

Uniting People and Science for Conservation

THREATENING SKIES: VCE BIOLOGISTS EXAMINE ATMOSPHERIC POLLUTANTS

It would appear that Bicknell's Thrush and Red-backed Salamander have relatively little in common. One, benefitting from winged migration, divides its time between the islands of the Caribbean and mountains of the Northeast and eastern Canada. The other, rarely seeing the light of day, spends much of the year in forest leaf litter, under rocks or logs, or in small burrows. One flies high and sings like a flute. The other lacks lungs and "breathes" through its skin. Yet biologists at the Vermont Center for Ecostudies are finding that the lofty thrush and the lowly salamander, and many organisms in between, face the same environmental risk, a threat as inescapable as the air around us.

Over the course of their research, VCE biologists have discovered that atmospheric pollutants carried around the globe present troubling risks to birds, amphibians, and other wildlife. Carbon dioxide, and its role in global warming, isn't the only concern. VCE biologists are finding that mercury, lead, and other contaminants are moving vast distances in the atmosphere to cause damage to wildlife far away.

"Whether you're studying polar bears or penguins or anything in between, this is a worldwide problem," says VCE biologist Kent McFarland. "Across our span of research, we often find ourselves investigating the effects of atmospheric deposition on wildlife. It's an undercurrent we can't ignore."

Common Loons

VCE's longstanding work on the recovery of Common Loons in Vermont now includes the effects of mercury. Feeding near the top of the food chain, loons are vulnerable to mercury accumulating in their tissue. For example, survival rates among loon chicks with high levels of mercury in their blood and feathers declined by 40% on Maine's lakes and ponds. Male loons with elevated mercury levels can become apathetic and less attentive to nestlings or chicks than birds with lower mercury levels. Analyses of air, water, and fish reveal that mercury concentrations are high and pervasive in the Northeast. Yet the likely major sources of the contaminant are far from our region, suggesting that the mercury is being transported in the atmosphere. Much of the mercury pollution in the Northeast originates from coal-fired power plants, industrial boilers, and waste incinerators.

From 1999-2001, VCE's Vermont Loon Recovery Project (VLRP) partnered, as part of a regional study, with Biodiversity Research Institute to assess mercury in more than 25 loons on 15 lakes statewide. Since 1997, 76 eggs have been collected for mercury analysis from 34 lakes and ponds. The majority of loons and eggs sampled indicate that Vermont's population has low to moderate levels of mercury, with only a few potential hotspots. Through its annual population assessment and productivity data, VLRP will assess whether any declines in productivity correlate to these hotspots and conduct follow-up sampling if warranted.



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A COMMON AMPHIBIAN IN VERMONT, THE RED-BACKED SALAMANDER PLAYS AN IMPORTANT ROLE IN THE HIGH-ELEVATION FOOD WEB; WE HAVE CAPTURED VIDEO FOOTAGE OF BICKNELL'S THRUSH FEEDING RED-BACKEDS TO NESTLINGS. MERCURY BIOACCUMULATES IN THIS SPECIES AND OTHER ORGANISMS IN THE MONTANE ECOSYSTEM.

Songbirds

Conventional thinking held that the mercury threat was limited to aquatic environments since mercury is most readily converted to its toxic form (methylmercury) in water. But McFarland and VCE Director Chris Rimmer led a groundbreaking study that revealed elevated mercury levels in the blood and feathers of mountain-dwelling songbirds such as Bicknell's Thrush, which the VCE biologists have studied since 1992. Although the effects of mercury bioaccumulation in montane birds are not yet known, VCE's findings

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Field Notes

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The Vermont Center for Ecostudies (VCE) is a nonprofit organization dedicated to the understanding and conservation of birds and other wildlife. With a reach extending from northern New England through the Caribbean to South America, our work unites people and science for conservation.

To make a tax-exempt donation in support of our work, please visit our website or call (802) 649-1431. Donations of any amount help us achieve our conservation mission.

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



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VCE VIEW

Six months into our existence, the Vermont Center for Ecostudies (VCE) is thriving. We're settled in a great office space on the Norwich-Hartford town line, we have a full slate of stimulating and important conservation research projects to tackle, and we are buoyed by confidence in the support we have received from many corners. We now have our 501(c)(3) nonprofit status, and we're poised to advance our vital conservation mission. We encourage you to visit us at our office anytime.

We believe our motto, "Uniting people and science for conservation," says it all. Many of you are among the more than 1,300 citizen scientists who form the backbone of VCE's work. Some of you clamber up mountains in the pre-dawn to count Bicknell's Thrushes, others paddle remote lakes to monitor loon families or place nesting platforms, and some slog through meadows under the hot midday sun to identify butterflies. A few of you have even volunteered at the office to catalogue samples, enter data, and sort through our bird band inventory. VCE couldn't do what we do without each and every one of you.

With completion of field work for the Vermont Breeding Bird Atlas and Vermont Butterfly Survey, we realize that many of you are eagerly awaiting a new citizen science initiative. While we encourage bird enthusiasts to continue atlas-ing via eBird, we're also weighing options to launch atlases on new wildlife taxa. For now, please consider joining one of our other great citizen science projects, or volunteering in other ways. See page 7 for opportunities to get involved.

