Field Notes



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Uniting People and Science for Conservation

An Atlas for Vermont's Future



The Red Milkweed Beetle is one of thousands of insect species recently documented in the Vermont Atlas of Life.

If the Vermont Center for Ecostudies were to become a department store, we would probably be forced to name ourselves "Birds, Bugs and Beyond."

Although VCE most often unites citizens and science on behalf of birds, we extend our model to butterflies, bees and dragonflies. Beyond these taxa, our interest in salamanders now includes an ambitious project to map, with help yet again from citizens, the locations of vernal pools across the state. We even sponsor friendly birdwatching competitions using Vermont eBird as a scorekeeper.

Never before has Vermont known more about the diversity of life within its borders. Never before have we needed to know more.

Despite the invaluable contributions of VCE biologists, citizen scientists, and other organizations, the collected knowledge of Vermont's biodiversity remains uncoordinated, fragmentary, and outdated with each passing day. Although we know that 382 bird species and 58 mammal species exist in the state, for example, our insect diversity alone may approach 22,000 species. It turns out that a genuine department store knows more about its inventory than we understand about what lives here in Vermont. In the information age, this is troubling.

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The Reign of the Monarch in Peril

Close to one billion Monarch butterflies migrated from the eastern U.S. and Canada to overwinter in the mountains of Mexico in 1996. Last year, just 60 million Monarchs completed that epic journey. This year, the numbers are projected to be even more dismal. Across their northern breeding range, Monarchs were conspicuously and alarmingly absent this summer. From my barber to the farmer down the road, inquiring minds wanted to know, just where were all the Monarchs?

Monarchs in northeastern North America undertake a truly spectacular migration. Beginning during the dog days of August, peaking in mid-

Perhaps less than one percent of adult Monarchs survive to breed.

September, and finishing with October's falling leaves, Monarchs glide more than 2,500 miles from northern breeding grounds to remote overwintering sites in the Transvolcanic Mountains of central Mexico. Here they form enormous,



Monarch butterflies mating on milkweed.

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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.



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VCE View

By the time you read this, Monarchs will be cloaking the oyamel trees in Mexico's Transvolcanic Mountains, while Bicknell's Thrushes furtively defend their cloud forest territories in Hispaniola, Bobolinks congregate in Bolivian grasslands before their final southward migratory leg, and Spotted Salamanders hibernate in small mammal tunnels beneath the Vermont leaf litter. All of these itinerant creatures, and many more, will be out of our sight during the months ahead.

© Jane Ackerman



Chris Rimmer enjoys a moment with a newly banded Bicknell's Thrush that hasn't yet realized its freedom.

For us conservationists, however, these animals' seasonal departures and prolonged absences from our daily lives must not lead to a diminished awareness. They face challenges at every stage of their annual cycles, and these demand as much or more attention and commitment as when they grace us here in the Northeast. For VCE, a "full life cycle" approach to conservation underlies nearly everything we do-from radio-tracking salamanders to winter hibernacula, to unraveling the complex overwinter ecology of Bicknell's Thrush, to documenting

via geolocators the remarkable and surprising migratory patterns of Bobolinks, to using stable isotopes to track the little-known migratory flights of Green Darners. Our science provides the foundation to understand year-round conservation needs of these migrants, and then, in turn, to guide action.

Despite our passion for the science and natural history that underlie our work, VCE's mission is fundamentally about conservation. We achieve it in different ways, under our tagline of "uniting people and science." Our methods can be direct, through working with local partners in Haiti or the DR, building their capacity, and helping them protect habitat on the ground. More indirectly, our science may inform a key land acquisition, management action, or policy. Often, our efforts fill information gaps that are critical to understanding wildlife population trajectories, thereby guiding conservation measures. In the final analysis, I believe that VCE's most important contribution overall is our engagement of people, i.e. all of you. You are our primary workforce and greatest asset, the ambassadors of conservation we all seek, the stewards of habitats and creatures we all cherish.

This issue of Field Notes features Monarchs, Bobolinks, loons, Rusty Blackbirds, and Giant Swallowtails—all may currently be out of sight, but none are out of mind. They'll be back with us a few months from now. VCE's new core initiative, the Vermont Atlas of Life, will be poised to "intercept" these and all other biota in 2014, plugging knowledge gaps that are essential for conservation. This innovative, sweeping project unites people and science in a deeper, more powerful way. Its outcomes will transcend Vermont's boundaries. We invite you to participate, and we hope to see many of you afield with binoculars, nets, hand lenses, and cameras during the years to come.

