

DISAPPEARING ACT: The coat of the Canada lynx varies according to the cat's climate range. The fur of this collared male is thick, for warmth, and light in color, for camouflage in snowy climes.



Ghost Cat

CAN A HISTORIC LAND DEAL IN WESTERN MONTANA KEEP A RARE CAT AND ITS FOREST HABITAT FROM DISAPPEARING?

By Scott McMillion

PHOTOGRAPHS BY TED WOOD

Trap Junkies

MARCH: Trapping a wild lynx is a fairly straightforward piece of business. You can do it with some chicken wire and plywood, some plastic pipe and a haunch of road-killed deer. A couple old compact discs to throw sparkle or, better yet, some bird wings strung to a tree, can lure the cat to the bait. Males in particular often return several times to the same box trap, tempted by the venison. “Trap junkies,” the field crews call them. Once there, they eat voraciously, scraping the bones clean.

If the animal is a recapture, the researchers will release it immediately. As often as not, it will take a few steps, then turn to watch them rig the trap for another cat.

But today you find a fresh capture, and as you approach, it crouches and snarls and gurgles and huffs, a deep-chest oratory of such diversity that it sounds almost like language. It twitches the tufts on its ears, snaps and expands the beard of fur around its neck, and licks its nose with a small pink tongue. So you hold still, waiting for the cat to relax and go silent, to turn its pale green eyes away. Then Zach Wallace, a field technician, delivers a sedative, reaching through the chicken wire with a jab stick, a contraption of wood dowels, plastic pipe and duct tape, with a hypodermic on the business end.

Once the cat falls asleep, Wallace and colleague Dustin Ranglack lift it gently from the trap to examine, weigh and measure it. They wrap it in a blanket to keep it warm, moisten its eyes with ointment, and fit a soft cap about its face to shield its eyes from the sunlight dancing off the snow.

You reach a bare hand into the thick fur to monitor the cat’s breathing and feel the dense muscles that let this animal, on occasion, take down a deer three times its size. You feel its drowsy heartbeat. You hear it snore. Wallace lifts its lips, checking the wear and tear on its teeth to estimate its age. He draws a vial of blood for genetic analysis, collars the cat with a radio transmitter and GPS device, and attaches an identification tag, punching a hole through the dense ear cartilage.

The process takes just a few minutes, and then the team returns the cat to the trap, where, after a half hour or so, it awakens, groggy.

When its legs stop wobbling, you lift the door. The cat steals into the woods, where it disappears like a wisp of smoke.

Ghost Cat

“I NEVER GET OVER IT, EVERY TIME I SEE A LYNX,”

says John Squires, a wildlife biologist for the Forest Service.

Squires has seen a lot of lynx. For more than a decade, he has headed up one of the most comprehensive lynx studies in the nation, based out of the Rocky Mountain Research Station in Missoula, Montana. Now his research is at the center of a strategy to protect the cat and its forest in one of the biggest conservation deals in history—a joint project between The Nature Conservancy and The Trust for Public Land (TPL) to purchase 310,000 acres of land from Plum Creek Timber Co. for \$490 million.

Using data provided by land managers and scientists like Squires, the Conservancy and TPL set out to determine which Plum Creek properties faced the biggest threats from subdivision and held the highest value for wildlife here in the largest intact landscape in the continental United States—a place known as the Crown of the Continent.

Centered on the spine and foothills of the Rocky Mountains that stretch from Montana into Canada, the Crown is a vast place—at 10 million acres of forest and rock and meadow and wetland, it’s nearly five times the size of Yellow-

“We let the lynx tell us what they’re using. Then we try to extrapolate that into a vast landscape: What is lynx habitat, and how much is there?”

stone National Park. These lands and waters still contain the full complement of wildlife—grizzly bears and lynx, wolverines and moose, bull trout and westslope cutthroat trout—that they held when Lewis and Clark crossed the Rockies 200 years ago.

But locating a wild cat in such a vast, wild landscape is no mean feat. And this elusive feline, the “ghost cat” of the forest, earns its nickname fair and square.

The lynx has evolved to scrape a living from the dense boreal forests of North America, places where winter is the lean season, and it lasts a long time. Large males weigh up to 30 pounds, but have hairy feet the size of a 120-pound mountain lion. Those big mitts, combined with light bones and long legs, allow them to glide over deep snow, moving almost like a bird. Their mottled coloring lets them blend into dense forest—where they feed almost exclusively on snowshoe hares, stalking them through the woods or ambushing them from a hidden daybed, usually in a couple of hops.