We'd love to hear from any of you with ideas for new or follow-up wildlife monitoring projects. Effective conservation is as much about people as it is ecology, and we're always listening. Thanks for all you've done to help get VCE where we are today. We look forward to partnering with you in the months and years ahead.

—Chris Rimmer

ANNUAL CARBON NEUTRAL BIRDATHON!

Each spring, we celebrate the return of birds from the tropics to the tundra by spending a day counting them on foot and by bike. This year's Birdathon incorporates a new twist—we will join efforts with Four Winds Nature Institute and the North Branch Nature Center to count birds, plants, insects, and other groups of organisms throughout Vermont. "Birdathon & Beyond" will take place on Saturday, May 17th.



BIRDATHON CREW 2006

We also invite all supporters and contributors to participate in their own communities and contribute funds raised to their favorite VCE project. More information will be available on our website soon. We hope you will participate or support the VCE team.

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VCE SPEARHEADS FORMATION OF AN INTERNATIONAL GROUP FOR BICKNELL'S THRUSH CONSERVATION

VCE's longstanding focus on Bicknell's Thrush conservation catalyzed an important advance for the species during the fall of 2007 with formation of the International Bicknell's Thrush Conservation Group (IBTCG). Following the lead of similar groups that have coalesced around other high priority species in North America (e.g., Cerulean Warbler, Golden-winged Warbler, Rusty Blackbird), the IBTCG's overall charge is to develop and implement a conservation action plan for Bicknell's Thrush. Our stated mission is "to develop a broad-based, scientifically-sound approach to conserve Bicknell's Thrush, incorporating research, monitoring, and on-the-ground management actions."

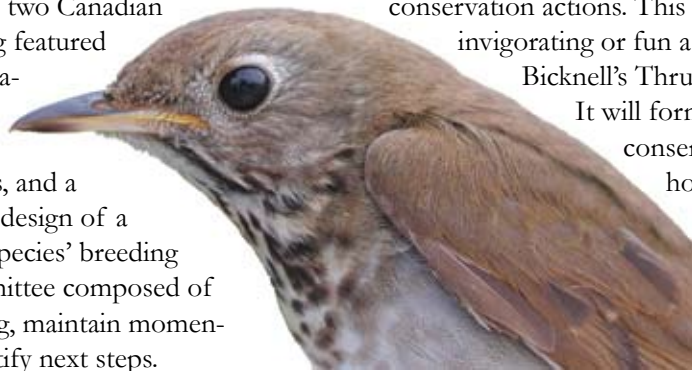
A coalition of scientists, natural resource managers, and conservation planners held its inaugural meeting at the Marsh-Billings Rockefeller National Historic Park in Woodstock, Vermont, on November 6 and 7. More than 25 people attended from five northeastern states and two Canadian provinces. Our two-day IBTCG meeting featured goal-setting, discussion of explicit population objectives for Bicknell's Thrush, preliminary work on identifying limiting factors and drafting conservation actions, and a daylong exploration of how to optimize design of a unified monitoring program across the species' breeding range. We formed a Coordination Committee composed of numerous partners who will seek funding, maintain momentum, set meetings and agendas, and identify next steps.

We also established four subgroups around the following themes: (1) Breeding Season Research, (2) Wintering Grounds, (3) Forestry, and (4) Monitoring. Kent McFarland, Chris Rimmer, and Dan Lambert serve as co-chairs on three of those committees, while Julie Hart has taken on the herculean task of organizing the "products" assigned to each subgroup and facilitating progress on the many tasks that are important precursors to development of an actual conservation plan. Our goal is to have a draft plan in place by the end of 2008.

Tangible progress achieved by IBTCG so far includes development of a web site (www.bicknellsthrush.org) and an e-mail listerv so that participants can readily communicate and keep up to date on the group's activities. We are all working through our slate of tasks, filling out spreadsheets on limiting factors, research and monitoring priorities, and discrete conservation actions. This work, while nowhere as invigorating or fun as censusing or banding Bicknell's Thrush, is no less important.

It will form the backbone of a conservation plan that IBTCG hopes will lead to a secure future for this rare, vulnerable species.

—Chris Rimmer



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ILLUMINATING RANGE CHANGES OF VERMONT'S BREEDING BIRDS

The second generation Vermont Breeding Bird Atlas Project (VBBA) completed its fifth and final year of data collection in 2007. Many thanks go out to the more than 200 volunteers and Regional Coordinators who logged nearly 30,000 hours of field time over the course of the project. In addition, thousands of unaccounted hours were spent traveling to and from blocks, reviewing protocols, reading newsletters, studying species accounts, and entering and reviewing data. This phase of the project culminated with a volunteer appreciation dinner held at the Montshire Museum in late November, at which 70 volunteers enjoyed talks by Sally Laughlin, editor of the first VBBA book, and naturalist Bryan Pfeiffer.

The VBBA successfully met its goal of collecting breeding evidence for 365 first- and second-tier priority blocks statewide, of which only two or three were not adequately surveyed. Most blocks were considered complete when at least 75 species were documented and at least 35 species were confirmed breeding. Some blocks with fairly homogenous habitat were expected to have fewer than 75 species. These were typically in remote and or high-elevation forested areas with few or no wetlands, development, or open lands. On most of these blocks, 56 or more species were found, and the block was considered completed. Thirteen blocks had at least 31 but not more than 34 confirmations, and 15 blocks had fewer than 31 confirmations. However, final data entry may result in completion of some of these nearly completed blocks.

