



# IN SEARCH OF THE WOLVERINE

What we're learning about one of the toughest  
(and most elusive) animals in the world

BY FRASER LOS  
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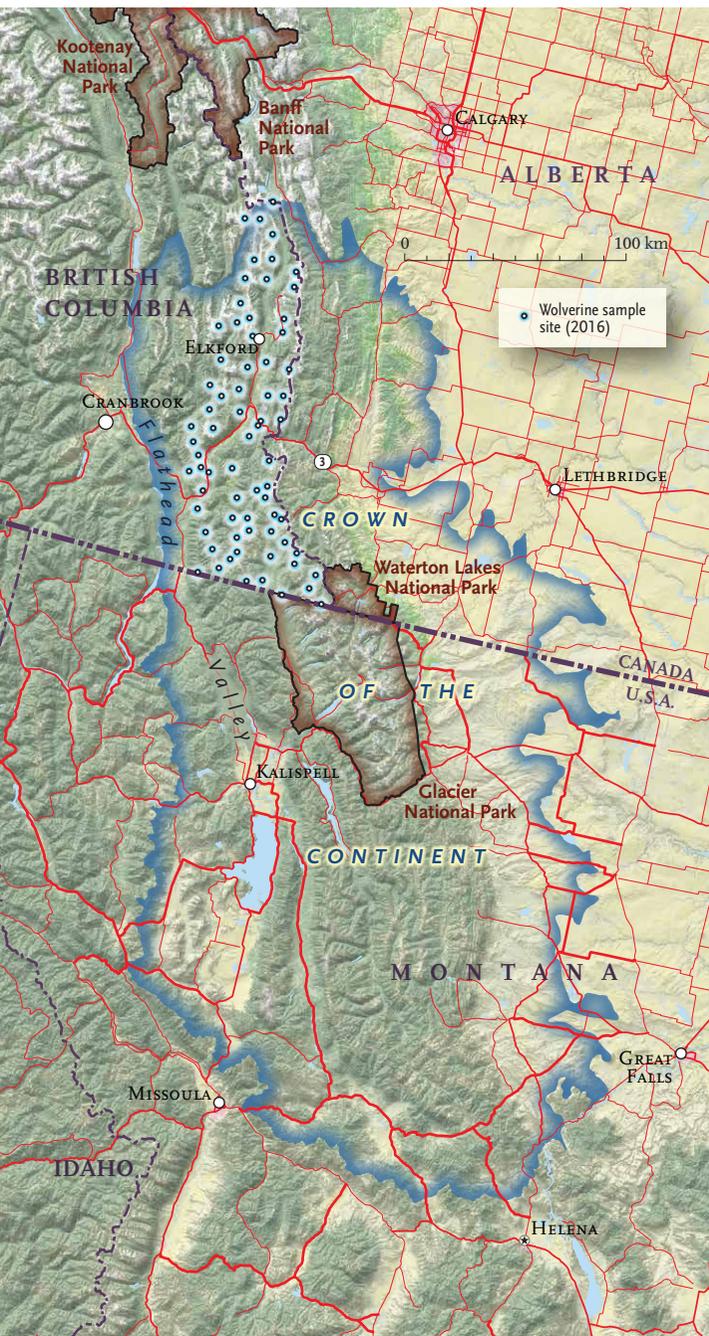
**A**BOUT 15 KILOMETRES into the snowy backcountry northwest of tiny Elkford, in British Columbia's rugged Elk Valley, I step off the snowmobile and follow a set of distinctive clawed footprints.

"They're definitely wolverine tracks," says Tony Clevenger, a wildlife biologist with the Western Transportation Institute at Montana State University who's leading a wolverine sampling study in the region. We trace the tracks for a few hundred metres and search unsuccessfully for scat to pick up for later analysis.

Back on the machines, we ride deeper into the valley, crossing avalanche paths and steep, rocky canyons, eventually snowshoeing another half kilometre through 1½-metre-high snow drifts to one of Clevenger's wolverine sampling sites, where a skinned, rotting beaver carcass is nailed to a pine tree, its flesh ripped apart. "Looks like a lynx did this," he says, "but I won't know for sure until we send these hairs to the lab for testing."