Although lynx are common in Alaska and Canada, the species has a precarious foothold south of the Canadian



FRESH CAPTURE:

In the winter, Zach Wallace and the other field technicians on John Squires’ team cruise mountain trails on snowmobiles to check box traps—crude enclosures made of chicken wire, plywood and PVC pipe lodged beneath dense pines—looking for Canada



lynx. If the researchers find a cat—baited to the trap by deer legs or snowshoe hares—they must determine whether it is a fresh capture or a recapture. If the cat sports a recent, working radio collar, it is released immediately. If not, the team tranquilizes

and examines it. While technicians weigh the animal, check its claws and use calipers to measure its teeth, the cat is kept comfortable and warm on a sleeping bag and wears a fleece cap about its face to protect its eyes from the winter sun.



FAMILY FELIDAE:
The Canada lynx is closely related to the bobcat, but the lynx is slightly larger and—thanks to its supersized paws, webbed toes and fur-insulated feet that spread the cat's weight over soft snow—it can survive in high elevations where the bobcat cannot.

border. In 2000, *Lynx Canadensis* was listed as a threatened species under the Endangered Species Act, and nobody knows just how many of the cats remain in the contiguous United States. Confirmed populations exist only in Maine, Minnesota, Montana, Washington and Wyoming, and the cat was recently reintroduced into Colorado.

Squires began studying lynx in Montana in 1998, when Endangered Species Act protections for the lynx were being proposed and the Forest Service, which manages most lynx habitat in the American West, realized it had little information about the cats.

“Their basic ecology in the lower United States was unknown,” Squires says.

So he set about trying to determine how many of them persist in western Montana and precisely what kind of habitat they need.

Today, Squires estimates there are fewer than 300 lynx left in Montana. He stresses that this number is just an educated guess, but notes that it is the largest native population in the Lower 48, west of the Mississippi.

Every winter, Squires and his field technicians set traps for lynx, hoping to catch and radio-collar as many as they can. Each cat in the study wears a tiny GPS collar designed to detach after seven or eight months and send out a homing signal, so a field tech with a radio receiver can slog through the woods to find it. Once the device is retrieved, Squires plugs it into a computer that maps out every place the lynx has gone.

In the summer, researchers bushwhack into sites favored by lynx—as pinpointed by the GPS data—and analyze what they find. They set up grids, count and identify all the plants, and even count the droppings of snowshoe hares.

It’s difficult work, but it provides knowledge critical to the long-term survival of the species.

“It’s revolutionized our thinking about how these animals use the landscape,” Squires says.

“We let the lynx tell us what they’re using, and we get a very detailed picture of the forest composition and structure that lynx need,” he explains. “Then we try to extrapolate that into a vast landscape: What is lynx habitat, and how much is there?”

As it turns out, lynx have very



THE CHECKERBOARD: A map of about 16 square miles near Seeley Lake, Montana, shows the movements of two male lynx, represented by red and yellow dots. The GPS data shows that the cats forage on lands owned by the Forest Service (dark green) but skirt the logged areas previously owned by Plum Creek Timber Co. (light green)—or haunt the edges where deadfall may hide hares. The Conservancy plans to restore these commercial forestlands in order to expand habitat for lynx and other species.

specific habitat needs. They prefer what biologists call “dense horizontal cover.” In plain English, that means a mess, a thicket, a deep copse of trees and brush likely to harbor snowshoe hares. While those places aren’t hard to find, they’re scattered and patchy because much of that habitat has for decades been managed for timber production, which means a lot of chainsaws and roads.

“They just have such a narrow tolerance,” says Squires.

While lynx are tough and efficient hunters, their needs are precise: high-elevation forests with thick stands of mixed conifers, usually spruce and fir.

A narrow habitat tolerance and an ever-narrowing habitat make for a grim combination.

Into the Deadfall

MAY: Come May, the toughest fieldwork of the year begins. Spring in northwest Montana means winter and summer scuffle for dominance, so you pack shorts and layers of fleece. You load up the rain gear and stocking hat and snow gaiters and sunscreen.

At first light, you roll out of your tent and scarf some cold cereal. Long before the sun begins to throw any real warmth, you start postholing

MAP: NORTH-CENTRAL ROCKIES LYNX STUDY



CAT NAP: John Squires carries a tranquilized lynx.

The big threat facing the cats these days comes not from logging but from the residential development of timberland.



