Field Notes

VERMONT CENTER FOR ECOSTUDIES
UNITING PEOPLE & SCIENCE FOR CONSERVATION

Vol.5, Issue 2
Fall 2012

Uniting People and Science for Conservation

Conservation through Empowerment

For nearly two decades, VCE and our Hispaniolan partners have worked tirelessly to build and support a corps of local conservationists on the island. Together, we have trained young Dominican and Haitian biologists to conduct field studies on birds, from long-distance migrants like Bicknell's Thrush to rare endemic species like Western Chat-Tanager. We have helped secure donations of needed equipment like binoculars, GPS units, and other field supplies. Our local partners have co-authored scientific journal articles with us and traveled to Vermont to participate in our research on montane forest birds.

VCE is proud of these and other collaborative efforts, which have helped to build a cadre of remarkably skilled and dedicated field biologists on Hispaniola. As successes mount, however, challenges continue to escalate, and strengthening local capacity remains our highest priority. Caribbean Bird Conservation Coordinator Juan Carlos Martínez-Sanchez now has his feet firmly on the ground in both countries, with a full year under his belt. This past spring, we partnered with local businessmen and conservationists to create the Dominican Republic's first private reserve, Reserva Zorzal, for which we are collectively developing a detailed management plan. Real conservation is happening on many fronts.

Dominican biology student Candy Ramirez participates in a training workshop in Sierra de Bahoruco.

October brought another important step forward as VCE spearheaded the award of a competitive $5,000 grant to our Dominican non-profit collaborator, Grupo Ja-

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Rusty Blackbirds: Confronting the Challenge of a Declining Species

Rusty Blackbirds often prefer beaver-influenced wetlands, foraging in waters at the edge of flooded areas.

"They're killing us," one of my formerly cheerful technicians reported during our weekly phone meeting, a note of stress creeping into his voice. "We can't escape. Nowhere is safe."

Mosquitoes and black flies were just two of the bloodthirsty insect thugs tormenting VCE technician Caleb Fisher. Caleb, along with intern Kaitlyn O'Donnell, was on a valiant mission: visit insect-infested bogs, swamps, and ponds in the northeastern U.S. to seek the elusive Rusty Blackbird.

Rusty Blackbirds once darkened the skies in flocks of thousands. Frequent winter visitors throughout flooded woods, swamps, and marshes in the southeastern U.S., during summer months, the species is closely tied to boreal forest wetlands across the far northeastern U.S., throughout Canada, and into Alaska. Historically, this drably adorned bird received scant attention from scientists and birders—until

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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 northern New England through the Caribbean to South America, our work unites people and science for conservation.

VERMONT CENTER FOR ECOSTUDIES
UNITING PEOPLE & SCIENCE FOR CONSERVATION

Field Notes is VCE's biannual newsletter and is free to citizen scientists, donors, and partners.

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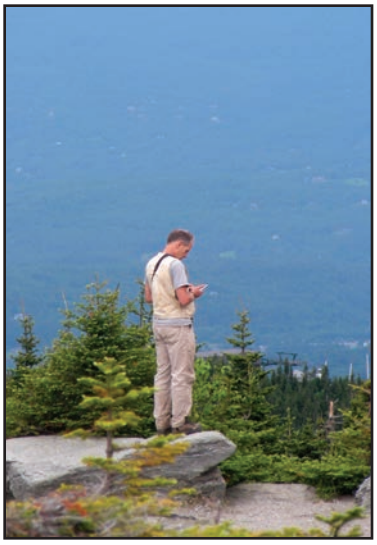
Printed on recycled paper

Field Notes is made possible by a generous gift from Jeff and Terry Marshall.

VCE View



Five short years ago, a band of six conservation biologists resolutely struck out on its own. Armed with a two-decade legacy of conservation science and a loyal constituency of citizen scientists, partners, and supporters, we formed the Vermont Center for Ecostudies. On October 1, VCE reached its five-year benchmark, a key milestone that signals both our coming of age and a new chapter in our evolution. We are strong, solvent, and confident about our future. We look forward to the next leg of our journey, and we hope you'll continue to be part of it.

What have we accomplished over five years? We've survived, for one, and in fact gained strength. That's no mean feat, given recent economic challenges. Our programs have flourished—we've mapped Vermont's vernal pools, launched a statewide survey of bumblebees, revamped Mountain Birdwatch, sent the second Vermont Breeding Bird Atlas to press, documented migratory stopover areas of Bobolinks, and helped create the Dominican Republic's first private reserve. Most importantly, we've built a solid community of stakeholders across the hemisphere. That includes you.

