# Field Notes

VERMONT CENTER UNITING PEOPLE & SCIENCE FOR CONSERVATION

> Vol. 3, Issue 2 Fall 2010

Uniting People and Science for Conservation

## INFORMATICS AND BIODIVERSITY UNITE FOR CONSERVATION

Biologists have discovered and described nearly two million species after 300 years of exploration around the globe. The world's natural history museums and research institutes now

of life. Unfortunately, until very recently, this library had no card catalogue.

hold about three billion plant and animal specimens and associated scientific data. In Vermont alone, over 750,000 invertebrate specimens are housed in collections, with likely well over a million total Vermont invertebrates catalogued from around the world. Additional information exists in the form of observational and experimental data, text, images, sound and video



PROBABILITY OF BICKNELL'S THRUSH OCCURENCE IN HISPANOLA USING COMPUTER MODELING. BLACK DOTS INDICATE VERIFIED SIGHTINGS OF BICKNELL'S THRUSH.

recordings. All of this is the raw material for studies of the global composition, identity, spatial distribution, ecology, systematics, and evolutionary history of two million species and counting. These data literally constitute an immense library

Perhaps fewer than ten percent of the world's collections exist in some form of searchable database or are geo-referenced to a discrete location on the planet. This lack of cataloging severely limits our ability to apply biodiversity information to science, conservation and society. VCE has joined a growing number of scientists and institutions aiming to change that.

Bioinformatics was developed to catalogue and track the genetic information of thousands of differ-

ent species and to track changes at the molecular level within those species over time. Bioinformatics synthesizes biology, computational mathematics, computer science and informa-

CONTINUED ON PAGE 4

# A New Era of Mountain Birdwatch

Hands flailing in front of me to ward off snapping branches, I stepped gingerly, feeling my way through the dense young firs. One of my technicians, Sage Dunn, forged a few meters ahead of me, her voice guiding me to the survey location, since I could barely see the white flash of her shirt through the branches. "There's a little cliff!" she called out, pausing at the brink of a short precipice. "Just a *little* cliff? Keep going!" I velled back. After an invigorating scramble down a steep incline, we emerged into a small clearing. Covered in fir needles and dirt and perching precariously on a steep slope, Sage and I evaluated the composition of the canopy, measured the tree density, and recorded the slope of the area. Now to find our way back to the trail...

It was not insanity that drove us through this high-elevation wilderness, but rather the initiation of Mountain Birdwatch 2.0 (MBW2), VCE's high-elevation monitoring program designed to measure density and abundance of montane songbirds across the entire breeding range of Bicknell's Thrush. For a decade, VCE has spearheaded Mountain Birdwatch, recruiting and training citizen scientists to annually monitor high-elevation bird species across the northeastern U.S. Widely hailed as a model citizen science program, the original MBW has produced invaluable avian population



FIELD TECHNICIAN SAGE DUNN CONTEMPLATES MT. KATAHDIN IN MAINE.

## www.vtecostudies.org

#### Field Notes Fall 2010 • Volume 3, No. 2

Executive Director Chris Rimmer

Associate Director Kent McFarland

#### Conservation Biologists Steve Faccio Eric Hanson Rosalind Renfrew Judith Scarl Sara Zahendra

#### Business Office Manager Melissa MacKenzie

Board of Directors John Peiffer, Chair Margaret Cheney David Evancich Brian Farrell David Key Jeff Marshall Chris Rimmer

The Vermont Center for Ecostudies (VCE) is a nonprofit organization whose mission is to advance the conservation of wildlife 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.

Your support in any amount will help us achieve our conservation mission. All donations are tax deductable

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



Vermont Center for Ecostudies PO Box 420 Norwich, VT 05055



Printed on recycled paper

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

## VCE VIEW

As VCE turns the corner of our three-year milestone, we feel exhilarated and confident, yet more than a little daunted. Events of the past year—Haiti's earthquake, the Gulf oil spill, Russia's epic heat waves and fires—have driven home the enormous global challenges we face. Locally, we all seem to notice that our woods, grasslands and waterways have become quieter. In fact, you and I as citizen scientists annually collect field data confirming songbird declines. Yet, successes abound to fuel our collective resolve and optimism. Vermont's Common Loons have recovered dramatically from near extirpation. There is now a range-wide Conservation Plan for Bicknell's Thrush. We have mapped 2,500 vernal pools across Vermont during the past two years, and field-verified 260. VCE's research has illuminated that Bobolinks can cover >600 miles during a single day's migratory flight!



By the time you read this, I and other VCE staff will have returned from our 25<sup>th</sup> trip to the Dominican Republic since 1994. We'll spearhead a 7-country meeting to implement conservation actions for Bicknell's Thrush, lead a 2-day field trip for 25 conservation biologists, and spend a week of intensive field training and research in remote Sierra de Bahoruco. Our roots may be locally deep, but our scope is hemispheric. Whether on a Vermont lake, an Adirondack peak, or in a Hispaniolan forest, VCE's thread of uniting people and science pervades every facet of our work. As we enter the next phase of our existence, we look forward to keeping you engaged. Simply put, VCE couldn't do what we do without you. Thanks, and have a great winter.