ONLINE:
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John Squires
narrates our
audio slide show
at [nature.org/
magazine](http://nature.org/magazine)

ROOM TO ROAM: In the Northern Rockies, insect infestations and wildfires triggered by climate change threaten lynx habitat. For millenia lynx have bounced back from such disturbances, but on a landscape fractured by subdivisions, movement away from disturbed areas could be impossible. The Conservancy's purchase with the Trust for Public Land of 310,000 acres here will ensure that wildlife can range over large landscapes.



CATCH AND RELEASE: Squires leads one of the most in-depth lynx studies in the nation. His team has so far captured 115 lynx, without the loss of a single animal. While the cat is tranquilized, Squires may draw a vial of its blood for genetic analysis or download GPS data from its radio collar to his laptop. "We're pretty darn careful," says Squires. "When you're trying to preserve lynx, you sure don't want to cause any mortalities."

NATURE'S HAYSTACK: When selecting a den site, lynx prefer sheltered spaces such as downed logs and wind-thrown trees, though they may occasionally den in boulder fields. Heavy deadfall in the Purcell mountains makes searching for lynx dens hazardous for Squires and his team.



through the rotting snow, trying to find the female lynx you trapped and collared a couple months earlier.

Even though the cat you seek wears a radio collar and you've got a receiver, a GPS and compass, you still might not find her. Even with good maps and good skills and a good set of legs under you. Even with snowmobiles and mountain bikes and four-wheel-drive trucks. Even with an airplane helping out. Snowshoes just in case. Even with all of this gear, it won't be easy to find your cat—let alone her den.

When, after a few miles, you get to the spot where the airplane last found the cat, you dive into the deadfall, scrambling through the kind of mess a weasel with any sense would avoid. You slither under logs and you climb over them. You find yourself 8 feet above the ground, balanced on a thin log, listening to the beeping receiver and trying to be as quiet as you can be, hoping you won't bust a leg, hoping the cat won't bounce too soon from this slop, hoping that she'll stick, that she won't run away and spell failure, tell you you've wasted a full day's sweat and toil.

But you don't even want her, really. Rather, you want her to lead you to her most precious things: her kittens. You need to count them and examine them while they're still too small to run away, and you won't get that job done if you blow this stalk, which is easy to do. Even if you do everything perfectly, you can still fail.

Radio signals hop around in holes and hollows. The topography itself seems part of the conspiracy. But it's what the cat likes, this tangle of deadwood. It's torture for you. But it's heaven for her and her young.

Yet even with two receivers trying to triangulate a position, more often than not, the day ends with no kittens.

The weather can foul you up, too. Pulling 2-week-old kittens—tiny, helpless and still sightless—from a den in bad weather, even for a few minutes, could risk their lives. If you find a den during a rainstorm, you mark the spot and make plans to return when the sun is warm.

And you hope the mother hasn't moved the kittens to a new den in the meantime.

They do that sometimes.

Intact Yet Fragmented

"THESE ANIMALS LIVE IN THIS COUNTRY AND KNOW it so much better than we ever could," says field technician Zach Wallace. "And they're trying to hide something in it. In the winter, we set traps where we want to trap. [In the spring,] they place their dens where they want to have them."

But after more than a decade of studying these cats, Squires and his team have gained a pretty good handle on where lynx live, travel and place their dens. The cats are territorial but sometimes go on walkabouts for scores of miles.

Squires has cataloged about 68,000 locations that his radio-collared cats have visited, primarily around Seeley Lake, the Garnet Mountains and the Purcell range near Yaak, Montana—lands owned mostly by the Forest Service and corporate timber companies.

The maps Squires generated with this GPS data indicate that lynx prefer dense forests, and they try to avoid

heavily logged areas, particularly in the winter.

And the region's long history of logging means that the Crown of the Continent, though one of the largest intact ecosystems on the planet, is also badly fragmented, especially along its edges, where lynx like to stake their turf.

This landscape was splintered in the 19th century, when the federal government offered up millions of acres of land to railroad companies willing to lay track through Montana and other Rocky Mountain states. Congress hoped, correctly, that jump-starting transportation infrastructure would speed the settlement of the West, so it granted every other square mile of land—up to 20 miles out from proposed railroad tracks—to the railroads. The government retained the squares in between, and eventually much of the public land became national forests. But the railroads sold much of their property to timber companies or, in the case of Plum Creek, spun off timber subsidiaries, perpetuating the checkerboard pattern of ownership that endures today.

