

North of 51

*Will conservation
stay on track
in Ontario's
boreal forests?*



A Conversation with Justina Ray

CONSIDER THE POWER of the wolverine (*Gulo gulo*). Typically about 20–30 pounds, it has no compunction in taking down wild sheep and caribou, using its large feet to outpace prey that get bogged down in deep snow. A recent, unprecedented wolverine sighting in Michigan left a state biologist and a group of coyote hunters nearly speechless as the animal leapt down 30 feet from where it had been treed. Even the usually stone-faced *Walker's Mammals of the World* gives a glimmer of enthusiasm, writing, “it seems to be unexcelled in strength among mammals of its size.” This member of the weasel family will dine on berries, lemmings, and bird eggs—though its massive head

allows the wolverine to bite through frozen carrion. Yet, like many carnivores around the world, the strength of the wolverine provides no power against the rifle, the road, or the rising temperatures of the planet. From these, its only defense is a huge tract of wild country.

Zoologist **Justina Ray** knows just such a place: the remarkably intact boreal forests of northern Canada. Here, caribou, wolves, and wolverines find refuge. But land use changes loom. Will these forests survive? Seeking a positive answer to this question, Dr. Ray has recently taken the helm as coordinator of the Wildlife Conservation Society's new program in Canada. In this role, she is working with many partners to apply new findings from field science directly into conservation planning for Canada's northern forests.

Her nearly two decades of field work have been good preparation, taking her from rainforest in the Central African Republic, to subdivisions in the Adirondacks, to the taiga of Canada; her numerous papers on the ecology of carnivores are built on hard-earned expertise in trapping, handling, and surveying many mammal species.

Wild Earth wanted to learn what she thought the future might hold for the boreal region and its residents. And—though she was eager to point out that she is not an expert on *Gulo gulo*—we couldn't help but ask her a lot of questions about a field study she is now part of that seeks to understand the mighty, mysterious wolverine.

Wild Earth's senior editor and staff writer, **Joshua Brown**, spoke with Justina Ray on December 31, 2003.



Your field studies, I imagine, involve long hours, howling snow storms, baking heat, marauding flies and mosquitoes—it must be challenging. Why do you do this work?

I don't remember any time when I wasn't interested in animals. I lived on the 10th floor of an apartment building in New York City so I didn't have experience with wildlife as a youngster except through books—and the American Museum of Natural History.

My first decision toward conservation came when I was about six and someone came into our class to do a presentation about whales. I learned about the threats to whale populations and was determined to boycott Japanese and Russian products. To me, that meant not going to my friend's birthday party at a Japanese restaurant. I was deeply moved about the plight of whales, although I don't believe that my solo boycott had much of an impact on overseas policymakers!

In school, I knew I was going into biology, but I didn't know that you could make a living in conservation until I read George Schaller's book, *The Year of the Gorilla*. I haven't looked back since.

This sense of mission—and your current efforts in Ontario—must have been honed by your pioneering work in Africa.

Yes. For my Ph.D., I went to central Africa in 1992 to undertake a carnivore community study. A lot of folks thought I was crazy to try this, and, in a way, they were right because at the

time there were no proven methods for live-trapping many of these animals. I had to spend a lot of my field time figuring out how to trap these animals, which didn't get me on the ground running.

But, once I did, there were many rewards: there I am, a pipsqueak researcher in the central African rainforest, and I live-trap this "rare" carnivore: the long-nosed mongoose (*Herpestes naso*). This animal had been known, prior to my work, from about 30 museum specimens—but, as it turned out, that was not because it was rare or highly endangered: it was simply that no effort had been taken to study them.

Give me another example.

One time I scooped up a dead shrew and pickled it; in these remote areas, I tried to collect anything. It turned out to be a new species to science and I got to name and describe it: *Sylvisorex konganensis*. (Kongana was the name of the camp where I was working.) That was no huge feat. Although I am exaggerating a bit, it is almost as if you put a little bit of effort into exploring these incredibly diverse, remote ecosystems and you become an expert in a minute!

