

# Field Notes

VERMONT CENTER FOR ECOSTUDIES | *Uniting People and Science for Conservation*

## VERMONT'S IMPERILED FRESHWATER MUSSELS

# Odd Names, Serious Trouble

| BY KENT MCFARLAND

**B**arely moving, they lie silent on the bottom of lakes, rivers, and streams, filtering water while feeding on microscopic food. So inconspicuous, they are often passed over as rocks. Yet these native animals are sending us an urgent message: many of our waterways are in trouble.

Freshwater mussels are bivalves—animals with two shells—and live on every continent except Antarctica. Home to more than a third of the world's species, North America is a hotspot for bivalve diversity. But, freshwater mussels are also one of the most endangered groups of animals on the continent. The Nature Conservancy reports that about 70 percent of freshwater mussels in North America are extinct or imperiled, compared to just 17 percent of mammals and 15 percent of birds.

In Vermont, 10 of the 18 native mussel species are listed under the state endangered species law, and several others are considered rare. One species, Dwarf Wedgemussel, is classified as Federally Endangered.

Steve Fiske, an aquatic biologist with the Vermont Department of Environmental Conservation (VTDEC), has monitored freshwater mussels for 30 years. "I've seen mussel populations decline here in Vermont from three major threats: invasive Zebra Mussels, stream warming, and streambed sedimentation and scour," says Fiske.

Zebra Mussels, native to eastern Europe, likely made their way to North America via ships originating from European ports, which discharged

*(continued on page 9)*

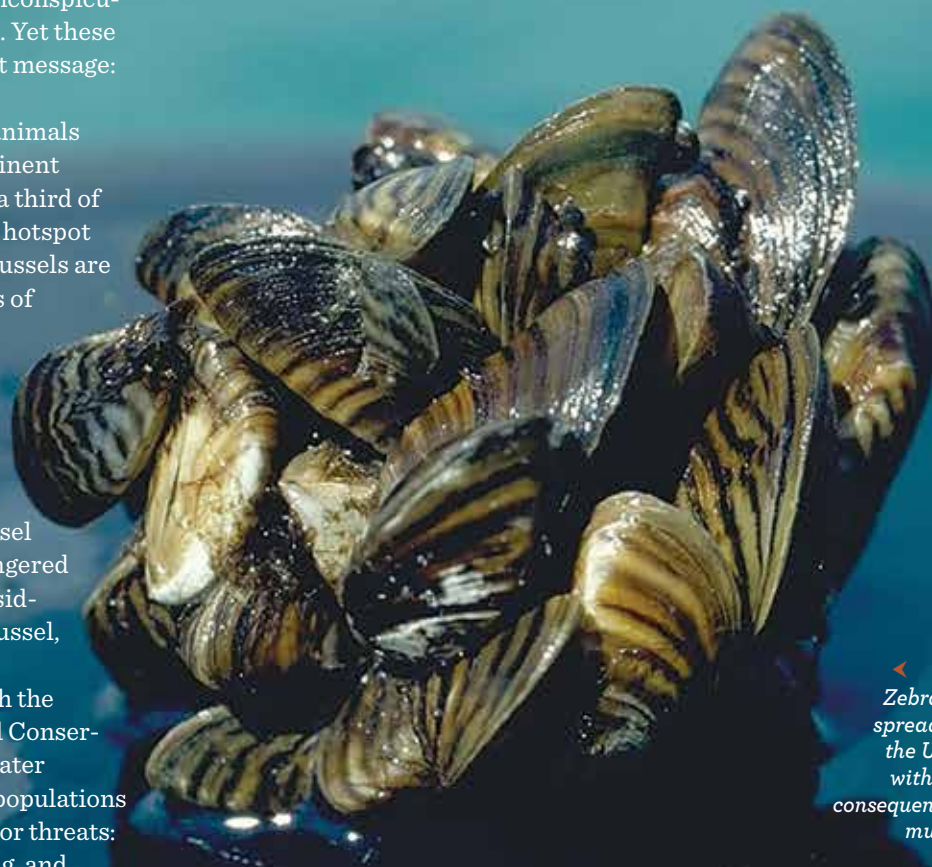
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◀ *The invasive Zebra Mussel has spread throughout the United States with devastating consequences to native mussel species.*

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## FIELD NOTES

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The Vermont Center for Ecostudies (VCE) is a nonprofit organization whose mission is to advance the conservation of wildlife across the Americas through research, monitoring, and citizen engagement. With a reach extending from Canada and northern New England through the Caribbean and South America, our work unites people and science for conservation.