Though many of Montana's forests are now pockmarked by square-mile timber cuts, these scraped areas aren't altogether a bad thing, as far as lynx are concerned. After a parcel has been logged, trees remaining around the edges become vulnerable to windthrow, which creates the dense downfall that lynx seek out for their dens. And 20 or 30 years after harvest, most cuts have grown enough trees to give hares a place to hide, which means lynx have a place to hunt them. But once the plots contain enough vegetation to attract cats again, loggers tend to go in and lop away some of the trees so that remaining ones more quickly grow to commercial sizes. It's a good way to run a timber company, but it's hard on lynx.

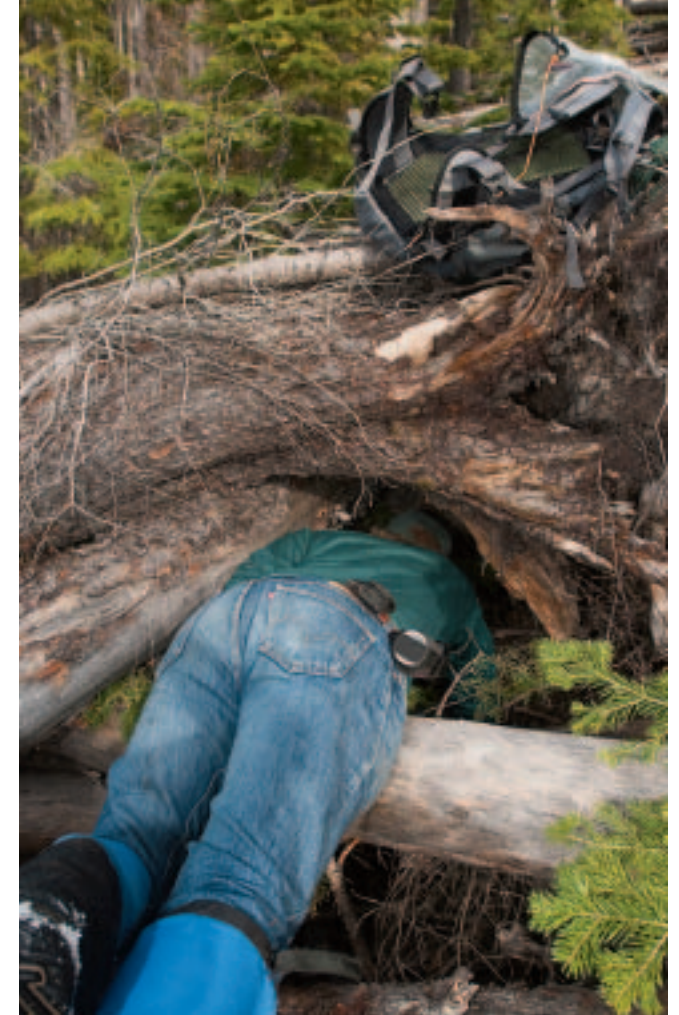
"Precommercial thinning of spruce-fir forest is detrimental to lynx habitat," says Squires.

Still, the big threat facing the cats these days comes not from logging but from the residential development of timberland.

For decades, Plum Creek Timber Co. ran its vast holdings largely as a tree farm, producing wood and paper for a growing nation. But in recent years, as the world has discovered western Montana and other scenic parts of the country, the value of the land has skyrocketed: Timberland that once had been valued at a few hundred dollars an acre has been selling as recreational or vacation-home property for as much as \$10,000 an acre.

In response, Plum Creek—the largest private landowner in America, with holdings of about 1.2 million acres in western Montana—began shifting its business model from lumber production to real estate, which too often means permanent fragmentation of habitat.

Industrial timberlands can recover, given time, says Brian Martin, director of science for the Conservancy in Montana. But subdivision doesn't go away.



MISSION IMPOSSIBLE: In the spring, Squires takes to the woods again to locate the cats he collared months before. He begins by using a map and compass to plan a route to a lynx location spotted by an airplane flyby. Late snow clogging the roads makes accessing the location with his

team and equipment challenging. The field crew uses snowmobiles to get close enough to track the lynx on foot—Squires carries a handsaw to dismantle downed trees that render the road impassable. Once the crew is within range, field techs use radio telemetry

to get a bearing on a collared lynx. Frustration is never far away, as radio signals can be spotty—the crew may need to climb to higher ground to get a fix on a cat. Some days, eight hours of tracking can amount to nothing. Others, the team finds its felines.

CAT IN THE CRADLE:
At 2 weeks old, lynx kittens have not yet opened their eyes. A field technician, holding the cat carefully, will prick its ear to obtain a blood sample for genetic testing.

