

NATURAL HERITAGE HARMONIES



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Vermont Fish & Wildlife Department
Agency of Natural Resources

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

An Uncertain Future: Vermont's Pollinators at Risk

by Deb Markowitz, Secretary, Agency of Natural Resources

Last year Vermont added three species of bumble bee to its threatened and endangered species list. One might wonder why it matters that there are declining numbers of rusty-patched, Ashton's cuckoo, or yellow-banded bumble bees when Vermont is home to 275 bee species? While 3 among nearly 300 may not seem significant at first glance, 60 to 80 percent of wild plants in our state are dependent on animals, mostly bees, for the 'ecosystem service' of pollination. Whole communities of flowering trees, shrubs, and herbs benefit from their activities.

In Vermont, many species of birds and other wildlife feed on blueberries, blackberries, apples, and serviceberries. How empty and silent our woods and fields would be without them. How diminished our own diets would be without the staple foods bees and other pollinators provide.

Yet across the state pollinators are facing several threats, from loss of habitat to disease epidemics. While researchers around the world continue to search for answers, we as a state have taken steps to curb pollinator losses. Along with listing the bumble bee species, we practice and advocate for thoughtful land management techniques to provide habitat for these critical species, and we counsel the careful use of pesticides and mowing on farms, fields and gardens.

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Nine Additional Species Protected in 2015

Agency of Natural Resources Secretary Deb Markowitz added nine new species to the state's endangered species list in 2015, based on recommendations from the Endangered Species Committee. Here's a quick rundown of what was listed.

Three bumble bees were added to Vermont's threatened and endangered list in 2015. The **rusty-patched bumble bee** and **yellow-banded bumble bee** are both facing declines due to a new parasite, thought to have been transmitted by captive-raised bees imported for farming. Pesticides such as neonicotinoids may also be driving their declines. Unfortunately, the **Ashton's cuckoo bumble bee** is dependent on the other two listed bee species for nest sites and has thus declined with them.

Two trees that are nearly one-of-a-kind in Vermont were listed as state endangered. The only known **wild tulip tree** location in Vermont is a single large 125-year-old tree, along with a few saplings and seedlings. The tree blossoms with beautiful orange flowers. At the time it was added to the state endangered species list, there was only a single known **dwarf birch tree** in Vermont, on a protected, high-elevation slope. More trees were suspected and have since been found. Unlike its grander cousins like the paper birch, the dwarf birch is a low shrub that is typically found on arctic tundra.

An incredible recent discovery was the **Green Mountain quillwort**, the world's only species that is found solely within Vermont's borders. This species was discovered by an amateur botanist. Looking somewhat like a fern, this species only lives in a single high-elevation pond and was listed as endangered. Vermont's single known population of **whorled milkweed**, composed of around 40 plants, was also listed as endangered.

The **rusty blackbird** is considered one of the continent's most rapidly declining species, and it was recently listed as endangered in Vermont. The cause of its decline remains a puzzling mystery to biologists.

The **Fowler's toad**, another recently listed species, was always rare in Vermont on sandy spots along the Connecticut River. But it has not been detected in the state in at least 15 years, although it has been located on the New Hampshire side of the river. It is difficult to tell apart visually from the more common American toad, but it is easily identified by its distinctive "waa-a-a-a" call that is sometimes compared to a bleating sheep.

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

cover image: Yellow-banded bumble bee (*Bombus terricola*)
sleeping on tall white clover (*Melilotus alba*). ©Leif Richardson



Rusty-patched Bumble Bee



Whorled Milkweed



Wild Tulip Tree



Rusty Blackbird



Fowler's Toad

Pollinator Palate Pleasers

With pollinator declines in the news, many gardeners are looking for ways to promote bees, butterflies, and moths in their gardens. For yards and gardens designed with pollinators in mind, plants with a variety of showy flowers that readily attract bees and other insects should make the top of the list. Bob Popp, botanist for Vermont Fish & Wildlife, also recommends that native plants be used whenever possible because local species of flowering trees, shrubs and plants are familiar to local pollinators and likely to be in flower when the bees are active and feeding. This means planting not just spring-blooming plants but a broad array from May to late fall. Such a palette could include wild geraniums and foamflower in the spring, followed by native campanulas to black-eyed Susan and Joe-Pye weed in the summer, and gentians and asters in the fall.

Popp also suggests that if you're planning an ornamental or pollinator-friendly garden, that you consider fruit trees, such as apples and crabapples, raspberries, blackberries, blueberries, and roses. A gardener's gentle tolerance for weeds is also beneficial for pollinators—after all, to a bee or butterfly that weedy flower (such as goldenrod) might just be their favorite or only source of pollen. The USDA list of pollinator-attracting plants can be downloaded from our website www.vtfishandwildlife.com.