Though I was not even thinking about shrews when I started out, I ended up discovering a lot about them through an enormous collection of scats I had gathered from the eight carnivores I was studying; over 1000 scats in a two-year period. When I got back to the lab, I analyzed scats for eight months—individual

teeth, bones, exoskeletons, seeds. A lot of the carnivores I was studying are truly omnivorous—they are vacuum cleaners out there. I found out quickly that there were many shrews in these scats. This was fascinating because I had read over and over again that carnivores don't like shrews. There is this folk wisdom that carnivores don't like shrews because they smell bad.

I sent these samples to the central African shrew expert of the world, Rainer Hutterer at the Museum Koenig in Bonn, Germany. He was so excited that he dropped everything and spent the next several weeks analyzing these teeth, and he found that there were 16 species of shrews represented in the scat collection—from a 35 square kilometer area! If you compare that with anywhere in North America, there are only 4–6 species. In

fact, this was a world record of shrew species. But we suspect that this isn't because this part of central Africa was such a spectacular shrew habitat, but because the method of discovering these shrews—i.e., by using the carnivores as the “trap” and looking in their scat—was far more effective for sampling the different microhabitats than any human-made shrew trap.

Almost every piece of data that I collected in Africa contributed to baseline knowledge about a species—which is very different from the work I do now in North America where there are 30 or 40 researchers looking at each species.

I know that wolverines are one of many animals that you study now in Canada; tell me more about that.

Right now I am working in northern Ontario as a partner in the first ecological study of wolverines in lowland boreal forest habitat. In Ontario, most of the current range for wolverines is north of the 51st parallel “cut line,” where logging is not allowed; it's a roadless area. And most of that area is home for 28 First Nations' communities. These are only connected to the rest of Ontario by winter ice roads for two or three months a year. Other than that it's just fly-in. These folks are living with wolverines. It's a very different existence to live with a large carnivore than to live in the city, so it's no surprise to find very different attitudes about this animal—all in the same province.

One major thrust of the work we are doing with wolverines is interviewing First Nations people in six communities. I go up there for about a week at a time and interview elders and trappers and listen to what it is like to live with wolverines. What are their historical relationships? Their individual relationships?

My earlier work in Africa has helped in this process a great deal. I worked very closely with indigenous people there for nearly three years. I gained an understanding of how decisions are made and what priorities are made in a context where folks are living right next to wildlife, and where social issues can loom much larger than worrying about whether a particular wildlife species persists in the landscape.

When you are talking with trappers and elders from the various First Nation groups, is there tension because their perception of wolverines is so different from yours?

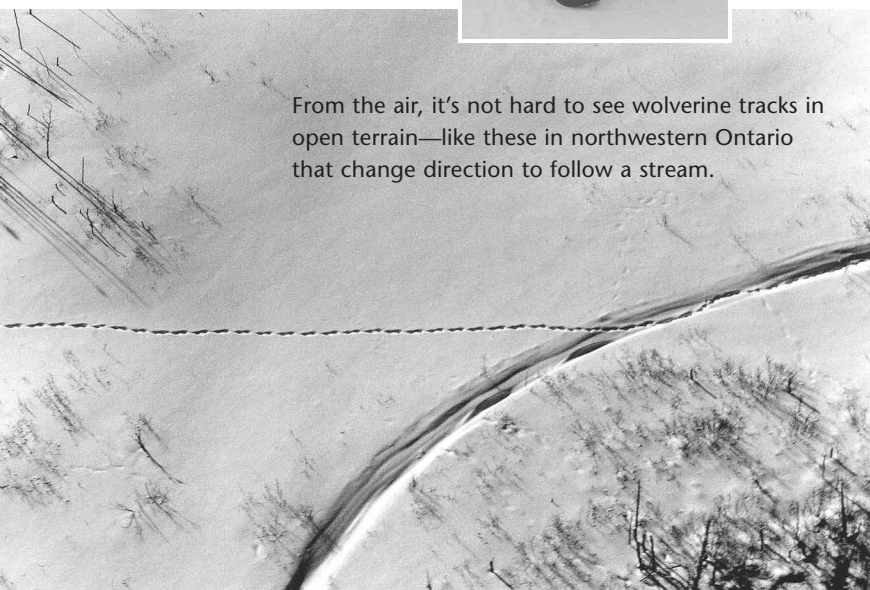
There is definitely some tension—after all, my focus is on the conservation of all wildlife, including wolverines—but mostly I'm there to

“If we just duplicate and push north the park system that we have in the rest of Canada, we stand to lose the boreal forest habitat on which a lot of wildlife depend.”