As the database nears completion, the patterns already revealed for most species are accurate, even if not precise. Fourteen species that were confirmed in the first atlas (1977-81) were not confirmed in this atlas (Table 1). Most notably, four species of boreal warblers were “missed” in the second atlas. Common Nighthawks have all but disappeared from the state, and were not confirmed as breeding. Red-headed woodpecker, although never abundant in Vermont, was not found at all during the second atlas. In contrast, a total of 17 species that were not found breeding in the first atlas were confirmed this time around (Table 1). These include species that have expanded their range into Vermont such as Merlin, Red-bellied Woodpecker, Sandhill Crane, and Fish Crow. Not surprisingly, species that have recovered through targeted management (Peregrine Falcon, Osprey, Bald Eagle) were confirmed in multiple blocks.

Besides the “fun factor” associated with atlas field work, one of the most interesting aspects of completing a second generation atlas is to examine changes in species’ distributions between the two survey periods. Note that in order to make accurate comparisons, only blocks surveyed in both

atlases (Priority 1 blocks) can be included. While a variety of species showed range expansions and increased block occupancy rates, perhaps none did so more dramatically than Tufted Titmouse. Found in just nine (5%) priority blocks during the first atlas, mostly in the southern third of the state, the titmouse has spread throughout much of Vermont, being recorded in 109 (61%) priority blocks during this atlas, with confirmed breeding in all but the three northeastern-most counties (Figure 1).

Not surprisingly, many species associated with grassland or early successional habitats showed range contractions, including American Kestrel, Upland Sandpiper, Eastern Towhee, Vesper Sparrow, and Eastern Meadowlark. Towhee and meadowlark showed remarkably similar patterns. Both were found in 115 (64%) priority blocks during the first atlas, but occupied only 55 (31%) and 54 (30%) blocks, respectively, this time around (Figure 1). The current stronghold for both species is the Champlain basin and the valleys of the Taconics, while most discrepancies occurred in the foothills of the Green Mountains and the eastern third of the state. Another species experiencing declines in block occupancy was Canada Warbler. Although its distribution in Vermont is still widespread, it was reported in 45% fewer blocks in this second atlas.

TABLE 1. NEW SPECIES CONFIRMED IN THE SECOND VERMONT BREEDING BIRD ATLAS, AND SPECIES CONFIRMED IN THE FIRST ATLAS THAT WERE NOT CONFIRMED IN THE SECOND.

Confirmed in first atlas, not in second	Confirmed in second atlas, not in first
Red-breasted Merganser	Bald Eagle
Cattle Egret	Osprey
Northern Pintail	Peregrine Falcon
American Coot	Great Egret
Gray Partridge	Double-crested Cormorant
Barn Owl	Sandhill Crane
Short-eared Owl	Caspian Tern
Common Nighthawk	Great Black-backed Gull
Loggerhead Shrike	Ring-necked Duck
Red-headed Woodpecker	Merlin
Cape May Warbler	Ring-necked Pheasant
Bay-breasted Warbler	Red-bellied Woodpecker
Wilson's Warbler	Fish Crow
Tennessee Warbler	Palm Warbler
	Clay-colored Sparrow
	White-winged Crossbill
	Red Crossbill

Two species that have become largely dependant on human structures for nesting habitat showed marked declines since the first atlas. Common Nighthawks, which utilize flat gravel rooftops for nesting, were found in just two blocks, compared

to 23 during the first atlas. Chimney Swifts, which depend largely on unused chimneys for nesting, were recorded on 33% fewer blocks in this atlas. Although still widespread in Vermont, the most dramatic decline occurred in the northern half of the state, possibly the result of changes in chimney construction, and the loss of old silos and barns (also used for nesting).