And while putting up with weeds may be easy, finding nonlethal ways to deal with unwanted visitors—such as flying or crawling insects—is also essential. Using organic, pollinator-friendly barrier methods of insect control will ensure that pollinators aren't accidentally targeted. Popp notes that insecticides that contain neonicotinoids, which are especially harmful for bees, should be avoided. The Xerces Society website (www.xerces.com) has many tips for protecting pollinators and lists garden sprays harmful to pollinators.

Finally, Popp recommends taking the time to sit and watch, especially bees in local fields, as they go about their work. For those inclined to look closely, you can even observe bees pollinating milkweed. “The milkweed flower has two pollen sacs connected by a filament, so they look like two buckets on either end of yoke. When the bee stops to gather pollen from the top flower, her leg catches on the filament and she carries the lower sac off to the next flower. Over and over again. It's entrancing.”



Native Azalea

Bob Popp

For yards and gardens designed with pollinators in mind, plants with a variety of showy flowers that readily attract bees and other insects should make the top of the list.



Apple Blossoms

Dwight Sipler



Black-eyed Susan

Doug McBee



Asters

USFWS

Vermont's Nongame Wildlife Fund – Conserving Vermont's Nature

A gift to the Nongame Wildlife Fund is a gift to the future of wild animals and wild places in Vermont and protects everything from osprey to moose. We're able to leverage your donation for additional federal funds, so one dollar to the Nongame Wildlife Fund can yield an additional ten dollars.



John Buck

Survey Spruce Grouse

Spruce grouse are found in only two known locations in Vermont's Northeast Kingdom, Nulhegan Basin and Victory Basin. We conducted surveys to document the extent of these state endangered birds in 2015.



VFWD staff

Preserve Vernal Pools

Perennial spring pools in the forest are the epicenter of breeding for many frogs and salamanders. Department staff along with Arrowwood Environmental and Vermont Center for Ecostudies have mapped many of these pools and are working to protect them against intrusion from development and other potential impacts.

Prioritize Important Habitats

We continue to map Vermont's natural communities, which are recurring groups of plants and animals that regularly occur together in certain physical environments. Knowing where rare or important natural communities exist help us make land management decisions on state land and prioritize conservation action on private lands.



Tom Rogers

Natural communities ecologist Eric Sorenson gathers data for mapping Vermont's natural communities.

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prey to sturgeon. We appreciate all of the people who donate year after year! Two to three dollars for conservation in Vermont. Here's how your gift helps.



Daneil Pieterse

Support Imperiled Rattlesnakes

Much like white-nose syndrome in bats, Vermont's timber rattlesnakes have been struck with a mysterious new fungal disease. We have been monitoring these snakes for snake fungal disease to determine if anything can be done to slow its spread.

Conserve Land for Rare Plants

Department staff monitor imperiled plant species and document their locations. This year, we doubled the size of Turner Hill Wildlife Management Area to continue protecting beaver-influenced wetlands that support the endangered Northeastern bulrush.



Arthur Haines, New England Wild Flower Society



Wildlife biologist Scott Darling examines a big brown bat.

Tom Rogers

Protect Vulnerable Bats

Vermont's bat species seem to have slowed their precipitous decline from white-nose syndrome, but they remain at dangerously low levels. Fish & Wildlife Department staff are working with university researchers from New York towards finding a cure for this devastating fungal disease.

Monitor Bald Eagles

Fish & Wildlife Department biologists, with help from Audubon Vermont staff, monitor the bald eagle's recovery in Vermont, and work with landowners to protect nesting sites. Bald eagle nesting success fell slightly in 2015 due to a cold, snowy start to spring.



Tom Rogers

Bumble Bees Use Flower Pharmacies to Fight Parasites

Plants make compounds, or chemicals such as hormones, to carry out the 'primary' tasks of photosynthesis, growth and reproduction. But they also create secondary compounds that have many other purposes. Chief among these is defense: they make plants distasteful or toxic to plant eaters that would otherwise chomp away.



Tri-colored Bumble Bee

©Leif Richardson

Interestingly, these defense compounds are not only found in leaves. They're also present in fruits and flowers. Yet whether these chemicals affect pollinators such as bees is still unknown.

In a lab setting, we infected the common eastern bumble bee (*Bombus impatiens*) with a gut parasite known to shorten bees' lives and limit their reproduction. Then we fed the bees a diet containing one of eight secondary compounds that naturally occur in the nectar of plants visited by bumble bees in the wild.

After one week, we counted parasite cells in bee guts. Overall, a diet containing these plant compounds resulted in healthier bees with far fewer parasites. The strongest effect was found in bees fed a compound created by tobacco, anabasine, which reduced parasite load by more than 80 percent. Other compounds that protected bees from parasites are found in nectar of basswood trees, and in turtlehead, a wetland plant of eastern North America.