Field Notes is VCE's biannual newsletter and is free to our constituents.

### VERMONT CENTER FOR ECOSTUDIES

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## VCE VIEW



**A**t the core of VCE's existence is our unshakable conviction that science must underpin decisions related to conservation and environmental health. As an organization, VCE strives to deliver the unbiased, empirical science that is essential to make wise choices about our natural world. Recently, the legitimacy and fundamental value of science as a tool to craft public policy have come under fire. Many of our current political leaders are in effect denying or demeaning, and thereby undermining, the scientific process.

VCE has every intention of standing up to this assault in a constructive and resolute manner. We will do so thoughtfully, selectively, and transparently. We will continue to champion the cause of objective, fact-based science as a means to safeguard ecological integrity, environmental and human health, and the wellbeing of our natural communities.

It comes down to this: facts matter. Data generate results, and these must stand on their own, uncensored. We cannot allow science communication to be blocked from reaching the public, and the policy makers in whom we entrust our ecological future.

VCE will stand up for science and scientists as we strive to improve the

welfare of our natural world—human inhabitants included—and to discover and explain its wonders. We will adhere to the highest standards of scientific integrity and independence as we address current and emerging environmental threats. How? We will lead within the conservation science arena to make data open and accessible; we will participate in the peer-review process as contributors and reviewers; we will advocate for decisions and policies that are based on the best available science.

And, most importantly, we will continue to deliver our own robust scientific findings to policy makers and others who can put them to work for conservation.

All of us, scientists and non-scientists alike, who believe that science can and must contribute to good decision-making and public policy, need to make our voices heard. Far too much is at stake to let those in positions of political power treat science as just another point of view. We need to demand that our elected representatives stand up for open, transparent, and uncensored science. We hope you'll join us in this struggle. It is one we simply cannot afford to lose. **FN**

*Chris Rimmer*  
EXECUTIVE DIRECTOR

[www.vtecostudies.org](http://www.vtecostudies.org)

© KENT MCFARLAND

© FYN KYND

*A male Common Eider in breeding plumage swims off the coast of Monhegan Island.*

*Below: Intrepid birders gather on Monhegan's rocky shore to identify pelagic migrants.*

# The Surprise of Monhegan

**A fall birding trip provides a setting for the unexpected.**

| BY SUSAN HINDINGER

**B**irders love a challenge, like finding that one Pink-footed Goose in a cloud of Canadas, or deciphering Blackpoll from Bay-breasted warblers in fall plumage. But perhaps even more, birders love a surprise. If you're a habitual birder, you likely have a few regular haunts. And when you visit those—especially during the height of breeding season—chances are, you know what to expect. So, we birders look to spring and fall migration in our quest for the unexpected.

Last October, VCE and 25 adventurous friends made a four-day foray to view the migration spectacle on Monhegan Island, Maine. The possibility—the promise—of Monhegan is the element of surprise. The East Coast's fall migration birding hotspots share some key features, and Monhegan offers them all. At 10 miles from the mainland coast, which migrating birds often follow, the island is far enough offshore to provide views of pelagic birds as well as wayward terrestrial species, sometimes in extraordinary numbers. Its isolation concentrates birds from a wide area seeking terra firma. Its many vantage points make for easy observation, and it offers all the resources transient birds require: food, water, and shelter.

Migrating birds driven off-course by autumn's westerly winds take refuge and refuel on this tiny, offshore outpost. A gathering of sparrows foraging in the dirt path might just—and did, for us—include a Dickcissel. Warblers of all stripes frequent the fruiting shrubs and small trees around the village, offering birders terrific, close views. A Western Kingbird or Yellow-headed Blackbird usually shows up at some point each fall. Towering cliffs on the island's eastern shore yield glimpses of soaring shearwaters and diving gannets, eiders and guillemots cruising the coves, and Double-crested and Great cormorants basking on the rocks below.

