VERMONT CENTER FOR ECOSTUDIES | Uniting People and Science for Conservation

VERNAL POOLS

Monitoring for Conservation

New Citizen Scientist Monitoring Program to Build a Statewide Database

BY LIZA MORSE

Vernal pools are harbingers of spring here in the Northeast, filling our forests with the raucous chorusing of frogs, even before our favorite songbirds have returned. In his poem, *Spring Pools*, Robert Frost describes vernal pools as "flowery waters...from snow that melted only yesterday." Though scientists might shy away from using the word "flowery" to describe vernal pools, Frost was accurate in his description of vernal pools as seasonal wetlands that fill with snowmelt, as well as spring rains, and often dry by late summer.

Vernal pools are not only home to poetic inspiration, but provide essential breeding habitat for a variety of wildlife, from amphibians to invertebrates. Many of these vernal pool breeders are considered "High" and "Medium" priority Species of Greatest Conservation Need under the Vermont Wildlife Action Plan. These species include Jefferson, Blue-Spotted, Spotted, and Four-toed salamanders, *(continued on page 10)* Coologist Matt Peters conducting an egg mass count at a vernal pool in Woodstock, VT, a technique that VCE volunteers will use to estimate abundance of pool-breeding amphibians.

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FIELD NOTES

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

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

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n my recent field trip to eastern Cuba's Sierra Maestra, hiking down an absurdly steep trail through fog-drenched cloud forest, the quavering and hauntingly dissonant songs of Cuban Solitaires above me, and the banter of my lively Cuban colleagues just 25 meters ahead, I was struck by a wonderful affirmation. Quite simply, after 25 years of traipsing all over the Caribbean Greater Antilles in pursuit of Bicknell's Thrush and its avian brethren, the moment somehow crystallized that one enduring value of VCE's work-and a deep source of personal reward for melies in the relationships we have forged with our local partners.

From the Dominican Republic and Haiti to Puerto Rico and now Cuba, VCE has truly embodied our motto of uniting people and science for conservation. This has happened in a largely organic way, often without explicit intent on our part, but I believe its effects have been profound. Many of our Caribbean partners attest that we helped shape their conservation careers, by involving them in our work, sharing our expertise, and providing ongoing mentorship. Many are still actively pursuing conservation agendas, and maintaining collaborations with VCE.

My musings as I lurched down the steep Cuban mountainside-knees protesting with each abrupt step-unleashed more expansive thoughts about VCE's role in mentoring. While far less extensive and visible than our efforts to engage citizen scientists, which number in the many hundreds, VCE has quietly but deeply immersed a cadre of aspiring young professionals in our work over many years. They range from Dominican ornithologists to montane bird technicians on Mt. Mansfield, Alexander Dickey Conservation summer interns, seasonal grassland bird field assistants in Kansas, and now our new Americorps member. Liza Morse. Some have volunteered, others received modest stipends, a few claimed college credits-all experienced conservation biology in a meaningful, hands-on way. Many have advanced to conservation careers that they likely never dreamed possible when banding their first thrush, counting their first Bobolink, or setting a loon nest raft with VCE.

And, to a person at VCE, we have gained immensely from the relationships we've built with our mentees. Make no mistake; it is fun and rewarding to share our skills and passions with these young, idealistic conservation scientists. They are the future. after all. the next line of defense for vulnerable wildlife, the best hope to tackle our daunting planetary challenges. I'm convinced that our mentoring, while not a major facet of VCE's conservation arsenal, will help define our legacy. As I listened to the rapid-fire Spanish of my bantering Cuban colleagues on a remote mountain trail, in concert with the plaintive chorus of solitaires, it was impossible to feel otherwise. 🖪

> Chris Rimmer EXECUTIVE DIRECTOR

The mountains of the Dominican Republic are hotspots of biodiversity, and a new strategic conservation plan for Sierra de Bahoruco National Park seeks to minimize threats to one of the most important ranges in the country.

Protecting a Biodiverse Treasure

Conserving the Sierra de Bahoruco for nature and people.

BY JOHN LLOYD



The Sierra de Bahoruco mountains rise sharply from the southwest coast of the Dominican Republic. Rooted in dry, hot lowlands, the higher slopes are a cool, cloud-shrouded oasis. This diversity of climates provides space for a rich biota of plants and animals, many of which occur nowhere else on Earth. The Sierra de Bahoruco also supports the needs of a large and growing human population in the foothills and valleys below. The mountain forests, where they remain intact, provide a clean, stable source of freshwater for parched lowland communities.