What lies ahead for VCE? We have a clear roadmap in our five-year strategic plan. We'll capitalize on our core strengths of science and citizen engagement, expand our programs, and increase the impact of our work. As we look to the next five years, we're compelled by a renewed sense of purpose and urgency. Our natural world faces unprecedented challenges, and we all have a crucial role to play. VCE will continue relying on you, our friends and partners, to help us deliver transformative wildlife conservation. The need has never been greater, nor the opportunities. Here's to another five years!

—Chris Rimmer

VCE Welcomes New Director of Development

VCE is pleased to welcome Jane Ackerman as our first Director of Development, a key position to boost VCE's steady growth towards long-term stability. Jane comes to us with a strong, diverse background. With an undergraduate degree from Middlebury College and a Master's from Dartmouth, her career has spanned pursuits ranging from literature to philanthropy. From her early days as an independent bookseller, Jane then worked on a number of epidemiological research projects at Dartmouth Medical School before transitioning to development positions with The Aloha Foundation, the Vermont Humanities Council, the National Wildlife Federation, and Dartmouth Medical School. A published poet, Jane continues to pursue freelance writing and editing, skills that will prove invaluable to VCE. Her lifelong passion for the outdoors—the Adirondacks, Green Mountains, and Maine coast all occupy special places in her life—ensures that Jane will effectively communicate a passion for conservation on VCE's behalf.

Kevin Hemeon, 2012's Outstanding Citizen Scientist

The Julie Nicholson Citizen Scientist Award honors Julie Nicholson's extraordinary passion and commitment to birds and wildlife conservation through her many years of tireless work as a citizen scientist. It is given annually to an individual who exemplifies Julie's dedication to the cause of citizen science and conservation.

I was raised in the hills of Petersburgh, New York. Throughout my childhood I had acre upon acre of woods to roam. A frog pond in an old cellar hole, a woodland stream, an old field, and a hemlock swamp added to the variety of habitats that were my playground. We tended a half-acre garden, raised various animals and picked any wild berries and fruits in season.

© Kevin Hemeon

Outstanding citizen scientist Kevin Hemeon catches darners for the Migratory Dragonfly Partnership! Hemeon plans to continue his contributions to citizen science projects for as long as he can swing a net and hoist a pair of binoculars.

My interest in nature took off from here. My rural setting necessitated that I was mostly self-taught, and I had all of Herbert S. Zim's nature guides. Although not comprehensive, they were invaluable beginning books. I filled holes in my knowledge with other books, including many borrowed from my school library.

My oldest bird guide, a dog-eared copy of *Golden Field Guide to The Birds of North America*, was given to me at age eight by my mother, in part to divert me from constantly asking, "What bird is that?" I diligently kept our home bird feeders full each winter, and I used that book to great advantage.

In 1981, I received my four-year degree in Zoology from the State University of New York at Oswego. Thanks to my entomology professor, Dr. Nelson, I developed an interest in insects. He encouraged me, via the loan of a net and collection jar, to join a three-week field course in Ecuador during my junior year. There we tended live traps in the mornings for a marking study of small mammals, and we mist netted bats in the evenings. I spent afternoons studying two species of lizard for an independent project. In my free time I made good use of that net, mainly in pursuit of beetles, which became my first insect interest. When returning my borrowed field gear to Dr. Nelson after the trip he asked, "What equipment?", allowing me to keep that net and use it for many more years.

Upon graduating from SUNY Oswego, I found my way into the landscaping trade, where my knowledge of plants proved helpful and has steadily grown. This has proved valuable for projects such as the Vermont Butterfly Survey (VBS), where an ability to locate host plants increased my efficiency during field surveys.

Currently, I live in Hoosick Falls, New York with my wife Marie. We have a son Connor, daughter Nicole, and two grandchildren. This past summer, I had the pleasure of putting a net in my three-year-old granddaughter's hands. Hopefully, her interest will blossom, and she'll become an expert butterfly catcher for the next VBS.

I have helped on dragonfly surveys in New York and New Hampshire, but most of my activity has been in Vermont, where I was happy to net Common Green Darners for VCE this summer. Participation in my local Audubon Chapter years ago led me to bird counts, then to VINS, and now to VCE. I have truly enjoyed my role as Bennington County coordinator for the Vermont County Birding Quest. The VBS brought me back to insects, and I have pursued that passion with the current Vermont Bumblebee Survey. It is a great honor to receive the Julie Nicholson Citizen Science Award, and I plan to continue working on these and other wildlife surveys for as long as I can swing a net and hoist a pair of binoculars!