Because most songbirds migrate at night, a birder's best chance to view concentrations of migrating passerines is to find a morning "fall-out." On Monhegan, fall-outs happen when westerly winds drive southbound nocturnal migrants off course. When the sun rises, airborne birds find themselves far offshore and exhausted. They descend by dawn's first light to rest and refuel before hitting the road again. Just outside the inn's front door one morning, two birds foraging in the garden offered an en vivo tuto-



© CHRIS RIMMER

rial on the head patterns of Chipping versus Clay-colored sparrows.

Monhegan offers respite to birds and birders alike. Most of the 4.5-square mile island is conserved by a local land trust and features 12 miles of hiking trails. The 400 million-year-old, erosion-resistant bedrock cliffs rise 150 feet above the ocean. Glacier-carved lowlands host habitats such as the central marsh that serves as the island's water supply, and the ice pond, another popular birding location. It's frenzy-free birding, with all the challenge and unexpected discovery a birder might want.

Finally, perhaps not quite as much as they love avian challenges and surprises, birders love beer. Good news: the Monhegan Brewery, opened in 2011, is also an eBird hotspot.

VCE will lead its second annual migration birding and natural history trip to Monhegan Island this fall, September 28-October 1. Email Susan Hindinger (shindinger@vtcostudies.org) for information. **FN**



If you enjoy watching wildlife and wish to contribute to protecting our natural heritage, then join the VCE team!

Consider becoming a citizen scientist.

### E-BUTTERFLY

**Leader:** Kent McFarland

**Season:** Spring-Fall

*Beginner to expert*

Report and explore sightings of all Vermont butterflies with the innovative online tool, e-Butterfly.

[www.e-butterfly.org](http://www.e-butterfly.org)

*email:* kmcfarland@vtcostudies.org

### MOUNTAIN BIRDWATCH

**Leader:** Steve Faccio

**Season:** June

*Beginner to expert/hiking required*

Adopt a mountain and survey Bicknell's Thrush and other mountain songbirds.

[www.vtcostudies.org/projects/mountains/mountain-birdwatch/](http://www.vtcostudies.org/projects/mountains/mountain-birdwatch/)  
*email:* sfaccio@vtcostudies.org

### LOON WATCH

**Leader:** Eric Hanson

**Season:** Mid-July

*Beginner to expert*

Participate in the annual one-day census of Vermont's breeding loons.

[www.vtcostudies.org/projects/lakes-ponds/common-loon-conservation/loonwatch/](http://www.vtcostudies.org/projects/lakes-ponds/common-loon-conservation/loonwatch/)  
*email:* ehanson@vtcostudies.org

### VERMONT LOON CONSERVATION PROGRAM

**Leader:** Eric Hanson

**Season:** Spring-Summer

*Beginner to expert*

Help monitor nests and lakes.

[www.vtcostudies.org/projects/lakes-ponds/common-loon-conservation/vermont-loon-conservation-project/](http://www.vtcostudies.org/projects/lakes-ponds/common-loon-conservation/vermont-loon-conservation-project/)  
*email:* ehanson@vtcostudies.org

Visit [www.vtcostudies.org/](http://www.vtcostudies.org/) volunteer to find the citizen science project that's right for you.

## PARTNER PROFILE

# Yolanda León

A champion of Sierra de Bahoruco

| BY CHRIS RIMMER

No matter what corner of the earth one inhabits, conservation entails an uphill battle. The struggle is often pronounced in developing countries like Haiti and the Dominican Republic, where pressures on native habitats can be especially intense. Conservation practitioners are few, but local pioneers occasionally break through the quagmire to deliver dramatic results. Long-time VCE partner Yolanda (Yoli) León has emerged as a true conservation champion in the Dominican Republic. Her approach combines unyielding dedication, unassailable technical skills, and of course, optimism.

A native of Santo Domingo, Yoli's passion for the natural world was sparked at an early age via her father's photographic pursuits and beachcombing with her mother. Her respect for nature led her to biology, galvanized by a growing conviction that "all species have a right to live on this planet we've inherited." As she witnessed mounting losses to Hispaniola's biodiversity, Yoli vowed to advocate "on behalf of beings who cannot do so for themselves."

