WILDLIFE AND GLOBAL WARMING

Navigating the Arctic Meltdown

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WOLVERINES

Sympathy for the tough, tenacious "devil bear," as the wolverine is also known, has never been widespread. That could change soon, as rising temperatures prematurely melt the deep, high-altitude, snow-pack dens where these misunderstood and already rare mammals nurture their young.

With fewer than 1,000 left in the contiguous 48 states, wolverines may be one of the rarest carnivores in North America. Low population densities and large home ranges make them sensitive to habitat disturbance and fragmentation—and difficult to study.

The names given to this creature of mountain forest and tundra indicate how poorly understood it is and why it was once persecuted by hunters. "Wolverine" and "devil-bear" are the ones most commonly used. It is not closely related to the wolf—or to Satan—but it does have a reputation for thievery and ferocity. The French call it *carcajou*, Inuit for "evil spirit." To the Cree, it is *ommeethatsees* or "one that likes to steal"; to scientists, it is *Gulo gulo,* Latin for "the glutton." Their fierce reputation does have some basis in fact: Researchers in one study found two radio-collared wolverines that died in fights with black bears 10 times their size. Most evidence indicates, however, that wolverines avoid confrontations with larger mammals—including humans. In fact, the mere presence of people in their habitat easily disturbs them.

Yet another moniker, "skunk bear," somewhat better describes the wolverine's appearance and behavior. The wolverine is a medium-sized carnivore with a stocky build like a bear's, and, like the skunk, has dark, shaggy fur with wide, lighter colored stripes running down its back. Like skunks, they mark their food and territory with strong-smelling secretions. Their closest relatives are actually weasels, badgers, ferrets, martens, fishers and otters, fellow members of the Mustelid family. Wolverines are the largest and rarest terrestrial members of this family.

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With its shaggy, coarse, striped fur, the wolverine resembles a cross between a skunk and a small bear, hence the nickname, "skunk bear."

The home ranges for these typically solitary wanderers are the largest reported for a carnivore of their size, rivaling those of bears, wolves and cougars in many areas. Given their need for huge tracts of habitat, wolverines probably always existed in low numbers and at very low densities. In the contiguous United States, they live exclusively in the Rocky Mountains and the Pacific coast range. Even there their hold is tenuous: perhaps 600 to 700 in Montana, Idaho and Wyoming, another 100 or so in the North Cascades of Washington.

In winter, wolverines spend much of their time in the coniferous forests of the mountains. In summer, they move up to the rock- and talus-covered slopes above the tree line—probably to avoid summer heat.

Wolverines prey on a large variety of small mammals, including squirrels, marmots, pikas, hares and even porcupines. They are less effective predators of larger mammals such as deer, elk and caribou, however, and rely on the hunting advantages deep snow offers. They also depend heavily on animals killed by harsh winter conditions or wounded by hunters. They often bury any excess or stash it in rocky crevices or trees.

Low prey densities and inhospitable conditions limit wolverine populations, which probably explains the unusually large home ranges of these carnivores. One study in Arctic Canada found that average home-range size was about 50 square miles for females, 150 square miles for males. In the rugged mountains of the greater Yellowstone area, each animal requires even more territory: females nearly 300 square miles and males 350 square miles. Reported ranges in Idaho are 175 square miles for females and 719 square miles for males. These ranges do overlap—a single male's territory, for example, often includes parts of the ranges of several different females—but overall they exist at very low densities. It is not unusual for wolverines to travel 20 miles per day in search of food.

The availability of food also governs wolverine reproduction. Wolverines reproduce through "delayed implantation." The egg is fertilized, but its development temporarily stops. It then floats in the uterus, implanting only when food supply, human disturbance level and other environmental conditions are acceptable. This reproductive mechanism allows wolverines to have their young when food is most abundant and to adjust the size of the litter, an effective way of reproducing without sacrificing precious energy.

Females den in high mountain cirque basins, digging deep into the snow in areas protected by logs and boulders. Substantial snow pack is essential to insulate and protect these dens where the young are born. In interior and northern Alaska, wolverine-excavated snow caves include one or two tunnels up to 60 yards long. Kits are usually born in January or February and remain in the den for 12 to 14 weeks. Wolverines reach adult size when they are seven months old, but they do not breed until they are two or three years old.

Fragmentation of habitat is one of the threats to the wolverine. In the contiguous United States, wolverines prefer high-elevation, subalpine communities, which means their habitat is naturally limited by geography. Roads and human developments introduce vehicle strikes as a source of wolverine mortality and carve up this already fragmented habitat, hindering wolverine movements, severing the rather tenuous connections between habitats and further isolating small groups of wolverines. In the Rocky Mountains, the wolverine population is now splintered into a half-dozen or so subpopulations of 50 to 200 animals, which may be too small to persist for long.