—Kevin Hemeon

Shortening the Distance between Farmers in North and South America

On the surface, the Bobolink represents a story of human irony. Revered by poets, cherished as an icon of North American grasslands, yet scorned as a pest, the Bobolink is simultaneously loved and despised. Its complex life history and reputation vary by epoch, geography, and culture. This complexity, however, brings with it immense opportunity. The Bobolink binds its friends and foes, linking people who otherwise lead disparate lives. Paradoxically, both Bobolinks and the livelihoods of those who vilify the species are interdependent.

© Neil Palmer/CIAT

While conservationists in North America struggle to halt the decline of Bobolinks, South American rice farmers face the challenge of protecting their fields as this species descends by the thousands to gorge on grain crops.

Originally a bird of the bygone North American prairies, Bobolinks now breed in human-modified grasslands, mostly hayfields. North American farmers have found the bird to be inconsequential to their operations. In fact, Bobolinks are beneficial during the breeding season, helping to keep insect populations in check as they feed their young protein-rich invertebrates. But both farmer and Bobolink have lost ground in the changing economy: as the farmer has suffered economic losses and abandoned operations, the Bobolink has lost nesting habitat. Earlier and more frequent haying causes nest failures, compounding problems of habitat loss.

In Ontario, Bobolink populations have plunged by 80%, prompting development of a recovery strategy to stem declines. Canadian farmers initially feared the impacts of regulations on their haying operations, but the recovery team was determined to protect farmers' bottom lines. The emerging strategy recognizes that with the decline of the cattle industry in Ontario also comes a reduction in Bobolink habitat. The strategy seeks to provide incentives that favor Bobolinks and help beef farmers by valuing agricultural practices for the environmental services they provide. It provides an opportunity for conservationists and the agricultural sector to work together to preserve a way of life, economic livelihoods, and natural resources.

Bobolinks face very different conflicts with farmers after the nesting season, when they migrate 6,000 miles to central South America. They make a complete transformation, inside and out, donning a new set of feathers and changing to a diet of seeds. This diet switch, adapted to meet the energetic demands of their migration and to optimize a widely available resource, is the bane of the Bobolink's existence in winter.

As in the north, the Bobolink's historic wintering grounds have been transformed by agriculture. The vast Pampas grasslands in Argentina have given way to cattle ranches, soybeans, and grains such as sunflowers. Again, Bobolinks

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© Juan Klavins

Pesticides, insecticides, and shooting by farmers seeking to protect their crops are just a few of the many threats Bobolinks face on their wintering grounds in South America.

have adapted, taking advantage of the smorgasbord offered by the flush of food resources provided by new agriculture further north, especially rice.

From January through March each year, Bobolinks descend by the thousands on rice fields in Bolivia and Argentina, gorging on the tender grain shortly before it is harvested. Farmers have tried various measures to thwart flocks, including shooting, firecrackers, and pesticides, with mixed results. Meanwhile, highly toxic insecticides seriously threaten Bobolinks foraging on this calorie-rich food. Protecting farmer's interests while conserving the Bobolink poses entirely different challenges south of the equator.

Bobolink numbers have plummeted to only half of their 1960's levels. While conservationists in North America struggle to halt this precipitous decline, rice farmers in South America have drawn a sigh of relief. As North Americans strive to protect the Bobolink, farmers in South America face challenges in defending their fields against the species.

The Bobolink thus presents both a challenge and an opportunity for farmers and conservationists to seek a balance across the hemisphere. Rather than spending precious resources to negate each other's efforts, here lies the opportunity to explore how Bobolinks and farmers can rely on each other to ensure that both survive indefinitely. A recent groundswell of support for "full life cycle" conservation is spawning new initiatives to address the year-round needs of migratory birds across their breeding, migration, and wintering seasons. The prospects have never been greater for working at a hemispheric scale to address the needs of Bobolinks, and the farmers upon which they depend.

—Rosalind Renfrew

Chris Rimmer Becomes AOU Fellow and Cornell Lab Associate

Chris Rimmer was recently elected as a Fellow of the American Ornithologists' Union, one of the world's oldest member organizations devoted to the scientific study of birds. Fellows are chosen for eminence in ornithology. Chris' work over the years has spanned the hemisphere from James Bay, Ontario to the Dominican Republic and Haiti; his election reflects the contributions of VCE's team and our many partners as much as it does his own accomplishments. Chris was also recently appointed a Lab Associate with the Cornell Lab of Ornithology's Conservation Science Program. Chris and all of VCE look forward to expanding our productive collaboration with colleagues at the Lab, from groundbreaking efforts to conserve forest birds in the Caribbean to helping push the frontiers of eBird.