“Permanent fragmentation is what you get,” he says. The Nature Conservancy, which has been working in the region for 30 years, took notice. “If Plum Creek sold that land for development, decades of conservation work in the Crown of the Continent would be for naught,” says Jamie Williams, Northern Rockies initiative director for the Conservancy. “We had to try to come together now or forever lose those opportunities.”

With the specter of backcountry sprawl looming over western Montana, the Conservancy and The Trust for Public Land knew it was time for a major play.

“We knew the lands we absolutely wanted in there,” says Martin. “The science guided us to the most critical parcels.”

Using Squires’ lynx data as a guide, the Conservancy has begun to consolidate the patchwork ownership that is tattering the Crown. Under a 2008 Farm Bill provision authored by Sen. Max Baucus, the federal government provided \$250 million for the project, laying the foundation for the Conservancy to permanently protect 310,000 acres of forest from development. The purchase will be complete in December 2010, and over the next decade much of the land will be transferred to the Forest Service and state government agencies to manage.

The purchase will not only bolster the local economy through sustainable logging projects and allow continued access to the land for the recreating public, it will also help link the Crown of the Continent to other vast wildernesses in central Idaho and Canada, providing habitat and dispersal routes for lynx, grizzly bears and wolverines—creatures that need wide swaths of undeveloped land to keep themselves fed, fit and genetically diverse.

Rare fish will benefit, too. The purchases include more than 600 miles of streams that,

under conservation management, will continue to offer cold, clean water for bull trout and westslope cutthroat trout.

The deal means that, for the first time in more than a century, the Plum Creek and national forestlands can be managed as a block, says Caroline Byrd, the western Montana program director for the Conservancy.

Though the logging scars are easy to see, they’ll mend in time. And for 310,000 acres, the prospect of subdivision is off the table.

“It has been harvested, but it remains a forest,” Byrd says. “And it will remain a forest for the long term. It won’t be homes or resorts like so much of the world has become.”

“If Plum Creek sold that land for development, decades of conservation work in the Crown of the Continent would be for naught.”

Snowshoe hares need forests—and lynx need those hares. “In regions where snowshoe hares are superabundant, lynx can be superfecund,” Squires says. “They really pour on the kittens.”

Even in good times, life is tough for a lynx. They die from poachers and turn up as roadkill. Mountain lions kill them, given a chance. Some starve every winter when the hare population sinks.

But with more of the dense forests that hares prefer, and without the prospect of more homes and roads and dogs and people in the woods, the lynx has a better shot at survival.

A Rare Find

MAY: *The search continues. You’re trying to locate six-ounce kittens in millions of tons of downed timber—a couple needles in a rugged mess of a haystack.*

You’ve scrambled up mountains, slogged through streams, punched your way through snowdrifts. You’ve even found tracks melting on a logging road and flowing to the far Pacific. But they’re the wrong kind: wolf, not lynx.

Suddenly the walkie-talkie crackles. Squires is 200 yards away, invisible in the deadfall: He has spotted the mother, hoisting herself over a log.

Her offspring must be close at hand. Squires scours the snarl of fallen wood, eyes peeled. The den could be anywhere in this clotted tangle, but he knows what to look for: a patch of ground free of snow, sheltered from the rain by one log or a dozen, someplace hidden, secret. He scans for a snagged hair, maybe a faint pathway carved by the mother’s travels, a footprint. He could step over the silent kittens and never know it. There’s just so much deadfall.

You take off after him.

Before you get far, another crackle from the walkie-talkie: Success, he says. He has kittens.

And you forget about the barked shins, the sweat and the ticks and the cold feet and thirst. You’ve got kittens. Squires cradles them in his hands, two tiny examples of one of the rarest animals in the Lower 48. They yawn and show their new white teeth. They stretch and extend their wee claws, tools they will need someday, after their eyes open.

The mother has bolted, but Squires says she hasn’t gone far. Not once in the study’s 11 years has a mother abandoned the kittens he and his crews have examined.

Still, he takes no chances. The handlers wear rubber gloves and work quickly. Squires pricks a tufted ear on each kitten and takes the drops of blood he needs for DNA sampling.

With sweat and persistence, all six of the female cats in Squires’ study will be tracked down this spring, their kittens counted—a new generation born into a newly secure landscape.

Squires returns the kittens to their den, squirming waist deep in the snug tangle of deadfall.

Their mother found this place. So did you, somehow.

You’re leaving now.

She’ll be back soon. ■