Justina Ray embarks on a day of wolverine survey flying.



From the air, it's not hard to see wolverine tracks in open terrain—like these in northwestern Ontario that change direction to follow a stream.



listen and to understand the context in which we can make some good decisions or recommendations.

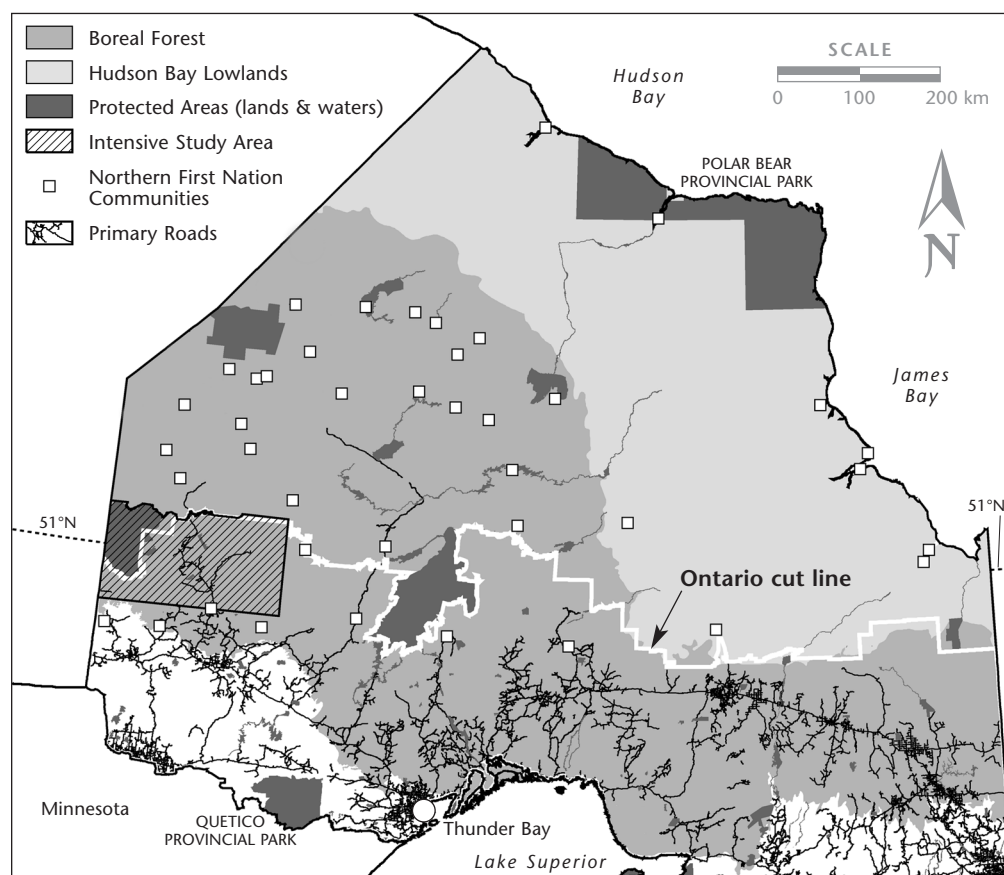
There was one individual who, when I was discussing the wolverine research, leaned over the table and said, “You’re not trying to protect these things are you?” That gave me something to think about! Very truthfully, my quest is to learn what it is like to live with wolverines, because we have lost that understanding in Ontario—or at least western science has. Although wolverines do still persist in managed forests, or at least on their edges, their distribution has retracted from where it used to be, which means that there are lessons to be learned so that the range doesn’t continue to disappear in the face of development being pushed northward. We need to first understand what we are asking folks to *do* when we ask for a conservation effort.

The Ontario government doesn’t specifically monitor wolverines other than through fur auction returns. This made me and one of the project partners, Neil Dawson from the Ontario Ministry of Natural Resources, want to know if the auction data provides an accurate gauge of how many wolverines are being harvested in total; do all animals harvested come to auction?

