THE RAVINES IN ONE OF THE WORLD’S LARGEST URBAN FORESTS NEED HELP AGAINST FRAGMENTATION, NEGLECT, INVASIVE PLANTS, AND NOW CLIMATE CHANGE.

BY LISA OWENS VIANI

PHOTOGRAPHY BY ROBERT BURLEY, COURTESY THE STEPHEN BULGER GALLERY

NORTHEND RAVINE

Toronto’s famed ravines, though not yet considered a forest, are the world’s largest urban forest. They are prime targets for invading species, pests, and diseases. Now, the ravines are facing a new threat: climate change. This article examines the challenges facing the ravines and the efforts being made to protect them.

NORTHEND RAVINE

Toronto's famed ravines, though not yet considered a forest, are the world’s largest urban forest. They are prime targets for invading species, pests, and diseases. Now, the ravines are facing a new threat: climate change. This article examines the challenges facing the ravines and the efforts being made to protect them.
ERIC DAVIES pauses every few minutes to bring binoculars to his eyes, scanning for the quick flash of a migratory warbler. The park we’re walking in, the Park Drive Reservation Lands in Toronto’s Don River watershed, is not silent—bird sounds abound—but something seems slightly off. For one thing, there’s no native understory, and the green that is starting to appear on the forest floor is an invasive plant, garlic mustard. Davies, a PhD candidate in forestry at the University of Toronto, shakes his head, pointing to a tree not yet leafed out. He breaks off a small twig, revealing a milky white sap. “See this latex sap? It’s completely toxic to insects. This is a Norway maple. They now make up 40 percent of the trees in the ravine. A 1977 study found only 10 percent.” Because Norway maples are toxic to insects, Davies explains, migratory birds must now stay twice as long to refuel on their journeys; the Norway maples also make the ground beneath them toxic so that the delicate native understory that used to be here—trillium, hepatica, trout lily, bloodroot, spring beauty, and others—no longer regenerates on its own.
Toronto is ribboned by ravines, steep forests carved by rivers and creeks, which cover one-fifth of the city, a total of more than 27,000 acres. Davies, along with other university researchers and citizen groups concerned about the health of the famed ravines, recently re-surveyed the same ravines that were surveyed in 1977. They are alarmed by what they found—a widespread decline in native trees, wildflowers, birds, and mammals over the past 40 years—and are pressing the city to take action.

Davies and his colleagues, who call their coalition TREES after the new Toronto Ravine Revitalization Study, are worried that there are no science-based plans for restoring the ravines’ ecology.

“These ravines are experiencing a rapid decline in ecological health,” Davies says. “Many of the trees are now under imminent threat of local extinction. That includes all ash species, due to the emerald ash borer, American beech from beech bark disease, eastern hemlock due to hemlock woolly adelgid, and butternut from butternut blight.”

Davies worries will spread to the native sugar maple. And old-growth oaks and shagbark hickories are coming down at a faster rate than expected. “Removing invasives, shutting up the eroding hillside, planting natives, trying to keep users on main paths, [and] building a raised boardwalk through marshy areas to allow water to move and people to move through are some of the steps,” she says. But Davies says despite its remarkable location and glorious old trees, even this ravine is experiencing a rapid decline in ecological health.

The city has developed an award-winning strategy that recognizes the ravines as a unique natural resource and establishes ways to approach their preservation. The city is also working on an implementation report that will be unveiled this fall, says Jane Welsh, a project manager of environmental planning for the city. That report will define ecologically sensitive areas as well as a matrix for how to prioritize them, Welsh says, and will address the resources needed for implementation.

The city’s current annual budget for ecological restoration is $60 million, says Jacylin Carlisle, a communications adviser for the city. Ravine stewards say that figure amounts to $370 per acre, not nearly enough to tackle the problems in the ravines.

“The city passed the [ravine strategy] without any additional funding, and the province is reducing the amount of money available to the city in daily pronouncements,” says Sharon Lovett, a volunteer coordinator with the High Park Stewards, a citizens’ restoration advocacy group. Yet Lovett also sympathizes with the city’s urban foresters. “They have very few staff working in this area and need to prioritize where to put their efforts to have the best outcome. There is no point removing invasives in an area where they aren’t going to plant or where there is little chance of native plants coming back from the seedbed or if there is a high level of disruption by people and dogs.”

Although the original 1977 study of the ravines called for establishing a science-based program across the city to monitor and restore them, such a program never happened, and people such as Davies and Paul Scrivener, one of the authors of the 1977 study, want to make sure that the new ravine strategy—and its eventual implementation plan—doesn’t sit on a shelf.

“Someone at the city has mapped many of the old-growth trees in E. T. Seton Park as part of his Big Trees of Toronto project, which includes more than 2,000 trees mapped, 20,000 seeds collected, and 5,000 trees growing.”