We expected that these bees might also live shorter lives as a result of eating these plant compounds, but that did not happen. The bees fed anabasine took longer to mature and lay eggs, but ultimately produced just as many young in our experiment.

This research clearly demonstrates that wild bees can benefit when they consume the secondary compounds that are naturally present in the nectar of flowers. And bees' lifetime exposure to these compounds is likely even greater in the wild than in our experiment in the lab.

Could this research be leveraged to help declining bee populations? We don't know... yet. However, our findings suggest some interesting questions about landscape management, pollinator habitat gardening and farm practices, all of which could contribute to protecting these important species from further declines.

—Leif Richardson

USDA NIFA Postdoctoral Research Fellow, UVM

Read the original article at <http://theconversation.com/>

Vermont's Pollinators at Risk

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Additionally, on March 17, the Agency of Natural Resources is hosting an all-day symposium, **Beetles, Bees and Butterflies: A Symposium on the future of Vermont's Pollinators**. The event brings together national, regional, and state pollinator experts as well as local beekeepers, farmers, gardeners and birders to discuss the threats facing our pollinator populations and to strategize on how to address the challenges they face.

For all of us, this is a time of climate instability and threats to the state's wild diversity. Your support of nongame species management has made a difference to eagles and ospreys, sturgeon and spiny softshell turtles, marten and Indiana bats. By continuing to work together we can also make a difference for pollinators.



Confusing Bumble Bee

©Leif Richardson

A Sign of Summer May be Lost Forever

Have you noticed something missing from the summer landscape recently? When was the last time you saw a monarch butterfly fluttering by on a sunny day?

The reason you may have trouble recalling a recent sighting of these once ubiquitous signs of summer is because monarch butterflies are in decline nationwide, and may be approaching dangerously low levels.

Monarch populations have decreased nearly 80 percent in the past 2 decades, down from an estimated 1 billion butterflies in the 1990s. They're struggling in large part because widespread herbicide use on Midwestern mega-farms is killing off their primary food source, milkweed plants.

But Vermont may play a crucial role in the future of monarch conservation. Our meadows and old fields provide ideal habitat for milkweed, on which monarchs lay eggs and feed as caterpillars.

Pesticides called neonicotinoids may also threaten monarch conservation. They are used on agricultural crops and are also applied in concentrated doses on home gardens, lawns, and ornamental trees.

Monarchs and other insects are critical for pollinating agricultural crops, wildflowers, and even the trees in the forest. We're working with Vermont Center for Ecostudies and others to make sure that a summer day in Vermont includes these beautiful, fragile creatures.



Monarch Butterfly

Kenneth Dwain Harrelson, Wikimedia Commons

WHAT YOU CAN DO TO HELP MONARCHS

- Allow milkweed to thrive—try not to cut it from July through October when monarchs are present in Vermont.
- Retain patches of wildflowers by leaving them unmowed while they are in bloom to provide monarchs with nectar plants.
- Limit your use of pesticides and herbicides.

DID YOU KNOW?

Monarchs from eastern North America overwinter at a single site in the mountains of central Mexico. But a monarch that leaves Mexico will never make it to Vermont. Instead, several generations are born and die along the way, meaning their great-grandchildren complete their migration each summer.

Together We Saved the Loon. Let's Not Stop Now!

Help Vermont's endangered wildlife by donating to the Nongame Wildlife Fund.

Look for the loon on line 29a of your Vermont income tax form or donate directly online at www.vtfishandwildlife.com





Wildlife Diversity Program

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1 National Life Drive, Davis 2
Montpelier, VT 05620-3702
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Your Support Makes a Difference!

Please donate to the Nongame Wildlife Fund on your Vermont income tax form. Look for the loon icon.



Volunteer Spotlight - Greg Van Buiten

Greg Van Buiten's love of wildlife is not new. He first met Fish & Wildlife biologist Steve Parren nearly 25 years ago through a shared interest in timber rattlesnakes in Vermont.

Today, Greg maintains most of his property along the Lamoille River as a nesting site for map turtles, providing sites for up to 60 turtles each year. He also boats out and monitors a spiny softshell turtle nesting site along the river. Not only does Greg provide important help that would be difficult for the department to do otherwise, the dollar value of his volunteer time is matched by a federal grant that provides \$1,800 annually towards the conservation of imperiled wildlife in Vermont.

On volunteering with Vermont Fish & Wildlife:

"It's been a lot of fun and I've learned a great deal. If you're thinking about becoming a volunteer, it's really worthwhile. You get to be outside and work with great people. It's such a gift to be involved with this work and with the committed staff and volunteers."

On why he donates to the Nongame Wildlife Fund:

"Living next to the river, I feel as though I share it with the turtles. It's important to me to know these species are thriving. When I can contribute to that cause, even in a small way, that really makes a difference. This is money well spent."



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