-Chris Rimmer

## New BOARD MEMBERS

VCE welcomes two new board members! Both bring invaluable experience and perspective to VCE, and we're pleased to introduce them here.

**David Evancich** is Vice President of Public Affairs and Marketing at Dartmouth-Hitchcock Medical Center, which he joined in 2001 after a several-year stint at the World Wildlife Fund's headquarters in Washington, DC. Dave previously held senior management positions at the American Red Cross and the United Way of Massachusetts Bay in Boston. He received a BA from Dartmouth College in 1974 and an MBA from the Tuck School of Business at Dartmouth in 1978. VCE stands to benefit greatly from his wisdom and expertise in marketing and communications. Dave currently lives in Norwich, has three grown daughters, and is an avid outdoorsman.





**Margaret Cheney** is a member of the Vermont House of Representatives, where she serves on the Natural Resources and Energy Committee and has been active in climate change legislation. Margaret brings a governmental policy perspective to the VCE Board, which should be instrumental in shaping how VCE can best inform the legislative side of conservation issues. In addition to her legislative duties, Margaret teaches Spanish and environmental science at Sharon Academy, is a House appointee to the Vermont Climate Collaborative, and serves as a member of the National Wildlife Federation's Northeast Leadership Council. Margaret lives in Norwich with her husband, Congressman Peter Welch, and has two sons and a daughter. data since 2000. Recently, VCE and a group of colleagues set out to refine and improve MBW in three key areas. Targeted goals of a revised program included randomized selection of routes, systematic survey design across Bicknell's Thrush breeding habitat, and improved survey methodology to ensure statistically robust conclusions from our hard-earned data.

MBW2 successfully incorporates each of those improvements. It also involves a close partnership between VCE and several Canadian groups, including the Canadian Wildlife Service, BirdStudies Canada, and Regroupement Québec Oiseaux. This binational collaboration will yield systematic and consistent sampling of high-elevation birds across the majority of montane forest habitat in the region. A random but spatially balanced selection of routes in target habitat across the entire Northeast, including areas of New York, Vermont, New Hampshire, Maine, Québec, and the Maritimes, ensures that these data will allow biologists to draw conclusions about trends across an entire habitat. MBW2's more robust survey protocols employ an analytic component that will allow accurate assessments of population density, despite variations in detection probability for different individuals of a given species. Together, these changes position MBW2 to become one of North America's most accurate and statistically powerful bird monitoring programs.

Thus, at the end of May 2010, nine technicians and I found ourselves at the peak of Battell Mountain in northern Vermont, navigating to our field site for an intensive two-day field training session. After the technicians practiced habitat sampling methods, GPS navigation, point documentation, and point count protocols, they fanned out in teams of two,



MOUNTAIN BIRDWATCH 2.0 SELECTED ROUTES IN THE U.S.

#### Nocturnal Adventures of a Montane Field Technician

There was heavy rain on the morning of the Encounter, so rather than conducting point counts, my field partner and I spent the day in an isolated wildflower meadow at the base of a small mountain on the Canadian border. In between birdwatching and strawberry picking, I tracked a mountain lion along the deserted road to our study site; this was exciting but nerve-wracking as I had to hike to our route in the dark the next morning. After a dinner of wild strawberries, we retired to the car to rest before a 4 a.m. start. Before turning off my headlamp, I picked up Stephen King's "IT", a nightmare-inducing book about a demonic clown that had absorbed me for days. At the end of a chapter, I was distracted by loud, heavy breathing. Turning around, I saw my field partner sleeping peacefully in the back seat—the noise was not coming from her. That was when I noticed the condensation on the windshieldcircles of water expanding and contracting to the rhythm of deep inhalations and exhalations. Heart pounding, I leaned closer, only to see the outline of a giant head visible in the moonlit darkness. Gathering all of my courage, I wiped away the moisture and came face to face with a very inquisitive-but decidedly not demonic-mother moose. She and her calf had approached to investigate the strange new addition to their mountain path.

-Chris Mulvey

each pair assigned to survey a set of routes in a specific region of northern New England and New York. Weather permitting, each team was expected to survey one mountain per day, a requirement that left little time for rest and recovery. Although all avian point counts were conducted on trails or roads, in order to quantify the habitat at each site, technicians often had to climb, crawl, or wade through dense vegetation and muck to reach off-trail vegetation sampling locations. Thus, the summer was physically taxing, but our technicians boldly persevered in (mostly) good humor. As technician James Ialeggio wrote in an email, "Things are soggy here. Yes, soggy and filled with mud, but morale remains high, along with body odor."

During June and July of 2010, the MBW2 technicians and I documented 91 routes in the U.S. alone. Each survey point was photographed, georeferenced, and verbally described, and we measured habitat variables such as tree density, canopy composition, and ground and shrub cover; this will enable future comparisons of habitat characteristics with avian abundance and distribution. Finally, we conducted point counts at 76 of the 91 new U.S. routes, setting the stage for data collection at these routes for years to come.

CONTINUED ON PAGE 4

#### MOUNTAIN BIRDWATCH - CONTINUED FROM PAGE 3



THE 2010 MBW FIELD CREW LOOKING CHEERFUL....BEFORE THEY START TRAINING!