What did you find out?

It is clear that, for most First Nations trappers I interviewed who have harvested wolverines, the primary motivation is to get rid of wolverines on the trap-lines that they set out for other furbearers. They want, for example, to prevent a wolverine from taking their target species. As scavengers, and very powerful ones at that, wolverines are famous for robbing trap-lines and breaking into supply caches. Nevertheless, wolverine fur is valuable, hence pretty much all of it ends up at the fur auctions. So the auction data so far does appear to provide a very good indication of overall harvest levels.

This is an example of how talking to people who are living with wolverines provides insight into conservation strategies: what I found out in my interviews strongly suggests that there are some situations where one would *not* want to recommend that all fur trapping cease. The fur auctions give us at least some sense about what is being taken from the land that is not being monitored by any other means—and chances are those wolverines might be harvested anyway even if they don’t come to auction.



Northern Ontario

Wolverine and woodland caribou ranges have receded during the past century as industrial development has expanded. Presently, the southern limits of the distribution of both hover around the current managed forest boundary—the “cut line.” Within the intensive study area, the Ontario Wolverine Project employs live-trapping, camera-trapping, hair-snaring and radiotelemetry. Aerial surveys for wolverines span the entire province north of the 50th parallel.

So you're saying that some trappers are going to trap or shoot the wolverines anyway even if it becomes illegal?

In some cases, there is a good chance of that because of the damage that a wolverine can do on occasion. Livelihoods and deeply held beliefs are at play here, although the perception of them as trap-thieves does not match up with the actual damage experienced. At the same time, it's fascinating to trappers and others living in the North that wolverines have been extirpated from many places where they once lived, which is often viewed with mixed feelings.

Are you optimistic about the long-term trends for wolverines?

Well, the long-term trends probably have little to do with wolverine harvest levels *per se*. They have to do with access. Folks often consider wolverines to be very difficult animals to trap and a lot of today's trappers in northern Ontario don't set traps specifically for them. There are only a handful that I have encountered that decide specifically to go after wolverine. It's not more than 6–10 wolverines that are harvested a year in the whole 450,000 square kilometer area. Wolverines are mostly harvested through opportunistic encounters—on a snowmobile, for example. The more motorized access there is to the landscape, the more opportunities to encounter wolverines.

The wolverine situation right now north of the 51st parallel in Ontario is quite good, and it appears that some range has been reclaimed since the 1970s. It was never a very abundant animal—this is at the periphery of its range; Ontario's lowland forests may be relatively marginal habitat compared to some core areas in mountainous and tundra areas. Perhaps it's doing well right now because, way up north, the prey situation has been pretty good with caribou and scattered moose and a few wolves to provide carcasses for scavenging. A healthy wolverine population has probably been facilitated by a lower level of trapping effort than in previous generations. Instead of spending nine months a year out on the land, many First Nations peoples are in settlements as of the last few decades, and spending less overall time in the bush. While this changing pattern of land use doesn't fully explain why wolverines are doing well today, it certainly contributes.

But this could change quickly: there are plans to move logging north of the "cut line" which is presently at the 51st parallel, and mining interests are quite high, and where you access natural resources you need roads. And roads are probably the biggest worry looming on the horizon—more than logging, more than mining—for the wolverine.

I've heard Michael Soulé say that the top three conservation problems are roads, roads, and roads.

I'm beginning to believe the same thing.

How do you do a large-scale survey of an elusive creature like the wolverine?

One of our partners, Audrey Magoun (one of the directors of the Wolverine Foundation and one of the first people to do a wolverine study in the 1980s), has experience in Alaska where there is a community of bush pilots who make their living on wildlife research. These are not only tremendous pilots, they have tremendous abilities to discern tracks and to understand what is going on from a vantage point of about 300 feet above ground. We were able to secure funding from the Wildlife Conservation Society, World Wildlife Fund–Canada, and the Ontario government to do aerial surveys over a two-year period looking for wolverine tracks in this 450,000 square kilometer area; it's been extraordinary. These pilots flew their PA-18 Supercubs in from Alaska—and we have covered more than 15,000 kilometers during two separate surveys.

