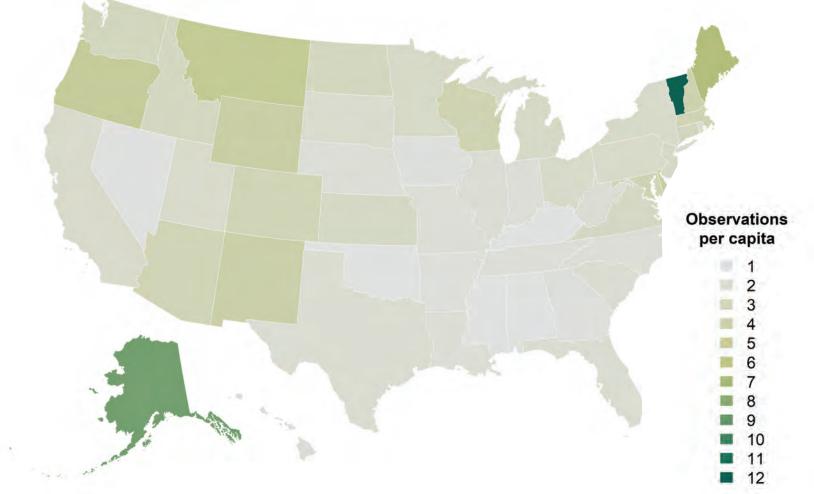
ANNUAL REPORT | 2022

UNITING PEOPLE AND SCIENCE FOR CONSERVATION

SECOSTUDIES

Together, we're leading the way for biodiversity.

Community scientists in Vermont have submitted more observations, per capita, into shared biodiversity databases than any other state.



To read more about VCE's Vermont Atlas of Life, see page 6.

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Dear VCE friends and supporters,

By any measure, 2022 was a transformational year for VCE, marked by no fewer than *three* major milestones for the organization and its work.

First, we honored the inspirational leadership of Founding Executive Director Chris Rimmer, who retired in October. Chris and his co-founders launched VCE in 2007, and Chris has led the venture with unwavering passion, scientific rigor, and humor through fifteen incredible years. We are grateful beyond words for his vision and commitment to building an organization that strives for excellence and achieves it with heart. Please enjoy the retrospective of his pioneering work on the pages that follow.

Next, we surpassed our \$4.5 million fundraising goal for the first phase of our strategic plan campaign. The outpouring of support empowers us to plan with confidence and ambition as we move to maximize our conservation impact. The future of this organization and Vermont's ecosystems just got brighter, thanks to the generosity and foresight of those who've given to the campaign so far. We can't possibly thank them enough.

The third milestone was the purchase of our office building in White River Junction. A generous donor made it possible for us to establish a permanent home base for our staff, volunteers, and visitors-without depleting any operational or program funds. If you're in town, please come by to check out the space and say hello!

Through this time of organizational growth, we're also committed to retaining the qualities that helped our young organization thrive. With steadfast partners, donors, and volunteers, a wise board of directors, and a talented and innovative staff, VCE will continue to build unity and community around a common purpose. We are this century's stewards of nature, and science is our guide.

We hope you'll enjoy the updates, outcomes, and discoveries from some of VCE's signature projects on the pages that follow-and that you're proud to be a part of this rewarding and essential work.

SUSAN HINDINGER EXECUTIVE DIRECTOR

Susan Aundingen Peter w Brooke

PETER BROOKE **BOARD CHAIR**

2022 was a transformational year for VCE. marked by three major milestones:

1. Executed a **Leadership Change**



2. Surpassed Our **Fundraising Goal**



3. Purchased Our **Office Building**



Thank you, **Chris!**

Chris Rimmer, VCE co-founder and its executive director for the last fifteen years, retired on October 1, 2022. Those who've had the privilege of working with Chris know him as a multi-talented leader of innovative, community-fueled conservation science. The energy and care he's devoted to VCE and its greater community is nothing short of inspiring. Here are just a few of the milestones along his journey.

The Spark

Though he started out as a classics major at the University of Vermont, Chris found his calling during a summer bird banding internship at Manomet with Trevor Lloyd-Evans, who became an influential mentor and lifelong friend. Upon his return to UVM, Chris promptly changed his major to wildlife biology and eventually went on to earn an M.S. in ecology and behavioral biology at the University of Minnesota.

Early Work

Following graduate school, Chris landed his first full-time job as director of research at the Vermont Institute of Natural Science (VINS), where he initiated programs to monitor and conserve at-risk species, including Common Tern, Peregrine Falcon, and Common Loon. He also began studying a newly declared species-Bicknell's Thrush-that would come to dominate his research and define his career as an ornithologist.