Despite the flurry of hired technicians in 2010, the U.S. segment of Mountain Birdwatch 2.0 is still a citizen-science program at its core. In 2011, existing volunteers will be encouraged to adopt new survey routes, and MBW2 staff will hold training sessions to introduce volunteers to the new field protocol. In the meantime, technicians will set additional routes in the U.S., focusing on New York and Vermont. This will allow for extensive subsampling in the southern regions of our survey area, as these areas are expected to show the earliest indications of climate change. By 2012, MBW2 plans to engage volunteers in surveying a total of 120 new routes in the northeastern U.S. This sample size will allow us to assess the effects of environmental factors such as climate change, management activities, and predator-prey cycles on high-elevation bird populations.

Are you intrigued? MBW2 needs new volunteers, especially in New Hampshire and Maine! If hiking a peak next summer isn't for you, please consider organizing and sponsoring a Mountain Birdwatch

talk in your region. Contact Judith Scarl, Mountain Birdwatch director, for details: jscarl@vtecostudies.org.

—Judith Scarl

#### BIOINFORMATICS - CONTINUED FROM PAGE 1

tion technology, allowing scientists to store and compare information from many different species and to document changes. Biologists can use this catalogued information to learn what living organisms inhabit an area, what natural resources are available, and how biodiversity may have changed over time. They can measure the biodiversity of an ecosystem or region to determine how healthy it is, how all of its components fit together, and ultimately how to conserve it.

Until recently, biodiversity collections lacked a common database architecture, which hindered the discovery and integration of data for research and education. However, in the last decade, biodiversity science has united with informatics science to spawn an internet-based information system for accessing, integrating, and analyzing biodiversity information. Further, this union enables the creation of sophisticated predictive models to help interpret these data. Biodiversity informatics is a young discipline; the term was coined in 1992, but the field has quickly emerged as a powerful tool for conservation biology.

From breeding birds to butterflies, vernal pools to zebra mussels, VCE biologists harness the power of biodiversity informatics to help solve conservation issues. The wintering grounds of Bicknell's Thrush illustrate this well. Despite nearly 100 years of work by ornithologists, little was known about location, and the extent and characteristics of the species' winter habitats. Few verifiable records existed before VCE and Canadian Wildlife Service biologists teamed up with various local partners to survey forests in Cuba, Jamaica, Haiti, Dominican Republic and Puerto Rico. A decade of strenuous surveys later, we have made great strides in knowledge, but been able to cover only a fraction of the islands' rugged and remote mountainous landscape. We are left with many questions that need answers in order to formulate conservation action plans. Where exactly are Bicknell's Thrushes wintering on each island? How much habitat remains? How much is protected? We turned to biodiversity informatics to provide crucial insights.

With a geo-referenced database of locations where each Bicknell's Thrush was found, geophysical and climatic attributes for every square kilometer in the Greater Antilles, plus



Make sure your java is Bird Friendly® and help VCE at the same time! VCE is partnering with Birds and Beans® to promote consumption of triple-certified, organic, shade grown, Fair Trade coffee. You can find this tasty brew in several Upper Valley and other regional food co-ops. Make sure to mention VCE, as we receive \$0.50 on every pound sold!

**Drink Coffee for the Birds!** 

#### **Biodiversity Informatics Projects Around the World**

Here are just a few of the more than 660 projects from around the world. You can view a list of most of these at http://www.tdwg.org/biodiv-projects/. VCE is involved in many of these projects and is able to share information back and forth with other organizations, creating a rich tapestry of biodiversity data.

- Global Biodiversity Information Facility (GBIF) http://www.gbif.org/
- The Encyclopedia of Life project (EOL) <u>http://www.eol.org/</u>
- Avian Knowledge Network <u>http://www.avianknowl-edge.net/content</u> and The Northeast Avian Data Center - <u>http://akn.nebirdmonitor.org/</u>
- Bird Point Count Database <u>http://www.pwrc.usgs.</u> gov/point/
- Butterflies and Moths of North America (BAMONA) http://www.butterfliesandmoths.org/
- Vermont Invertebrate Database Alliance (VIDA) -<u>http://www.vtinverts.org/</u>
- North American Breeding Bird Atlas Explorer <u>http://</u> www.pwrc.usgs.gov/bba/
- NatureServe Explorer <u>http://www.www.natureserve.</u> org/explorer/
- The Species 2000, ITIS (Integrated Taxonomic Information System), and Catalogue of Life projects -<u>http://www.itis.gov/</u>

powerful and predictive computer modeling, we were able to determine the species' potential geographic distribution (see map on page 1). By overlaying predicted areas of occupancy with lands known to be protected, we are now better able to target further conservation efforts.