© Kent McFarland

Conservation - continued from page 1

©Pedro Genaro

This past spring, VCE helped create the Dominican Republic's first private reserve, Reserva Zorzal, on which Grupo Jaragua will conduct surveys, map habitat, and assess conservation threats for the Bicknell's Thrush.

ragua. This innovative funding mechanism was courtesy of the Bicknell's Thrush Habitat Protection Fund, which VCE and an alliance of northeastern U.S. conservation partners established in 2007. The Fund's explicit purpose is to protect the species' Caribbean wintering habitat through monies raised in North America. The novelty of this grant is that, for the first time, we issued a formal request for proposals to our Hispaniolan collaborators, asking them to put forward their plans to conserve this vulnerable songbird's winter habitats. We were gratified to receive four strong proposals, all of which received careful, objective scrutiny from a panel of seven reviewers.

Grupo Jaragua's project received high marks for its well-articulated conservation outcomes and sound field methods. Jaragua will conduct surveys for Bicknell's Thrush, map its habitat, and assess conservation threats in the southern Sierra de Bahoruco, a key wintering area on the Haitian border. Results from this work, which will engage volunteers from local communities, will inform effective conservation of dwindling forests in this threatened, highly biodiverse region.

Sixto Inchaustegui, a senior scientist with Grupo Jaragua, remarked that the grant will allow his team to establish an essential local presence in a forested area that is under heavy pressure from illegal agricultural expansion and charcoal production. "By better understanding Bicknell's Thrush and its conservation needs," he said, "Jaragua and our partners will more effectively tackle pressing issues that threaten all biodiversity in this sensitive region."

The grant to Jaragua embodies VCE's refocused approach to conservation on Hispaniola. For all the progress we have helped achieve over two decades, we now recognize certain shortcomings of our tactics. In may respects, we have not addressed the need to equip local partners as the primary agents of conservation change in their own countries. We have unwittingly continued to orchestrate the overall agenda, by being principal designers, executors, and funders of projects. Well-intentioned as our efforts have been, it is now clear that we must provide our partners with the full set of conservation tools they need. We are therefore refining our emphasis and encouraging our Dominican and Haitian partners to tell us what needs to be done, how they will do it, and how we can best guide them. We are putting the responsibility squarely on their shoulders, where it belongs.

What especially energizes VCE about the grant to Grupo Jaragua is that it adds a vital dimension to our ongoing, collaborative program on Hispaniola. By empowering our local partners to lead conservation from the ground up, we are helping to build the only kind of capacity that can truly endure.

VCE congratulates Grupo Jaragua. We hope this grant award will catalyze additional investment in the Bicknell's Thrush Habitat Protection Fund, with many more grants to be issued in the years ahead.

—Chris Rimmer

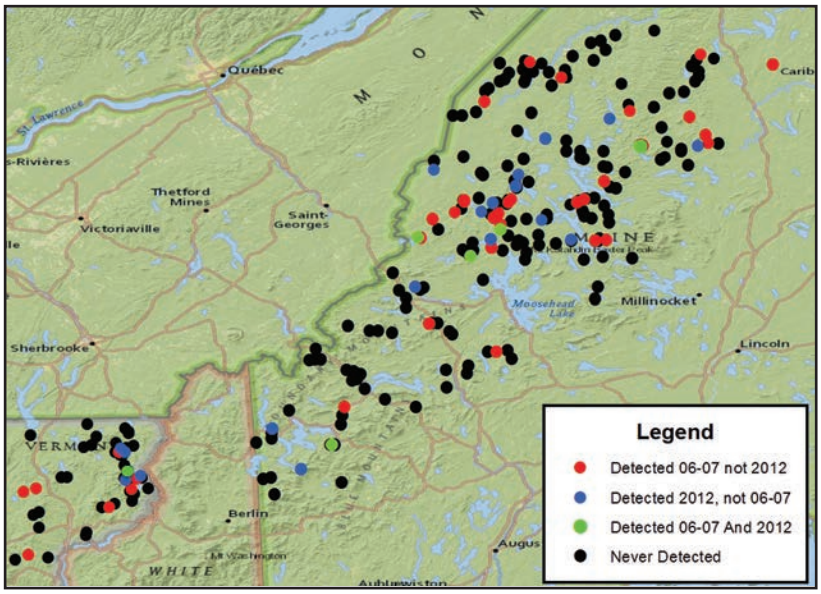
Help Us Reduce Our Footprint!

If you are interested in receiving *Field Notes* but would like to do so electronically, please contact Melissa at: mmackenzie@vtecostudies.org

Rusties - continued from page 1

suddenly the species became notable for its conspicuous and unexplained absence. Recent estimates suggest that Rusty Blackbird populations have declined by 85-99% over the last 40-50 years; this represents one of the most severe declines exhibited by any once-common North American songbird. Only in the last decade have scientists begun to systematically investigate causes of this startling decline.