KENT MCFARLAND

Bicknell's Thrush

In 1992 when Chris and Jon Atwood, then at Manomet, first ventured up mountains inhabited by Bicknell's Thrush, there was scant information about the species' status and ecology. Their first step involved documenting the bird's distribution in the U.S. by enlisting a network of volunteers to survey sites from New York to Maine. At the same time, Chris and Jon launched an intensive demographic study of the species on Mount Mansfield. Over 30 years later, hundreds of community scientists, ornithologists, students, conservationists, land managers, and others have joined these first efforts. Today, we monitor the population annually, coordinate the International Bicknell's Thrush Conservation Group, and continue to solve mysteries about this bird's enigmatic lifestyle high up among fog and fir trees on Mount Mansfield.

Chris and Mark LaBarr banding Common Terns



The Caribbean Connection

In 1994, Chris expanded his Bicknell's Thrush research into the mountains of the Dominican Republic, where he set up long-term study plots. He and his collaborators have since tagged over 100 thrushes to reveal the birds' migratory pathways. They can now tag a bird in Vermont and pinpoint its precise two-acre winter territory in a Cuban, Dominican, or Haitian forest patch. Chris' work to study and conserve this globally vulnerable songbird has established enduring partnerships across the hemisphere.

Mount Mansfield

Far more than a study site, Mount Mansfield has become, in many ways, Chris' muse his source of ecological inspiration, ornithological discoveries, and personal rejuvenation. One of his great pleasures has been sharing his expert knowledge of Bicknell's Thrush and its montane habitat with hundreds of people on this iconic mountain.

Founding VCE

Ready to chart their own path, Chris and fellow VINS biologists Kent McFarland, Rosalind Renfrew, Julie Hart, Eric Hanson, and Steve Faccio launched VCE in 2007 with a common goal of advancing wildlife conservation through a combination of ecological research and community engagement. Chris took on the role of executive director and spent fifteen years building the organization's budget, staff, volunteer and partner networks, suite of projects, and positive impact on Vermont and beyond. All the while, he maintained an active research and conservation program where Bicknell's Thrushes breed and winter.

Mentorship

A huge part of Chris' legacy lies in the opportunities he created for others. Through scores of training workshops, countless mentoring relationships, internships, and even bull sessions between mist net checks, Chris never stopped inspiring those around him—especially students and young professionals—to keep learning. He has boosted and even launched robust careers for scores of Caribbean and North American researchers and conservationists.

"Chris has been one of the most influential mentors in my career, shaping the scientist and conservation biologist I have become. I suspect Chris never imagined I would go on to become an eager student of molt and develop a new molt-based aging system. All of this was made possible because of his willingness to teach an eager mind. Thanks, 'Dr. Molt.' I will forever be in your debt."

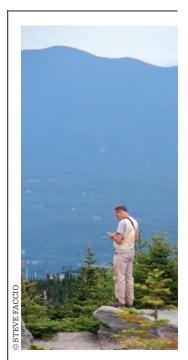
> - Brandt Ryder Ph.D., Chief Conservation Scientist Bird Conservancy of the Rockies

Recognition/Awards

Chris forged hundreds of connections in the ornithological community through more than three decades of mentorship, collaborative research, and conservation partnerships. These relationships have so far produced upwards of 120 publications as well as a legacy of respect and goodwill that spans five biomes from James Bay to the Greater Antilles. His influence on avian ecology and on fellow scientists is evident in a pile of awards that includes the Partners In Flight Investigation Award (1999, with Kent McFarland), the David N. Pashley Lifetime Achievement Award (also from Partners In Flight, 2021), and the Wilson Ornithological Society's Margaret Morse Nice Award for lifetime contributions to ornithology (2022).

▼ VCE founders





PARTING THOUGHTS

"After a tenure at VCE more rewarding than I can begin to express, it was my honor to pass the baton to a talented new generation of leadership. I am immensely proud of the work we've all done together, and I could not be more enthused and confident about VCE's future. This organization has never been stronger or more vibrant. Its promise is unlimited, its potential barely tapped. The growth ghead for VCE will not change the core values that got us this far. but it will dramatically magnify our impacts for sciencebased conservation and our ability to tackle challenges facing us all."

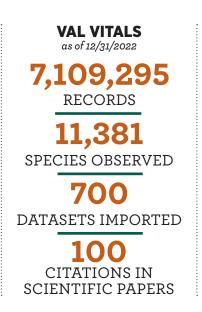
–Chris Rimmer

VCE's Data Powerhouse Delivers

The Vermont Atlas of Life (VAL), VCE's high-tech engine for harnessing the state's biodiversity data and putting it to work for conservation, shows how community science can change the world. And we're just getting started.