-Chris Rimmer

David Hoag, 2013'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.

Dave Hoag, a life-long resident of Grand Isle, is a man of few words but myriad natural history accomplishments. He'd rather talk about winged creatures than himself any day. No one has logged more time over the past half-century—or ever—identifying, counting, atlassing, photographing, and just plain discovering the wildlife of Grand Isle County. Awarding the 2013 Julie Nicholson Citizen Science Award to Dave was a ridiculously easy task. Retrieving information about Dave the person? Well, let's just say he's all about the birds, bees, butterflies, and biology.

Because Dave goes about his citizen science so unobtrusively, none of us at VCE realized the full extent of his contributions until we actually enumerated them. The term "prodigious" is one of many descriptors that apply to both the volume and quality of Dave's recent efforts. Here is a synopsis:

• Second Breeding Bird Atlas (BBA) – Dave spent 343 hours in the field and many more as volunteer coordinator of Grand Isle County. He submitted 1,067 individual records to

the BBA and was crowned "King of Clay-colored Sparrows" by BBA coordinator Roz Renfrew.

• Vermont Butterfly Survey (VBS) – Dave was one of four people to contribute over 2,000 records to VBS (2,470 to be exact). He also contributed historic data and was one of the few to document a Juniper Hairstreak butterfly in Vermont. Dave has now become an eButterfly devotee.





Clay-colored Sparrow, a rare breeding species in Vermont.

Vernal Pool Mapping Project (VPMP) – Of our 125 dedicated VPMP volunteers, Dave visited the most pools (41), all of them in Grand Isle County, where he confirmed the presence of the elusive and rare Bluespotted/Jefferson salamander in 12 pools. Dave spent about 100 hours slogging through the early spring woods, and, as usual, his very detailed observations were complete with unique photo-

As a youth, David Hoag remembers seeing Vesper Sparrows and Loggerhead Shrikes, both uncommon now in Vermont.

mosaics of the pools he visited and species he encountered.

• Vermont Bumblebee Survey (VTBees) – during the past two field seasons, Dave submitted over 500 records, including several specimens of *Bombus citrinus* and *B. rufocinctus*, both uncommon species in Vermont.

• Vermont eBird – in 2003, Dave became the second person to join



Even as a child, David showed fascination with the natural world.

Vermont eBird. In each of the ten years since, he has logged more species of birds than anyone else in Grand Isle County. His county eBird list stands at a remarkable 271 species, including rarities such as Eared Grebe, Wilson's Storm-Petrel

(first Vermont record), and Long-tailed Jaeger.

A multi-generational "islander," Dave was raised on the family farm, where he remembers Vesper Sparrows and Loggerhead

Shrikes. Reportedly, his first word was "bird," and he built an avian library from an early age, receiving Frank Chapman field guides from both sets of grandparents. The feeders were always filled with suet and seed, and his grandfather built him a Purple Martin house, which was immediately colonized. Dave even recalls once seeing Barn Owls in the family's South Hero barn. He survived 16 years "trapped in schools," including UVM, where he majored in Animal Science. His professional experiences have run the gamut from farming to printing press operation. With typical self-deprecating humor, he states that his "most recent employment was map-making for Ted Murin's and Bryan Pfeiffer's Birdwatching in Vermont." Outside of naturalizing, Dave is an avid biker and sails a 14 foot Hobie Cat.

Dave is one of those naturalists, rare nowadays, who prefers to sit quietly and watch one bird or butterfly, rather than dash around counting as many as possible. As he puts it, "I'd rather sit down while Avocets, or Purple Sandpipers, or a Red Phalarope feed at my feet; or have a catbird perch on my hand while feeding its young." VCE congratulates and thanks Dave Hoag for his truly impressive legacy of wildlife discoveries and contributions to conservation—we never know what he'll find next!

-Chris Rimmer

Why Most Animals Aren't True Blue



A Green Frog lacking yellow pigments in its skin.

A nimals display a dazzling variety of colors, particularly in the tropics. But even here in northern New England, where wildlife diversity is comparatively limited, we enjoy a rich palette of colors and patterns. The majority of colors are produced by pigments—particles of color chemicals found within specialized cells. What's surprising, however, is that pigments producing blue coloration are all but unknown in the animal kingdom, even though we have plenty of bluecolored animals, particularly among birds, butterflies, and fish. So if it's not pigments, what makes an animal blue?