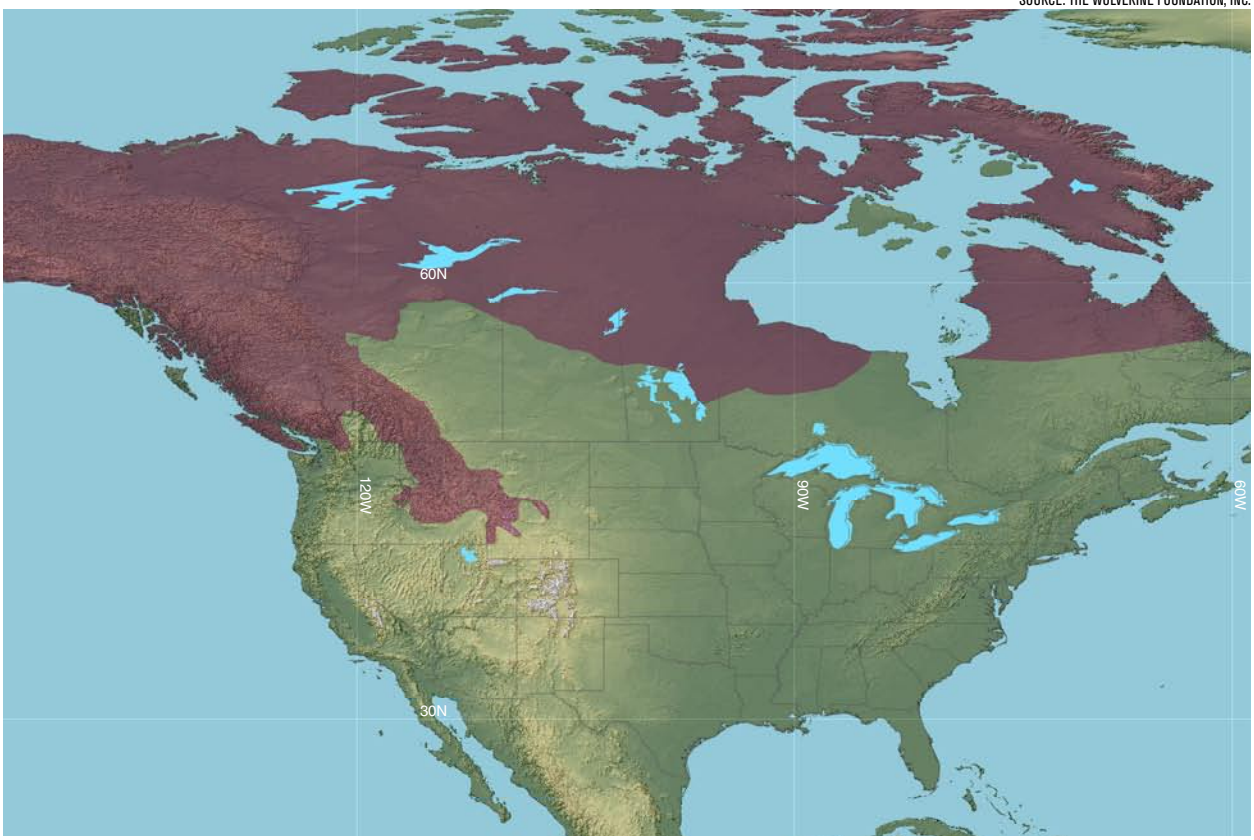
Wolverine fur is frost resistant, making it a popular trim for parka hoods, thus trapping is another source of mortality for the species. Wolverine trapping is still legal in Montana, one of the animal's last strongholds in the lower 48 states. In Montana's Pioneer Range, trapper harvest

U.S.D.A. FOREST SERVICE

Glacier National Park has the winterlong snow cover wolverines prefer.

North American Distribution of the Wolverine

SOURCE: THE WOLVERINE FOUNDATION, INC.



Wolverine range (purple areas on map) includes the mountainous regions of Idaho, Montana, Wyoming, Washington and British Columbia, and all of Alaska and northern Canada. A separate wolverine subspecies occurs in northern Europe and Asia.

accounted for six of the 12 wolverines that died during the course of a research study. Wolverine trapping is also allowed in Alaska.