Since its inception in 2013, the number of documented observations in VAL reached more than 7 million by the end of 2022, comprising more than 11,000 species. The vast majority of those records—more than 95%—were submitted by community scientists using guidance and tools provided by VCE. Working together, we've made Vermont the nation's leader in community science observations per capita, blazing the trail for other states and regions to follow.

Because VAL was strategically built using open-source platforms integrated with the Global Biodiversity Information Facility (GBIF, the international hub for biodiversity data), all that hard-earned Vermont data are available to anyone, anywhere in the world to inform new research, conservation action, and policymaking. **Here's what that looked like in 2022:**







VAL is empowering us to be more effective than ever in our work. and its long-term potential for helping us achieve conservation victories is enormous.

CROWD-SOURCED COMMUNITY SCIENCE TOOLS











< Through crowd-sourced community science apps like iNaturalist, naturalists can share biodiversity observations from anywhere.

A New Tool for Free & Full Access

The new VAL Data Explorer now enables anyone. anywhere to explore vast amounts of biodiversity data from across the Green Mountain State. VCE software developer Jason Loomis worked closely with GBIF to ensure smooth integration and maximum utility. Users can now filter and download data, create custom maps, image galleries and tables, and much more. The VAL Data Explorer can be found at val.vtecostudies.org under the "EXPLORE DATA" tab.

VAL and the New UN Biodiversity Framework

United Nations Member States came together in December of 2022 for the UN Biodiversity Conference (COP-15). VCE, with its Vermont Atlas of Life, joined a global network of biodiversity data partners to inform their decisions. The result was the Kunming-Montreal Global Biodiversity Framework—a landmark international agreement to drastically reduce biodiversity loss by 2030. The framework is grounded in 23 specific targets related to ecosystem restoration, invasive species management, land and sea conservation, and other critical areas.

"We need to monitor progress toward achieving these new targets, which requires documenting status and trends of biodiversity from around the world over time," says VCE biologist and VAL Director Kent McFarland. "The Vermont Atlas of Life does exactly that here in Vermont while also contributing to the global picture."

Working Smarter

Because VAL was built and has evolved so strategically, and because the community scientists in Vermont are so engaged, the total amount of data available is growing at an incredible pace. And as the data get more robust, they become invaluable for modeling, reporting, and designing projects likely to have the greatest conservation impact. Here's a pair of examples from 2022:

> Drawing information from more than 50,000 records in VAL, we published "The State of Vermont's Wild Bees," the first-ever report on the status, threats, and conservation opportunities for these critical pollinators. See page 8.

> Because VAL contains tens of thousands of photoobservations of moths, we were able to feed that information into an AI prototype designed to identify moths drawn to revolutionary continuous-monitoring stations. See page 10.

Visit val.vtecostudies.org



Our Landmark Case for Wild Bees

VCE has produced the first-ever comprehensive report on Vermont's vitally important wild bees. It's a big step toward an even more ambitious goal—an integrated conservation strategy for the whole spectrum of Vermont's pollinators.

There is a growing public awareness that bees are both important—most notably as crop and wild plant pollinators and a conservation concern. And while bumblebees and nonnative honeybees get most of the attention, there are hundreds of wild bee species in Vermont that have received little to none ... until now.

From 2019 through 2022, VCE, in partnership with the Vermont Fish & Wildlife Department, has been going all-out to learn more about wild bee species richness, abundance, and distribution through its first Vermont Wild Bee Survey. By digitizing historic records and enlisting community scientists to record additional observations (and did they ever, logging nearly half of the 352 species present and 22% of the total records!), the VAL team grew the wild bee dataset to nearly 60,000 records.

Armed with all those data, Vermont is now one of very few states equipped to produce reliable, actionable analyses about its wild bees. Using the VAL Data Explorer, VCE has done just that with its historic report, "The State of Vermont's Wild Bees," which includes sections on current knowledge, threats, conservation opportunities, and next steps.

Visit stateofbees.vtatlasoflife.org

Here are just two of the ways this landmark report changes the game:

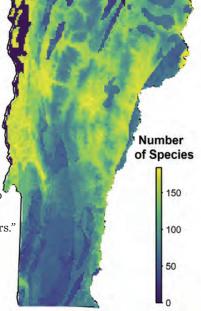
> VCE has now assigned nearly all of Vermont's wild bees an "S-Rank," a standardized ranking used by regulatory agencies and conservation groups to focus management efforts on species at highest risk of collapse or extinction. The new report identifies 55 species in urgent

need of protection in Vermont.
Sophisticated new models generated from VAL data have revealed 12 distinct "Important Bee Areas" within Vermont that support unique bee communities and/or rare bee species as well as region-specific conservation recommendations for each.

