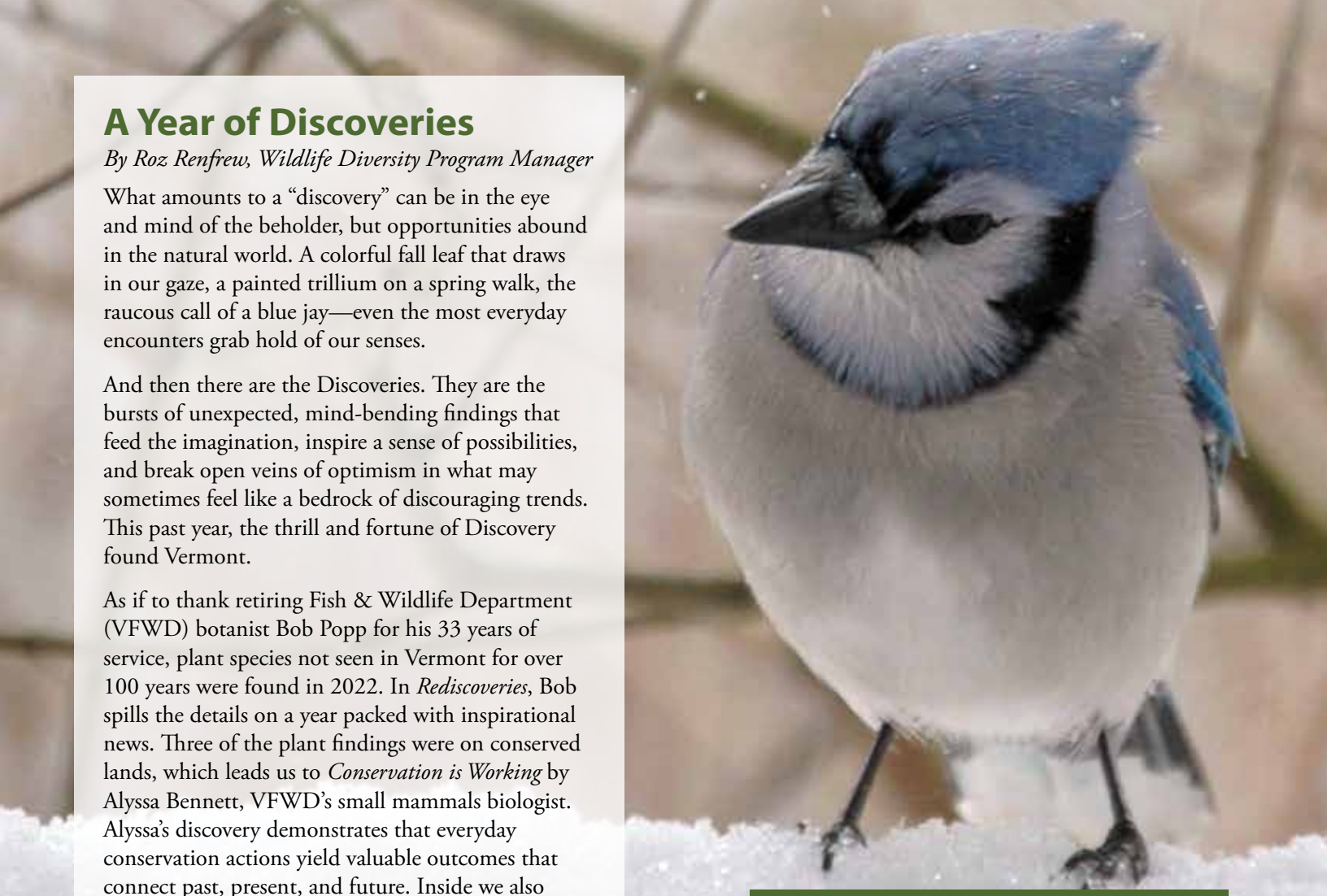
NATURAL HERITAGE HARMONIES

A publication of the Vermong Fish & Wildlife Department

Agency of Natural Resources

WINTER 2023

Conserving Vermont's fish, wildlife, and plants and their habitats for the people of Vermont



A Year of Discoveries

By Roz Renfrew, Wildlife Diversity Program Manager

What amounts to a "discovery" can be in the eye and mind of the beholder, but opportunities abound in the natural world. A colorful fall leaf that draws in our gaze, a painted trillium on a spring walk, the raucous call of a blue jay—even the most everyday encounters grab hold of our senses.