Meanwhile, closer to home in Vermont, VCE biologists identified a more local problem. The Vermont Endangered Species Committee was created in 1983 to advise the Secretary of Natural Resources on all matters relating to endangered and threatened species-which species to list, how to protect them, and more. The Committee recognized the value of establishing expert advisory groups to focus on specific taxa in Vermont-birds, reptiles and amphibians, mammals, and invertebrates. With estimates of over 21,000 invertebrate species in Vermont, the Invertebrate Scientific Advisory Committee (ISAG) faced the most daunting task of all. During early stages of developing the Vermont Wildlife Action Plan, ISAG realized the need for a comprehensive and spatially explicit invertebrate database for Vermont to help assess the group's conservation status. With a State Wildlife Grant, VCE began to plan, design and implement an invertebrate knowledge network for Vermont. The project is called the Vermont Invertebrate Database Alliance, or VIDA, the Spanish word

meaning life.

Knowledge networks facilitate research by providing an efficient way to discover, access, integrate, and analyze broadly distributed scientific data. VIDA unites Vermont invertebrate records from private and public collections, published literature and, in some cases, unpublished observations. All of these records are unified in a standardized, constantlyexpanding database that is available to anyone at any time via the Global Biodiversity Information Facility (GBIF) for science, conservation and education.

GBIF coordinates and holds electronic records from biodiversity data collections worldwide to facilitate the discovery and use of vast quantities of data. Right now there are nearly 217 million plant and animal records available at our fingertips. Simply go to <u>http://data.gbif.org/</u> and select the species or location you wish to view. Type in Blackpoll Warbler, and within seconds you will have over 19,000 records across the Western Hemisphere, viewable on an instant map, downloadable into a spreadsheet or as a Google Earth layer. You can learn how and who collected the data, where they are physically stored in the case of specimens, and more.

Thanks to the help of thousands of citizen scientists and partners, VCE has contributed over 364,030 bird records from 4,704 locations via Vermont eBird, 30,818 bird records from 1,986 locations during Mountain Birdwatch Surveys, over 61,000 bird records from Forest Bird Monitoring sites across the state, and 56,147 records from the Vermont Breeding Bird Atlas. And those represent just some of our data.

CONTINUED ON PAGE 7



MAP OF THE DISTRIBUTION OF THE BLACKPOLL WARBLER ACROSS THE WESTERN HEMISPHERE USING RECORDS PROVIDED BY THE GLOBAL BIODIVERSITY INFORMATION FACILITY (GBIF).

# RUTH STEWART, CITIZEN SCIENTIST EXTRAORDINAIRE

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 forever looking for the perfect leaf—no imperfections, exceptional color. It could always be replaced the next day. I must have been 6 or 7 years old then, walking home from school in Detroit. Before my 8<sup>th</sup> birthday we moved to a farm in the Finger Lakes region of western New York. I had a bike, lots of countryside, forests, swimming holes, and an exploratory bent. Maybe it was that dead female opossum with young that fired my lifelong curiosity about the natural world. It was my first close-up look at a marsupial, and I almost took it home!



Through her efforts as a citizen scientist, Ruth Stewart has made invaluable contributions to the world of science and conservation.

I chose college at the State University of NY at Albany for English and Library Science-not biology. That decision led me to a teaching/librarian career after I moved to Vermont. Always somewhat frustrated by the path not taken, I began learning about nature on my own. Identifying spring wildflowers was my first quest—stationary objects that could be photographed, examined, or torn apart if necessary. It was easy to combine the duties of young motherhood with a leisurely walk in the Vermont woods.

Then birding grabbed my attention. In the early 1970s, George Ellison and his teen son, Walter, offered a field birding 'course' through the Vermont Institute of Natural Science (VINS). We traveled to hotspots like the Northeast Kingdom, Herrick's Cove, Dead Creek, Newburyport and Plum Island. It was my initiation to the world of birds, birding places, birding people, birding fanatics, and birding contagion. I've been hooked ever since.

What followed were many years of Vermont-based birding excursions and events offered by VINS. My favorite was the annual Bird Conference, with workshops on bird behavior, natural history, identification, and conservation, plus local field trips. Best of all were the renowned speakers sharing information about their ornithological travels and studies. These conferences maintained a flow of fresh and continuous learning, while providing an abundance of camaraderie, networking, and lifelong friendships.

When statewide citizen scientist projects began, I jumped on board as a less-than-skilled, but enthusiastic and willing birder. I participated in the first Vermont Breeding Bird Atlas from 1976-1981. My experiences during this Atlas made me a much more knowledgeable and confident birder, such that I 'graduated' to become a Bennington County Coordinator for the second-generation Atlas in 2003. At the same time, the Vermont Butterfly Survey was launched, providing me an opportunity to learn about a new taxonomic group and contribute data to a valuable conservation project. I was newly retired, and for the first time in my life I had plenty of time to enjoy my outdoor passions. Both Atlases provided an excuse and a purpose to be outside, exploring new areas of Vermont, and contributing important data for conservation. I am sorry that the field work is over!

Vermont eBird is an ongoing project that is perfect for citizen scientists like me. It provides an opportunity to share bird records with others and to make one's own observations permanently accessible for research and conservation. Observations entered in the eBird database can be used to help understand phenomena from local population dynamics, to migration timing, to the global biodiversity of bird populations.