Increasingly, the forest is also seen

as a place to farm. For the past several years, we have borne witness to, and written about, the emerging conflict between agriculture and the protection of Sierra de Bahoruco's forests both for nature and for what they provide to local communities. Much of what we have seen has been discouraging. Although nominally protected as a National Park, authorities have been largely unwilling and unable to limit incursions into the park by individuals and corporations seeking land to clear for crops. The result has been widespread deforestation, primarily in dry forest at lower elevations but also at higher elevations, where large, export-oriented companies have turned verdant cloud forests into barren plantations of avocados. Not only does this threaten the many endemic species that call these mountains home, but it also cuts into one of the largest and most important blocks of wintering habitat for Bicknell's Thrush.

At last, though, we have good news to report. The new Minister of the Environment, Francisco Domínguez-Brito, has spoken out forcefully about the need to adequately manage and protect the country's national parks and has begun taking action to reign in illegal activity. At about the same time that Dominguez-Brito was appointed, VCE and Grupo Jaragua, a leading NGO in the Dominican Republic, launched an effort to develop a strategic conservation plan for Sierra de Bahoruco National Park. Our goal was to develop an actionable plan for conservation-one that balanced the needs of local people with a long-term focus on sustainability and protection of nature-via a participatory approach that involved a large and diverse group of local stakeholders. With the support of the U.S. Fish and Wildlife Service's Neotropical Migratory Bird Conservation program, we were able to launch the process in 2017.

Now, after many meetings, hours of consultation, and a long writing process, the plan is complete. Of course, a plan is only useful if it inspires action. Coincident with the completion of the plan, Domínguez-Brito signed an agreement with Grupo Jaragua that designates the NGO as a co-manager of Sierra de Bahoruco National Park. This means that we have both a plan for conservation and a motivated, empowered partner to carry it out. We are one step closer to achieving the shared vision articulated by the participants in the planning process: "That Sierra de Bahoruco, its biodiversity, natural resources, and ecological services will be conserved and utilized sustainably and responsibly, benefitting the development and prosperity of the people."

CITIZEN SCIENCE OPPORTUNITIES

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

Consider becoming a citizen scientist.

E-BUTTERFLY

Leader: Kent McFarland Season: Spring-Fall Beginner to expert Report and explore sightings of all Vermont butterflies with the innovative online tool, e-Butterfly. www.e-butterfly.org

email: kmcfarland@vtecostudies.org

MOUNTAIN BIRDWATCH

Leader: Jason Hill Season: June Beginner to expert/hiking required Adopt a mountain and survey Bicknell's Thrush and other mountain songbirds. www.vtecostudies.org/projects/ mountains/mountain-birdwatch/ email: jhill@vtecostudies.org

VERNAL POOL MONITORING

Leader: Liza Morse **Season:** April-June *Beginner to expert* Adopt a vernal pool and collect data

using standardized protocol. https://vtecostudies.org/projects/ forests/vernal-pool-conservation/vermont-vernal-pool-monitoring-project/ email: emorse@vtecostudies.org

VERMONT LOON CONSERVATION PROGRAM

Leader: Eric Hanson Season: Spring-Summer Beginner to expert

Help monitor nests and lakes. www.vtecostudies.org/projects/lakesponds/common-loon-conservation/ vermont-loon-conservation-project/ *email:* ehanson@vtecostudies.org

Visit www.vtecostudies.org/ volunteer to find the citizen science project that's right for you. TRIBUTE

Melissa Mackenzie

Farewell to a VCE institution

BY CHRIS RIMMER

hange creates opportunity-that • oft-repeated mantra may sound forward-thinking, even virtuous, but when referring to VCE's longtime and soon-to-depart colleague Melissa MacKenzie, it conjures up prospects that are daunting, if not downright unnerving, and definitely bittersweet for us. The good news is that Melis will soon embark on a grand new life adventure, bidding VCE farewell in mid-April, when she and husband Darrin will load up their customized 1962 Land Rover and head in a generally southward direction, exact points unknown. Over the next two years, they'll criss-cross the hemisphere, ultimately penetrating deep into South America. They're beyond excited and have been planning this intrepid mega-excursion for several years.

