ECOLOGY

Animals Thrive in an Avalanche's Wake

Avalanches are efficient killers, hurtling down mountain slopes with forces of up to 54 tons per square meter, sweeping away trees, wildlife, and humans alike. At least 30 people have died in avalanches this year in the United States and Canada; in the French Alps, another 13 lost their lives at one swipe in late January. But in a series of recent and ongoing studies, biologists are finding that avalanches also have a positive side: The stubbled terrains they create provide key habitat for everything from deer to grizzly bears to wolverines.

"Just about everything in the mountains keys into [avalanche tracks] in one way or another," says Rick Mace, a biologist with the Montana Department of Fish, Wildlife, and Parks in Kalispell, Montana. As a result, several agencies are now moving to protect the tracks, which are coming under threat from logging operations.

Slides boost plant diversity, researchers say, because they first clear the land, gouging out permanent open chutes up to a kilometer long and 100 meters wide through terrain that would otherwise be densely covered by conifers. Indeed, when the snow is gone, forested slopes in avalanche country look like they have been clawed by giant fingers, which in some regions cover 20% of the mountainside. But plants and shrubs that can't grow under shady conifers spring up in these sunny chutes, providing important nutrition for large mammals as well as a variety of birds.

Mountain travelers have in fact long suspected that avalanches boost biological diversity, much as natural fires do. "Just hang out and you'll see a parade of animals go by," says Matt Besko, a habitat biologist for the British Columbia Ministry of Forests. But most studies have been narrowly focused, done by specialists on certain animals or on plants. Only recently, after realizing that avalanche slide zones are threatened by increased logging, have researchers begun to study their overall ecology and appreciate their central role in mountain ecosystems.

One of the most extensive of these studies comes from the Columbia Basin Fish and Wildlife Compensation Program (CBFWCP) in Athalmere, British Columbia. In their as-yet-unpublished report, the agency hired a contractor to pull together previous and ongoing research relevant to slides; much of the ongoing research is being sponsored by the CBFWCP, Parks Canada, and the British Columbia Ministry of Forests. Researchers found 350 avalanche paths along a single 32-kilometer creek drainage. And by observing radio-tagged animals from aircraft and on foot for thousands of hours, biologists found that the slide tracks are vital winter habitat.

Because mountain forests are often buried by 3 meters or more of snow in winter, grazing animals not only can't forage, they flounder when they walk. But avalanches often sweep slide tracks practically clear of snow, so the tops of plants may stick out. Mountain goats and deer frequently trot out to graze;

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Avalanche effect. Slide tracks swept clear by repeated avalanches provide crucial habitat for many mountain species.

mountain caribou, which subsist on tree lichens in winter, appear to use slides for easier traveling, says Parks Canada warden John Flaa.

Of course, hanging out in an avalanche track in winter is just as dangerous for animals as it is for people. After outfitting 60 mountain caribou with radio collars since 1988, biologists observed that six of them have been killed in avalanches, says Flaa. He estimates that slides are responsible for up to 15% of mountain caribou mortality.

But death for one animal often means an opportunity for another. In this case, it seems that wolverines, elusive and rarely studied scavengers, are among the winners. By radio tagging and following 41 wolverines for the past 3 years, CBFWCP biologists John Krebs and Dave Lewis found that the animals spend much of their time patrolling avalanche tracks, apparently seeking fresh carrion; the researchers have also found cached carrion near slides. "I'm convinced this is their number one winter food source," says Krebs.

Through radio tagging, Krebs also managed to track a few females to their midwinter birthing dens, the locations of which have long been a mystery. The dens lay snugly under snow-covered jumbles of boulders and logs in the so-called runout zones near the bottom of the avalanche paths. Tunnel complexes go in as far as 20 meters—"real fancy places, convenient to food and very protected under all that snow," says Krebs.

Slides are crucial habitat in spring, too. The snow covering the tracks melts off long before that in the snowy woods, and caribou move in to graze on early grasses and forbs. And when grizzlies awake in spring, they mainly eat starchy avalanche-lily roots dug from slide tracks, says Roger Ramcharita, a University of British Columbia doctoral student following radio-tagged bears and analyzing scat for another multiagency study. Tracks make up only 10% of his study area in the Columbia Mountains, he says, but 40% of his spring bear radio locations are in them.

After studying radio-tagged grizzlies in the Swan Mountains of northwestern Montana for 10 years, Mace came to the same conclusion: Avalanche tracks comprised only 5% of his study area, but grizzlies spent 60% of their time there. And it's not just food they're after: Females ready to breed go to the same spots in the same chutes year after year and wait for males to show up, says Mace, who published part of this work with his colleague John Waller in a recent issue of *Journal of Wildlife Management*. "These sites have historical resonance for bears," he says.

Avalanche paths are now attracting newer creatures: loggers. Rising timber prices have made it profitable to cut trees in steep, remote drainages adjacent to slide tracks, particularly in British Columbia. But logging removes nearby cover, without which bears, caribou, and other animals won't venture into a track. Logging roads often cut directly across runout zones, bringing snowmobilers and hunters, says Besko.

Given the mounting evidence showing the ecological importance of slides, the British Columbia Ministry of Forests has begun requiring buffer zones around tracks and is pushing to close off roads. U.S. Forest Service managers hope for stricter rules, too. "These places are obvious gems," says Besko. "We have to protect them."

–Kevin Krajick

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