Do you fly some kind of formal quadrant?

We're doing transects. Our method is dictated by the enormous constraints we face by working in roadless areas: communities are scattered; they certainly weren't designed for aerial surveys! We also need to transport fuel in advance; the preparation takes much longer than the surveys themselves. Our actual routes are dictated by where we can land and spend the night. We're doing this in the dead of winter—it was minus 38° Celsius on a recent survey—so stopping on route is not the best idea.

How do wolverines react to the fly-overs and the live-trapping? Is there debate about their level of stress?

There is always debate about stress—and that's appropriate. Certainly a wolverine is better off without a collar than with a collar; certainly a wolverine is better off not having been trapped than having been trapped. However, when looking at the broader perspective, the amount of information we get from the few animals we collar or track for a short time is well worth the cost. Wolverines might get stressed by an airplane for the few minutes that it is overhead, but the experience is over quickly. And a wolverine will probably only encounter us once. This is unlike the amount of stress encountered in the occasional encounter with wolves!

This stress on a few individuals needs to be weighed against the cost of not being able to answer critical questions about their needs, and, potentially, allowing a land-use pattern that endangers the entire population. For example, we have trapped and outfitted six wolverines with satellite collars in order to get an idea about range use and movements in relation to logging and other human disturbances; it is highly useful to know what we are talking about in terms of the areas that these animals range over. We can't just apply information from elsewhere—the boreal forest is too different from the other places where they have been studied. We don't know what it means to be a wolverine in these habitats; we don't know what kinds of denning structures they need; we don't know what are the limiting factors in their environment; we don't know how many there are and where they are. This information will bear directly on the size of protected areas and land management strategies.

Nevertheless, much of the best conservation research now uses a suite of entirely non-invasive techniques: camera traps, track plates, scat collection, scat-sniffing dogs. These non-invasive methods, where we can use them, are going to be favored more and more. I'm interested in trying to hone those non-invasive techniques. The fact that we got such great results with our aerial surveys in northern Ontario, and some promising results with hair snares and camera traps on a smaller study area, is very encouraging for wolverines in that whole range. In the future, we might not have to set up camp, try to trap these animals.

Are the wolverines in Ontario at the southern edge of their range?

Actually, they're at the eastern and southern edge of their range now, even though they used to range much further east—into Quebec and Labrador—and further south in Ontario. The last known harvest of a wolverine in Labrador was in the 1950s and in Quebec was in the 1980s. But they may still persist there. Inuit in those areas swear they see tracks. We're not sure, but there are plans to start an investigation.

Our aerial technique has piqued the interest of the Labrador Inuit Association and the Newfoundland and Labrador Wildlife Agency; they think this might be the ticket to exploring the wolverine sightings that have been reported by Inuit people and to contribute to recovery planning that they have been engaged in for several years. So they are planning a survey for 2005 that is very much designed like ours, and we are going to help. It's a neat application of some of the work we have been doing up north.

That's really exciting. You're hoping that you're going to find these creatures even though they haven't been scientifically documented in Labrador in 50 years.

It's very important to know because it will dictate the direction of conservation and management. For example, should they gear up to reintroduce wolverines? Presently, there may be good habitat in northern Labrador; the caribou populations appear to be in good shape and there are not many people. Wolverines would do well in that landscape. But managers need to know: are they there now?

Were wolverines once in the Adirondacks and New England?

They certainly are documented in several states and provinces, and some old maps show wolverine distribution extending down into New England, New York, and even into northern Pennsylvania. However, if you look very closely at records of wolverines—historical records in New York, for example—you only come up with a handful. This probably indicates that they were not strongly present in these areas; they were probably stragglers. But we're not sure.

Would it be a leap then to project what it would take to "restore" them to New England if this area was never a stronghold for them anyway?

I wouldn't proclaim from the hilltop that they *weren't* there as a stronghold. What we do know is that today's landscape is different from what it was like 300 years ago. These animals need enormous ranges. I would be extremely hesitant to get excited about reintroducing them in New England before we have wolves and caribou there—a sequence of changes is needed before you get wolverines into the restoration equation.