Needless to say, we're thrilled for Melis, genuinely sad that she's moving on, and just slightly terrified at the prospect of a Melissa-less VCE! As Business Manager, she has worn more hats than anyone during her ten years here, and we all agree that VCE wouldn't be where we are without her steady hand, uber-capable execution of every role undertaken, supreme organization, wisdom, caring attitude, and patience. Her financial acumen is legendary, her institutional memory unequalled. And, did I mention her patience? Imagine coping with, let alone corralling, the unruly antics and fiscal fumblings of 8-10 conservation colleagues, most of whom would rather decipher field marks on a vagrant Fieldfare than a budget spreadsheet?

Truly, Melis has in so many ways been the proverbial glue binding VCE together over our first decade. It's



STEVE FACCI

© STEVE FACCIO

AS BUSINESS MANAGER, MELISSA HAS FILLED MANY CRITICAL ROLES OVER THE LAST 10 YEARS, AND HER GUIDANCE, WISDOM, CALM EFFICIENCY, AND PATIENCE WILL BE GREATLY MISSED.

an understatement to say that we'll miss her quiet and efficient ways, her wide-ranging skills, her financial wizardry, her subtle humor, and...her patience. Thankfully, we can all rest assured that Melis leaves VCE in excellent shape, with financial matters and office logistics as robust and well-oiled as they could possibly be. Thanks for everything, Melis-buen viaje-we look forward to hearing exhilarating news from afar!



Melissa and Darrin's 1962 Land Rover, which Darren painstakingly rebuilt and customized for their road-camping adventures from Vermont to South America.

With a range extending from Alaska to Central America and from coast-to-coast, the Great Horned Owl is the most widespread owl in North America, and is equally at home in deserts, wetlands, forests, grasslands, backyards, and cities.

2018

YEAR

OF THE

BIRD

Year of the Bird OF THE A celebration and gailg paction.

BY ROZ RENFREW

hese days, airports can bring encounters with flying objects of an unexpected kind. Against the backdrop of beeping carts and competing boarding calls, you might hear a monotonous chirping, and perhaps catch a small flit of movement out of the corner of your eye. HE use Spar ows, introduced from Europe in the late 1800s, have been so successful in North America that they now inhabit some airports, providing what I call "terminal birding moments."

Worldwide, over 1,300 bird species are under threat of extinction, and 197 are Critically Endangered. Even the House Sparrow, which has fared tremendously well on this continent, is suffering population declines in its native Europe.

Led by the National Geographic Society, Year of the Bird is a 12-month campaign to inspire conservation action by highlighting the beauty and plight of birds, through storytelling, science, and hands-on activities. More than 100 non-profits like VCE, state and federal agencies, zoos, and ornithological societies have joined forces to examine threats and highlight what we can all do to help secure a brighter future for birds.

As distinguished conservation biologist Thomas E. Lovejoy says, "If you take care of birds, you take care of most of the environmental problems in the world." Birds reach the farthest corners of the earth and make their nests in every niche imaginable, from glaciers to streetlights. They provide ecological services such as insect control and pollination; they inspire and delight, and connect us to the

natural world. Birds are also sirens. signaling deeper problems. Declines in urban House Sparrow populations in Europe have been linked to air pollution and an unhealthy diet-a warning for half of the world's human population living in cities. Help the birds, and we help ourselves.

The calendar year 2018 was chosen for Year of the Bird to commemorate the centennial of the most far-reaching, important bird-protection law ever passed, the Migratory Bird Treaty Act. Over the last century, this law has saved millions, perhaps billions, of birds from harmful human activities. A sad irony, however, is that days before the Year of the Bird campaign was launched, the Act was quietly knee-capped by Secretary of the Interior, Ryan Zinke, with a "re-interpretation" that greatly weakened its power to protect birds. Literally overnight, the Year of the Bird's call to action gained more urgency than anyone could have imagined.

The recent federal dismantling of bird protection underscores the need to speak and act for birds now, and VCE encourages you to join us. Each month brings a call to action-simple, meaningful ways individuals can help birds-and VCE will guide you. In January we launched Year of the Bird with a well-attended workshop to demonstrate how to enter and manage bird sightings in eBird, an online data repository for science and conservation. Since then, we've taken part in a global bird count, and promoted plantings and products that benefit birds. In May we'll hold our annual Birdathon as part of the Global Big Day to raise funds for bird conservation. Additional themes in the coming months include reducing use of plastics, discovering parks, sharing photos, and getting kids outside.