Yoli's formal trajectory began at Universidad Autónoma Santo Domingo, where she graduated with a BSc in biology. She then migrated north, receiving an MSc in Zoology from the University of Florida and a PhD in Marine Affairs from the University of Rhode Island. Never doubting her return to attend to Hispaniola's conservation needs, Yoli accepted a faculty position at Instituto Tecnológico de Santo Domingo (INTEC), where her work focuses on endangered species conservation through teaching biology and environmental applications of geographic information systems.



"SIERRA DE BAHORUCO'S FLORA AND FAUNA URGENTLY NEED OUR HELP."

Yoli's INTEC professorship just scratches the surface of her immersion in the Dominican conservation arena. She has long been involved with—and is currently President of—Grupo Jaragua, a leading Hispaniolan conservation non-profit and VCE partner since 1994. Beginning as an office volunteer, Yoli quickly moved to field work in Jaragua National Park, which hosts an outstanding array of lowland dry forest and coastal biodiversity. Her Master's research on Jaragua's sea turtles cemented her love of the DR's Southwest.

VCE's collaboration with Yoli arose through our deeply shared conservation concerns for Sierra de Bahoruco. One of the Caribbean's most biologically diverse regions, Bahoruco is a vital refuge for many endemic animals and plants, and home to a large overwintering population of Bicknell's Thrush. Chronic, severe deforestation threatens Bahoruco's irreplaceable cloud and pine forests. In collaboration with VCE, Yoli is leading an international effort to catalyze formation of a strategic conservation plan. Obstacles abound, and progress is halting, but Yoli perseveres. In her words, "Sierra de Bahoruco's flora and fauna urgently need our help. We are so pleased to join forces with VCE to save the forests of this precious biosphere reserve." **FN**



Over 20 years ago, Chris Rimmer (third from left) and Kent McFarland (second from right), began conservation work in the Dominican Republic's Sierra de Bahoruco.

# Looking Forward, Looking Back

© JEFF NADLER



**More than 20 years of bird conservation efforts in the Caribbean.**

BY JOHN LLOYD

VCE scientists have a long history of studying and promoting the science-based conservation of birds in the Caribbean. It was more than 20 years ago that Chris Rimmer and Kent McFarland began banding birds in the Dominican Republic's Sierra de Bahoruco. Ten years ago, we founded the International Bicknell's Thrush Conservation Group to bring together scientists and conservationists from North America and the Caribbean interested in the study and conservation of this remarkable migrant. Five years ago, VCE formalized its commitment to working in this region when we hired Juan Carlos Martínez-Sánchez to serve as our first-ever Caribbean Bird Conservation Coordinator. Now, we have reached another landmark—this one bittersweet—as Juan Carlos bids farewell to VCE. Thankfully, Juan Carlos has left the program stronger than ever.

Times of transition like this can serve as catalysts for strategic thinking. While we look back with pride at the accomplishments of the past five years, we have also begun to ask ourselves what we hope to accomplish during the next five. Most importantly, we hope to improve conditions for Bicknell's Thrush in at least three priority areas on the wintering grounds. This could include supporting efforts to develop management plans for important protected

areas like Sierra de Bahoruco National Park, or helping our local partners carry out on-the-ground efforts to restore degraded habitat on private land.

We also hope that by 2022 we will have completed our effort to better understand the wintering range and habitat use of Bicknell's Thrush. We've already achieved this on Hispaniola through our many years of work on that island. As of 2016, we learned that Puerto Rico supports only a small number of Bicknell's Thrush during winter. Plans are currently underway to survey Cuba and Jamaica, the only other islands known to host wintering populations.

Finally, we plan to continue our leadership role in the International Bicknell's Thrush Conservation Group. This will include publishing a revised Conservation Action Plan for the species later this year and making sure that the group follows through with research and conservation priorities established in the plan.

Change is never easy, and Juan Carlos has left us with enormous shoes to fill, but the next five years of VCE's Caribbean program hold real promise. Accomplishing our goals will leave Bicknell's Thrush in better shape and will help us realize our mission of promoting conservation not just here in Vermont and the Northeast, but wherever our migratory wildlife travel. **FN**



© LORETTA GARDEN

VCE bids farewell to Juan Carlos Martínez-Sánchez, VCE's first Caribbean Bird Conservation Coordinator.

Collecting a blood sample from an adult Wood Frog for mercury analysis.