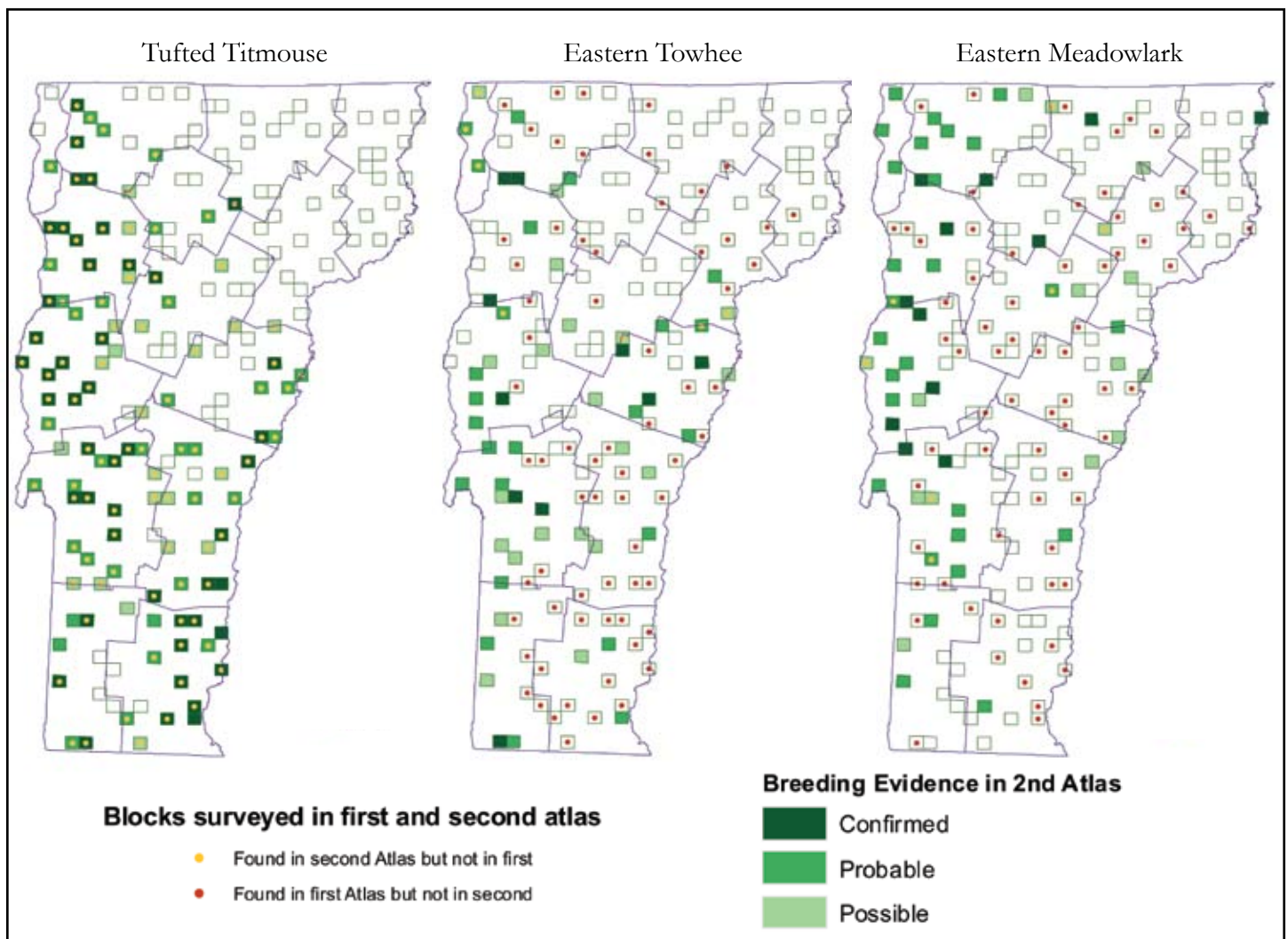


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A BROOD OF MERLINS IN WEST DANVILLE, DISCOVERED BY THE VERMONT BREEDING BIRD ATLAS IN 2003. MERLINS WERE NOT CONFIRMED BREEDING IN THE FIRST ATLAS.

—Steve Faccio

FIGURE 1. DISTRIBUTION AND BLOCK OCCUPANCY CHANGES FOR THREE SPECIES BETWEEN THE FIRST ATLAS (1977-81) AND THE SECOND ATLAS (2003-2007).



CONTINUED FROM PAGE 1

have made it increasingly clear that mercury can no longer be viewed as strictly an aquatic pollutant. As a result, VCE's work has helped change the way scientists and policy makers view the nature and extent of mercury contamination in North America. VCE is now investigating how mercury moves through the food chain in mountaintop forests, from leaf litter and foliage, to insects, spiders, songbirds, red squirrels, and small raptors.

Amphibians

Mercury is also showing up in Red-backed Salamanders and Wood Frogs. Studying these amphibians on Vermont's Stratton Mountain and Mount Mansfield, VCE biologist Steve Faccio found that mercury levels increased along an elevational gradient from hardwood forest species lower on the mountains to the spruce-fir zone toward the summits. Another atmospheric pollutant, acid rain, may play a role in mercury bioaccumulation in these and other amphibians (see sidebar).

Climate Change

Carbon dioxide now figures prominently in VCE's work on montane songbirds and global warming. Studying birds in the mountains of New York and New England, VCE biologists Kent McFarland and Dan Lambert conclude in a forthcoming research paper that among the most vulnerable birds may be those nesting in high-elevation forests of fir and spruce. According to the VCE model, regional warming of even 1°C (or

1.8°F) will reduce potential Bicknell's Thrush habitat by more than half; an increase of 2°C may be enough to eliminate all breeding sites from the Catskill Mountains of New York and most of Vermont. These projected temperature increases are widely accepted as likely before the end of this century. Indeed, summer temperatures are projected to rise on average by 2.8°C under a lower-emissions scenario envisioned in the research and 5.9°C under a higher-emissions scenario. At this upper end, possible by late in the century, suitable habitat for Bicknell's Thrush is predicted to disappear entirely from the Northeast. Among other species that could be affected are montane breeding populations of Spruce Grouse, Three-toed Woodpecker, Black-backed Woodpecker, Yellow-bellied Flycatcher, Gray Jay, Boreal Chickadee, and Blackpoll Warbler.

Five other VCE projects offer insight into the effects of climate change on wildlife populations. Each project helps VCE illustrate and track changes in wildlife populations over time:

Vermont eBird, managed by VCE in cooperation with the Cornell Lab of Ornithology and National Audubon Society, is a growing database of bird sightings from observers across the state. Included among the data are historic records of birds in Vermont dating back as far as 30 years or more. The eBird database can be a powerful tool in comparing how bird migration, arrival dates, and distribution can change over time, perhaps in ways that correspond to warming global temperatures.