For more than 30 years, I have been an avid student of natural history, an environmental advocate, conservationist, citizen scientist, and teacher. I still conduct annual point count surveys for VCE's Forest Bird Monitoring Program and Cornell's Birds in Forested Landscapes program, and I coordinate the Winhall Christmas Bird Count for Audubon. In addition, I count monarch larvae and butterflies for Monarch Watch. I have conducted birding workshops and talks, led bird walks, educated summer day campers about birds, and participated in Earthwatch natural history projects. My passion for birding has taken me to every continent except Antarctica (but there's still time!). My avocation is birder and naturalist-a dabbler in much, a master of little. Life is a continuous learning experience. My life is enjoying where I am and what I am doing at the moment. Knowing that my small contributions as a citizen scientist add to understanding the bigger picture is part of that enjoyment.

-Ruth Stewart

#### BIOINFORMATICS - CONTINUED FROM PAGE 5

VIDA and its partners are poised to share nearly 1 million invertebrate records with GBIF, including butterflies and giant silkmoths from the Vermont Butterfly Survey, bumblebee records compiled by ecologist Leif Richardson, dragonflies and damselflies gathered by Mike Blust at Green Mountain College and Bryan Pfeiffer from Wings Environmental, bark beetles from traps set by the Vermont Department of Forest Parks and Recreation Forest Biology Lab, mosquitoes trapped and identified by the Vermont Agricultural Agency, crayfish records from the Vermont Department of Environmental Conservation Biomonitoring Section, and freshwater mussels found by the Biomonitoring Section and the Vermont Fish and Wildlife Nongame and Natural Heritage. VIDA continues to grow as more and more partners share data.

All of these projects will bring together centuries of accumulated data and knowledge into currency for conservation, science and society. This allows us to understand what used to be here, what is here now, and what might be here someday given changing conditions. VCE believes that the creation, integration, analysis, and interpretation of information on biological diversity—the emerging field of bioinformatics—will help us all work together to better understand and conserve our natural world. It literally unites people and science for conservation.

—Kent McFarland

## CITIZEN SCIENCE OPPORTUNITIES

If you enjoy watching wildlife and wish to contribute to protecting our natural heritage, then it's time to join the VCE team! Consider becoming a citizen scientist. Visit www.vtecostudies.org/citsci.html to find the citizen science project that's right for you.

Project	Website/email	Leader	Season	Ability	
Vermont and Hispaniola eBird Report and explore bird sightings with this online checklist.	ebird.org/content/vt/ ebird.org/content/hispaniola/ kmcfarland@vtecostudies.org	Kent McFarland	Year-round	Beginner to expert	
<b>Mountain Birdwatch</b> Adopt a mountain and survey Bicknell's Thrush and other mountain songbirds.	www.vtecostudies.org/MBW/ jscarl@vtecostudies.org	Judith Scarl	June	Beginner to expert. Hiking required.	
<b>Loonwatch</b> Participate in the annual one-day census of Vermont's breeding loons.	www.vtecostudies.org/loons/ ehanson@vtecostudies.org	Eric Hanson	mid-July	Beginner to expert	
Vermont Loon Recovery Program Help monitor nests and lakes.	www.vtecostudies.org/loons/ ehanson@vtecostudies.org	Eric Hanson	Spring-Summer	Beginner to expert	
Forest Bird Monitoring Program Help track long-term changes in populations of interior forest songbirds.	www.vtecostudies.org/FBMP/ sfaccio@vtecostudies.org	Steve Faccio	June	Able to identify forest birds by sight and sound. Hiking required.	
<b>Vernal Pool Mapping Project</b> Help map vernal pool locations statewide by con- ducting field visits to potential pools.	www.vtecostudies.org/VPMP/ sfaccio@vtecostudies.org	Steve Faccio	Primarily Spring, also Summer and Fall	Beginner to expert	

## **Reduce Your Footprint!**

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

# VCE PROJECT UPDATES

#### Vermont Vernal Pool Mapping Project

Following up our successful pilot year, the Vermont Vernal Pool Mapping Project (VPMP) completed its second season of remote mapping and field work in central Vermont during 2010. To date, we have mapped a total of 2,428 potential vernal pools across northern and central Vermont. Thanks to a hardy and dedicated corps of volunteers, 260 (11%) pools have so far been field-verified. Preliminary analysis indicates that aerial photo interpretation, in which we view color, infrared aerial photographs with a stereo-scope to locate "potential" vernal pools, is a reasonably accurate method. Although we discovered that many smaller pools, as well as those located under conifer cover, cannot be detected using this method, 66% of the pools we mapped as "potential" turned out to be true vernal pools when visited on the ground, while 25% were not (volunteers were unable to classify the remaining 9% as vernal pools or some other wetland type). Of the 25% that were *not* vernal pools, more than half were another category of wetland (e.g. seep, swamp, beaver pond)-these held water during the spring and were therefore difficult to distinguish from a vernal pool without an actual site visit, underscoring the value of field-verification for VPMP. During field-veri-



Biologist Steve Faccio celebrates earth day with a trip to vernal pools.

fication, data were collected on amphibian and invertebrate "indicator species" present in each pool. The most commonly detected species was the Spotted Salamander, whose eggs and/or larvae were found in 127 (69%) confirmed vernal pools, followed closely by Wood Frogs which were found in 109 (60%) pools. Only 15 (8%) pools had eggs of Bluespotted Salamanders, while 10 (6%) pools contained Jefferson Salamander eggs—this reflected the two species' more limited distributions as well as their smaller, more cryptic egg masses. Among invertebrates, fingernail clams were found in 40 (22%) pools, while fairy shrimp were discovered in just 6 (3%) pools. In 2011, our remote vernal pool mapping and training workshops will focus on the southern third of Vermont, including Rutland, Bennington, Windham, and southern Windsor counties. Field-verification will continue statewide, so be prepared to help us complete our statewide VPMP coverage next spring!