## Poison in the Pools

High levels of mercury in vernal pools have significant implications for wildlife that feed on amphibian larvae.

| BY STEVE FACCIO

Numerous studies have investigated mercury concentrations in both aquatic and terrestrial wildlife—and for good reason. Mercury (Hg), and its more biologically available form, methylmercury (MeHg), are powerful neurotoxins that impact the central nervous system. A naturally occurring element found in the earth's crust, mercury is generally inert. It becomes a problem when it is released into the atmosphere, primarily through coal-fired power plants and industrial incinerators, where it can be transported widely before being deposited in precipitation. Then, under certain environmental conditions, anaerobic bacteria convert inorganic Hg to MeHg and it enters the food web. The Northeast is considered a mercury “hotspot,” due largely to our position downwind from airborne emissions that originate in the industrialized Midwest.

Surprisingly, fewer than a handful of studies have examined mercury in vernal pools, even though these small wetlands support a variety of landscape and geochemical conditions that both enhance mercury transport into pools and its transformation to MeHg. For the last two years, however, I've collaborated with Dartmouth College Research Associates Dr. Vivien Taylor and Dr. Kate Buckman on a ground-breaking investigation of mercury levels in Vermont vernal pools.

To gain a broad view of mercury concentrations in vernal pools, we sampled water from 21 pools across eastern Vermont, from Rockingham north to Walden. Then we intensively studied six pools in the Upper Valley area, collecting monthly water, soil, and leaf litter samples for Hg analysis. To these we added 1,528 invertebrate samples, including mosquito and caddisfly larvae, fairy shrimp, predatory

beetles, and others. Finally, we sampled Wood Frog and Spotted Salamander eggs and larvae, and collected blood and tissue samples from adults of both species.

Our results show that Hg concentrations and percent MeHg can vary considerably between pools, due to a variety of factors that range from water chemistry metrics such as pH, to pool and watershed size, to how long a pool



© KATE BUCKMAN

UNFORTUNATELY, LITTLE IS KNOWN ABOUT HOW MERCURY AFFECTS AMPHIBIANS, LET ALONE AQUATIC INVERTEBRATES.

holds water. As expected, mercury biomagnifies up the food web, with predatory invertebrates such as diving beetles accumulating higher mercury levels than detritivores and filter feeders, such as caddisflies, fairy shrimp, and mosquitoes.

Mercury levels in amphibian eggs were 10,000 times greater than that of the water, suggesting that females may off-load some of their mercury burdens when depositing eggs. We found that Hg bioaccumulated quite rapidly in predaceous Spotted Salamander larvae (~50 to 100 times greater than their egg masses), and only moderately in omnivorous Wood Frog tadpoles (~10 to 20 times greater than their eggs). This has significant implications for any wildlife that feed on amphibian larvae.

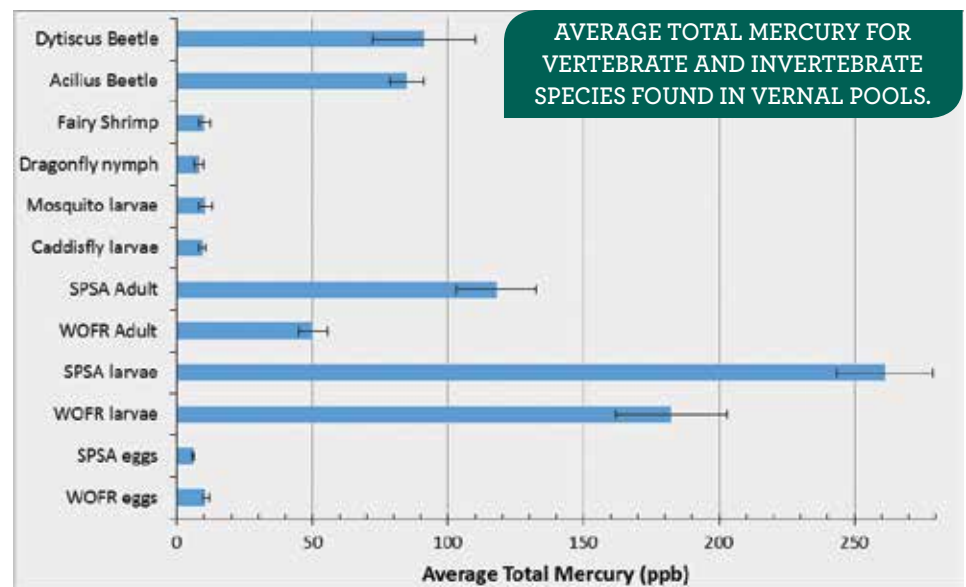
Among adult frogs and salamanders, Hg levels were roughly one-third to half that found in their larval stages, probably because the terrestrial adults are exposed to lower Hg concentrations than aquatic larvae. On average, adult Spotted Salamanders had more than twice the Hg of Wood Frogs, which is likely due to the fact that salamanders are much longer-lived.