He carefully picks the hair samples off barbed wire he had wrapped around the tree, and after labelling and sealing the samples into individual packets, it's time to add more bait. We dump another skinned beaver out of the stinky bag we've been carrying, then screw three metal spikes into the tree trunk to act as steps. I position myself on the top two steps, and Clevenger holds the carcass in place as I nail it beside the ravaged one. Clevenger then adds to the stench with a cloth soaked in a horrible-smelling concoction of skunk glands and other pungent substances. He ties it on a string, throws it over a branch, then pulls it into the canopy, a beacon for carnivores far and wide.

Clevenger and his fellow researchers have gone to great lengths studying wolverines in the central and southern Canadian Rockies since 2010 — skiing, snowshoeing, snowmobiling or helicoptering into remote areas to set up a grid of bait traps like this one (complete with motion- and heat-activated cameras that snap multiple images when any animal approaches) to collect every hair sample they can find. It's a non-invasive form of sampling, since no wolverines are physically trapped or collared. "The beauty of that is you can cover a large area and the animals don't even see you," says Clevenger, "but you still get the genetic data. And you're studying the population fully, whereas other studies may look at one individual with a collar and extrapolate from there." In 2016 alone, the researchers surveyed more than 8,200 square kilometres.



Clockwise from ABOVE: Beaver carcass bait in a wolverine hair trap; Tony Clevenger snowshoes to a sampling site in the Flathead Valley, B.C.; a wolverine; Clevenger's research assistant Troy Malish (with glasses) collects hair samples. PREVIOUS PAGES: A valley in the southern Canadian Rockies, a.k.a. prime wolverine territory.

possibility for breeding with healthier populations farther north. “We hope to provide a roadmap,” says Clevenger of his research. “What are the important corridors and habitat for wolverines, and what kind of connectivity do they need?”

Clevenger says the wolverine is one of the least-studied mammals on the continent and a key indicator species that appears to be in decline in parts of its increasingly fragmented and shrinking western North American alpine habitat — a combination that makes understanding where it is and how it moves across the land all the more important.

**HERE'S SOME** of what we *do* know about wolverines.

The largest species in the weasel family, they are fearless and tenacious, pound-for-pound one of the toughest animals in the world; a wolverine has been known to challenge a 230-kilogram grizzly bear (more than 10 times its size) for a morsel of food, and can crush and even eat bones with its powerful jaws and teeth — it's called *Gulo gulo* (“glutton” in Latin) for a reason. In western North America, wolverines live high in the mountains, where food is scarce, and at such low densities that they must roam vast distances, sometimes hundreds of kilometres, just to find a breeding partner.

We also know that in places such as southern British Columbia, as with many other mountain ranges in the Rockies, the terrain is more than ever being shared by loggers, miners, snowmobilers and skiers. And the more intensive that human activity becomes, the less likely it is that wolverines will stick around. In fact, at the last two bait sites Clevenger and I visit, the beaver carcasses had been left on the tree intact, stinking up the environs for a month.

In early 2016, Clevenger and his colleagues wrapped up six years of wolverine research to better understand where they live and how human development affects them. For the first three years, the researchers surveyed wolverines in Banff, Yoho and Kootenay national parks to see whether the animals were

crossing the four-lane Trans-Canada Highway that slices through protected areas, dividing prime wildlife habitat. For the next three years, they sampled the Canadian part of the Crown of the Continent ecosystem, an area that encompasses the Rockies of southern British Columbia and Alberta. Here, much of the land is unprotected and wolverines face a range of obstacles, including highways, mines and clearcuts, and the maze of resource roads that service them, which impede their ability to move through the landscape in search of food and mates.

When the results came back from surveys in Banff, Yoho and Kootenay, Clevenger's team found that the highway was inhibiting some wolverine movement, especially that of females, but that the populations were healthy. “These parks are really important for wolverines. They're doing fine there,” says Clevenger. “The problem is this matrix between those core protected areas. And really, we know nothing about how wolverines are doing in those areas. Nothing at all.”

Like many iconic mammals in western North America — grizzly bears, wolves, caribou — wolverines live in a patchwork of protected and unprotected areas that extend from around Yellowstone National Park in the United States all the way to the Yukon. Maintaining and, in some cases, restoring connectivity along this vast expanse, dubbed Yellowstone to Yukon, is perhaps the last hope for wolverines in the southern reaches of the Rocky Mountains, where roads and other forms of development are keeping them isolated in protected areas and limiting the

**Wolverines are tenacious, pound-for-pound one of the toughest animals in the world.**

**CLEVENGER'S SAMPLING** areas are exclusively in Canada, but as with many of his wolverine-studying colleagues throughout the Rockies, his research focus is continental in scope.

