

Tribes have long studied how to preserve our most vulnerable ecosystems. Researchers in Mass. are listening.

A handful of prominent institutions are blending their research strategies with Indigenous knowledge to better conserve and restore the state's forests and wetlands

By [Ivy Scott](#) Globe Staff, Updated September 19, 2024, 1:40 p.m.

PETERSHAM — Roughly a quarter-mile into one of the more well-traveled trails in the Harvard Forest, a 4,000-acre [living laboratory that was once the hunting ground of the Nipmuc tribe](#), Keshia De Freece Lawrence stopped walking, peering up into the quiet canopies overhead. The September air filled with the soft rustle of hemlock and ash boughs but was eerily devoid of birdcall.

“For whatever reason,” she declared, “sky and land are not getting along right now.”

There are many signs of this discord, said Lawrence, the forest's Indigenous education specialist and a member of the Ramapough Lenape tribe. But among the most concerning to her is the decline of the red-tailed hawk, a sacred relative to her people.

Beside her, Harvard forest ecologist Neil Pederson nodded solemnly. The duo's

research into the red-tailed hawk in the Eastern United States is one of a handful of examples of prominent institutions in Massachusetts blending their own research strategies with Indigenous knowledge in an effort to better protect vulnerable ecosystems from the effects of climate change.

Along with Indigenous fellowships and research partnerships at [universities including Harvard and MIT](#), state climate officials are also providing funding for municipal governments and local tribes, such as the Wampanoag in Mashpee and the Mohicans in Stockbridge, to address ecological challenges in their region. From reversing harmful algae blooms in wetlands to tackling invasive species in woodlands, there is a growing understanding among policymakers and researchers that collaboration with Indigenous tribes is critical to addressing the overall health of an ecosystem.

“Tribal land management is an essential part of how we’re looking towards climate resiliency,” said Oleander Stone, the state’s deputy director of climate equity and environmental justice. “Land management is so much more than how we deal with invasive species. It’s about relationship building: how we build relationships with land, and how we build relationships with our past in order to build a more resilient future.”

Lawrence, who previously worked in the subarctic with a Canadian research center that facilitates partnerships between government scientists and the region’s Indigenous population, said the tribal perspective has a lot to offer academic researchers. For example, plants and animals are considered family members, referred to as grandfather or cousin, which Lawrence said makes addressing their decline feel both more personal and more urgent.

As part of her research, Lawrence has conducted dozens of surveys to understand

where red-tailed hawks are traveling and what is responsible for their deaths. Unlike Western scientists who might follow a rigid set of survey instructions, Lawrence said her research is often driven by an instinctive connection to the bird.

“I have abruptly pulled over on high-speed lanes before [to pick up a dead hawk],” she confessed. “I’m like, I saw a relative! I had to!”

Lawrence said on a recent drive, she found seven dead red-tailed hawks, all babies.

“For them to have this decline means there are definitely other things being affected [in the ecosystem] that we just haven’t noticed yet, and that’s the scary part,” she said.

A red-tailed hawk soared over the Harvard Forest. JOHN TLUMACKI/GLOBE STAFF

As top predators, hawks play a critical role in maintaining the predator-prey dynamics of woodlands, controlling the small mammal population and preventing other smaller animals from venturing beyond their native habitats and further disrupting the ecosystem.

In the past two years, Lawrence said, she has observed 86 dead hawks in the region between Massachusetts and Albany, only one of which had reached maturity. In some cases, it's clear the bird was struck by a car. In other cases, Lawrence said, she's found birds that appear completely whole and seemingly healthy, with the exception of their eyes, which have exploded. These instances, which she theorizes are the result of pesticide and rodenticide buildup in the hawk's bloodstream over time, are even more troubling.

"These things are not just a phenomenon," she said. "At some point, it becomes a pattern."

Pederson, an ecologist who has studied the impact of climate change on forests in the Eastern United States for more than three decades, said he was eager to lend his expertise to the Harvard Forest's research project and better understand Indigenous approaches to ecology.

Lawrence and Pederson both noted that while Western tradition has historically treated the symptom — by trying to increase the squirrel or rabbit population in a hawk habitat, for instance, since that's a primary food source — the Indigenous approach looks more broadly at the entire ecosystem as a family network: Could it be that the problem isn't actually the hawks' food source, but the trees where it likes to nest? Or if there *are* fewer rabbits, why? Did something happen to the grasses they usually eat? Have they been struck by a disease? If so, where did it come from, and it is

affecting squirrels and mice, too?

“That’s why the Indigenous perspective matters,” Lawrence said.

Through the state’s Municipal Vulnerability Preparedness program, officials have awarded millions of dollars in grants to tribes for land conservation or restoration work over the past three years.

For example, in Mashpee, the town’s natural resources department is [partnering with the Wampanoag tribe](#) for guidance on how to redirect stormwater runoff causing toxic algae blooms in Santuit Pond that were killing local wildlife. The town initially tried to disperse the bacteria using a solar-powered pump. When that failed, officials turned to nature-based solutions with input from the Wampanoag, which have so far been successful.

And last year, the Stockbridge-Munsee Band of Mohicans, many of whom were displaced from Western Massachusetts to Wisconsin centuries ago, [received more than \\$2 million from the state to purchase roughly 350 acres](#) of their Indigenous homelands and develop a land management plan.

Randall Wollenhaup, the tribe’s ecology director, said he envisions conducting a full land survey, with a focus on the invasive species that have cropped up in recent years, to study “what tree species are left, and how do we get it back to what we think the land wants to do?”

Keshia De Freece Lawrence (right) walked with Neil Pederson along a path in the forest. The duo are in the early stages of a research project into the red-tailed hawk intended to pair Western science with traditional Indigenous wisdom. JOHN TLUMACKI/GLOBE STAFF

Stockbridge Select Board member Patrick White said he believes Indigenous land management strategies, which tend to favor restoring native plant species over introducing new ones, will offer valuable tools for the town's future conservation and restoration practices in its woodlands. The town is immensely grateful for the help, he added, particularly when it comes to addressing the sharp decline in the region's core tree species, like hemlock and ash.

“Western management of our natural resources has been deeply flawed, and I’m just humbled and honored to learn anything we can to reverse that,” White said, “because

every time I walk through these forests, I'm elated [to be there], but also sad to see what we've done to it."

Back at the Harvard Forest, as Pederson and Lawrence veered off the main trail onto a smaller footpath, Lawrence said she wonders what's wrong with the red-tailed hawks' primary food sources that has prompted the birds to prey on city rats, or search for roadkill on the side of the highway. There have even been documented instances of them eating other, younger red-tailed hawks, universally acknowledged as "a red flag and a cry for help," she said.

As her research gets underway, Lawrence is blending her academic and native training to better understand the hawk and its ecosystem. Even as she pushes for Indigenous people to gain greater access to the prominent research institutions that have historically shut them out, she's also hopeful for more mutually beneficial partnerships that incorporate Indigenous wisdom into Western academic research at places such as Harvard.

"There's not a lot of board-level decisions being made to support this work ... but I'm hopeful that this can be a moment that tells the story of Indigenous people entering into these institutions," she said, "and that all those individual choices and partnerships [we're forging] are building up that sense of protocol."

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