Also, there is probably some climate trigger that wolverines respond to. Though this is not proven, Audrey Magoun has a hypothesis that wolverine distribution is tied to a particular temperature and snow signature. If this is true, it would mean that the climate is even more important than human factors, and we certainly don't have the same climate today in New England as we find in their present stronghold.

How does your research about wolverines fit into the larger conservation landscape?

The wolverine work is only one aspect of my present research. The reason I am part of that study—other than the fact that I have grown to be fascinated with these creatures, of course—is because I'm involved in the Northern Boreal Initiative. This is a government-led land-use planning exercise in which the gov-

ernment is mandated to designate protected areas *prior* to letting any resource extraction go on north of the 51st parallel. This northern territory is currently unallocated, inaccessible forest. With resource development options becoming increasingly limited in southern Ontario, forest products and mining companies are looking northward. In addition, planning is underway to build an all-weather road network connecting northern Aboriginal communities in the province, many of which are grappling with achieving a balance between the pursuit of new economic opportunities and maintaining their cultural and ecological integrity in traditional use areas.

It became clear to the protected areas team of the Initiative that we needed more information. Most of the government's resources—in terms of research and monitoring—are geared toward areas where development is already taking place. North of the 51st has been all but ignored—so we have very little on which to base management decisions.

We decided to start studying the few species that stand to lose the most by moving “business as usual” up north. Woodland caribou and wolverine are particularly vulnerable to the kind of land uses being proposed for north of the cut line. They require very large, relatively intact areas. If we just duplicate and push north the kind of park system that we currently have in the rest of Canada, we stand to lose the source boreal forest habitat on which a lot of Ontario wildlife depend. Development has continually pushed these species northward—we need to help them hold their ground.

What do you need to know—what are the burning questions—before you can make good management recommendations?

There are so many burning questions that a fire might start! At the top of my list are threshold questions. We know a lot about the ecology of species either in pristine areas or in impacted areas. But we don't understand the thresholds: in a particular context, how much development can happen before that species or community will start seeing effects?

We are gaining this understanding with some animals. For example, with American marten the great work that has been done in Maine is helping us to understand some of those thresholds with regards to forest management. Also, I just wrapped up a project with Roland Kays and Matthew Gompfer in the Adirondacks looking at how carnivore communities respond to landscape change. The Adirondacks present a strong contrast between pristine areas in the middle of the park spanning out to the agricultural and suburban fron-

tier. We are measuring community structure in various parts of this landscape that allows us to identify thresholds of change. For example, at what degree of landscape fragmentation do raccoons start to appear? But we don't have that appreciation for the thresholds of some of these larger species like caribou and wolverine—and we're going to need that if we are going to do conservation right in the northern boreal forest.

The history of conservation in North America is mostly one of small victories and slow retreat. Do you think we can succeed in protecting the boreal forests?

You can't be a conservationist without being optimistic. I see this as a tremendous opportunity to do good conservation planning in northern Canada. That's where eyes are going to be turning because these are some of the last true wilderness areas left on the planet. There are a lot of amazing people in the effort, hell-bent on doing it right.

I also note that we have enormous pressures; there are powerful forces against conservation right now. And these forces are resource-dependent and these resources lie in these northern areas. Without changing this extractive behavior we don't have much hope. But I refuse to concentrate on that!

The northern boreal forest is the only area in North America where we are actually proactively establishing protected areas and trying to think about the conservation of the whole landscape—rather than retroactively fitting in protected areas within a sea of development.

Today, we still have source boreal forests. North America has northern Canada, Finland and the rest of Scandinavia have the Russian forest, and lots of birds and other wildlife depend on these source habitats—more than many people imagine. But this could all change, unless we act quickly.

I hope I'll continue to see boreal birds—winter irruptions of crossbills, and flocks of white-crowned sparrows traveling north each spring—resting in the cedars behind my house in Vermont.

Isn't that amazing that some boreal birds may now be in danger? But if they don't have a northern stronghold to rely on anymore then what do they have? The whole boreal forest could look cut-over like it is south of the 51st parallel. Imagine traveling farther and farther north through industrial timberland and all of the sudden you get to the boundary of the trees and that's it. But we don't have to accept business as usual; this chapter of forest history could have a much better ending, if we work together. ☪