—Steve Faccio

#### The Sun Sets on the Vermont Butterfly Survey

It is both with great excitement and a twinge of nostalgia that we announce the official end of the Vermont Butterfly Survey (VBS). From its beginning in June of 2002, this sometimes daunting, but always enlightening project has endeavored to unravel the little-known status of Vermont's butterflies. Eight years later, we have succeeded in accomplishing much of what we set out to achieve. From the first day that our intrepid citizen scientist volunteers fanned out across Vermont, netting and photographing thousands of Lepidoptera, we have been amazed by the deluge of new information about these fascinating arthropods.

Going into this project, our objectives were many, given how little we knew about the status of Vermont's butterflies. There existed no species distribution maps, no scientific assessment of the threats facing our butterflies, no statewide conservation concept for the group and not even a comprehensive list of the butterfly species that exist in Vermont!

Now, after several years and remarkable effort by hundreds of dedicated butterfly enthusiasts, the depth and breadth of our knowledge has been vastly increased, as we have acquired much of the baseline information necessary to protect both Vermont's most imperiled and most common butterfly species.

Here is a snapshot of some VBS accomplishments over the years: Between 2002-2007, the Vermont Butterfly Survey amassed 36,121 records collected by 149 citizen scientist volunteers; these represented 103 species of butterflies and 4 species of giant silkmoth. Accounting for visual records as well as specimens and photographs, VBS observers added 12 new species to the former list of butterflies known to exist in Vermont. Every biophysical region in Vermont was thoroughly scoured, and we have produced a comprehensive analysis of each species found in every habitat type. We have created 107 species accounts relating habitat preferences, physical descriptions and life history characteristics, as well as detailed abundance and distribution maps. We have charted their Vermont flight periods, developed species richness maps and identified butterfly "hot spots" throughout our state.



Armed with nets and binoculars, butterfly enthusiasts Kent McFarland and Bryan Pfeiffer kick off the Vermont Butterfly Survey in 2002.

Perhaps most importantly, we have assessed the conservation concerns of Vermont's butterfly species and evaluated current and potential threats to the Species of Greatest Conservation Need in Vermont.

Though the sun has officially set on VBS, our interest in Vermont's Lepidoptera is far from over, as we continue to work towards a better understanding of these insects' status in Vermont. Even now, we are updating the VBS website to reflect our newest discoveries and analyses, and we guarantee that annual summer searches for some of Vermont's more elusive butterflies will continue long into the future.

—Sara Zahendra

#### 2010 Vermont Loon Summary

Vermont's Common Loon population enjoyed another record year in 2010, with 72 breeding pairs statewide, 57 (79%) of which were successful, producing 70 chicks that survived through August. In contrast to ten years ago when only 38 pairs attempted to nest and 44 chicks survived, Vermont's loon population continues to experience a steady and remarkable increase (see Table). VCE's work to monitor and manage Vermont loons this summer benefitted from over 300

Vermont Loon Summary	2004	2006	2008	2010
Nesting pairs	43	58	61	72
Successful nests	34	44	49	57
Territorial pairs	64	77	86	91
Chicks surviving through Aug.	44	56	55	70
Chick survival rate (%)	81	85	73	82
Number of adult loons observed in VT during July Loonwatch	184	201	225	210

volunteers who helped with a variety of tasks, from censusing loons to protecting nest sites to educating lake users. During the annual Loonwatch survey on July 17, volunteers counted 210 adult loons on 127 lakes statewide.

Several new breeding pairs squeezed into unoccupied territories on larger lakes, including Great Averill Lake, Groton Lake, Joe's Pond, and Somerset Reservoir, each of which now host 2-3 nesting pairs. The new pairs on Groton Lake and Joe's Pond nested very close to summer cottages, but the considerate actions of landowners and boaters enabled both nests to succeed.

Miller Pond in Strafford had potential pair activity in May and June, while McConnell Pond in Brighton apparently lost its pair. Loons nested for the first time since 1999 on Jobs Pond in Westmore, but the nest was depredated. After a 3-year absence, a pair nested successfully on Ewell Pond in Peacham, producing one chick. The Buck Lake pair in Woodbury, which last nested in 2003, worked on three nest bowls but never laid eggs. Compared to recent years, there appeared to be an increase in territorial fighting among adults. This is expected as more territories become occupied and non-breeders seek to acquire space through takeovers. Despite these intrusions, few chicks were lost during territorial confrontations.

Several loon mortalities were documented in Vermont this year, including an adult that died on Maidstone Lake after being shot. Its wounds had healed over, but the bird had elevated lead levels, suggesting it probably died from lead poisoning, rather than the gunshot wound itself. Two other loons died from a fungal lung disease. Tufts University wildlife veterinarians conduct all the necropsies to assess the causes of loon mortality. It is unlikely Vermont's loons will be affected by the Gulf of Mexico oil spill, as our birds migrate to the New England coast for the winter. Adults usually depart in October, followed by the chicks in November.