Unfortunately, little is known about how mercury affects amphibians, let alone aquatic invertebrates. Laboratory studies indicate that sensitivity of frog tadpoles to MeHg is highly variable among species. For example, Wood Frog tadpoles showed no adverse effects at concentrations roughly equal to those we detected in the field, while Southern Leopard Frog and American Toad showed impaired growth and reduced survival at levels well below those we documented. Our results appear to be the first reported for Spotted Salamanders.

In recent years, EPA regulations have led to demonstrably reduced Hg emissions through the Clean Air Act. Unfortunately, the current administration seems determined to rollback many of these advances, casting a dark cloud of uncertainty on the future of this dangerous toxin's presence in our environment. **FN**



Dartmouth College Research associates, Dr. Vivien Taylor (left) and Dr. Kate Buckman, collect water samples at a vernal pool in Sharon, VT.



# Hot Off the Presses!

The long awaited Status of Vermont Forest Birds report, detailing results from 25 years of monitoring is now available online.



## HIGHLIGHTS INCLUDE:

Relative abundance of forest birds declined by 14%



8 species increased significantly



13 species declined significantly



Recommendations for land conservation and forest management practices



Review of programs working to enhance Vermont forests for biodiversity

Visit [www.vtecostudies.org/projects/forests/vermont-forest-bird-monitoring-program/results/](http://www.vtecostudies.org/projects/forests/vermont-forest-bird-monitoring-program/results/)

[vtecostudies.org](http://vtecostudies.org)



© STEVE FACCIO

## VCE Birdathon

After a late winter with abundant February snow, VCE's birding enthusiasts are gearing up for our annual spring Birdathon. Join us on May 25th as we take to mountains, fields, and waterways in an attempt to identify as many bird species as possible. Form your own team anytime in May, or sponsor VCE's Green Mountain Goatsuckers. Either way, you'll help VCE advance the conservation of wildlife through monitoring and citizen engagement!

## Suds & Science

Join VCE and colleagues for handcrafted brew, lively conversation, and cutting-edge science. Don't miss Suds & Science, the first Tuesday of most months at the Norwich Inn in Norwich, VT. As we like to say, "You buy the beverage, we bring the actual living scientist!"



© CHRIS ALBERTINE

## Outdoor Radio

What better way to spend your Thursday morning commute than listening to Outdoor Radio on VPR? From looking for lynx in all the wrong places to chasing flocks of uncooperative crows, we bring you the sounds and science of our natural world. Join us the third Thursday of every month at 7:50 am and again on Friday at 6:20 pm, or listen anytime online at [www.vtecostudies.org/outdoor-radio/](http://www.vtecostudies.org/outdoor-radio/)



## MUSSELS

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the mussel from their freshwater ballast into Great Lakes ports. In 1988, the first Zebra Mussels were discovered in Michigan. Just three years later, they had spread throughout the Great Lakes, St. Lawrence River, New York's Finger Lakes, and much of the Mississippi River basin. Their continued spread throughout North America seems inevitable.

In Vermont, Zebra Mussels were first reported in southern Lake Champlain in 1993. One year later VTDEC, in cooperation with the Lake Champlain Basin Program, initiated the Lake Champlain Zebra Mussel Monitoring Program to track the invaders' distribution, documenting them as far north as Rouses Point. Today, the Zebra Mussel invasion of Lake Champlain is complete, with devastating consequences.

"The introduced invasive Zebra Mussel has virtually wiped out native mussels in much of Lake Champlain from competition and smothering," says Fiske. Freshwater mussel surveys, especially in the southern portion of Lake Champlain, rarely find native living mussels present, just old shells encrusted with Zebra Mussels. Conservationists are working hard to keep this exotic pest from being introduced into other waterways.