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Amphibians and Mercury

As part of VCE's ongoing research into mercury burdens in the mountain food web, we sampled adult Red-backed Salamanders on Stratton Mountain and Mount Mansfield, as well as Wood Frog tadpoles from a small pool at the summit of Stratton (3,928 ft). As Vermont's only completely terrestrial amphibian species, Red-backed Salamanders deposit their eggs inside rotting logs where they hatch into miniature versions of their parents. Both amphibian species are predators, feeding on a variety of invertebrates, and represent an important link in the high-elevation food web (we have video footage of a Bicknell's Thrush feeding a Red-backed Salamander to its chick).

Of the 32 Red-backed Salamanders sampled (12 from Stratton and 20 from Mansfield), mercury burdens ranged from 0.059-0.206 parts per million (ppm), with an average of 0.098 ppm, about the same found in Bicknell's Thrush. Salamanders from Stratton had slightly higher average mercury burdens compared to those from Mansfield, a pattern that was evident in Bicknell's Thrush from the same two study sites. In addition, a weak but increasing trend of mercury

accumulation was evident along an elevational gradient from 2,100 to 3,600 feet on both mountains.

Somewhat surprisingly, mercury burdens among the six Wood Frog tadpoles from Stratton were twice that of salamanders, averaging 0.193 ppm. Since Wood Frog tadpoles are herbivorous and had only been present in the pools for a few weeks, it seems unlikely that they would accumulate mercury that quickly. To see if this situation is unique to Stratton, we sampled 20 Wood Frog tadpoles from a pool at 3,800 ft on Mt. Mansfield in July 2007, and results from the lab are pending. It may be that the elevated mercury levels in tadpoles are the result of female Wood Frogs ridding themselves of mercury burdens during egg-laying. In the future, determining mercury levels of female frogs before and after egg-laying, as well as in recently deposited embryos, will help to test this theory, providing a more complete picture of atmospheric mercury deposition and bioaccumulation among terrestrial and aquatic amphibians in montane forests.

—Steve Faccio

The **Forest Bird Monitoring Project**, coordinated by VCE, has tracked breeding birds in selected undisturbed forest habitats since 1989. This growing data set will help VCE investigate the influence of climate on birds; for example, whether birds are singing on territory earlier in spring than they were 20 years ago.

The **Vermont Breeding Bird Atlas**, which concluded its field work in the 2007 season, will help VCE document changes in breeding bird distribution compared to the first survey 25 years ago.

Similarly, VCE has completed field work for the first-ever **Vermont Butterfly Survey**, providing a solid baseline of information in order to document future changes in butterfly distribution across the state and region. This will be an invaluable reference in the face of changing climatic patterns.

Finally, **Mountain Birdwatch**, launched in the spring of 2000, is designed to establish a long-term monitoring program for Bicknell's Thrush and other montane songbird species. It has already contributed to our understanding of the effects of atmospheric pollution on songbirds. Mountain Birdwatch data were instrumental in creating the Bicknell's Thrush habitat model used by McFarland and Lambert to assess the impacts of climate change on the distribution of Bicknell's under different emissions scenarios.

"Atmospheric pollution is so pervasive worldwide that it inevitably finds its way into all of VCE's research," says Chris Rimmer. "We need to consider the effects of pollution as an ecological stressor in all aspects of our work."

—Bryan Pfeiffer

Contributing author, naturalist, and VCE Associate

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.

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@vtcostudies.org	Kent McFarland	Year-round	Beginner to expert
Mountain Birdwatch Adopt a mountain and survey Bicknell's Thrush and other mountain songbirds.	www.vtecostudies.org/MBW/jhart@vtcostudies.org	Julie Hart	June	Beginner to expert. Hiking required.
Loonwatch Participate in the annual one-day census of Vermont's breeding loons.	www.vtecostudies.org/loons/ehanson@vtcostudies.org	Eric Hanson	mid-July	Beginner to expert
Vermont Loon Recovery Program Help monitor nests and lakes.	www.vtecostudies.org/loons/ehanson@vtcostudies.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@vtcostudies.org	Steve Faccio	June	Able to identify forest birds by sight and sound. Hiking required.
Vermont Nest Record Program Find and monitor bird nests in your area.	www.vtecostudies.org/nest/rrenfrew@vtcostudies.org	Roz Renfrew	Spring-Summer	Beginner to expert
Vermont Breeding Bird Survey Participate in a roadside survey of Vermont's breeding birds and help track population trends.	www.vtecostudies.org/vtbs/sfaccio@vtcostudies.org	Steve Faccio	June	Able to identify VT breeding birds by sight and sound. Vehicle required.

VOLUNTEER OPPORTUNITIES

If none of the above citizen scientist opportunities fits your style, but you have other skills to offer for the benefit of wildlife, consider volunteering at the Vermont Center for Ecostudies. Our staff are always interested in working with enthusiastic volunteers who have an interest in helping us achieve our conservation mission.

- * Data entry (banding, bird surveys, bibliography)
- * Digitizing photos
- * Digitizing data in GIS
- * Typing historical field notes
- * Cataloging photo and slideshow files
- * Data quality control
- * Entering historic bird sightings into eBird
- * Assisting with major mailings

BANNER YEAR FOR BICKNELL'S THRUSH?