When we see a Blue Jay or an Indigo Bunting, the intense blue that we perceive is due to the microscopic structure of its feathers and the way they reflect blue and violet light. This is known as structural coloration. Furthermore, for amphibians, reptiles, and some birds, the scattering of blue wavelengths, together with the presence of yellow pigmentation, is fundamental for the expression of the color green.

A simple way to experience structural coloration is to hold a blue feather up to the sky so it is backlit. With sunlight streaming through the feather, rather than bouncing off its surface, the blue color vanishes, and the feather appears a drab gravish-brown. But, bring the feather down so the light bounces off, scattering blue wavelengths of light, and the feather appears blue once again. Structural coloration is also responsible for a variety of color phenomena, including iridescence and sky color. Indeed, for many years scientists thought birds look blue for the same reason the sky does: red and yellow wavelengths pass through the atmosphere, but shorter blue wavelengths bounce off gas molecules and scatter, emitting a blue glow in every direction. But Richard Prum, an ornithologist at Yale University (and a native Vermonter), discovered that the blue in birds' feathers is slightly different.

Prum discovered that as a blue feather grows, protein molecules called keratin (located within the feather cells) separate from water. When the cells die, the water evaporates and is replaced by air, leaving a specific structure of keratin interspersed with air pockets. This three-dimensional arrangement of the keratin/air layers within feather barbs is what reflects blue wavelengths of light back to our eyes. Prum also discovered that different shapes and sizes of these keratin/air layers create the different shades of blue that we see among various species of birds. However, even though blue is a structural color, the key to this entire phenomenon is the presence of the pigment melanin, because without it, all blue birds would look white.

Underlying the keratin structure of a feather is a layer of melanin, which absorbs red and yellow wavelengths. Without melanin (or other pigment cells), all wavelengths would be reflected back to our eyes, resulting in pure white feathers. When this occurs in feathers or hair that normally have color, it is known as leucism—sometimes mistakenly referred to as partial albinism. (Albinism occurs when melanin is absent from all cells, including skin and eyes.)



Drink Coffee for the Birds!

Support sustainability 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. Help us maintain bird-friendly environments while supporting farm families who grow their coffee sustainably. Make sure your java is Bird Friendly®.

Blue skin in amphibians is relatively uncommon. Notable exceptions include the Blue-spotted Salamander and the South American Blue Poison Dart Frog. However, since green pigmentation is not normally present in amphibians, the structural expression of blue wavelengths from amphibian skin is essential for the green coloration of many frogs. Basically, the shorter blue wavelengths of light are largely absorbed by the filtering yellow pigment layer, reflecting the yellow-green wavelengths back to our eye. Occasionally, however, due to a genetic mutation, frogs that normally appear green-such as the American Bullfrog and Green Froglack the yellow pigments in their skin, making them appear blue.

To date, only two vertebrates are known that have blue coloring as a result of cellular pigment called cyanophores. Both the Mandarinfish and the closely related Psychedelic Mandarin (also called the Picturesque Dragonet) are vividly colored fish native to coral reefs in the Pacific Ocean. You might say that these small, stunning fish, which are popular in the saltwater aquarium trade, are the only animals worthy of being called true blue.

So the next time a hungry band of Blue Jays descends upon your feeder, remember, they're not really blue, they just look that way.



The blue that we perceive in the feather of a Blue Jay is due not to pigmenation, but rather to its microscopic structure and the way light reflects off it.

-Steve Faccio

Update from Haiti's Mountain Forests

n 2005, Chris Rimmer and a handful of hardy colleagues visited Haiti's La Visite National Park to study migrant birds in some of the country's last remaining montane forest. When I followed Chris's footsteps in 2008 to survey this same area for endangered Black-capped Petrels, the pace and extent of deforestation there stunned me. If the national park failed to protect the forest, what measures could? That burning question led me to a PhD program at Cornell University, then to team up with VCE to implement a pilot forest conservation program in La Visite. Currently, we're testing a payment for ecosystem services model in the park which provides direct, conditional cash payments to landholders in exchange for their commitment to conserve and restore forests.

© Jim Goetz



A montane forest fragment in VCE's La Viste project area.