We have a program in which we train people to remove invasives,” says Welsh. “It obviously has to be done with care. We want people to have basic knowledge.” Welsh says she thinks there are worse-and more insidious invasives than the Norway maple, besides their toxic properties, adelgid, and butternut from butternut blight.”

“We have a program in which we train people to remove invasives,” says Welsh. “We have a program in which we train people to remove invasives.”

“We have a program in which we train people to remove invasives,” says Welsh. “We have a program in which we train people to remove invasives.”

“We have a program in which we train people to remove invasives,” says Welsh. “We have a program in which we train people to remove invasives.”
identified the need to develop management plans for respective ravines’ ecologically sensitive areas. She adds that city staff are developing detailed information on these areas to help direct management activities, including stewardship. “While not every ravine has a dedicated management plan or stewardship group, our approach combines staff, contractors, and volunteer management,” Carlisle says. “Staff guide volunteer stewardship in approved locations, which will not be harmed by trampling. We advise where it is better to undertake work through smaller groups of well-trained staff or contractors, where the work requires specialized techniques, or where conditions may not be suitable, such as steep slopes.”

Even the best invasives removal plan will not be enough to restore ecological integrity to Toronto’s forests, say Davies and Nina-Marie Lister, Honorary ASLA, who is the director of the Ecological Design Lab at the School of Urban and Regional Planning at Ryerson University. Although the city is removing infected ash trees, for example, these zones need thoughtful replanting plans. “The city could plant fast-growing native poplars or birch trees, depending on the soil,” Lister says. “Native pioneer species could be selected that are appropriate to the bottomlands of ravines or the slopes. They could then be thinned out over time and replaced with specimen trees. It should be done with an eye to long-term ecological health of the region.”

Lister points out that the ecological decline seen in Toronto’s ravines is not uncommon in North America—or throughout the world. “We are in a time of climate crisis with a biological decline like we’ve never seen before,” she says. “There is a frightening decline in native species everywhere.” She describes native trees as the bones of the forest and their loss as a “creeping ailment…. By the time we realize what’s happening, it will be too late.” She says. “Suddenly you look up, and there are no insects or native songbirds. It’s like a symphony but someone has plucked out the French horns, and many people may just think, ‘Oh well, it’s a woodwind symphony.”

Davies has analyzed data from the U.S. Forest Service for 50 cities throughout the United States and Canada, and found that almost all of them have lost more than half of their native trees. “It’s a good snapshot showing that our native tree diversity across North America is disappearing,” Davies says. “The trees are a canary in a coal mine.” The data he analyzed includes urban forests in many major metropolitan areas, including Washington, D.C., and Chicago.

Jeanne Braha, the executive director of the Rock Creek Conservancy in Washington, says Rock Creek Park, which is managed by the National Park Service, is about 20 percent covered with invasive species, including the Norway maple. But Japanese knotweed, English ivy, kudzu, and lesser celandine are bigger offenders, she says. Vines, in particular, climb up native trees and make them top-heavy and vulnerable to falling. “Our goal is to reduce the invasives to less than 5 percent cover,” Braha says. As in Toronto, the native understory has greatly declined as well. Braha says the National Park Service trains volunteers—called “weed warriors”—who in turn train other volunteers to help remove invasives. The volunteers typically focus on one or two species at a given volunteer event, and their efforts are beginning to make a difference. “We were really excited this year to see so many spring ephemerals pop up,” Braha says. “We were so excited to see they were still there—if you can just give them a little space.”

Chip O’Leary, an ecologist who is the deputy director of resource management with the Forest Preserves of Cook County, which manages 70,000 acres of native forest in the Chicago metropolitan area, says invasives have span the spectrum from ground cover to vines to trees. “Our woodlands have been invaded by a whole variety of small trees, including tree of heaven and black locust, which is very aggressive. Before you know it, it’s a really big problem,” O’Leary says. The emerald ash borer has taken a big toll, infecting one in five trees and causing the loss of many thousands of trees. “You cannot find an ash. It was a very thorough elimination of five different species of ash and was expensive to manage. It changed the look of our woods.” In the shrub layer, he says, Oriental bittersweet had so covered native cherry and oak trees that his foresters had a hard time finding the trees at one point. He said other native trees are doing well, however, and that the woodlands have good wildflower—the diversity across North America is disappearing.”

—ERIC DAVIES
University of Toronto researchers and citizen scientists have studied ecological change in Park Drive Ravine for 40 years.
Eric Davies, LEFT; Lisa Owens Viani, RIGHT

cover. His agency, which is a county government organization, works with many nonprofit partners, a restoration crew, a large network of volunteers, and trained contractors to manage invasives and otherwise care for the forests. O’Leary says the Norway maple is present—at a “low to moderate” level—but is on their worry list. “These things change quickly, and with climate change, we’re expecting some new [invaders] to come, and we’re quite nervous about that.”