And then there are the Discoveries. They are the bursts of unexpected, mind-bending findings that feed the imagination, inspire a sense of possibilities, and break open veins of optimism in what may sometimes feel like a bedrock of discouraging trends. This past year, the thrill and fortune of Discovery found Vermont.

As if to thank retiring Fish & Wildlife Department (VFWD) botanist Bob Popp for his 33 years of service, plant species not seen in Vermont for over 100 years were found in 2022. In *Rediscoveries*, Bob spills the details on a year packed with inspirational news. Three of the plant findings were on conserved lands, which leads us to *Conservation is Working* by Alyssa Bennett, VFWD's small mammals biologist. Alyssa's discovery demonstrates that everyday conservation actions yield valuable outcomes that connect past, present, and future. Inside we also share a story of how some VFWD biologists made a discovery that turned a cold October day into the 4th of July.

These exceptional findings underscore the resounding call for biodiversity conservation, echoed during the 2022 Convention on Biological Diversity (COP15). *Biodiversity: From the Summit to the Base* attempts to bring this monumental, international gathering closer to home.

INSIDE HIGHLIGHTS

John Gange

Small Whorled Pogonia

Glenn Mittelhauser

Purple Crowberry

Donald Cameron © 2023 (gobotany.nativeplanttrust.org)

Mare's-tail

Rediscoveries

By Bob Popp, F & W Botanist

Finding new things is always exciting, but so too is rediscovering lost, or in this case, historic plants. This past year was extraordinary due to the re-discovery of two plant species that were believed to be extirpated (no longer occurring anywhere) in the state. Both species have been sought by numerous botanists, but it took the keen observational skills of two recreational botanists to rediscover these "lost" plants.

The federally threatened, small whorled pogonia (*Isotria medeoloides*) was last observed in Vermont at a single location in 1902, where it had been dug up from what is now the Burlington Country Club. It was discovered elsewhere on protected land in Chittenden County by a retired University of Vermont greenhouse manager who placed the image on the iNaturalist application, seeking identification assistance. This fall we had even more good fortune when an Adirondack Mountain Club summit steward rediscovered purple crowberry (*Empetrum atropurpureum*) on Mt. Mansfield during a Green Mountain Club field trip. The purple crowberry, not to be confused with the more common black crowberry, was last seen in the state in 1908, somewhere on Mt. Mansfield.

Complementing these spectacular highlights were rediscoveries of "missing" populations of two very rare plants. The state endangered mare's-tail (*Hippuris vulgaris*) was relocated at a site in the Northeast Kingdom where it had been last seen in 1895, and Torrey's bulrush (*Schoenoplectus torreyi*) was found on newly protected land in Windham County where it was last observed in 1912. Lastly, two species of bryophytes new to the state were discovered this year. The four-toothed moss is known only historically from Maine in the US while marble screw moss is rare in the northeast.

Three of these rediscoveries occurred on protected land, demonstrating the importance of land conservation. We rarely know all the species that are present, but we do know that conserving intact natural communities yields the best opportunity for supporting Vermont's biodiversity, from common species to rare ones. The fact that all these plants have persisted for so many years gives us hope in these times of ecological change. With Vermonters' increased interest in the natural world, we can assume that historic finds will continue.

Natural Heritage Harmonies is a free, annual publication of the Vermont Fish & Wildlife Department. Please acknowledge the Vermont Fish & Wildlife Department in any reprints.