Is it working? After a full year to set up and begin implementa-

tion, our answer is an unequivocal "yes, mostly." Twenty families have enrolled 50 hectares (120 acres) of forest inside the park and have planted 77,000 native trees on degraded land. With monthly visits to forge personal connections and quarterly payments to reinforce the link between conservation and compensation, compliance has steadily climbed to about 90%. Still, some locals graze livestock or cut fuel wood in contracted forest. Do they not understand the rules, or are they skirting them because we don't yet have the right incentives? In the project's second year, we will strive to answer these challenging questions, which must be resolved if we are to implement a model that truly sustains Haiti's fragile forests.

> -*Jim Goetz is a longtime VCE colleague, who has crossed the hemisphere* many times in pursuit of Bicknell's Thrush and montane forest conservation.

VERMONT ATLAS OF LIFE - CONTINUED FROM PAGE 1

As human activity profoundly alters the map of life on local and global scales, our response requires knowledge of plant and animal distributions across vast landscapes and over long periods of time. Vermonters cannot respond effectively to climate change, natural disasters, invasive species, and other environmental and economic threats without a deeper, evergrowing understanding of the state's living resources.

VCE's response to this need is the Vermont Atlas of Life (VAL)—a program no less ambitious than the documentation

of every living thing in the state. VAL will unify VCE's varied biodiversity mapping projects and expand to incorporate other data from any credible source, including you.

VAL will become a computer library of photographs, distribution maps, and other information free of charge to anyone—from backyard naturalists, to scientists, to policy makers. At the risk of extending the metaphor too far, VAL will be one-stop shopping to explore the diversity of life in Vermont.



Participants in the Vermont Atlas of Life field day gather at Marsh-Billings-Rockefeller National Historical Park for an afternoon of tree, flower, and bumblebee identification.

"We demonstrate every day that a small group of biologists and a large corps of volunteers can unite to bring the benefits of science and citizenship to bear on conservation," explains VCE Executive Director Chris Rimmer. "The Vermont Atlas of Life, a natural evolution for VCE, will make us all better scientists, more engaged citizens and more effective conservationists."

Many of you have already contributed to the Vermont Breeding Bird Atlas, the Vermont Bumblebee Survey, Mountain Birdwatch, the Vermont Vernal Pool Mapping Project, and our other mapping initiatives. Additional biodiversity encounters are pouring into our new iNaturalist Vermont website, which has succeeded beyond our expectations since its launch on January 1, 2013. By combining these and other biodiversity mapping projects, VAL will be a powerful tool for conservation. From orchids to oaks, mice to moose, beetles to birds, everything counts.

To be sure, at VAL's core are computer databases that hold every byte of data the program will accumulate. However, VAL will be less a computer system than a community of people who contribute and use information about the changing nature of Vermont. By way of a few examples, VAL will:

• Inspire a new spirit of "bio-civics" as people serve their communities by contributing local sightings, with an option for participants to share knowledge online via VAL's social media component.

• Be a reliable resource for biologists studying rare plants and wildlife species. Even in its infancy, iNaturalist Vermont, a vital component of VAL, has already revealed new populations of a rare dragonfly and a rare plant species.

• Kindle interest and fascination among educators and Vermont schoolchildren, who will use VAL to learn about biodiversity and contribute their own discoveries to the project.

VAL will require leadership, organization, equipment, and additional

staff here at VCE to curate the project's ever-growing mass of data. As VAL becomes a thriving community of knowledge-seekers, VCE will serve as the community's librarian, publicist, educator, technical support team, and maintenance department.

VAL is an exhilarating and logical step forward for VCE. It is also an exciting way for anyone, including young people, to discover and enjoy the diversity of life in Vermont.

National Park Service ecologist and avid iNaturalist user Kyle Jones says, "VCE has developed a way for all Vermonters to contribute to the state database of species. I can record observations from a tractor seat or during a walk in the woods."

VAL promises to advance VCE's core strategy of uniting citizens and science for conservation.

-Bryan Pfeiffer

MONARCHS - CONTINUED FROM PAGE 1

dense aggregations, numbering in the millions, clinging to trees and each other for the duration of winter. In early spring they leave their winter roosts to launch the next generation along the Gulf Coast. Returning individuals are few; perhaps less than one percent survives to breed. Yet numbers can rebound dramatically if the conditions are right.