Recreation, especially during the denning season, is also detrimental to wolverines. The species is so sensitive to human disturbance that cross-country skiing and snowshoeing, let alone snowmobiling, can drive a mother to move her kits to another location. The tremendous increase of snowmobiling in wolverine habitat in recent years is of particular concern. "Female wolverines appear to be most sensitive to human presence during the denning period," U.S. Forest Service wolverine biologist Jeff Copeland told attendees at Carnivores 2006, the biannual predator conservation conference sponsored by Defenders of Wildlife. Bob Inman, studying wolverines in the Yellowstone area, agrees: "If females are expending energy to avoid humans in the winter, that would definitely affect their reproductive success."

WARMING TRENDS

Global warming threatens to eliminate mountaintop habitat at the southern edges of wolverine range, a serious loss for a species already holding on tenuously. Seasonal movements of wolverines farther up mountain slopes appear to be linked to intolerance of high temperatures. Global warming is likely to increase summer temperatures, effectively shrinking the wolverine's range and possibly hindering travel to find mates.

In winter, the snow pack is likely to move 300 feet upslope for every degree of warming. In parts of the American West, snow seasons that now average four months long now would shrink to less than three months in 20 years, and down to two months in 40 years.

Deep snow pack lasting long into early spring seems to be important for wolverines, because it provides secure, well-insulated dens in which to raise their kits. At the Carnivores 2006 conference, wolverine researchers warned that receding snowlines could significantly reduce quality denning habitat. Mild winters also potentially affect food availability for wolverines. The species depends extensively on winter-killed carrion and the advantages that deep snow offers for hunting ungulates.

PREPARING FOR THE MELTDOWN

To ensure that wolverines continue to roam the remote wild lands of North America, we must act now to reduce the emission of greenhouse gases. We also must take other important steps now to help the wolverine navigate a looming bottleneck of complex threats posed by climate change.

- **Protect the wolverine under the Endangered Species Act**. We must continue to press for strict federal protection of wolverines. Such protection is crucial because wolverine populations have low resiliency due to their

rarity and low reproductive rates, making it difficult for them to rebound from numbers lowered by natural or human-influenced factors. In 2000, Defenders of Wildlife and other groups petitioned the U.S. Fish and Wildlife Service to protect wolverines in the lower 48 states under the Endangered Species Act. In 2003, the Bush administration denied the petition, citing insufficient evidence of declines. Defenders successfully challenged that decision in court, and the government is now reconsidering listing the wolverine.

- **Protect wolves throughout wolverine range.** During mild winters, fewer deer, elk and moose die from starvation and cold-related stress—good news for the ungulates, bad news for scavengers that rely on carrion. Researchers in Yellowstone National Park found that wolves aid several species of scavengers—from magpies to grizzlies—during mild winters, because they are active and effective predators year-round, which means a reliable supply of carrion. Wolves thus "extend the timescale over which scavenger species can adapt to the changing environment." To date, wolverines in Yellowstone have not been observed feeding on wolf kills, but as global warming lessens the intensity of winters, wolf kills may become an important source of food for wolverines.

- **Control trapping.** Montana and Alaska allow wolverine trapping, although it provides little economic benefit and is a worrisome source of wolverine mortality. The wildlife agencies in these states must monitor not only harvest numbers, but also sex and age ratios and the impact of trapping on the total wolverine population, and adjust seasons, bag limits and other regulations accordingly.

- **Restrict snowmobile use in wolverine habitat in national parks and roadless areas**. Areas where wolverines are likely to be denning should be off limits to motorized recreation, such as snowmobiling and helicopter skiing. Other precautions may be necessary as the mountain snow pack shrinks and wolverines and people come into closer contact, causing additional disturbance that can negatively affect breeding success.

- **Protect existing large areas of habitat from logging and development**. We must safeguard the forested corridors adjacent to logging roads that wolverines may use to get to other parts of their home ranges. Large protected tracts, such as national forest roadless areas, are critical as sources for wolverine dispersal to other regions. We must also address the threat posed by trappers who use these roads to set their traps.

- **Restore linkages where roads cross valleys between mountainous areas.** Roads that permit human access to wolverine habitat can be detrimental to wolverine populations, especially in areas where trapping or hunting is allowed. Major roads, such as the Trans-Canada Highway, can also block wolverines from reaching important parts of their habitat.

- **Conduct research.** The wolverine, still one of the country's least understood carnivores, was precluded from listing under the Endangered Species Act twice within the past 10 years for lack of adequate information. We need more data on population size, ecology and optimal denning habitat. We also need a better understanding of wolverine range and movements to inform the design and placement of road crossings and corridors between key habitats. All research must be done with care as even the presence of researchers can cause wolverines to abandon their dens.

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DEFENDERS OF WILDLIFE
1130 17th Street, N.W. | Washington, D.C. 20036 | 202-682-9400
www.defenders.org