**The Case of the Disappearing Rabbit**

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**Ten million acres of the American West may depend on the fate of the vanishing snowshoe hare.**

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In the roadless, snow-muffled backcountry of northwestern Montana lies your best chance of ever seeing a wild Canada lynx. An improbable creature, it is small on the spectrum of wildcats—about three times the size of a house cat—and stands on disproportionately long legs, on which it is uncommonly fast. Its great head seems larger and wiser for its tuft of beard and the birdish plumes at the tips of its ears, but its feet spoil its air of gravitas. They are enormous. They act like snowshoes, and they are part of what makes the lynx supremely adapted to this part of the Rocky Mountains. Another inhabitant, the snowshoe hare, is adapted to life here, too. A lynx, if it could, would eat nothing but snowshoe hares its whole life, and pretty much does.

An animal so specialized that it only eats one kind of food has a tenuous place in the world. But this stretch of Montana—what the 19th-century naturalist George Grinnell named the Crown of the Continent—is unlike most places, or even most wildernesses. In an age of daily extinctions, the Crown has not lost any of the vertebrate species present when the first Europeans ventured this far west—creatures seen, heard, and feared by Lewis and Clark. If the Crown is a window into the past, it is also a particularly privileged window: no other intact ecosystem on the continent affords a view this grand. Only here do you find the full suite of North America's big predators—wolves, cougars, coyotes, and black and grizzly bears. Then there are the stranger beings: cutthroat trout, bull trout, and Arctic grayling in the glacial waters; river otter, bobcats, fishers, martens, lynxes, and wolverines. Between Glacier National Park and the Bob Marshall Wilderness Complex, the Crown is 10 million acres of the West as it once was, and as it would have been.

Yet it is not a time capsule. Being free from development by people hasn't made it a static place: the Crown rearranges itself, in a constant flux between the living and the dying, as the planet rolls on. Historically, this has happened on a time scale largely beyond our power of perception—"glacial pace" is not far from the mark. The problem is that glacial pace is not what it used to be. It is speeding up, as the glaciers melt into the Rockies, retreating up to 90 feet each year. For the first time in geological history, you can watch glacial ice move, and by the current projection, 20 years from now there will be nothing to see. Altogether, climate change is a phenomenon more keenly felt in a place like the Crown—a mountainous landscape with reservoirs of ice and snow—than anywhere else. This makes it the best possible natural laboratory, a window into the large-scale ecological change that global warming will bring. The effects of warming are magnified two to three times in the Crown, says Dan Fagre, climate ecologist in Glacier National Park, though the Crown's persistent biodiversity suggests that the ecosystem is weathering the difference so far. But Fagre thinks this persistence has a limit: at some point, the pressure of the changes will be too great, and beyond this unmarked boundary the present system will come apart. An ecosystem doesn't die, but as species depart or spread, it will change the way it operates, take a different form. Potentially, the Crown has innumerable thresholds—the last of the glaciers, the first animal extinction—beyond which it could rapidly become a fundamentally altered place: different trees, different cycles, different lives. Whatever will trip that invisible wire, a look now at the Crown is a look at final moments—the last of a storied American West, of the natural wealth that once enabled this extravagant diversity of life. What awaits, in a climate-changed world, is a new era of uniformity.

What sets the Crown apart from every other ecosystem on earth is its ecological schizophrenia. Straddling the Continental Divide, it is besieged by disparate climates from the fertile west, the open prairie to the east, and the cold north; even its rivers, issuing from Triple Divide Peak, flow in all four compass directions into the Pacific, the Atlantic, and the Arctic oceans. In all this, the mountains are the agents of volatility: they toss wind and snow to different sides of the Divide and wildly apportion sunlight to different slopes; historically, their dramatic nightly cooling has produced some of the coldest temperatures ever recorded below the Arctic. The convergence of these forces is what packs into the Crown the widest range of life on the continent, a diversity as distinctive as the tight profusion of Madagascar or the sweeping wealth of the Serengeti. "We have this incredible mix of microclimates," says University of Montana climate expert Steve Running, who shared the Nobel Peace Prize in 2007 with the Inter-governmental Panel on Climate Change, "which then allows an incredible mix of microhabitats for animals."

To a certain extent, this patchwork of habitats is its own refuge against ecological disturbance, which is why, though records of a warming trend go back to the 19th century, no population has yet abandoned the ecosystem. "The animals can make use of those gradients," Running explains. "They can go from the Pacific side over toward the continental side, they can walk from the southern end of the Rockies farther north, and then they walk up in elevation. When their habitat goes off the top of the mountain, then it's all over." Global warming has a leveling effect on mountains: under an atmosphere thick with carbon, mountains cool less, allowing lower-elevation plants and animals to push into the upper reaches. We get more of one kind of habitable world, but we lose the planet's extremes, along with their wholly unique strata of life—lynxes, for instance, and snow-colored hares.

On paper, the lynx population in the Crown goes back to the 1810s, in the records of the old Hudson Bay Co. fur trade. In 2000, when the species was pronounced "threatened" under the Endangered Species Act, trapping became illegal. This February the amount of lynx habitat singled out for protection dramatically increased, and of the nearly 43,000 square miles of new critical habitat spread across a handful of northern states, just under half is in one ecosystem: the Crown. Rarity, for a species, is a biological Catch-22: the animals are so well adapted to their particular ecological niche that they are unable to spread indiscriminately in larger numbers, but specialization is what makes their lives possible at all—by allowing them to survive in places where most others cannot. Lynxes, says Forest Service biologist John Squires, are "long, thin, and light"; with those oversized paws, they have "everything for flying through snow, trying to catch snowshoe hares." But while these animals are untouchable on their territory, they are the most vulnerable in the larger scheme of ecosystem change: as the Crown teeters toward a new balance of species and habitats, their niches will be among the first to wink out.