But they haven't been for the past couple of years. From Texas to the Corn Belt, severe drought and excessive heat in 2012 resulted in abysmal reproduction and difficult conditions for southbound migrants on their way to Mexico. Winter 2012-13 population counts were the lowest ever recorded since monitoring began in 1994; a mere 60 million Monarchs were estimated to cover just three acres of trees.

Since then, life hasn't exactly improved for Monarchs. A cold spring greeted butterflies returning to the southern U.S., where the first generation is produced. Newly emerging adults were slow to develop and late to migrate



In the oyamel fir forests of central Mexico, Monarchs form aggregations numbering in the millions. Their overwinter survival depends on the unique microclimate of this small area.

northward, as unusually cold and wet conditions prevailed from the Midwest to the Northeast. Few Monarchs made it onto the northern breeding grounds in June, as rainy, cool weather persisted. Many observers didn't see Monarchs in the north until August. Reproduction was late and sparse.

"I am sure this is the first year in two decades that we haven't seen a Monarch on our property," said Susan Greenberg, expert naturalist and long-time citizen science contributor from Hartland, Vermont.

The challenges for Monarchs have not been due solely to short-term weather patterns. Historically, the Corn Belt has produced half of the continent's Monarchs each summer, but agricultural intensification has taken a heavy toll. Milkweed, the only plant that Monarch caterpillars eat, has been eradicated at alarming rates. Once growing within and around corn and soybean fields, milkweed has been eliminated by increased use of herbicides that are applied to genetically modified, herbicide-resistant crops. Increasing demand and higher prices for corn to make biofuels have led to conversion of more and more acres to corn production.



Milkweed, which is being eradicated in the Midwest at alarming rates, is the only plant on which Monarch caterpillars feed.

Meanwhile, illegal logging on the Mexican wintering grounds has caused widespread deforestation and fragmentation of the fir forests where Monarchs overwinter. The butterflies depend on a unique microclimate to survive the rigors of winter. And, because the entire population overwinters in just one small area, a rogue storm or fire could have devastating consequences.

Former President Jimmy Carter, who visited the overwintering sites in Mexico last year, articulated our task. "The Monarch butterfly unites the three countries of North America in peace. It is an ambassador of peace, which requires protected areas and ecosystems that are preserved through sustainable agricultural and forestry practices. We need to work together to maintain a healthy and balanced ecosystem for all North America." Whether you're a gardener or a farmer, a policy-maker or a land manager, a scientist or an amateur naturalist, we must all play a role in ensuring that the Monarch continues to reign on its travels across our shared land.

—Kent McFarland

VCE Project Updates

Vermont Loons Reach New Heights



To everyone's amazement, Vermont's loons keep raising the productivity bar. This summer proved no exception—the new statewide record of 81 breeding attempts was due in large part to the unusually high number of territorial pairs that actually nested. In a typical year, about 20-25% of loon pairs that have nested in recent years forego breeding altogether. During 2013, only 12 of the 93 known territorial pairs (13%) failed to nest at all. As a result, Vermont loons hatched out a record 97 chicks, with 71 surviving through August.

Always encouraging, four first-time nesting pairs were documented: on Center Pond (depredated nest), Coits Pond (both chicks lost), Green River Reservoir—Big Island (failed nest), and Miller Pond (two chicks). Miller Pond in Strafford represents the first Upper Valley breeding site in Vermont, and we noted an uptick in loon activity on nearby lakes Fairlee and Morey. There are now more than 120 lakes in Vermont with consistent loon activity! During the annual statewide Loonwatch Survey, held on July 20th 2013, volunteers counted 297 adult loons on 162 lakes, compared to the 280 adults tallied in 2012.

Despite 20-plus inches of rain from late May through June, only six loon nests were lost to flooding, a similar rate to that of neighboring New Hampshire which experienced at least 15 flooded nests among its 180 breeding pairs. Without question, the widespread use of rafts in both states reduced nest failures from flooding.

We found one adult killed by another loon on Nelson Pond in Woodbury; a second loon crashed and died in a manure pit. Two chicks were taken by eagles, despite the fact that loons generally defend themselves and their chicks fairly well. Ricker Pond lost both its chicks: one to a boat hit and the other to an intruder loon attack. Two adults were rescued from entanglement in fishing line: one on Lake Fairlee, a second on Bald Hill Pond.