*The Eastern Elliptio, a common freshwater mussel in northeastern North America, filter feeds in a Vermont river.*

© ETHAN NEDEAU


Among native Vermont mussels, the endangered Eastern Pearlshell is one of the longest lived. But in order to survive it needs two things that go hand in hand—cold water and Brook Trout. Freshwater mussels have a unique mating system that requires a host, usually a fish, to achieve full maturation. And for the pearlshell, that host is trout.

Male mussels release sperm, which females then filter from the water. Eggs are laid and brooded inside chambers called marsupial gills, where they develop into microscopic larvae called glochidia. Here's where the host fish come into play: glochidia must parasitize a host to complete development, usually by attaching to gill filaments, fins, or other tissues where they are encapsulated by the host's tissue. If the glochidia don't attach to a host quickly, or attach to the wrong host, they are lost.

Only a small percentage of glochidia encounter a suitable host. But some freshwater mussels have amazing adaptations to help beat the odds. Some extend fleshy mantle flaps out of their shells as lures, even wiggling them to attract attention. When a fish strikes, it ruptures the marsupials between the flaps, releasing a cloud of glochidia. Other mussels bait fish with masses of eggs which, when bitten by a fish, dislodge glochidia that then attach to the unsuspecting host.

Brook Trout require cold, clean waters. And Eastern Pearlshell populations can't persist without trout as a host and clean streambeds for filter feeding, unencumbered by sedimentation. "Stream warming is a threat to those mussels reliant on cold water fish as their host," says Fiske. "In response, we have to identify and protect cold water and drought refugia."

Freshwater mussels are a bellwether for our waterways. And hope for their persistence lies in safeguarding natural processes to keep waterways clean and resilient, for all forms of life.

Learn more about freshwater mussels at the Vermont Atlas of Life <http://val.vtcostudies.org/projects/vermont-freshwater-mussel-atlas/> 



© KENT MCFARLAND

*Freshwater mussels are the most endangered group of aquatic organisms in North America. Of Vermont's 18 species, 10 are given some level of protection under the state's endangered species law.*

The Llanos grasslands: home to a number of imperiled migratory bird species, including Bobolinks.

Below: Agronomist Gustavo Marino and VCE's Rosalind Renfrew discuss conservation actions for Bobolink conservation.



# Research Results Lead VCE to Colombia

Geolocators have tracked Bobolink migration patterns, enabling more precise conservation efforts in South America.

BY ROSALIND RENFREW

Not long ago, the lives of migratory songbirds that breed in North America were portrayed as belonging to two discrete worlds. For most species, their breeding grounds in the north were relatively well known, and usually the rough outlines of wintering ranges had been established. However, our understanding of what happened in between—the routes, patterns, and stopover sites of songbird migrations—was often murky at best.

Recently, data gathered from novel technologies have filled a black hole in our understanding of hemispheric songbird migrations. These findings have catalyzed a quantum leap in conservation planning.

Before geolocators became available to track bird movements, our knowledge of Bobolink migration was based on limited, scattered observations. As a result, the



© CARLOS RUIZ

species' migratory route was depicted as an enormous cloud that spanned most of the northern half of South America. However, VCE's data from these light-gathering devices have shown that nearly all breeding Bobolinks from across North America follow a relatively narrow migration corridor through South America. After converging in western Venezuela and in the eastern edge of neighboring Colombia,

Biologists from Colombia and Venezuela meet to determine priority conservation actions for the Bobolink Full Life Cycle Conservation Plan.



© CARLOS RUIZ

they cross the Amazon to Bolivia and often continue south to Argentina; their route is similar when they return north in spring. In Colombia and Venezuela, geolocator data show that Bobolinks use a region that spans these two countries for a lengthy 3- to 6-week stop on their way south, and pass through the region again, more quickly, during their northward return to the breeding grounds.

Now, literally and figuratively on the Bobolink migratory map, these two countries are among those that are front and center for addressing conservation needs of the species. In October of 2015, VCE convened a workshop with Colombian and Venezuelan biologists to generate conservation and research priorities for inclusion in the full life cycle Bobolink Conservation Plan. Spearheaded by VCE and the U.S. Fish and Wildlife Service, this hemispheric plan includes strategies to address threats faced by Bobolinks and other co-occurring resident and migratory birds in these countries.