From mid-May through late June of 2012, Caleb and Kaitlyn drove thousands of miles on rough logging roads, battled voracious insects, and visited some of the Northeast's most remote and breathtaking wetland landscapes to investigate site consistency in the Rusty Blackbird. The Maine Department of Inland Fisheries and Wildlife conducted surveys for Rusty Blackbirds throughout Maine in 2001-2 and throughout northwestern Maine and northeastern Vermont in 2006-7. In 2012, VCE launched an effort to resurvey these areas to determine whether Rusty Blackbirds return to the same breeding sites across the span of a decade. Understanding consistency in this species' site selection could help guide land managers and policymakers to prioritize targeted conservation measures for specific areas. In addition, identifying site persistence in Rusty Blackbird populations might help scientists identify locations for future research.



Sites surveyed in both 2006-7 and 2012. At most sites where Rusty Blackbirds were observed, the birds were detected in only one of the two time periods.

In just 38 days, VCE's dedicated field team surveyed 280 wetlands throughout Maine and northern Vermont, performing playback surveys to detect this enigmatic bird. Our hard work, constant dampness, and insect-induced blood loss paid off. We detected birds at 24 of the 280 wetlands surveyed in 2012, a rate almost identical to past detection rates in this region. Site consistency, however, appeared very low across these five-year intervals. Of the 48 sites with detections in either 2006-7 or 2012, Rusty Blackbirds were detected at only six sites in both 2007 and 2012. Of the 104 sites surveyed in all three time periods, 24 yielded Rusty Blackbird detections in only one year, two sites had detections in two out of the three time periods, and at only one site were Rusty Blackbirds detected during all three survey periods.

Why did we observe such low site consistency between survey intervals? One possibility is that observers simply missed birds that were present. To test that possibility, we visited 20 Maine sites twice in 2012; each revisited site had a historic Rusty Blackbird detection. We found 100% consistency between the 2012 surveys; that is, we detected Rusty Blackbirds at the same two sites during both surveys. This suggests that at least in 2012, the likelihood of detecting birds that were present was high, so our results were not exclusively caused by failing to detect birds at occupied sites.

More likely, Rusty Blackbird habitat changes rapidly in the northeastern U.S., creating differences in local suitability across five-year spans. Rusty Blackbirds frequently inhabit beaver-influenced wetlands, and beaver activity can quickly change a wetland's appearance and composition. In addition, much of the Rusty habitat in Maine is privately owned and often managed for timber, so the composition and density of forests surrounding wetlands in this area change as lands are harvested and replanted. Habitat changes may not be the driving force behind the shifts we observed, however; low population density in the Northeast may leave large swaths of available habitat unoccupied. Lack of competition may allow individuals to choose from multiple potential breeding sites, leading to shifts across the landscape as birds settle in suitable but unoccupied habitat.

Although perceived lack of site consistency in the northeastern United States challenges our ability to target specific areas for conservation, our results illuminate several directions for future research. One top priority is to examine how different types of land management—including forestry practices and beaver control—affect Rusty Blackbird habitat use. Information gained from this and other studies will be critical to determine effective management strategies for this vulnerable species. VCE and our partners in the Northeast will continue to investigate the Rusty Blackbird at the edges of its boreal breeding range, constructing a broader picture that we hope will help solve the mysteries of this declining bird.

—Judith Scarl

VCE Project Updates

Vernal Pool Mapping Project Wraps Up


© Steve Faccio

Spotted Salamander eggs left high and dry on April 12, 2012, as a small vernal pool in Grafton, Vermont recedes due to lack of rain.

We completed our fourth and final field season of vernal pool verification this spring and summer, with VPMP staff and volunteers visiting over 200 potential pools. This effort boosted our impressive sample size of field-verified sites to nearly 1,400 pools visited during the four-year mapping project! During spring fieldwork, VCE colleague Michael Lew-Smith and I both noted a high number of pools with dense algal blooms in the water column, along with a relatively high proportion of infertile or dead Spotted Salamander embryos. Both conditions likely resulted from April's exceptionally warm, dry weather, which left some pools dry and many others with low water levels, leading to increased water temperatures and lower dissolved oxygen. Unlike the loose egg masses of Wood Frogs, which allow water to permeate and oxygenate the embryos, Spotted Salamander eggs are protected by a firm jelly matrix. This jelly limits water movement through the egg mass so that some embryos near the center may not receive enough oxygen. Normally this effect is mitigated by a symbiotic alga that blooms within the jelly, producing oxygen as it undergoes photosynthesis. However, this spring's additional algal blooms in the water may have restricted sunlight reaching the algae in egg masses, limiting their ability to photosynthesize. Fortunately, some much-needed rain arrived, and the majority of pools that I visited in May and early June held water and were teeming with developing larvae. Highlights from my 2012 pool visits include additional confirmations of Jefferson Salamander and several ridge-top pools in Pomfret and Woodstock that supported fairy shrimp populations.