“Wolverines were once eradicated from the lower 48 states,” says Jodi Hilty, who helped lead a wolverine study in the greater Yellowstone ecosystem in the 2000s, and is now president and chief scientist of the Yellowstone to Yukon Conservation Initiative, a joint Canada-U.S. not-for-profit dedicated to securing the long-term ecological health of that region. Like elsewhere in North America, a combination of intensive hunting, trapping and poisoning, and habitat loss and fragmentation almost finished them off. By the 1930s, however, wolverines had made a comeback, almost certainly via movement of individuals from Canada.

Today, researchers estimate that there are 250 to 300 wolverines in the contiguous United States. Most of these are spread thinly across protected but isolated mountain ranges in Montana, Idaho and Wyoming, with a smattering in Washington and Oregon, and usually with only between two and five animals in each range.

The densest population of wolverines south of the Canadian border is in Montana's Glacier National Park, where in 400,000 hectares there are only 35 or 40 individuals. And given the wolverine's notoriously low reproduction rates — females don't breed until the age of three, and have only two or three kits every other year — that population isn't growing fast.

The bigger problem, says Hilty, is that in core protected areas such as Glacier and Yellowstone national parks in the United

TOP LEFT: NANSEN WEBER; MAPS: CHRIS BRACKLEY/CAN GEO

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States and Banff National Park in Canada, wolverines are not reproducing much (or not at all) *outside* their own population, since travel beyond park boundaries is increasingly perilous. “In the U.S. Rockies particularly, those mountain ranges are like little islands,” she says, adding that wolverines in the United States need to interact with others in Canada to have a long-term and viable population. That interaction introduces new individuals into each population, making them more resilient to major changes such as disease and climate change.

The latter is a controversial topic when it comes to protecting wolverines in the United States. In April 2016, a federal judge there ordered wildlife officials to reconsider their earlier decision not to list the species as threatened under the Endangered Species Act and put the onus back on the government to find a way to protect wolverines in the face of an increasingly warming climate.

“Climate change is one of the greatest challenges wolverines face because it will further fragment their habitat,” says biologist Jeff Copeland, who led wolverine research studies for more than 20 years in Glacier National Park and elsewhere in the U.S. “And with only a handful of wolverines in each local area, any random event can potentially wipe out a population.”

The case for listing is unprecedented because it’s based largely on future changes — specifically the expected acceleration of diminishing snowpack and warmer temperatures, which could imperil the snow-loving wolverine. Beyond losing some of their competitive advantage over other predators, the most pressing concern is the effect on wolverine denning habits — breeding females rear their young in dens dug deep into the high-elevation snowpack, usually near avalanche paths where they feed on animals buried in the slide.

“If wolverines could adapt to a warmer climate, we’d see some variance in where they’re living and how they’re denning,” says Copeland. “So far we’ve seen zero variability. You just don’t see wolverines denning in the absence of snow.”

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A wolverine scales a tree in Banff National Park to get the bait left in a hair trap (ABOVE), a shot captured by a remote camera (TOP LEFT). Troy Malish collects tufts of hair from a hair trap (BOTTOM LEFT).

**TONY CLEVINGER** had all of these threats in mind when he kicked off his second research study, but he also put a heavy emphasis on connectivity. His survey covered more than 20,000 square kilometres of the Crown of the Continent ecosystem, a critical transboundary region that provides one of only three viable corridors for wolverines and other wide-ranging wildlife to move back and forth between protected areas in Canada and the United States.

Straddling the borders of Alberta, British Columbia and Montana and covering roughly 72,000 square kilometres of mixed-use land, the Crown is a microcosm of the greater Yellowstone to Yukon region. It’s one of North America’s most diverse ecosystems, alternating between icy peaks and wide, gravel-bed river bottoms, and it features the world’s first trans-border park, Waterton-Glacier International Peace Park, which connects Alberta’s Waterton Lakes National Park with Glacier National Park in the United States.