In nearby states, adult loon numbers appear to be stable in New York's Adirondacks and in Maine, based on annual Loonwatch counts of a subset of lakes. In Maine, Loonwatch results for chicks varied from about 600 in 2011 to fewer than 200 in 2012; results from 2013 will reveal whether this dramatic one-year decline is of real concern. In New Hampshire, fewer nesting pairs (180) and lower nest success rates (58%) have led to reduced overall chick numbers (117), despite the number of territorial pairs remaining stable (283). VCE's longtime partner organization in NH, the Loon Preservation Committee, is closely monitoring this perplexing situation. In Massachusetts, 27 nesting pairs produced 11 surviving chicks. Vermont's relatively high rates of nesting (87% of territorial pairs) and chick productivity (0.88 surviving chick per nesting pair) are cause for continued optimism.

Our complete 2013 loon report with individual lake results will be available on VCE's loon web page www.vtecostudies. org/loons later this fall.

—Eric Hanson



www.vtecostudies.org

Rusty Blackbird Spring Migration Blitz



Rusty Blackbird populations have dropped between 85-99% over the last half-century.

Rusty Blackbirds represent one of North America's most rapidly declining landbirds—and an intriguing conservation mystery. Until the mid-1990s, tremendous population declines went unnoticed; during a 30-year period, between 85-99% of the population may have been lost, with little fanfare marking this precipitous change. Over the last 15 years, however, scientists have gained a broader understanding of Rusty Blackbird breeding biology and winter habitat requirements; this knowledge is guiding further research and conservation efforts to aid the recovery of this vulnerable species.

As with many migratory birds, knowledge about Rusty Blackbird migration lags woefully behind an understanding of the species' other life cycle phases. Recent geolocator studies and feather isotope analyses have begun to elucidate migratory pathways and connectivity. However, scientists' understanding of habitat use during migration, migratory hot spots and stopover ecology, and potential conservation challenges during migration remains slim at best.

To address these knowledge gaps, the International Rusty Blackbird Working Group will initiate a Spring Migration Blitz in 2014, coordinated by VCE biologist Judith Scarl. From 2014-2016, we will challenge experienced birders to document the Rusty Blackbird's journey northwards, from its wintering grounds in the southeastern U.S. to the boreal wetlands of northern New England and Canada. Partnering with eBird to compile these citizen science data, this broad-scale initiative will furnish a key piece in the Rusty Blackbird conservation puzzle. Not only will we amass critical data to focus future migration research and conservation efforts, but this transcontinental call to action provides an essential venue for bringing the Rusty Blackbird plight to the public's attention. By the end of 2013, Judith and the Blitz Coordination Committee will have finalized a list of states and provinces to include in the Blitz, determined a timeline for the 2014 effort, and begun to recruit state and provincial coordinators to galvanize interest among advanced birders across the region. Stay tuned for information about how you can get involved as this exciting initiative unfolds!

-Judith Scarl

Battling Rain for the Birds-Mountain Birdwatch 2013

When my alarm went off at 4 a.m., the woods were so loud with rain and rushing water that I knew I wouldn't be able to hear any birds. The woods were completely unrecognizable. The trail was a rushing torrent of water, and the survey points were all underwater."

Mountain Birdwatch (MBW) volunteer Sarah Dantuono's flooded morning epitomized a conundrum faced by many others in June of 2013. With record-breaking levels of rain, trails morphing into rivers, and thunderstorms deterring even the boldest of adventurers, high-elevation bird surveys became daunting challenges. Despite such soggy setbacks, MBW volunteers slogged through mud, hiked in pelting rain, and persevered bravely with their surveys. Their dedication paid off—Mountain Birdwatchers censused 635 points along 115 routes in 2013, only slightly fewer than the drier Junes of 2012 (123 routes surveyed) and 2011 (116 completed routes).

2013 boasted other noteworthy accomplishments for MBW as well. For the first time since our 2010 transition to new routes and revised protocols, MBW did not hire field technicians to cover the less-desirable routes. Instead, volunteers stepped up to adopt many of the tricky, remote routes this



River replaces trail at Bunnell Notch's third MBW survey station.