Bicknell's Thrush seemed to be more abundant than ever in 2007. And more people were combing the spruce-fir forests in search of them.

Since Mountain Birdwatch (MBW) expanded its efforts across the Northeast in 2001, an average of 115 mountaintops have been surveyed annually. This past summer, a gallant effort by citizen scientists resulted in over 140 surveys, surpassing the previous high of 121 routes in 2003.

Bicknell's Thrush appeared to have a good year. More were observed than ever before, with 231 detected via point count as compared to the previous high of 214 in 2005. They were also observed on routes that only support Bicknell's Thrush in good years. VCE's flagship species, Bicknell's tends to blip in and out on some mountaintops corresponding with a boom and bust red squirrel population cycle. With red squirrels a major predator of Bicknell's Thrush eggs and nestlings, a crash in their population gives breeding adults a chance to raise more young, so that numbers of adults rebound in the following year. This effect is more evident in Vermont, where habitat patches tend to be smaller. Observers up-and-down the state, from Haystack to Brousseau, were delighted that 2007 was an "on" year. Bicknell's Thrush have only been detected in one other year on these mountains since Mountain Birdwatch began.

With recent findings of sharp annual declines in Bicknell's Thrush in the White Mountain National Forest (-9%) and New Brunswick and Nova Scotia (-19%), we were curious to examine our seven years of Mountain Birdwatch data. Preliminary analysis of 55 routes run six out of the past seven years showed an annual increase of greater than 10%. This is markedly different than indicated by our past trend analyses. Why the disparity? Several explanations are possible, including that we analyzed a different subset of routes than before, that Bicknell's Thrush numbers have actually spiked in the past couple of years, or that short-term fluctuations are

masking longer-term trends. Alternatively, MBW observers may have improved in their abilities to detect the species. It is also important to caution that trends on only 55 routes may not accurately represent the true status of Bicknell's Thrush across the landscape.

With three very different trend estimates across the breeding range and increasing threats to this species from climate

LOG ON TO WWW.VTECOSTUDIES.ORG TO WATCH VIDEOS TAKEN AT THE NEST OF A BICKNELL'S THRUSH.

change, habitat loss, and pollution, VCE is working hard to develop an improved survey that incorporates recent advances in field methods and data analysis. We have undertaken a five-year initiative in close partnership with our Canadian colleagues. Together, we aim to update the MBW sampling scheme, develop and implement optimal count techniques, assess threats to high-elevation birds and their habitat, and better inform management of high-elevation songbirds. Priority research projects highlighted by the International Bicknell's Thrush Conservation Group (see article on page 3) will be integrated into this updated version of MBW.

MBW has already yielded benefits for Bicknell's Thrush conservation. Data have been used to develop a habitat model, conduct a rangewide conserved lands assessment, predict impacts of climate change, and elucidate the connection between annual cone crops, red squirrels, and Bicknell's breeding success. After a tenth season of MBW in 2009, we will revisit trend estimates across the region.

So was it a banner year for Bicknell's Thrush? It *seemed* like it, but we still have a lot to learn. Stay tuned.

—Julie Hart

Help Us Help Bicknell's Thrush

If you enjoy hiking in remote areas, and have an interest in conserving high-elevation habitats and the songbirds they support, Mountain Birdwatch is the project for you. This year we will pilot new protocols in addition to traditional surveys. We need more volunteers than ever before for this increased effort. We are looking for Mountain Birdwatchers in New York, Vermont, New Hampshire, Maine, and southern Quebec. For more information, visit www.vtecostudies.org/MBW/ or contact Julie Hart, Mountain Birdwatch Coordinator, at jhart@vtecostudies.org.



© Julie Hart

HUMAN AND AVIAN VETERANS MEET ON STRATTON MOUNTAIN

Last summer's encounter of VCE biologists and the oldest known Bicknell's Thrush on record has called into question bragging rights for longevity. On 30 May 2008, Chris Rimmer extracted Bicknell's Thrush #1531-48278 from a mist net next to a Stratton Mountain ski trail. This bird, a male, turns out to be the all-time reigning veteran of its species, having been banded by us as a yearling on 23 July 1997, in almost exactly the same spot! Assuming an approximate hatch date of 1 July 1996, its age of 10 years and 11 months places it firmly in the category of wizened avian elder. In fact, #1531-48278 has been captured a total of 29 times since 1997, in every year except 2003. It is a true legend among Bicknell's Thrushes.

For perspective, the USGS Bird Banding Lab's data base of avian longevity indicates that our Stratton male Bicknell's Thrush pales in comparison to the all-time record-holding Laysan Albatross of 50 years and 8 months. North American records for longevity belong to an Arctic Tern of 34 years and an Atlantic Puffin of 31 years and 11 months. However, consider that migratory passerine birds, being generally small-bodied and metabolically high-functioning, rarely live longer than 7-8 years, if that. Among other North American thrushes, only the American Robin (a much larger bird) exceeds our Stratton Bicknell's for known longevity, with the record-setter a bird of 13 years and 11 months. Among other Catharus thrushes, a Swainson's of exactly 11 years officially tops our Stratton male, while the longevity record for Veery is 10 years and one month, for Hermit nine years and four months, and

for Gray-cheeked Thrush seven years and four months. The oldest known banded Wood Thrush is eight years, 11 months.