This fall and early winter we will error check all VPMP data, conduct analyses, and prepare a comprehensive final report and GIS layer for the Vermont Fish & Wildlife Department. These will be available on our website. We will also explore ways in which we can continue to accept data collected from unverified potential vernal pool locations so VPMP will live on and continuously be updated with new information.

—Steve Faccio

Another Banner Loon Nesting Season


© Rich Bard

Volunteers counted a record 280 adult loons during the annual Loonwatch survey this year, and despite increased human activity on certain lakes, 50 pairs nested successfully.

Vermont's Common Loon population enjoyed another strong year in 2012, with 70 loon pairs attempting to nest and 50 successfully raising at least one chick, 66 of these chicks survived through August. This provides a remarkable contrast to 10 years ago (2002), when only 40 pairs attempted to nest and 40 chicks survived! As usual, volunteers formed the project's backbone, as more than 300 people helped track Vermont's loon population. Volunteers counted a record 280 adult loons on 150 lakes statewide during the annual Loonwatch survey

on July 21, up slightly from the 2011 tally of 271 adult loons. Banner counts in both years probably reflect more lakes being surveyed by our dedicated volunteers and actual population increases throughout the state.

Unfortunately, six adult loon mortalities were documented in 2012. Two birds were badly entangled in monofilament fishing line, and one bird likely ingested lead fishing gear. Several rescue attempts and searches were made for four other loons caught in fishing line or other threadlike material. We successfully rescued one bird, were unable to rescue another in four attempts, and never relocated the other two loons.

We identified several new potential territorial pairs in 2012. However, several ponds with consistent pair activity in 2011, but no recent history of nesting, had markedly lower loon activity this summer. For the first time in many years, none of the three loon pairs on Maidstone Lake were documented to nest, in part due to human activity on at least two territories. VCE staff and volunteers periodically observed groups of 5-20 adult loons on several larger bodies of water including Caspian Lake, Green River Reservoir, Peacham Pond, and Lake Seymour—a sign that many birds may be "waiting in the wings" for future breeding opportunities.

—Eric Hanson

VTBees Takes Off

This year marked an exciting new undertaking for VCE, as we launched Vermont's first-ever statewide survey of our little-known bumblebees. Thanks to the help of a small but intrepid group of citizen scientists, our pilot year of the Vermont Bumblebee Survey (VTBees) has been a tremendous success.

© Lucien Zahendra

Sara Zahendra chases bumblebees in a clover field near Rockingham, Vermont.

© Kent McFarland

To date, VTBees has amassed nearly 4,000 historic specimens and over 5,000 records from this year's survey.

To gain historical context, our first step was to identify and document existing bumblebee collections from Vermont. We visited numerous universities and museums, uncovering a wealth of data long neglected and largely forgotten. By the end of March, after much photographing and databasing, we had compiled information on close to 4,000 historic specimens, some from as far back as the 1930s. In late April, VTBees took full flight with sunny days, warmer temperatures, emergence of the first queens, and a bumblebee workshop. Nearly 30 *Bombus* enthusiasts, both novices and veterans, spent a Saturday at VCE learning about bumblebee ecology, life cycle, and identification, then scouring neighborhood rhododendrons for potential specimens. Now, armed with an in-depth introduction to these pollinators, we fanned out across the state and began collecting, photographing, and observing.

To date, we have amassed over 3,000 specimens and nearly as many photos and observations. Data have poured in from every geographic region of the state, but especially from our 2012 focal area, the Southern Vermont Piedmont. Historically, this region has yielded very few *Bombus* records, and we are eager to document the distribution and relative abundance of its current bumblebee assemblage.

Preliminary inspection of our 2012 data shows a rather surprising lack of diversity, especially in the Southern Vermont Piedmont. The three most common species documented statewide were the Half-black Bumblebee (*B. vagans*), the Common Eastern Bumblebee (*B. impatiens*), and the Tri-colored Bumblebee (*B. ternarius*). All three species were ubiquitous and abundant. The Two-spotted Bumblebee (*B. bimaculatus*) was also common and widespread, though its numbers decreased as summer progressed. We documented relatively few of the Yellow-banded Bumblebee (*B. terricola*), the Confusing Bumblebee (*B. perplexeus*), and the Yellow Bumblebee

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(*B. fervidus*), and we found only two individuals of the Lemon Cuckoo Bumblebee (*B. citrinus*). We were surprised not to encounter any American Bumblebees (*B. pennsylvanicus*), and disappointed, though less surprised, to have found no Rusty-patched Bumblebees (*B. affinis*). This species, last documented in Vermont in 1999, is declining throughout its range.