—Eric Hanson



A LOUNGING BABY LOON HITCHES A RIDE ON MAMA'S BACK.

#### Bobolink Migration Revealed for the First Time

Bobolinks keep breaking the rules. Among all songbirds worldwide, the Bobolink's migration is one of the longest. It is one of seven species that molt all feathers twice each year. Now, light-level loggers (geolocators) retrieved from Bobolinks show that their migratory strategy is unusual, if not unique.

Weighing less than a gram, geolocators estimate the daily location of birds based on recorded light levels (see *Field Notes* spring 2010), allowing ornithologists to map movements during the non-breeding season. At the population level, geolocators will illuminate whether birds breeding in different regions have different migration routes and wintering areas. If Vermont birds migrate along a different route or winter in different areas compared to Oregon birds, conservation measures may need to be population-specific rather than a one-size-fits-all.

Geolocators work best on open-habitat species like Bobolinks. Without shading from trees, the data produced are "clean," with accurate sunrise and sunset times that are used to estimate latitude and longitude. Still, each Bobolink location point comes with an uncertainty of about 100 km in latitude and longitude.

In 2009, VCE and our partners (University of Vermont, University of New England, the Platte River Whooping Crane Maintenance Trust, and the Smithsonian Migratory Bird Center) attached 45 geolocators to Bobolinks across the breeding range: Vermont, Nebraska, and Oregon. Upon spring arrival a year later, returning birds are recaptured to retrieve geolocators and download the logged data. We recaptured four Bobolinks in 2010 that still carried their "backpacks"; we resighted several others that had shed their unit, presumably because the material used to attach them did not endure the elements (we deployed 60 more geolocators in 2010 using different material). One of the units had failed soon after deployment.

Though only three loggers yielded data (2 from Vermont, 1 from Nebraska), these were rich with information. Each Bobolink flew different routes in spring versus fall, but paths were generally similar among individuals. Southbound migrations to the wintering grounds took longer (8-13 weeks) than return spring flights (5-6 weeks), consistent with other migratory bird species. Not unexpectedly, the Nebraska bird crossed the Gulf of Mexico, while the Vermont birds hugged the East Coast. Each of the Bobolinks chose different wintering areas in Paraguay and northeastern Argentina, regions known to host large concentrations of Bobolinks. Regardless of wintering location, spring departure was fairly synchronous. Arrival on the breeding grounds varied by up to a week. It turns out that Bobolink migrations are unusual for their lengthy stopovers. Lasting for up to 6 weeks on the southbound route in South America, these periods of relative stationary behavior likely include local foraging movements. This gradual, apparently leisurely journey has not been documented in other long-distance passerines, prompting questions about its evolution. Though stopovers in North America and the Caribbean were brief (<1 week), they were often at the beginning or end of relatively long flight legs, suggesting that habitats used may be critical.



MOVEMENTS OF A BOBOLINK BETWEEN JUNE 2009-JUNE 2010 BASED ON GEOLOCATOR DATA. BROWN AND GREEN LINES REPRESENT FALL SOUTHBOUND AND SPRING NORTHBOUND MIGRATORY ROUTES, RESPECTIVELY.

Average flight rates for the 9,000-9,500 km northbound migration, including stopovers, were 210-260 km/day. Between stopovers, rates averaged 1000 km/day. The fastest flight leg was 1900 km within one day (79 km/hour). The speed of this flight leg, undoubtedly assisted by tailwinds, has been noted in shorebirds, but is a record-breaker (so far) in the songbird world.

The Bobolink's global population has declined by almost half in the last 40 years, spurring much-needed conservation actions on the breeding grounds. Geolocators will help determine whether we should be paying attention to the species during the rest of its annual cycle as well.

-Rosalind Renfrew

## NORWICH 2010 BIRDING QUEST TOPS ITS GOAL

Have you ever wondered how many bird species you could find in your hometown? During 2010, several ambitious birders in Norwich challenged themselves and other local birding enthusiasts to collectively identify as many species as possible within the town limits. Collective wisdom predicted that 150 would be a stretch, but possible with sustained effort and luck. Admittedly, the Norwich 2010 Birding Quest's primary incentive is recreational, providing an 'excuse' to get outside and watch birds as often as possible. Hand in hand with that self-serving motive has been our ambition to better document Norwich's diversity of birdlife. With many bird populations in decline across North America, there is an increasing need to understand patterns and trends as a first step towards conservation. Birds are excellent ecological indicators, and their patterns of abundance and distribution can tell us much about ecosystem health, even at a local, townwide scale.

As of mid-October, we're pleased to report that the Norwich Quest has shattered its goal of 150 species, with a tally of 161 (162 counting an unidentified Scaup sp.). Our Vermont eBird www.ebird.org/content/vt/ account, which combines all observers' reports, has recorded > 600 checklists, nearly a third of all those submitted for Windsor County! We have offered

monthly public walks to various Norwich birding 'hot spots', and these have drawn as many as 20 participants to explore and become better acquainted with the town.