Along with the advanced intellectual and technological capabilities of humans comes our responsibility to protect creatures that cannot advocate for themselves. If we choose, birds can fill our senses, and bring us to our senses. We need them to do both.

VCE estimated winter survivorship of Bicknell's Thrush, such as this one perched in a Dominican Republic tree fern, and found it was relatively stable over the last 15 years, and appeared unrelated to rainfall amount or storm frequency.

A Canary in the Conifers

Exploring how climate change and factors on the wintering grounds limit Bicknell's Thrush populations

BY JASON HILL

A ccording to some climate models, at the end of this century, Vermont summers may feel more like those in present-day Tennessee. Needless to say, such predicted climatic changes are likely to exert profound effects on our flora and fauna. There can be little doubt that Bicknell's Thrush are already experiencing the effects of climate change. Recent research strongly indicates that climate change is occurring sooner and at a faster rate at higher elevations. Given that U.S. Bicknell's Thrush populations are largely restricted to montane forests above 2,600 feet, we can reasonably expect this species to experience the effects of climate change earlier and more dramatically than species whose core populations occur at lower elevations.

In the long run, climate change casts serious doubts on the stability and persistence of Bicknell's Thrush populations. Over the next 300 years, models predict that the upslope movement of maple-beech forests will replace more than 50 percent of the Northeast montane spruce-fir community. It seems inevitable that we will see a corresponding long-term decline in Bicknell's Thrush populations. In the short-term, however, it's anyone's guess as to how Bicknell's Thrush will respond and adapt to climate change. Warmer (and wetter) summers are predicted for the Northeast. Could that mean greater insect abundance (i.e., more food to eat, leading to higher survival of both adults and nestlings) at higher elevations during summer? Possibly.

But what about the wintering grounds, where the biology of Bicknell's Thrush is less well known? Past VCE work suggests that most Bicknell's Thrush spend winters on Hispaniola, where they are difficult to locate, let alone study. Other researchers have found that migrant birds overwintering in the Caribbean have higher survival in relatively wet years-presumably due to booming insect populations. Climate change, however, is expected to alter rainfall patterns, produce more intense and less-predictable Atlantic storm seasons, and cause an overall drying trend. For Bicknell' Thrush. it is therefore critical that we understand how winter weather drives variation in the species' annual survival.

To explore this, we used our longterm banding data from Mt. Mansfield, where we captured and recaptured 178 adult Bicknell's Thrush from May-July of 2001-2015. We compared annual survival rates to annual estimates of Caribbean forest loss and winter weather data, including rainfall, a measure of El Niño intensity, tropical storm frequency, and NDVI (a remotely sensed measure of the greenness of Earth's landscape).

© PEDRO GENARO

Through the ups and downs of winter weather, adult survival was relatively stable over 15 years, an encouraging result. Completely counter to our hypotheses, apparent survival was higher in years with relatively brown vegetation, and unrelated to rainfall amounts or storm frequency. It appears that Bicknell's Thrush have evolved a successful strategy to cope with extreme winter storms, but we don't understand (yet) why they fare better in relatively dry years. For Bicknell's Thrush, and most other Nearctic-Neotropical migrants that overwinter in the Caribbean, we don't know what fruit and insects comprise their diet, or what predators eat them. Perhaps there are fewer predators and more abundant food during dry years on Hispaniola. As always, we have much to learn.



The probability of surviving between two summers for adult Bicknell's Thrush. On average, survival fluctuated about 60%. Dots indicate the mean estimate of annual survival for a 12-month period, while the vertical bars (i.e., the 95% confidence intervals) show the uncertainty in that mean estimate.



VCE NEWS AND NOTES

Identifying Threats to Biodiversity

VCE's Director of Science, John Lloyd, along with partners from the Hubbard Brook Research Foundation and Middlebury College, recently released a white paper that identifies the key threats to biodiversity conservation in Vermont and the outstanding information needed to address them. The paper, "Co-creating an action-oriented agenda for biodiversity research in Vermont", (https://vtecostudies.org/ scientific-publications/) establishes a road map for scientists interested in conducting research that will further conservation of Vermont's ecosystems. The group took a unique approach: rather than relying only on scientists to determine which conservation issues were most pressing, they assembled a diverse group of stakeholders that also included private landowners, timber companies, land trusts, and other conservationists. Why this approach? As John and his colleagues put it, "By bringing together a diverse group of stakeholders and asking them to discuss the big questions we all face, we sought to explore the spaces at the interface of science, policy, and action, which we believe is fertile ground for developing and implementing effective and widely supported strategies for biodiversity conservation. As Vermont enters an era of potentially rapid environmental and social change, the need for strategies that draw on the strengths of all stakeholders will become increasingly critical."