UPDATES - CONTINUED FROM PAGE 9

year. Dedicated volunteers Mike and Barb Zimmermann singlehandedly surveyed nine routes in western and central Maine during a three-week adventure spanning from the Maine-Canada border, to deep within Baxter State Park. Summer technicians from the New York State Department of Environmental Conservation adopted Adirondack routes that weren't assigned to volunteers, and our stellar MBW intern, Laura Tobin, enjoyed several impromptu excursions to mountains for a last-minute survey. Mountain Birdwatch even featured an inspiring romantic event this season; New Yorkbased volunteers Kate Yard and Matt Walter got engaged at survey station 3 along the Jay Mountain route in the Adirondacks!

As always, VCE welcomes new volunteers to this critical monitoring project. We can't guarantee a dry trail or a cloudless sky, but if you're looking for a mountain adventure that benefits conservation, grab your boots and adopt a mountain route for 2014!

-Judith Scarl

Creative Conservation for Grassland Birds

Ongoing habitat loss and a piling-on of other threats have left grassland bird populations more vulnerable than ever. As long as their habitat needs compete with human food production, this suite of species is likely to remain on the losing side of the conservation ledger. Decades of enacting measures that attempted to satisfy both conservation goals and agricultural production needs have failed to reverse declining grassland bird population trends. The time is ripe for creative new tactics.



Male Bobolink in mid-molt before its 10,000-km flight to South America.

A Bobolink Conservation Plan provides one opportunity to tackle this problem. Under a contract from the U.S. Fish and Wildlife Service, VCE will write this Plan with input from stakeholders throughout the hemisphere. Species conservation plans are go-to guides for biologists, conservationists, land managers, and even politicos who promote, fund, or carry out research and conservation. Although plans typically focus on a particular species, they inherently aim to conserve the entire ecosystem on which that species depends.

A Bobolink plan faces greater complexity than previous plans. Grasslands are among the most imperiled biomes on the planet. Most are privately owned and provide income for entities that range from family farms to megacorporations. After grassland bird populations plummeted during the 1970s and early 1980s, conservation programs within the 1985 U.S. Farm Bill emerged as the beacon of hope. Farmers were compensated to leave marginal lands unplowed, thereby reducing erosion, conserving groundwater, improving water quality, and reducing flooding. By 1990, 40 million acres were enrolled—many of these hosted breeding grassland birds.

These gains, however, have been lost in recent years. High corn prices have reverted marginally productive lands back into crops. Land values have soared, and conservation programs no longer provide economical options for farmers. In the upper Midwest, over 1.3 million acres of grassland were lost to corn and soy production in only five years (2006-2011), largely in response to demand for biodiesel. Complex socioeconomic factors have changed the landscape, figuratively and literally.

Biologists are eager to find innovative solutions to conserve grassland ecosystems. The Bobolink Conservation Plan is an opportunity to advance new strategies to maintain vast, highquality grassland habitat on the landscape while also fulfilling agricultural production objectives. Adding to the complexity is the plan's geographic scope. One of the first "full life cycle" plans, its development will require engaging Canadian, U.S., and South American partners over the Bobolink's entire hemispheric range, from Newfoundland to Argentina.

"Hard problems are hard," says Jason Pontin of MIT Technology Review. In a recent TED (Technology, Entertainment, Design) talk, Pontin discusses how society has shied away from addressing our most onerous, root problems. The Bobolink Plan may not tackle society's most weighty issues, but it promises to respond creatively to the myriad conundrums faced by grassland birds.

-Rosalind Renfrew

BBS: 47 years of Continent-wide Breeding Bird Counts



The BBS consists of approximately 3,700 survey routes, 23 of which are located in Vermont.

If someone wants to know the status or population trend of a given bird species, they invariably turn to the North American Breeding Bird Survey, commonly referred to as the BBS. Initiated in 1966 by visionary ornithologist Chandler Robbins, the BBS provides invaluable data about breeding bird populations throughout the U.S. and Canada. As the longest-running continent-wide bird survey in existence, it has become the "go-to" dataset for evaluating population trends, distributions, and relative abundance, particularly on continent- or range-wide scales.

The BBS consists of approximately 3,700 randomly located roadside survey routes across the U.S. and Canada. Each route is 24.5 miles long with 50 stops located at 0.5-mile intervals. Skilled volunteer birders conduct a single survey of their adopted route each year at the height of the breeding season. The protocol involves stopping at each of the 50 points and tallying all birds seen or heard during a 3-minute count. In the U.S., the BBS is coordinated by the U.S. Geological Survey's Patuxent Wildlife Research Center, while in Canada, Environment Canada's National Wildlife Research Center fulfills this role. Additionally, a volunteer in each state and province helps coordinate their survey by recruiting birders for vacant routes, and acts as liaison between volunteers and the BBS staff. VCE's Steve Faccio has served as coordinator of Vermont's 23 BBS routes for nearly 20 years; he and Roz Renfrew each survey an established route.