Avian highlights have ranged from the mundane to the unexpected. Surprises have included Red-necked Grebes and Longtailed Ducks on the Connecticut River, Pectoral Sandpipers and Short-billed Dowitchers on the Ompompanoosuc Flats, a calling Whip-poor-will on seldom-visited hiking trails, a fly-by Golden Eagle, and Orchard Orioles for the second consecutive year at Ledyard Bridge. Hoped-for species that have eluded us so far include Black-crowned Night-Heron, Great Horned Owl, Blue-gray Gnatcatcher, and Orange-crowned Warbler.

With two months remaining to discover new species within Norwich's borders, we have our sights set on a final tally of 170, with an outside shot at 175. What's next? We consider 2010 a beginning—next year Norwich may 'challenge' surrounding towns, and/or seek to improve on our 2010 total. For now, there Northern Cardinal at the Montshire banding station. are plenty of birds to be seen and entered on Vermont eBird



NORWICH BIRDING QUEST PARTICIPANT SPENCER HARDY BANDS A FEISTY

during the remainder of 2010. Northern Shrike? Lapland Longspur? Gyrfalcon?? Anything is possible, and we encourage other Vermont or New Hampshire towns to take on their own birding quests - it's fun, contributes valuable information, and is a great way to connect with other birders!

—*Spencer Hardy and Chris Rimmer* 

### LEAVE A LASTING IMPRESSION A Legacy gift to VCE will help sustain our mission of advancing wildlife conservation through RESEARCH, MONITORING, AND CITIZEN ENGAGEMENT. PLEASE HELP VCE MAKE A LASTING IMPRESSION. NAME VCE AS LEAVE A BEQUEST TO GIVE THE GIFT VCE IN YOUR WILL A BENEFICIARY OF STOCK TOGETHER WE CAN MAKE A DIFFERENCE!

www.vtecostudies.org

#### Field Notes Vermont Center for Ecostudies PO Box 420 Norwich, VT 05055

NON-PROFIT ORG U. S. POSTAGE PAID PERMIT NO. 222 BARRE VT

# WESTERN AND EASTERN CHAT-TANAGER (CALYPTOPHILUS TERIUS AND C. FRUGIVORUS)

As dawn filters through cool broadleaf forests high in the Dominican Republic's Sierra de Bahoruco, an emphatic, melodious song rises from the densely tangled understory. One of Hispaniola's most rare, furtive and at-risk endemic songbirds, the Western Chat-Tanager, is beginning its day. First described in 1883, the species' taxonomic history has been a confusing one. The chat-tanager 'complex' formerly consisted of seven recognized subspecies, but recent mitochondrial DNA studies by VCE colleagues have led to the designation of two distinct species—the Western and Eastern Chat-Tanagers. Both are montane forest specialists and considered globally vulnerable by the International Union for the Conservation of Nature.

Nearly identical in plumage and voice, the two species are

best distinguished by their non-overlapping ranges. Western Chat-Tanagers inhabit Haiti's La Hotte and La Selle mountain ranges and the DR's Sierra de Bahoruco, while Eastern Chat-Tanagers are confined entirely to the DR, occurring in the extreme eastern Bahoruco range, Sierra de Neiba, and the Cordillera Central. Most birds of both species occupy elevations between 1,000-2,000 meters, though a historic population



A WESTERN CHAT-TANAGER, ONE OF HISPANIOLA'S RARE, ENDEMIC SONGBIRDS.

occurred at sea level on Haiti's Île de la Gonâve, where it has not been documented for a half-century.

While neither species is ornithologically well-known, the Western Chat-Tanager has been a focal endemic of VCE's long-running avian studies in Hispaniola's mountains. We have banded well over 100 individuals in Sierra de Bahoruco alone, and one of these is believed to hold the longevity record for Hispaniolan songbirds—a 12-year old bird banded on 12 November 1998 and mist-netted within 50 meters of its original capture site on 15 March 2010! In addition to being extremely site-faithful montane forest residents, Western Chat-Tanagers appear to remain in mated pairs year-round. A VCE radio-tracking study in March of 2010 confirmed that territories of both males and females are small—only 0.18 hectares (<½ acre). Primarily ground dwellers, both species are believed to feed mainly on invertebrates, for which they forage in the leaf litter.

The two species' nests were unknown to science until the early 2000s, when VCE biologists found two Western Chat-Tanager nests in Sierra de Bahoruco. Situated in near-im-

penetrable tangles of vines
1-2 meters above ground,
both were bulky, partially domed structures, com posed mostly of moss, dried leaves, twigs, and fine stalks.
Eggs were light blue with reddish brownish flecking,
but both nests unfortunately failed before fledging, victims of predation, probably from introduced feral cats or rats.

Locally named *Patico Chirri* in the DR and *Kònichon* in

Haiti, the two Chat-Tanagers are considered at serious risk of extinction due to habitat loss and degradation. VCE and our many partners are working hard to secure the long-term protection of Hispaniola's montane forests. Our collective success will likely dictate the future of these two secretive endemics.

—Chris Rimmer

## www.vtecostudies.org