Vermont Fish & Wildlife Department
1 National Life Drive, Davis 2
Montpelier, VT 05620-3702
(802) 828-1000 www.vtfishandwildlife.com

Cover image: Blue Jay by Heather Katsoulis, Creative Commons by SA 2.0

Biodiversity: From the Summit to the Base

By Roz Renfrew, Wildlife Diversity Program Manager

From the moss, fungi, and insects on a rotting log to the genetic makeup of a flock of birds, "biodiversity" can describe the diversity of life at any scale. In popular culture "biodiversity" invokes a sense of ecological robustness at larger scales, whether a natural community like the northern hardwood forest across countries or continents…or the entire planet.

"Biodiversity" had its moment in the media during the 2022 Convention on Biological Diversity's 15th Conference of the Parties ("COP15"), which established a strategy for biodiversity conservation worldwide. Hailed as its most important achievement was the global objective to protect 30 percent of land and sea by 2030. The most biodiverse countries are now slated to protect key areas such as the tropical forests of the Amazon, the Congo basin and Indonesia. Given 17 percent of terrestrial and 10 percent of marine areas are currently protected, this agreement charts a course for a significant increase.

COP15 also established the goal to reduce extinction risk by 2030. Many would have liked to see quantitative targets—for example, by what percentage the risk would be reduced, and what about the abundance of species? A target to enlarge natural ecosystems by 5 percent by 2030 was also considered, but didn't make it into the final version.

International "summits" draw sorely needed attention to global, vexing problems. The agreements that emerge are critical, despite the challenge in holding parties accountable. However, as Vermonters know intimately, a summit only rises from a base. To reach the "summit" of biodiversity is to weave together all the interdependent, functioning parts, from the minutiae to the grand, that form the basis of healthy ecosystems.

Such is the daily work of our Wildlife Diversity Program staff, alongside our many partners. If the intrinsic value of biodiversity fails to resonate strongly in a society increasingly disconnected from nature, that biodiversity is fundamental to our very survival might strike a chord. Without it, we would see more epidemics, failed crops, insect outbreaks, and floods, to name a few. In all its forms, and for all the reasons, biodiversity is the rich, complex fabric our existence absolutely depends on. The summits will only succeed with our achievements at the base.

VFWD

Indiana Bat fitted with a temporary radio transmitter.

Conservation is Working

By Alyssa Bennett, F & W Small Mammals Biologist

Excitement, disbelief, and pure joy. These are the feelings that rushed through me as we captured one Indiana bat after another in Hinesburg last summer with the help of volunteers. We set up several special "mist" nets along a wide forested trail on conserved land, but had only a small hope of capturing our target species, the endangered Indiana bat. Our goal was to find out whether the maternity colony we documented in 2006-2008 was still in existence after the deadly fungal disease White-nose Syndrome caused devastating population declines.

The Vermont Fish & Wildlife Department responded to the original discovery of Indiana bats in Hinesburg by acquiring a $500,000 Recovery Land Acquisition Grant from U.S. Fish and Wildlife Service as part of a complex land acquisition project. Naturally, we wondered if conserving this summer habitat was working. The bats roost in large trees with peeling bark such as shagbark hickory and declining white pine, elm, and ash. We had revisited other colonies over the past decade only to find greatly reduced numbers of bats, and wondered, would it be the same story here?

Within minutes of opening our nets at dusk we captured four lactating Indiana bats. We soon had to close our nets to focus on affixing temporary radio transmitters onto the backs of three individuals. These bats led us back to five different roosts over the next week, and to our amazement, all of them were on some type of conserved land. But the surprises didn't end there. After finding no more than 83 bats exiting any given roost since White-nose Syndrome hit Vermont,

(continued on page 7)

Wildlife Diversity Highlights - Supported With Help From Vermon

Your donation to the Nongame Wildlife Fund helps the future of Vermont's wild animals and wild places, protecting everything from y
We leverage your donation for additional federal funds, so one dollar to the Nongame Wildlife Fu