In judging whose staying power is more impressive, Bicknell's Thrush #1531-48278's or Bicknologists Chris Rimmer's and



© Kent McFarland

VCE DIRECTOR CHRIS RIMMER AND BIOLOGIST KENT MCFARLAND WITH THE OLDEST KNOWN BICKNELL'S THRUSH ALIVE TODAY.

Kent's McFarland's, consider the following: we conservatively estimate that #1531-48278 has logged 35,000 straight-line miles in 10 round-trip migrations between Stratton Mountain and its presumed winter quarters on Hispaniola. We can

probably double that number to account for other flying during the course of its life. Assuming that #1531-48278 has sired an average of two young per year over the 10 years of its breeding life, it has added 20 progeny, spending immeasurable amounts of energy acquiring mates and food for those young. It has endured repeatedly harsh weather at every phase of its annual cycle. The list goes on. Rimmer and McFarland? Well, yes, they too have endured their share of hardships in pursuit of this and other Bicknell's Thrushes since 1992—sleep deprivation, rough terrain, black fly hordes, primitive living conditions, tough weather, mental anguish, etc. Give them a pat on the back for their persistence as “brute force biologists”, but there is no contest in the final analysis. Bicknell's Thrush comes out on top.

—Chris Rimmer



Hispaniola Veterans

Robert Ortiz, curator of birds at el Museo Nacional de Historia Natural in Santo Domingo and a long-time research partner on our Hispaniolan project, is seen here holding an 11-year old Green-tailed Ground-Tanager. This bird was originally caught at Pueblo Viejo in the Sierra de Bahoruco in 1997 and was recaptured in February of this year. Other long-lived birds we captured during our 2008 field work included an 11-year old Western Chat-Tanager and a 10-year old Greater Antillean Bullfinch.

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VIDA PUTS LIFE AT YOUR FINGERTIPS

In 300 years of explorations across the globe, biologists have described approximately 1.8 million species of plants, animals, and other organisms. Their evidence is found in roughly 3 billion specimens amassed in the world's natural history museums. These specimens, and their associated biotic data, provide the raw research material for studies of the composition, identity, distribution, ecology, systematics, and history of our planet's diversity. They are literally a library of life. But this library lacks a searchable card catalogue. The Vermont Invertebrate Database Alliance (VIDA) will help change that.

Over a million invertebrate specimens are thought to be housed in Vermont collections. Fewer than 10% of these are entered into some form of searchable database or are geo-referenced in some manner. Collections in Vermont range from the University of Vermont's Zadock Thompson Invertebrate Collection, which houses about 590,000 pinned and identified insects, some 50,000 of which await identification, and a nearly equal number of insect larvae, spiders, snails and other invertebrates, to private collections held by citizens like you. These collections alone are impressive enough, but together, they represent a library of Vermont's natural heritage and perhaps a key to its conservation.

The Vermont Endangered Species Committee was created in 1983 to advise the Secretary of The Agency of Natural Resources on all matters relating to endangered and threatened species—which species to list, how to protect them, and more. The committee quickly recognized the value of establishing expert advisory groups to focus on specific wildlife groups in Vermont—birds, reptiles and amphibians, mammals, and, of course, invertebrates. With estimates of over 20,000 invertebrate species in Vermont, the Invertebrate Scientific Advisory Group of the Vermont Endangered Species Committee was given perhaps the biggest task of all.

Last year, the advisory group recognized that it needed an authoritative database to help understand the status of all these species. With the help of a State Wildlife Grant from the Vermont Department of Fish and Wildlife, the idea has gone from dream to reality. This year VCE will launch the Vermont Invertebrate Database Alliance (VIDA).

VIDA, the Spanish word for life, will bring over 100 years of accumulated knowledge of Vermont's invertebrate diversity into currency for science and society.

Our goals are to:

- Build a cooperative community of professional and amateur scientists interested in understanding and conserving Vermont's invertebrate species;
- Facilitate open access to invertebrate data from the Internet;
- Enhance the value of individual collections through cataloging databases, and joining them with other valuable data;
- Conserve curatorial resources across the state; and,
- Foster education about Vermont invertebrates and their conservation by providing the public with a rich base of invertebrate biodiversity information.

So far, we have identified over a dozen institutions in Vermont as potential VIDA members. Additionally, several regional museums have been identified as having large numbers of Vermont specimens in their collections. Maybe you have a personal collection that you would like to see added to VIDA. All potential alliance members will be contacted and invited to a VIDA meeting in early 2008 where we will formally introduce the project and enlist cooperators into the alliance.

CONTINUED ON NEXT PAGE

SOME MAJOR BIODIVERSITY DATABASE ALLIANCES.

Project	Internet Site
Mammal Networked Information System (MaNIS)	http://manisnet.org/
FishNet2	http://www.fishnet2.net/index.html
HerpNet	http://www.herpNet.org/
Ornis	http://olla.berkeley.edu/ornisnet/
Avian Knowledge Network	http://www.avianknowledge.net/content/
eBird	http://ebird.org/content/ebird/
The Mountains and Plains Spatio-Temporal Database Informatics Initiative	http://mapstedi.colorado.edu/
All Taxa Biodiversity Inventory Alliance (ATBI)	http://www.atbiallyiance.org/index.shtml
Global Biodiversity Information Facility (GBIF)	http://www.gbif.org/
Antbase	http://antbase.org/

VCE has a database platform ready to be implemented for VIDA. The program, known as *Specify*, is a research software application, database, and network interface for biological collections information. It manages specimen data such as descriptions and georeferenced information of collecting locations, participants, determination histories, and more.