We are eager to capitalize on VTBee's momentum in 2013. We will focus more intensively on other geographic regions of the state, continue our search for the Rusty-patched Bumblebee, and expand our core group of citizen scientists to help discover and conserve Vermont's natural heritage.

—Sara Zahendra

Triumph! Technician Audra Valaitis and intern Joe Lovenshimer celebrate after completing an MBW point count survey.

Mountain Birdwatch: The International Challenge

Mountain Birdwatch 2.0 (MBW2) celebrated an exceptional year in the U.S. in 2012; this past summer, volunteers, technicians, and VCE staff surveyed 123 of the 129 available high-elevation routes in the Northeast. MBW2 volunteers especially rose to the occasion, covering 96 (78%) of these 123 routes. More than 30 dedicated volunteers participated in spring training workshops in Maine, Vermont, and New York, and we welcomed 20 new volunteers to the project in 2012.

Bicknell's Thrush (BITH) is the flagship species of this ambitious monitoring project, which examines patterns of abundance and distribution of 10 breeding bird species throughout montane forests in the northeastern U.S. and similar forests in southeastern Canada. MBW2 runs smoothly in the U.S., with dedicated volunteers surveying most routes and BITH detections occurring at approximately one-third of points. Trails that traverse well-protected forests ensure access to many remote areas of quality avian habitat. However, our MBW2 Canadian counterparts face a different situation. Not only are BITH densities considerably lower than in the U.S., the majority of Canadian BITH habitat is difficult to access, with few roads or trails penetrating the vast swaths of forest. Accessible areas are comprised primarily of industrial forest, where management activities affect both forest composition and extent. As a result, BITH detections are very low. In 2011, observers detected BITH at only 8% of points in the Maritime Provinces, while Québec points yielded an astonishingly low detection rate of 3%.

Such low international detection rates of our flagship species have led to concern that MBW2 might not be able to adequately document BITH population trends across the species' entire breeding range. MBW2 partners have carefully brainstormed methods to modify this project internationally without abandoning carefully formulated region-wide goals. In 2012, our colleagues in Québec and the Maritimes modified their route sample to include only protected or unmanaged areas in order to compare surveys in equivalent habitats across Canada and the U.S. In addition, partners intensively sampled a smaller patch of habitat in Québec to assess which habitats BITH occupy within a more discrete, manageable sampling area. Results from these 2012 surveys, along with a reassessment of state and provincial goals, will inform the direction of the international MBW2 route selection protocol. Although implementing a successful range-wide monitoring scheme presents many challenges, VCE and our partners are committed to improving MBW2 across the entire region.

In the meantime, MBW2 will continue unmodified in the U.S. in 2013. Before next June, VCE will seek new volunteer recruits to conduct dawn surveys, especially in New Hampshire and Maine. In the meantime, to stay current with MBW2 updates, or to explore exciting pictures of our high-elevation adventures, please "like" our Facebook page (search Facebook for Mountain Birdwatch) and share in our off-season enthusiasm!

—Judith Scarl

VCE Monthly eNews

If you would like to receive our NEW monthly eNews, email Melissa at mmackenzie@vtecostudies.org

Amphibian Toxins: Pass the Frog's Legs Please

I was eating breakfast when I noticed the American Black Duck quietly feeding on our small pond. Suddenly, the peaceful scene was interrupted as the duck began spinning wildly in circles, one wing flapping frantically as water splashed in all directions. Ten seconds later and just as suddenly, the duck was floating belly-up. I searched for signs of an underwater predator, perhaps an otter or the Loch Ness Monster, but saw nothing. A little shocked, I fished the duck out and brought it to the office where Kent McFarland and I conducted a necropsy. Not expecting any revelations, we were quite surprised when we found that the gizzard was stuffed with at least a dozen, undigested Eastern Newts. I was aware that newt skin contained toxins, but wondered if it was potent enough to kill a three-pound duck so quickly.

While ordinary handling of the Red Eft is not dangerous, its skin contains a potent toxin that can be deadly if ingested.

At first glance, amphibians appear rather defenseless. However, nearly all species have glands that produce toxic secretions, the potency of which is highly variable, ranging from distasteful, to mildly irritating, to deadly. In the case of the Eastern Newt (as well as all North American newts), it's deadly.