The Crown may be a vital region connecting populations of wolverines, but it’s also facing heavy development. “In the land between Banff, Yoho, Kootenay and Waterton-Glacier, you’ve got Highway 3 and extensive traf-

fic, and you’ve got oil and gas development, forest cutting and motorized recreation,” says Clevenger. “This really is a critical piece of geography.”

As expected, Clevenger and his team found fewer wolverines in these unprotected areas than in the protected areas he surveyed in the first three-year study. “Detection rates were only about 25 to 30 per cent, whereas in the national parks it was 85 to 90 per cent,” he says, adding that the lowest wolverine numbers were found in the southern Alberta Rockies, where undisturbed habitat is more scarce.

Biologists and conservationists view those heavily developed regions in southern Alberta and British Columbia as missing pieces in a puzzle, the gaps acting as impediments for animals roaming north and south along one of the only viable mountain habitats wolverines have left. In scientific terms, those unprotected areas could cut off the genetic lifeline for southern populations, which would become more isolated and more vulnerable over time — an issue that’s even more dire in a changing climate.

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Take that puzzle analogy a little further, and you'll see why conservationists were so ecstatic when the Alberta government announced in September 2015 that more than 100,000 hectares would be protected in the Castle watershed, an area just north of Waterton-Glacier. And why they've been pushing to protect similarly important habitat farther west, especially the Flathead Valley, a transborder watershed that links southern British Columbia to northern Montana and forms the centrepiece of the Crown of the Continent ecosystem.

"Genetic studies have identified clearly that for the U.S. population to survive, it's dependent on immigration from Canada," says Clevenger, adding that although genetic isolation could take several generations to cause wolverine populations to crash, it would likely be inevitable. "Maintaining connectivity is crucial," he says, especially in the fragmented landscapes just north of the U.S. border, which provide that all-important linkage to healthier populations farther north.

Although Clevenger says interconnected ecosystems are essential, he's quick to add that the most urgent concern is protecting extant core populations: "When you have people trapping and taking individuals out, especially breeding females, those effects are huge," he says. "They have an immediate effect in one or two generations."



A set of tracks leading across a snow-covered lake is the only immediate sign of a wolverine's presence in Yoho National Park.

Protecting wolverines has never been an easy sell — they don't often get the "charismatic megafauna" tag that grizzly bears or wolves do, even though in many ways they embody the true essence of wilderness. Ironically, that may partly explain why we know so little about them. It's their wild ways that make them so exceedingly difficult to study.

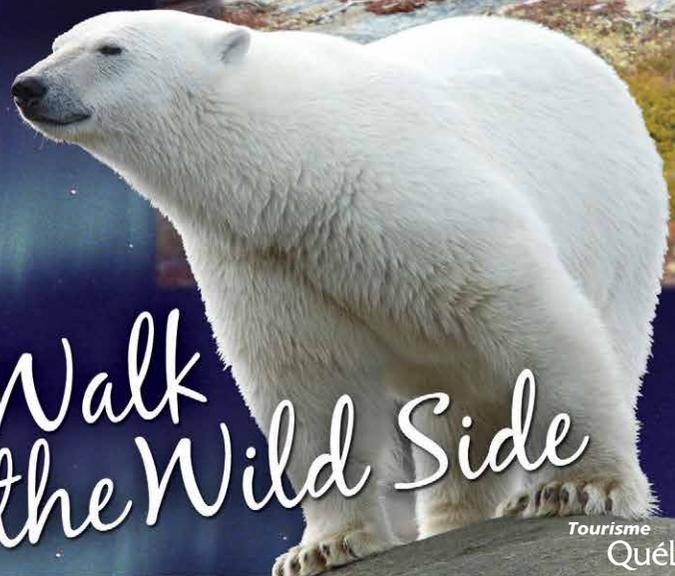
Clevenger believes his work is important not just for the long-term survival of the wolverine, but for the health of the mountain ecosystems they inhabit. He suggests that wolverines may be even more sensitive to human disturbance than grizzly bears — the animal most often touted in North America as an indicator species — and so perhaps a better measure of healthy, well-connected ecosystems. "If you lose wolverines," he says, "it's a pretty good indicator something's wrong."



Learn how highways and other developments are threatening the genetic diversity of wolverines at [cangeo.ca/dec16/wolverines](http://cangeo.ca/dec16/wolverines).

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