Dan Delcuia – VFWD

Lake Sturgeon

Tracking Endangered Lake Sturgeon

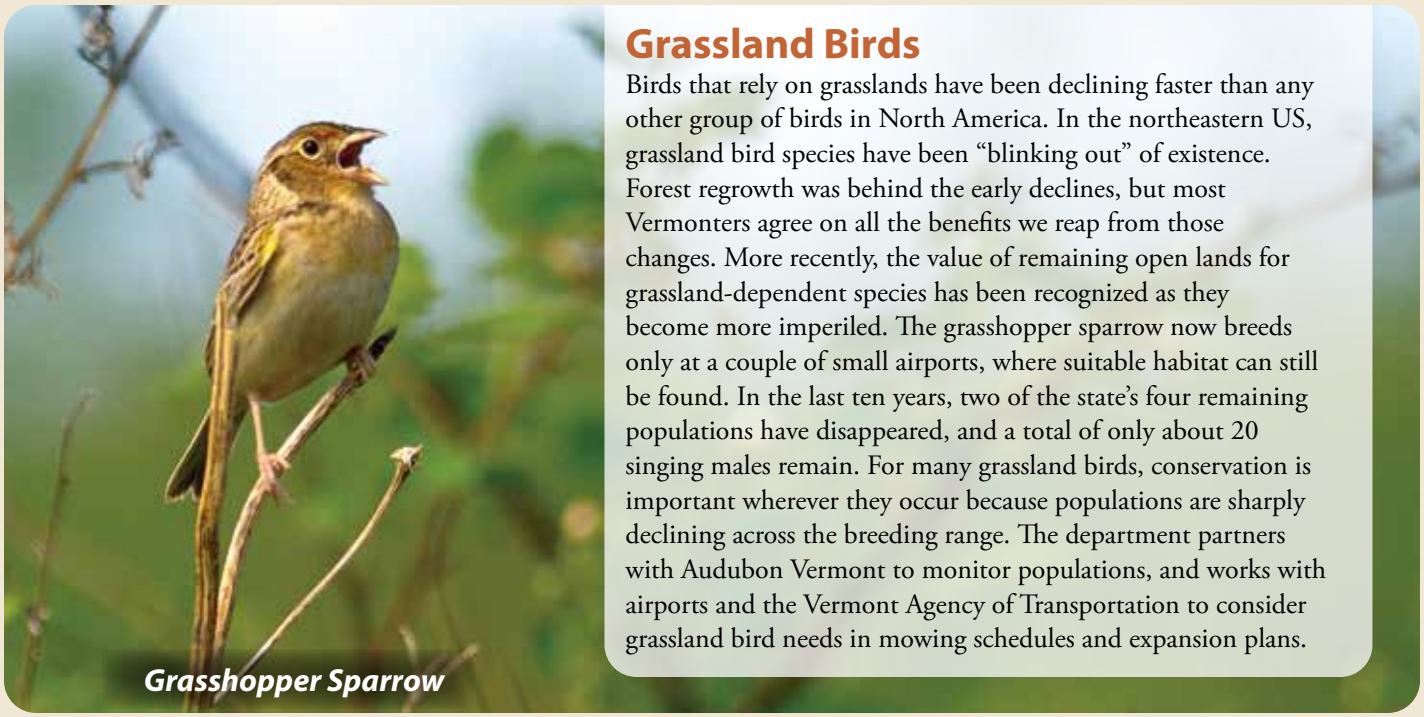
Following the priorities laid out in a 2016 recovery plan, research on lake sturgeon in Lake Champlain and its tributaries has focused on estimating population size, monitoring adult movements, and identifying wintering areas where sturgeon congregate. Results from an ongoing acoustic tagging project are contributing to our understanding of lake sturgeon movements in Lake Champlain, particularly for adults spawning in the Winooski and Lamoille Rivers. Increasingly, effort is also being focused on the Missisquoi River. Three lake sturgeon presumed to originate from and spawn in the Missisquoi River have been acoustically tagged in the past year. Their movements will be tracked over the next ten years to inform our understanding of spawning movements in this tributary as well.