Dragonfly Atlas

VCE's Vermont Atlas of Life launched an online atlas of damselflies and dragonflies, allowing anyone to report, track, study, discover, or simply enjoy these charismatic insects. The Vermont Damselfly and Dragonfly Atlas presents vivid photos, real-time distribution maps and written profiles for 145 species found everywhere from backyard ponds to remote bogs and swamps. The project currently features over 10.000 records of Vermont damselflies and dragonflies, dating as far back as 1891 and now assembled in the atlas' online database. VCE urges anyone with even a casual interest to contribute their sightings and photos. "We're making new discoveries nearly every year," said VCE research associate Bryan Pfeiffer, "often from folks who are just beginning to discover and enjoy these amazing insects."

Above: American Rubyspot is one of the many species found on the Vermont Damselfly and Dragonfly Atlas

Loon Recovery

In one of Vermont's most striking conservation success stories of all time, Common Loons are continuing their astonishing recovery. The statewide nesting population topped out at a new record 97 pairs last year, nearly reaching the vaunted century mark that few could ever have dreamed of 40 years ago. It also marked Eric Hanson's 20th year coordinating the program. "It has been a truly amazing journey to foster VLCP, watching the statewide loon population grow from 106 adults on Loonwatch day in 1998 to 308 in 2017, and numbers of nesting pairs jump from 25 to 97 during that same period," said Eric. Sincere thanks to all the terrific volunteers who have helped and to our longtime partner, the Vermont Fish & Wildlife Department.

BRYAN PFEIFFER

Mimicking natural forests, shade coffee plantations (bottom right) can harbor up to 90 percent more bird species, such as this Rose-breasted Grosbeak, than sun coffee.

Sipping for Songbirds

Saving migratory birds one cup at a time. BY KENT MCFARLAND

hree-quarters of the world's coffee farms destroy forest habitat to grow coffee 📕 under full sun. When forests disappear, migratory songbirds do too. In order to combat critical losses of bird populations and their habitats, scientists at the Smithsonian Migratory Bird Center created Bird Friendly Coffee certification. With thoughtful consumption, coffee drinkers can help save songbirds one cup at a time.

"One of the greatest environmental challenges we face in the coming century is producing enough food for our growing population while minimizing our impact on biodiversity. Smithsonian's Bird Friendly Coffee does just that," said Pete Marra, director of the Smithsonian Migratory Bird Center (and member of VCE's Advisory Council).

In the 1970s, sun coffee plantations quickly became the dominant means to produce coffee using a newly developed hybrid plant. But the cost to biodiversity was high. The natural forest is cleared and coffee trees are planted in tidy rows. The ground is kept clear of weeds, and pesticides and fertilizers are applied. Production is high, but so are the ecological costs.

Under natural conditions, coffee is an understory shrub that thrives in deep shade. Traditionally, small farmers grow coffee under a thick canopy of trees, usually without the use of chemicals. These rustic coffee plantations mimic a natural forest, complete with thick leaf litter covering the soil, humid and cool air, and plenty of birds. Scientists have found that a typical shade coffee plantation can harbor up to 90 percent more bird species than sun coffee. Bird Friendly Coffee plantations are home to 74 species of migratory birds commonly found in North America each summer, such as Baltimore Orioles, American Redstarts, Ruby-throated Hummingbirds, and many others.

Shade-grown coffee plantations are the next best thing to undisturbed forest habitat. But not all shade grown coffee is created equal. Coffee grown under the Smithsonian Migratory Bird Center's Bird Friendly Coffee certification program is based on years of careful biological research. It literally has science behind the certification. Farms must meet stringent criteria for rich and structurally complex



habitat. Other shade grown coffee may originate from plantations with just a single species of shade tree, heavily pruned and supporting little more biodiversity than sun grown plantations. The best shade for birds is diverse shade provided by up to 30 species of trees growing 10 to 65 feet tall creating a variety of microhabitats for birds and other biodiversity.

