailing what genetic testing on 10,000 hair samples showed about the demographic effect the Banff crossings have on area bear populations.

Their results offered an encouraging assessment that a highway punctuated with 25 different crossings did not fragment the habitat in a way that prevented bears from seeking food, shelter and dispersal areas on either side of the Trans-Canada Highway.

"This is a landmark study because it's the first time anyone has done extensive genetic sampling to address unanswered questions about the use of highway crossings by bears," Clevenger said. "We knew that bears used the crossings, we just didn't know how many, what percentage of each species' population uses them, whether there is a preference by males or females to use crossings, and if there was a gender or species preference for overpasses or underpasses."

Another paper from the study due this fall will break down what ecologists call "gene flow" between bear populations in the Banff ecosystem. That data should help gauge how well the crossing structures perform in allowing different bears to find mates in an ecosystem bisected by a major highway.

"By collecting the genetic data on each bear using the crossings, we have a much more powerful tool for gauging the effectiveness of the crossing structures to provide connectivity within the ecosystem," Clevenger added.

In 2006, Sawaya, Clevenger and Kalinowski began setting out noninvasive hair snags – strands of barbed wire strung across the wildlife crossings, hair traps with wire snags that collect samples from bears lured to a scent and rub trees with wire attached. Over the next three years, the MSU scientists and assistants collected hair samples from 20 crossings, 420 hair traps and 497 dispersed rub trees.

Once the genetic testing was finished, Sawaya said they could identify 15 individual [grizzly bears](#) and 17 individual black bears that used the highway crossings over the three years, which Sawaya said paints a good picture of the demographic connectivity provided by the crossing structures. During the study, close to 20 percent of the grizzly and black bears in Banff used the crossings. Grizzlies were more likely to use the overpasses, while black bears were more likely to use underpasses.

Sawaya said research shows that movement of more than 10 percent of a population through the highway barrier signals there is sufficient connectivity to maintain a healthy ecosystem for bears and other large mammals.

Clevenger, who has been tracking the numbers of bear crossings on the Trans-Canada Highway crossing structures for over a decade as part of

the Banff Wildlife Crossings Project, said the study's findings are a breakthrough.

"This is confirmation of what our previous investigations have suggested but couldn't confirm," Clevenger said. "We were pretty certain that the numbers of bears using the crossings had steadily increased. Now we know."

The use of wildlife crossings to protect motorists and wildlife on the Trans-Canada Highway in Banff has been a model for similar projects elsewhere. WTI has been consulting on proposed projects with similar goals in countries around the world, from Mongolia, to China, to Brazil.

In Montana, where U.S. Highway 93 runs through the southern Flathead Valley, it runs near prime grizzly bear habitat in the Mission Mountains and the Bob Marshall Wilderness complex. At the request of the Confederated Salish and Kootenai Tribes, the Montana Department of Transportation installed more than 40 wildlife crossings on the Flathead Reservation.

WTI is researching wildlife habits at those crossings also to assess their success in improving habitat. The multiyear study is set to run through 2015, according to Rob Ament, manager of WTI's Road Ecology Program.

Ament said the research WTI scientists are doing in Banff and on the Flathead Reservation is a fundamental part of its mission to provide solutions to transportation problems in the rural West, where wildlife and wildlife-vehicle collision are a common occurrence.

"Between Banff and the U.S. 93 project, we're talking about the two largest wildlife mitigation projects for highways in North America, if not the world," Ament said. "The lessons we learn will be shared with

transportation practitioners not only here in the United States but also with those around the globe."

Provided by Montana State University

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