Forest Management for Bats

Vermont is a leader in bat conservation. The guidelines the department provides for mitigating impacts of land-use activities to the state-endangered northern long-eared bat is one example of how we have earned this distinction. We have continued our extensive and intensive work with stakeholders, conducting on-site trainings for landowners, foresters, biologists, consultants, regulatory personnel, and land managers. We conduct regular surveys to understand the distribution, habitat use, and movements of the species, and identify cave hibernacula, tree roosts, and other important habitat features for this and other bat species. This information is used to inform appropriate protection and to prioritize conservation efforts. Our work gives Vermont a leg up as we prepare for a change in the species' status from federally Threatened to Endangered, planned for March 31, 2023.


VFWD

Northern Long-eared Bat


Andrew Weitzel - Flickr

Grasshopper Sparrow

Grassland Birds

Birds that rely on grasslands have been declining faster than any other group of birds in North America. In the northeastern US, grassland bird species have been "blinking out" of existence. Forest regrowth was behind the early declines, but most Vermonters agree on all the benefits we reap from those changes. More recently, the value of remaining open lands for grassland-dependent species has been recognized as they become more imperiled. The grasshopper sparrow now breeds only at a couple of small airports, where suitable habitat can still be found. In the last ten years, two of the state's four remaining populations have disappeared, and a total of only about 20 singing males remain. For many grassland birds, conservation is important wherever they occur because populations are sharply declining across the breeding range. The department partners with Audubon Vermont to monitor populations, and works with airports and the Vermont Agency of Transportation to consider grassland bird needs in mowing schedules and expansion plans.

t's Nongame Wildlife Fund

yellow-banded bumblebees to American martens. Many thanks to all our supporters who donate each year! und can yield two to three dollars more for conservation in Vermont.

Natural Community Classification & Inventory ➲

Natural communities are one of the primary considerations in management decisions on state lands, and for prioritizing conservation measures and activities throughout the state. Natural communities are a means to organize and understand the complexity of vegetation and wildlife patterns on the landscape. The department made a significant update to link Vermont's natural community classification to a major update of the National Vegetation Classification (NVC) system. Wildlife Diversity staff worked closely with ecologists from other northeastern states and our national partner NatureServe to refine the classification descriptions and geographic ranges. Such behind-the-scenes work provides a coordinated classification system that is essential to natural community conservation planning and implementation across the region.

Hemlock Forest Natural Community

VFWD

Red Eft

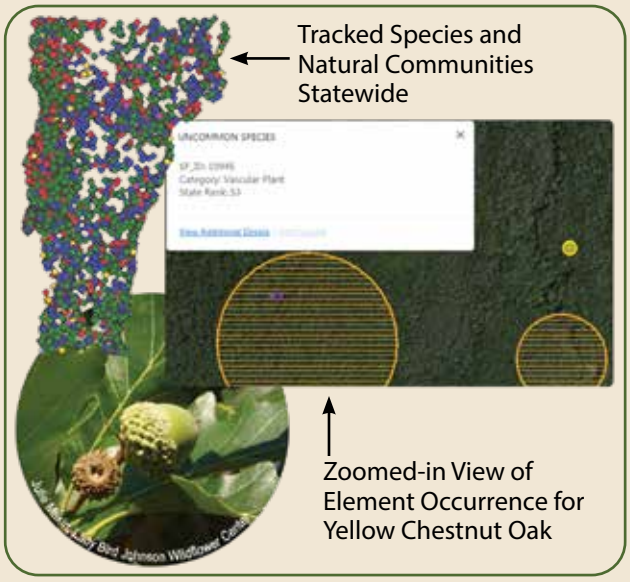
John Hall

➲Vermont Reptile & Amphibian Atlas (vtherpatlas.org)

First published in 1995, the Vermont Reptile and Amphibian Atlas relies heavily on volunteer citizen scientists to submit records of reptiles and amphibians ("herps") throughout the state. This ongoing project documents town-level presence of all Vermont reptiles and amphibians and has greatly enhanced our knowledge of herp distribution and abundance. Wildlife Diversity staff regularly provide records resulting from their own work, and the department provides funding for this essential project. To date, there have been more than 109,000 reports added to the atlas database.