"Bird Friendly shade-grown coffees demonstrate that agriculture can not only promote biodiversity, but can also sequester carbon, fight climate change and save species," says Marra.

Learn more about Bird Friendly Coffee at the Smithsonian Migratory Bird Center website at https://nationalzoo.si.edu/migratorybirds/bird-friendly-coffee/, then support both VCE and bird conservation by buying Birds & Beans coffee: https://birdsandbeans.com/. 🖪

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

VERNAL POOLS continued from page 1

MOORE

ORAH

and a variety of invertebrates, such as fairy shrimp, and several dragonfly and freshwater snails. Additionally, vernal pools may be used as stepping stones by other wetland species, enabling them to disperse greater distances over an otherwise inhospitable terrestrial landscape. Thus, vernal pools not only provide critical breeding habitat, as well as food and shelter to a variety of species, but they may also provide habitat connectivity for species that rely on permanent wetlands.

Despite the importance of vernal pools as breeding habitat for Species of Greatest Conservation Need, the future of these tinv ecosystems remains uncertain. Ephemeral wetlands face a number of threats, ranging from the effects of climate change, to airborne pollutants such as mercury, to direct loss or genetic isolation due to development. Over the last 10 years, VCE has been working on a strategy to better understand and conserve vernal pools, including mapping where vernal pools are located, developing new methods of detecting vernal pools remotely, building a region-wide database of vernal pool locations, and investigating how mercury bioaccumulates in vernal pool food webs. Still, vernal pools remain poorly monitored across our region, and without baseline data collected repeatedly from the same pools, it will be difficult to evaluate future changes that may occur. To address this knowledge gap in the face of such challenges as limited funding and limit-



ed personnel, we turn to citizen science.

Citizen science has always been central to VCE's goal of "uniting people and science for conservation." Indeed, much of our understanding of Bicknell's Thrush and Common Loon populations, as well as many other species, would not be possible without the help of our dedicated corps of volunteers. Their enthusiasm is infectious and inspiring. Perhaps then, it comes as no surprise that this spring VCE will pilot a new citizen science program: the Vermont Vernal Pool Monitoring Project (VPMon).

Following on the heels of the Vernal Pool Mapping Project (VPMP), which mapped the locations of potential and field-verified pools across Vermont, VPMon will address the lack of longterm data on Vermont's vernal pools and species. While VPMP remains ongoing, with potential pools still in need of verification, VPMon will provide much-needed data on the condition of vernal pools over time. Citizen scientists will collect standardized field data ranging from amphibian breeding phenology, to hydroperiod (length of time a pool holds water), to counts of amphibian egg masses. These data, along with additional verification of mapped pools in Vermont, will provide state agencies, local municipalities, and non-profit entities with much needed information that will advance conservation planning for these critical, but often overlooked, wetland habitats.

Become a Vernal Pool Monitor

This spring marks the pilot season of VCE's Vermont Vernal Pool Monitoring Project, which will not only provide initial data but also help VCE staff revise field protocols based on volunteer feedback. Anyone can contribute to this effort by signing up to be a Vernal Pool Monitor and/or Mapper. If you are interested in getting involved, please contact Liza Morse at emorse@vtecostudies.org, and visit our Vernal Pool Monitoring Project web page. Grab your rubber boots, head outdoors, and become a citizen scientist!

New VCE research explores how intensively managed forests, such as this one in western Maine, can meet the needs of bird populations

Below: Industrial timberlands support a rich avifauna, including many boreal species such as Fox Sparrow, which is otherwise quite rare in the U.S. .

Working with the Forest Industry on Bird Habitat

Win-win solutions for wildlife and forestry in the Northern Forest. | BY JOHN LLOYD

The Northern Forest region of Maine and northern New Hampshire contains more forestland than all other New England states combined. Yet unlike Vermont, and to a lesser extent southern New Hampshire, these forests were never cleared for agriculture. With the exception of some of the richer farmlands in Maine's Aroostook County, land cover in this region remains much as it was several hundred years ago.

The forests, however, are used intensively for commercial timber production. So even though Maine and northern New Hampshire are covered by about as much forestland as they were 400 years ago, the composition and structure of the forests are likely far different. Historical reconstructions of Maine's pre-colonization forests suggest that today's forests are far younger, on average, contain more Balsam Fir and Red Maple, and less American Beech and Yellow Birch.