Newts contain a powerful poison called taricha toxin, which is biochemically very similar to tetrodotoxin, or TTX, found in pufferfish. A highly potent neurotoxin, TTX is the most poisonous non-protein substance known to science. Once it enters the bloodstream, TTX acts quickly by blocking conduction of nerve signals from your brain that tell your heart to beat and your lungs to breathe. There have been several cases of human poisoning from newts, including at least one death, but ordinary handling is not dangerous, as the poison must enter the digestive tract or the bloodstream. The bright orange, immature, terrestrial stage of the Eastern Newt, known as the Red Eft, contains 10 times as much TTX as the drab-colored adults.

For species such as Spotted and Jefferson salamanders, it's not the potency of the toxic secretion, but the stickiness or disagreeable taste that may help them escape from a predator. With poison glands concentrated in their tail, when salamanders encounter a predator they turn around and "waggle" their tail, while a sticky, whitish substance is secreted. If the predator "takes the bait" and gets a mouthful of noxious salamander "goo," it often decides to seek more palatable prey elsewhere.

Toads in the genus *Bufo*, on the other hand, including the widespread American Toad, have poison glands concentrated in "warts" on their backs and in two large parotid glands behind their eyes. When grabbed by a predator (including dogs and cats), the paratoid glands release a whitish, foamy secretion consisting of three substances: bufogenin and bufotoxin—which affect the adrenal and cardiovascular systems—and bufotenin, an alkaloid which is a powerful hallucinogen also found in some mushrooms. In most cases, the toad is quickly released due to the repulsive taste of the toxins. Then, for the next several hours, as a lingering reminder of the encounter, the predator is left with a variety of symptoms—including salivation, nausea, vomiting, heart arrhythmia, and hallucinations. If an entire toad is ingested, the symptoms range from convulsive seizures, to paralysis, neurologic disorders, and even death.

Amphibian secretions are not all bad, however. More than 200 chemical toxins considered to be beneficial in medical research have been isolated from just a small percentage of the world's amphibian species. One alkaloid produced by a tropical poison dart frog is a highly effective painkiller, 200 times stronger than morphine without being addictive. Skin secretions from the Australian Green Treefrog stimulate activity in the human pancreas and intestine, and commercial drugs based on these compounds are now available. Amphibian skin secretions, like those of the African Clawed Frog, can also have powerful antibiotic properties that help heal cuts and bruises; these may provide doctors with a whole new class of antibiotics in the years ahead.

—Steve Faccio

Field Notes
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Rusty-patched Bumblebee (*Bombus affinis*)

Not long ago, the Rusty-patched Bumblebee was among eastern North America's most common *Bombus* species. This docile bumblebee, whose workers and males are adorned with a single brightly colored abdominal patch, has been in serious decline for over a decade. *Bombus affinis* has likely been extirpated from Vermont and is absent in many parts of its former range. When we talk of pollinators in peril, this bumblebee defines the phrase.

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The once common Rusty-patched Bumblebee has all but disappeared from much of its former range.

Natural history

The Rusty-patched Bumblebee has a natural history similar to that of other *Bombus* species. The colonies are annual and initiated in early spring by a single queen. As spring progresses, the queen collects pollen and nectar, then secures a suitable nesting site to begin her colony, often in an abandoned rodent hole. Her first several broods consist solely of female workers who take over the collection of food, defense of the colony, and tending to subsequent broods. Later in the summer, the queen begins producing males as well as next year's queens. The males, whose sole purpose is to mate with new queens , provide neither resources nor defense for the colony. By season's end (late summer to early fall), the males die, as do the workers. The young queens, however, having mated and stored fertilized eggs, will enter diapause and survive the winter to begin a new colony the following spring.

The Decline

Historically, Rusty-patched Bumblebees ranged from Minnesota east to Maine and as far south as Georgia. Recent surveys, however, show an extreme contraction of the species' range with only isolated patches remaining in Midwestern and Northeastern states. *Bombus affinis* was last observed in Vermont in 1999.

Although the exact cause of this crash is uncertain, introduced parasites from imported colonies and pesticide use appear to be two major culprits. During the 1990s, to more successfully pollinate certain commercial crops, greenhouses across the United States began importing species of American bumblebees that had been reared in Europe. Having been exposed to foreign pathogens for which most native species had evolved no resistance, the imported bumblebees escaped the greenhouses and infected bees in surrounding areas. In addition, pesticides used to control other insect species also kill *Bombus*. Even small amounts used on lawns and in gardens can negatively impact entire colonies.

Learn More

Despite its dramatic decline, hope remains for the Rusty-patched Bumblebee! Both citizens and conservationists alike have taken notice of this pollinator's decline and are working together to help this imperiled species. Visit the Vermont Bumblebee Survey webpage at www.vtbees.org to learn more about Vermont's *Bombus* and VCE's discoveries on these precious pollinators.

—Sara Zahendra