VT Natural Heritage Database ➲

Vermont's Natural Heritage Inventory documents the diversity of native plants, animals and natural communities across the state. The value of this information is hard to overstate. It is an essential resource for local, state, regional, and sometimes even national conservation planning and management. It tracks the distribution of rare, threatened and endangered species to inform their conservation and protect populations. The database contains species and natural community type information such as taxonomy, conservation priority ranking, habitat descriptions, threats, and population trends. Boasting 2,454 animal taxa, 1,679 plant taxa, and 97 recognized natural community types, the Heritage database is continuously added to as we learn more about the presence and abundance of these species and communities in Vermont. General information is available to the public through Vermont Open Geodata Portal (geodata.vermont.gov) and the Agency of Natural Resources' online Atlas (anrmaps.vermont.gov/websites/anra5).



Seeking Spotted Turtles

By Luke Groff, F & W Herpetologist

Turtles are facing many threats worldwide, but one species in Vermont is poised to benefit from a new project. Last winter, the Vermont Fish & Wildlife Department partnered with the University of Vermont (UVM) and The Orianne Society to develop an ambitious project to identify unknown spotted turtle populations in the state and improve habitats that support these populations.

Luke Groff

State-endangered Spotted Turtle

The spotted turtle is state endangered and is currently under review for federal listing under the Endangered Species Act. Only three spotted turtle populations are known in Vermont. Additional unknown populations likely exist but have yet to be identified due to the species' low detectability, the complex habitats it uses, and a lack of concerted survey effort.

Our first step is to determine which wetlands in Vermont have the greatest likelihood of supporting spotted turtle populations. To do this, we will develop a model that identifies wetlands with characteristics, such as wetland type and adjacent landcover, that are similar to wetlands with known populations. After winnowing down the state's 385–577 square miles of wetlands, we will use multiple survey techniques to determine if any of the identified wetlands harbor unknown spotted turtle populations.

One of the survey techniques we will use is environmental DNA (eDNA), which involves collecting water samples and analyzing them for the presence of the species' DNA. This technique will allow us to determine if spotted turtles are present within a wetland without having to spend days or weeks conducting traditional visual and trapping surveys. We will use our survey results to inform the final phase of the project, which is to create, restore, or manage up to five acres of spotted turtle nesting habitat.

Our project is funded by the US Fish and Wildlife Service's Competitive State Wildlife Grant Program and is bolstered by partnerships with the US Geological Survey Vermont Cooperative Fish and Wildlife Research Unit, US Fish and Wildlife Service's Fish and Wildlife Partners Program, and Smithsonian Conservation Biology Institute's Center for Conservation Genomics. Funding will, in part, support a UVM graduate student to lead the project under the advisement of Dr. Brittany Mosher. We are hoping to make some discoveries!

The Independence Tree

By Bob Zaino, F & W Natural Community Ecologist

"How old could that tree be?"

We were a small group of Vermont Fish & Wildlife ecologists and biologists, exploring a Montane Yellow Birch-Red Spruce Forest, a natural community found on middle elevations of Vermont's mountains. It's above the familiar Northern Hardwood Forest of sugar maple, beech, and birch, but below the dense spruce and fir that blankets the ridgelines. Yellow birch and red spruce trees are intermixed in the canopy, and the understory is usually a dense carpet of mountain wood fern or a thick tangle of hobblebush.

Wandering through this forest on a cold and cloudy October day, with the sky spitting snow, we saw some of the tell-tale signs of wildlife. Oval-shaped depressions of matted ferns indicated moose beds. Bite and claw marks on a stunted paper birch marked the passing of a black bear.