VCE is actively pursuing research and conservation actions identified for Colombia even in advance of the release of the Bobolink Conservation Plan. In collaboration with Birdlife International, we are helping Colombian

partner Asociación Calidris launch initiatives that benefit Bobolinks and other bird species. Calidris will conduct surveys for Bobolinks, reach out to cattle ranchers and rice producers, and promote bird-friendly management practices. These efforts are embedded within a broader approach that encompasses migratory shorebirds such as Buff-breasted Sandpiper, as well as resident species like the Ruddy-breasted Seedeater.

VCE's science-based approach centers on informing conservation through rigorous research. Our work with the Bobolink is a prime example of how research translates to planning and then to action. Fueled by discoveries of migratory routes, stopovers, and wintering grounds, we capitalize on the findings revealed by geolocators to direct conservation where it is most needed.

Our Grasslands Program has extended its geolocator studies to three additional grassland bird species: Upland Sandpiper, Eastern Meadowlark, and Grasshopper Sparrow. Supported by the Department of Defense Legacy Program, this project promises to yield results that are both scientifically fascinating and vitally important for the conservation of these vulnerable migrants. **FN**



# Join the Bicknell's Legacy Society

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To learn more, contact  
**Susan Hindinger**  
VCE Associate Director  
[shindinger@vtecostudies.org](mailto:shindinger@vtecostudies.org)  
**802-649-1431 x 103**  
[www.vtecostudies.org/give](http://www.vtecostudies.org/give)



*When you make your pledge, VCE will welcome you to the BLS with this limited edition 8x10 metal print of a nesting Bicknell's Thrush, photographed by our own Kent McFarland.*

© ORAH MOORE

# FIELD NOTES

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## Dark Fishing Spider {*Dolomedes tenebrosus*}



A Dark Fishing Spider lies motionless, ready to ambush its prey.

© KATJA SCHULZ



© KATJA SCHULZ

One of New England's largest spiders, the Dark Fishing Spider hides behind its bark-like camouflage.

| BY SUSAN HINDINGER

If you have ever met our featured species, *Dolomedes tenebrosus*, or “Dark Fishing Spider,” you’ve likely not forgotten it. One of New England’s largest spiders, females can reach 26mm (1”) in body length—double or triple that if you include the legs. If its size didn’t take you aback, and if you weren’t startled by its stealthy bark-like camouflage, surely its speed caught your attention. This spider is bold, but savvy, so unless you are a hapless insect or even a tiny fish, it won’t waste precious energy confronting the likes of you, but instead will scurry to the closest hiding place.

Spiders in the genus *Dolomedes*—known as fishing spiders—are so-named for their somewhat unique ability to walk on, and sometimes even dive below, water in pursuit of prey. Unlike the Diving Bell Spider (*Argyroneta aquatica*), they don’t actually swim, but capture prey by ambush or active hunting, usually near water or just below its surface. Our featured species

is less tied to aquatic habitats than its cousins; *D. tenebrosus* can be found in wooded habitats, gardens, and even occasionally in buildings.

These spiders belong to the family *Pisauridae*, or nursery web spiders, and feature distinctive habits related to the rearing of young. Once mated, the female spins a spherical cocoon to contain her eggs (up to 1,400) and carries it with her fangs and pedipalps (a small pair of leglike appendages in front of the legs) for the duration of egg development, rendering her defenseless during this time. Just before the eggs hatch, she weaves a “nursery web” and suspends the cocoon inside it. She stands guard until her spiderlings have hatched and undergone their first molt, after which they disperse.

The Black Widow (*Latrodectus hesperus*) spider’s moniker derives from the (largely mythical) notion that female spiders kill males after mating with them. While this practice is generally frowned upon, even among spiders, our featured species is guilty as charged. Researchers have observed *Dolomedes* females attack and consume males even before copulation takes place, and when a male succeeds in mating with a female, she usually dispatches him soon thereafter. In 1988, researchers at the Smithsonian videotaped the courtship and copulation of *D. tenebrosus*. After 1.5 hours of courtship, copulation lasted 4.5 minutes and was abruptly terminated when the female killed the male! **FN**