For the last 10 years, Squires has tracked lynxes in the Crown using radio telemetry and, more recently, data-streaming GPS collars. Between one study site in the -Seeley-Swan Valley, near the southern limits of the Crown, and a second in the Purcell Mountains, near Glacier National Park, he typically has about 60 cats "on air" every year. He does not know in what pro-portion the collared cats stand to the whole population, but from their movements he has come to understand their narrow world. "Clearly, there are places where this animal goes and places where it doesn't," he says, with GPS points plotted in clusters on a map. Unfailingly, lynx territories are boreal forests, congregations of subalpine fir, larch, and Engelmann spruce trees whose wide-reaching boughs come so low to the ground, they touch the snow. Snowshoe hares, a de-fault prey species for nearly all predators in the Crown, cling to this protected setting, and where the hares are, so are the lynxes.

Trapping a lynx is like trapping a ghost. Even its thick coat is the color of ashes. In the winter, its distinctive tracks show up in the snow. When one is caught, the invisibility cloak falls away, and it's as though the cat has been momentarily plucked from the whole mysterious whirl, a piece of the shifting wilderness held in an uncommon state of arrest. The trap Squires uses to catch and collar lynxes is his own de-sign: a wire-mesh cage the size of a dog-house with a suspended door tautly held to an angled floor piece. The cat walks over the floor piece to reach the mounted bait and triggers the door. This year, Squires has caught fewer new cats and almost no females. In March, two weeks be-fore the bears would emerge from their dens—at which point all bait becomes bear bait—he has collared only one female in Seeley and says, "I think something's going on." His mind goes briefly to the new surge of mountain lions in the Crown, a cat that kills lynxes on sight to eliminate competition, but reasons that lions stay out of snow-thick lynx territory in winter. But the one thing Squires can count on to affect the population of lynx is the population of hares, which has always, in this lowest fringe of the North American boreal forest, been on the brink. In fact, the fragile footing of this frontier population of hares is precisely what makes them valuable, because the moment the ecosystem falls out of balance, the hares will tell. If hare and lynx habitat ranges farther north as temperatures warm across the map, Squires's southern outpost is the best "early-warning -system"—the animals will stop showing up.

Unseasonable warmth is a problem for hares for a not-immediately-obvious reason: it isn't the heat itself but what it does to the single most important constant in the Crown—the snow. As the largest perennial food prize in the ecosystem, snowshoe hares have just one good trick—turning white in winter, brown the rest of the year—cued by the changing length of days. Now winter snow melts nearly a month earlier in the Crown than it did just a century ago, causing, says Dan Fagre, a "decoupling" between two cycles that used to be synchronized: light and temperature. This means that a snow-white hare will end up sitting on brown earth—and have no idea. Researcher Scott Mills at the University of Montana, with his own set of radio-collar signals, has found more and more compromised hares in recent years and believes that they are dying for it, in increasingly large numbers, every spring and fall. Given enough time, hares may genetically sort themselves out, along with all the other species that have evolved, over millennia, a certain exquisite timing for their migrations, for giving birth, or for coming out of the ground. But in a fast-decoupling world, expecting snowshoe hares to survive by adaptation is like trying to engineer a genetic jackpot. Statistically, it could happen, but every spring and fall, you lose a lot of chances.

Biodiversity happens when an ecosystem brings competing species to a stalemate: all have their niche, all get by, none can completely suppress another. Global warming doesn't so much tip this finely wrought balance in the Crown one way or another as knock it all down: no niche wins out; the real winners are the species that don't have a niche. These are the ones who don't have to change their genes. Grizzly bears may be the world's least choosy eaters, omnivores par excellence that can live on anything and learn what they need to survive. Wolves, mountain lions, and coyotes are also versatile generalists. Populations of these animals have become more and more robust in the Crown, and so long as they avoid getting shot by people, they will live just as well in an ecosystem restructured by climate change. So across the current range of species in the Crown "there's going to be a shakeout," says Fagre, "because some will be able to adapt better than others. The ability to change your behavior will be really important." Species that are "hard-wired" to live a certain way—hares who change color for winter, or bull trout that only spawn in clean, icy waters—will be hard-pressed to do things differently in their lifetime. And the world that leaves them behind is not necessarily one we would recognize. For all life in the Crown is checked by the available water, and mountains unable to hold onto snow and glaciers trickling to nothing can no longer provide a steady supply. That leaves the species that can make do with least, and an ecosystem determined not by the resources it has but by what it lacks. In place of a lively mosaic of habitats, Fagre has a vision of Glacier National Park as a single landscape of "wall-to-wall lodgepole pine," a tree that needs little water and is always the first to leap up after a forest fire, like a weed. In this impoverished place, the lynx—built for one niche, one prey—is an impossible biological flourish, a dream.

In a last effort to find cats, John Squires sent Dustin Ranglack, a member of his Seeley Lake crew, to scout out the slopes of Fawn Peak, which had been consumed by a forest fire in 2003. It was the only place he hadn't trapped, and now he thought he might as well try. Ranglack returned to report that there was no sign of life there—no tracks of deer, or mountain lions, or hares. "When there're no hares, there's nothing," said Squires. "There's no place else to go." He loaded his truck, and with two snow machines in tow, drove north.