This poses a conundrum for conservation. The forest-products industry is an important part of the economy of many rural communities in both states, and the value of the land as a source of timber is one reason why so little of it has been sold and cleared for development (which permanently fragments and destroys habitat for wildlife). Extensive young forest also benefits some species, including the Federally Threatened Canada Lynx. On the other hand, an excess of young stands–those less than 50 years old–means less space available for wildlife that use late-successional forest stands. Over the long run, a better balance of protected land and working forest will help ensure both a sustainable timber-based economy and adequate habitat for species needing large blocks of old forest.

In the short run, we can help wildlife thrive in the Northern Forest by figuring out how to make young forest as useful as possible for wildlife. That's the goal of a new project we've initiated in conjunction with the National Fish and Wildlife Foundation and several large forest-management companies operating in western Maine and northern New Hampshire.

We're focusing on young stands of Balsam Fir, of the sort that regenerate after clearcuts or other similar harvest strategies, trying to determine what sorts of



practices can meet the needs of forest managers while simultaneously creating suitable habitat for breeding birds including, perhaps, Bicknell's Thrush. Although Bicknell's Thrush is largely a bird of the stunted krummholz forest found atop our region's mountains, the species also occurs commonly in young, regenerating stands of Balsam Fir in New Brunswick's industrial timberlands. A related goal of our project is to determine whether Bicknell's Thrush use similar habitat in Maine and New Hampshire–a surprising gap in our knowledge of this species.

Even if Bicknell's Thrush don't turn out to be common occupants of young fir stands in industrial forests, these timberlands do support a rich avifauna, including many boreal species such as Blackpoll, Magnolia, and Yellow-rumped warblers, as well as Fox Sparrow, a species which is otherwise quite rare in the U.S. By working together with partners from the forest-products industry, we are working hard to uncover win-win situations that will allow wildlife to thrive aside an important rural industry.

FIELD NOTES

VERMONT CENTER FOR ECOSTUDIES PO BOX 420 NORWICH, VT 05055

Andrena Bees {genus Andrena}



Andrena bees are commonly called "mining bees" because they excavate nesting tunnels.

BY SUSAN HINDINGER

As the springtime sun makes its way through still-bare treetops, life awakens on the forest floor. Spring ephemeral wildflowers emerge to bloom, exploiting a window of warmth before leaf-out limits their access to sunlight. And when flowers bloom, insects come a-calling.

Just as early-blooming plants stand at the ready to sprout, bloom, and set seed quickly, their pollinators hit the ground running, too. Key among them are solitary bees of the genus *Andrena*. Commonly called "mining bees" because they excavate vertical nesting tunnels in sandy or loose soil, *Andrena* adults emerge in response to warming temperatures and mate soon thereafter. The female constructs a nest of branching tunnels, and into each tunnel deposits one egg on a ball of pollen that she has collected. After laying up to 30 eggs she caps each brood cell with soil, and her life ends mere days to weeks later. Most of an Andrenid bee's life cycle passes in these brood cells. After hatching, the larva feeds on the pollen and nectar provisions in the tunnel, then pupates and overwinters as an adult–all within its brood cell–emerging the following spring ready for action.

Many of our native pollinators are "generalists," meaning they gather nectar or pollen from lots of different flowers rather than relying on resources from just one species or group. Andrena is a different story as many are specialists. Andrena erigeniae specializes in pollinating Spring Beauties, while A. erythronii specializes on Trout Lily, and A. ziziae favors Golden Alexanders. While they are not the sole pollinators to visit these flowers, studies have shown that they are the most effective in accomplishing pollination.

Interrupting the progress of these industrious pollinators is a genus of interloper bees called *Nomada*. *Nomada* bees also require pollen for raising their young, but rather than collecting it themselves, these wasp-like bees loiter around the Andrenid nest. When construction is complete and the Andrenid female departs on a pollen run, the *Nomada* bee dashes in, lays an egg in the brood cell, and hastens away. In a strategy known as Kleptoparasitism, the *Nomada* larva hatches first and consumes the Andrenid egg and its pollen ball.

So, when you see the first Bloodroots, Trout Lilies, and Spring Beauties burst forth, look for small mounds of soil, resembling anthills, near stands of spring wildflowers–*Andrena* bees nest alone but in communities. Take a seat nearby, redirect your binoculars from the early warblers in the treetops to the forest floor, and watch for the drama unfold!