As valuable as these data are, the program is not without its shortcomings. First, the BBS is a roadside survey, and because habitat changes along roads may not be representative of regional habitat changes, inferences from BBS data can only be made about bird populations along roadways. In addition, in areas where roads do not exist—such as large portions of northern Canada and Alaska, and most montane areas—neither does the BBS. This results in some habitat-spe-

cialists (such as Bicknell's Thrush) being poorly sampled by the BBS—a primary reason that VCE initiated Mountain Birdwatch. Further, since habitat at BBS survey points is not measured or evaluated, as it is in the Vermont Forest Bird Monitoring Program (FBMP), the BBS does not provide habitat-specific data (e.g., are Canada Warblers more abundant in upland hard-

wood forests or in forested wetlands?). However, when we conduct analyses of FBMP data, which are collected at interior forest sites away from roads, results are routinely compared to those of the BBS, this helps elucidate overall patterns in bird population trends via finer-scale interpretation of the two complementary datasets. For example, if Hermit Thrushes are declining along roadside BBS surveys in Vermont, but not on FBMP surveys, that may suggest that roadsides offer less consistent habitat. However, if both datasets show declining trends, there may be reason for real concern.

Despite these sampling and other biases, the BBS represents a unique and irreplaceable long-term survey of breeding bird populations across North America. Enormous amounts of data have been collected that, in some cases, provide the only information on large-scale avian population trends and breeding distributions. The future challenge is to maintain the BBS's extensive coverage, to identify and minimize its deficiencies, and to augment the BBS with complementary, habitat-specific surveys.



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

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Giant Swallowtail (Papilio cresphontes)

It's hard to miss a giant. In late July of 2010, when Ardys Fisher spotted North America's largest butterfly fluttering among her flowers, she knew she had something remarkable. Her husband Lionel snapped several photos, and with a little internet help and confirmation from VCE, this became Vermont's first verified record of a Giant Swallowtail.

The Fishers' surprising 2010 encounter turned out to be a bellwether of things to come. In 2011, a massive explosion of Giant Swallowtails occurred throughout the Northeast. Beginning in August and ending with the first frost, sightings were

reported from across Vermont and beyond. Incredibly, some observers even found caterpillars.



Giant Swallowtail caterpillars tend to feed on just a few plants, mostly in the citrus family (Rutaceae). Farmers in the south call the caterpillars "orange dogs" because of the devastation they can wreak on citrus orchards. One known host plant that grows in Vermont is Northern Prickly-ash (Zanthoxy*lum americanum*), a shrub that colonizes old fields, fencerows, riverbanks, and forest edges, sometimes forming thickets.



The Giant Swallowtail now breeds as far north as Montreal.

The caterpillars rely on camouflage, chemistry, and mimicry for protection. Their resemblance to bird droppings disguises them and may deter predators. When disturbed, mature larvae rapidly extend bright red and fleshy "horns" called osmeterium that are hidden within the thoracic segment behind their head. These glandular structures are thought to scare potential predators by mimicking a snake's tongue, also serving as a deterrent via the release of noxious defensive chemicals.

These observations made clear that Giant Swallowtails were reproducing in Vermont, but could they survive the

winters here? If caterpillars could avoid early frost and their overwintering chrysalises experience relatively mild weather, it might be possible. VCE alerted our network of citizen scientists to be on the lookout during the 2012 spring.

On May 19th we got our answer. Terri Armata sighted a fresh Giant Swallowtail in Bennington. Soon, observations began to pour in from areas west of the Green Mountains. The spring flight was successful and a second one in late summer and fall was even larger. Once again, Giant Swallowtails were seen fluttering across many areas of Vermont, and many observers again reported caterpillars on prickly-ash.

The Giant Swallowtail now breeds as far north as Montreal. It has overwintered at least twice in Vermont and appears, at least for now, to be locally common. Will a cold winter cause another southward retreat? Will the species expand even farther north? With our army of citizen scientists scattered across the state and documenting their sightings on the Vermont Atlas of Life, we'll be watching and learning together.

-Kent McFarland