At this moment, though, we focused on the tree. It was a tall red spruce, but not particularly large in diameter. It grew on a steep slope at the base of a short cliff. Using a tool called an increment borer, we carefully extracted a narrow cylinder of wood containing a cross-section of the tree's annual growth rings. (This process doesn't harm the tree.) We counted them with the help of a magnifying lens—100 rings… 200 rings… all the way to 246 rings—reflecting a remarkable 246 years of growth! We had discovered a red spruce that started growing in 1776.

It's easy to marvel just at the longevity of such an old tree. But old trees, and old forests, have important ecological roles. Just as young forests are critical for some birds and mammals, old forests also provide essential habitat. Lungwort lichen and shingle moss are two of the many species of fungi, lichens, and mosses that thrive in old forests. The dead and fallen trees in old forests support many species of beetles and other invertebrates. And many common birds and mammals, like black-throated blue warbler and fisher, are abundant in old forests.

As we walked out of the woods, we all agreed that the appropriate name for the tall red spruce was inescapable.

Noel Dodge

F & W staff discovered a red spruce that started growing in 1776 and aptly named it the Independence Tree.

Conservation *(continued from page 3)*

in this area we saw an astonishing 150-300 bats exiting each roost on any given night, with a total colony size of an unprecedented 700+ bats! Keep in mind that bats only have one young per year, putting into perspective this miraculous finding after such severe population declines.

The story gets even better. For the first time in Vermont, we observed Indiana bats roosting in bat houses that were built by Eagle Scout Thomas Keller 10 years ago. We trapped bats exiting the houses and confirmed the residents were all indeed Indiana bat females and their newly flying pups. For the most northeast-known Indiana bat colony in the entire species' range, we believe habitat conservation may play a central role, as climate change is predicted to cause their range to shift northeast. Conservation is an investment for our future, with dividends that are worth the wait.

Wildlife Diversity Program
Vermont Fish & Wildlife Department
1 National Life Drive, Davis 2
Montpelier, VT 05620-3702
www.vtfishandwildlife.com

Your Support Makes a Difference!

Please donate to the Nongame Wildlife Fund on your Vermont income tax form or online.

Comings and Goings

By Danielle Owczarski and Roz Renfrew


Danielle Owczarski

Danielle Owczarski is the new State Lands Ecologist, accepting Bob Zaino's former position in the Lands and Habitat Program in July. Danielle graduated from the University of Vermont's Field Naturalist Program with a master's degree in plant biology and has served as a state Wetlands Ecologist and Watershed Planner before joining the Fish & Wildlife Department. While Danielle loves all the natural communities Vermont has to offer, she has an affinity for wetlands and their diverse and resilient species assemblages—forested, boggy and marshy!

Danielle works statewide on lands owned and managed by the Agency of Natural Resources (ANR) including wildlife management areas, state forests and state parks, to protect and enhance significant ecological features. She is responsible for the inventory, assessment, and monitoring of natural communities, and also works on developing long-range management plans for state lands.

After exactly 10 years with the Fish & Wildlife Department, Doug Morin is embarking on a new adventure.

When he began his tenure he coordinated the development of a long range management plan for West Mountain, the department's largest Wildlife Management Area (WMA). The property had a long history of public interest that required Doug to navigate strong opinions about how it should be managed. Thanks to his masterful skills of diplomacy, the department was able to restore trust and support from constituents who had long-held, hard feelings about WMAs and our management.

In 2019 Doug switched gears and became the state's bird biologist. He seamlessly transitioned to carry on monitoring projects for several listed bird species with our partners at Vermont Center for Ecostudies and Audubon Vermont. He started a blog, provided guidance for permits and mitigation for listed species, worked with rehabilitators, responded to public inquires, and so much more.


Chris Ingram

Doug left an indelible mark on public land stewardship and bird conservation in Vermont. He and his wife are starting an apple orchard business in Whitefield, NH. We'll see him at the orchard for his inaugural crop in 2024!