Specify was developed and is supported with funding from the U.S. National Science Foundation (NSF) and has received continuous NSF funding since 1987. The objective of the *Specify* Project is to provide a well-supported collections data computing platform, which is responsive to the research management requirements of collections as well as to new research opportunities enabled by the Internet. Collaborating institutions can use *Specify* for no charge. By adopting *Specify* with its web interfaces, we avoid the significant ongoing costs of software development, maintenance, and support, thus bringing VIDA data to the burgeoning environmental informatics research infrastructure.

Not only will we be looking for alliance members, but we hope to enlist the help of volunteers as well. Stay tuned for upcoming information as this project gets in full swing.

—Kent McFarland



© Kent McFarland

JULIE NICHOLSON AND ANNE AVERSA WERE AMONG NEARLY 20 VOLUNTEERS THAT HELPED SORT AND CATALOGUE BUTTERFLIES IN THE ZADOCK THOMPSON INVERTEBRATE COLLECTION AT UVM FOR THE VERMONT BUTTERFLY SURVEY. COLLECTIONS LIKE THESE MAY HOLD PIECES OF THE PUZZLE TO INVERTEBRATE CONSERVATION AND SCIENCE.

eBIRD 2007 AN eSUCCESS

In 2007 eBird surpassed one-million checklists. In December, John Beetham of Highland Park, New Jersey, submitted the millionth checklist. In 2007 alone, eBird collected nearly 443,000 checklists representing over six million bird observations across the Western Hemisphere. Vermont eBird observers added 10,755 checklists last year, making us the 14th most active eBirding state.

“We’ve come a long way and are growing tremendously,” says eBird project co-leader Chris Wood from the Cornell Laboratory of Ornithology. “Just three years ago we averaged about 5,000 checklists each month. Now we’re up to about 50,000 a month. All that information makes it much easier to understand patterns of bird distribution across the Western Hemisphere and how they are changing.” All eBird sightings become part of a huge database that anyone can explore using maps and charts focusing on the entire continent, a region, or even their own backyard.

We continue to expand the project’s reach and to find new ways to make the data available for bird conservation. For

example, since 1983 the Vermont Loon Recovery Project, now at VCE, has held an annual Vermont Loonwatch on the third Saturday of July. Volunteer observers adopt a lake and report every loon they see. We are now uploading all of these data to Vermont eBird. Loonwatch will be using eBird in 2008 to collect the data directly from volunteer observers, and we will all see the results nearly instantly.

Nearly 2,500 rare bird records from the archives of the Vermont Bird Record Committee have been uploaded to Vermont eBird. You can explore sightings of super rarities such as the Swallow-tailed Kite found in Waitsfield in 1913 or track the timing of jaegers migrating southward on Lake Champlain. Rare birds and out-of-season reports that are reviewed by the committee are uploaded each year to Vermont eBird.

The commitment made by tens of thousands of birders makes eBird a powerful tool. Thanks to all of our eBirders for making this possible. Good eBirding in 2008!

—Kent McFarland

Field Notes

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FOUR-TOED SALAMANDER (*HEMIDACTYLIUM SCUTATUM*)

Small and secretive, the Four-toed Salamander is rarely encountered by humans. In Vermont, its distribution appears to be limited to low elevations of the Champlain Valley, Taconics, and lower Connecticut River Valley. The species has specialized breeding requirements and is dependent on habitat mosaics consisting of lowland forest adjacent to suitable wetlands.

Cool Facts

- This small, secretive salamander has the distinction of being Vermont's smallest terrestrial vertebrate.
- Its tail has a distinct basal constriction—the “pinch me here” mark—where it will break off if the salamander is grabbed by a predator.
- As its name implies, this is our only terrestrial salamander to possess four toes on both its front and hind feet. All other salamanders have five toes on their hind feet and four on the front.
- Its bright white belly is peppered with black, providing the best field mark for distinguishing it from the common Red-backed Salamander.
- Females deposit eggs in wet moss clumps, sometimes in communal nests, and will often attend the eggs until they hatch.

Conservation Status

The Four-toed Salamander is listed as a Species of Special Concern in Vermont, and throughout the Northeast. In addition, the Vermont Fish and Wildlife Department included it as a Species of Greatest Conservation Need in the Vermont Wildlife Action Plan. This species has specialized breeding requirements that make it vulnerable to habitat disturbance. It requires relatively mature, moist hardwood/mixed forest stands with abundant coarse woody debris, leaf litter, and underground refugia (small mammal tunnels, rock crevices, etc.)

in close proximity to suitable breeding sites. Breeding occurs in a variety of mossy wetlands, including red maple swamps, bogs, fens, vernal pools, etc. Any habitat conversion, alteration, or fragmentation that disrupts their ability to move between breeding and terrestrial sites, or that changes water/soil chemistry, pool hydroperiod, etc., may have negative effects on scattered populations. Road mortality has become an increasing problem for this species during its spring and fall migrations.

How Can You Help?

Report any sightings of this species to the Vermont Reptile and Amphibian Atlas Project at <http://community.middlebury.edu/~herpatlas/>