Brian Crooks, a forester with the Western Pennsylvania Conservancy, which has acquired and protected a quarter-million acres throughout the heavily wooded state, says the spread of invasives, including the Norway maple, is a challenge in its forests as well. The emerald ash borer, the hemlock woolly adelgid, oak wilt fungus, and a new invader—the spotted lanternfly—are wreaking havoc on the state’s trees. In Pennsylvania, as in Toronto and elsewhere, the Norway maple is still planted as a popular, fast-growing street tree. Loss of a native understory is a problem throughout Pennsylvania forests, too. “These spring ephemerals need a certain host of characteristics in order to survive and propagate further,” says Crooks. He says Pennsylvania’s forests have been hurt not only by invasives but also by fragmentation, with native woodlands overtaken by manicured landscapes. “That limits where these higher value species can grow,” he says. His organization is tackling invasives by working with volunteers, including an annual garlic mustard pull. “We help them identify the right things to pull, so they know what they’re pulling,” Crooks says. The conservancy has also partnered with state parks on an invasive species management plan. “We’re trying to find the new invaders that we don’t know about and do our best to spread the word,” he says. The scale of effort needed to save these unique forest ecosystems, Davies and Lister both say, is much greater than current efforts. The city of Toronto recently hired a forestry expert to analyze and collect data in 200 small plots throughout the ravines, for example. But Davies says the data will only confirm what is already known: Native plants are declining in diversity and abundance while invasives are increasing.

“I think in many ways this approach is akin to fiddling while Rome burns,” Davies says. “What we need is adaptive management, to find management protocols to fix the problem, and to collect data on the management actions, to evaluate the data, and update the management actions. And like magic, these actions will get better, cheaper, and faster every year.”

Davies points out that the city is working to address crumbling freeways and other gray infrastructure but that addressing its crumbling green infrastructure is just as urgent—possibly more so—and needs similar levels of funding. “Toronto has one of the largest urban forests in the world, and, being so degraded, it probably has on its hands one of the most challenging, and exciting urban forest restoration projects in the world. Toronto is also one of the wealthiest cities in the world, with high-net-worth individuals. So what about using a public–private partnership to raise $10 million to transform a public space for the public good?”

Alissa North, International ASLA, an associate professor of landscape architecture at the University of Toronto, grew up next to one of the ravines and says she has watched their decline with alarm. “There’s an urgent need to act. We need the right canopy cover and species diversity—the Norway maple is a crazy invasive and hugely problematic. But it can’t just be that the city is going to go in and pay to remove trees and other invasives. How do you get people to become the agents of change if we were the agents of change in the first place? How can we use ourselves as the manpower?” Davies has proposed putting a civilian conservation corps to work, similar to the New Deal in the United States in the mid-20th century. For now, Davies and his colleagues are not waiting for the city to take action. With help from master’s students at the university, they have now mapped the location of more than 1,000 old-growth trees throughout the ravines, collected data on their health, and have identified more than 100 unique forest communities. They have also created a digital forest inventory of the entire ravine system, and are working on a plan to protect the older trees in the ravine system and to bring back the natural forest cover.”
more than 20,000 seeds, and begun growing them in schools, nurseries, and parks throughout the city. They’ve drafted a “Seeds to Seedlings Program Manual” for K-12 teachers and students to help them grow native trees for the ravines. “I view these trees as a living seed bank that can help restore the health and function of Toronto’s forests,” Davies says. He’s giving talks to capacity crowds, trying to drum up interest in developing a public-private partnership to save the ravines, similar to New York City’s Natural Areas Conservancy. His ideas are gaining notice. Toronto City Councillor Mike Colle says he has begun a Save Our Ravines effort, pulling in diverse stakeholders that he hopes will ultimately become a Toronto Ravines Conservancy. He was encouraged by a pharmaceutical company’s recent offer to adopt a ravine. Colle says it plans to inventory species, remove invasives, and replant with natives. “The cost is prohibitive given the city’s limited budget, but they’ve agreed to finance it themselves. That kind of partnership is the way of the future, and we have to create a channel for more private-sector partnerships.”

“It’s go time,” Davies says, as the climate changes and exacerbates the tolls of forest pests and diseases. “Not only for the Toronto ravines but for the whole world. It’s time to step it up everywhere—by 10 to 20 times.”

LISA OWENS VIANI IS A BAY AREA-BASED FREELANCE WRITER AND LAM CONTRIBUTING EDITOR WHO SPECIALIZES IN ECOLOGICAL AND WATER-RELATED TOPICS. SHE GREW UP ON A RAVINE IN PENNSYLVANIA, AND HER FATHER PLANTED NORWAY MAPLES IN THE BACKYARD.

The city has developed a master plan for Glen Stewart Ravine and allows volunteers to remove invasives and plant natives on a limited basis.