From here, VCE will work with a coalition of scientists, natural resource managers, decision makers, conservation planners, and others on a task force to develop a comprehensive "Vermont Conservation Strategy for Pollinators." Together, we can—and must provide a landscape where these animals can thrive and serve their ecosystems, now and for future generations.

A Bi-colored Sweat Bee

✓ The map shows how bee diversity across Vermont may change given anticipated climatic conditions. Visit the State of Bees report to view an interactive map.





NEW VCE TOOLS

VERMONT WILD BEE GUIDE

IS AN ONLINE GUIDE TO HELP NATURALISTS IDENTIFY BEES FROM PHOTOGRAPHS.

BUMBLE BEES OF NEW ENGLAND

IS A TWO-PAGE, PRINTABLE PDF THAT CAN BE BROUGHT INTO THE FIELD.

Using AI in the Race to Save Insects

To protect insects against decline and collapse, we need a more robust accounting of their populations and population trends. VCE is working with international partners on a revolutionary new way to speed up that process—autonomous, computer-controlled monitoring stations that attract insects and use Al to identify them. First up: moths.

Moths are an incredibly diverse group of insects that are important to the ecosystems they inhabit. They are a valuable food source for everything from spiders to bears, and are vital and prolific pollinators, too.

Scientists are concerned that moths, like a great many other insect groups, may be in rapid decline. If that sounds indecisive, it's because baseline population data for moths is spotty at best. Why? Because surveying moth populations across large areas using boots-on-the-ground field techniques is very challenging. For starters, most of the astronomical number of species—thousands in Vermont alone—are nocturnal.

To tackle the knowledge gap with the urgency of the moment, VCE's Kent McFarland and a team of biologists, engineers, and computer scientists from around the world have designed and built autonomous, computer-controlled monitoring stations—stationary robots, basically—that can survey moths continuously, in any environment, and orders of magnitude faster than human researchers ever could.

In 2022, the team successfully field-tested the units in the United Kingdom, Canada, Cyprus, Panama, Argentina, and of course here in Vermont.

At sunset each night, the units automatically turn on using a solarpowered battery. The computer triggers the camera to snap an image each time a moth lands or moves on the moth-attracting UV light panel. Each image is then analyzed by AI, first to determine if it is a moth, then—if it is—to classify it.

Building reliable AI for identifying moths in this way requires feeding the software lots of information from which it can "learn" to distinguish one species from another. Due almost entirely to VCE's mobilization of community scientists to document moth sightings over the last decade, we were in a unique position to provide that information. Those records well over a hundred thousand of them, logged through VCE projects on iNaturalist, and available via VAL—are the knowledge base on which this powerful new technology is being built.

Ultimately, these units will be feeding vast amounts of data back into VAL. And while the first-generation machines are focused on moths, efforts are already underway to expand monitoring capabilities to other taxa as well. The potential torrent of new data could revolutionize our ability to detect insect population changes and create effective conservation plans. Autonomous monitors (right) can survey moths such as this Luna moth continuously.





The scientist charged with building the AI for this project is Dr. David Rolnick, professor at McGill University. David is a pioneer in machine learning applications for climate change and biodiversity, but we first got to know him as a budding, 12-year-old naturalist who volunteered to help us with the first Vermont Butterfly Atlas in the early 2000s. It was clear at the time that David was destined for great things, and it's an honor to be working with him again.

Biologist Jason Hill connects experts with community members to discuss topics such as insect conservation in a warming world. Communicating Science

> Suds & Science: VCE biologist Jason Hill hosts this live and

> laid-back, free program, in which guest scientists talk about their work and engage in Q&A with the audience. Explore the video archive and learn about upcoming programs at vtecostudies.org/ suds-and-science.

> eNews: Every month, VCE's electronic newsletter, eNews, brings the outdoors to your email inbox. We report on the innovative field work of VCE biologists and breaking news from the frontiers of conservation biology—here in Vermont and beyond. eNews is short and designed to inspire you to explore the natural world. Subscribe at vtecostudies.org/subscribe or find past issues at vtecostudies. org/enews.

> Field Notes: Our annual spring and autumn news magazine offers in-depth explanations of the science and conservation efforts of VCE biologists and our community scientists. Learn about what we've been doing and how you can join us to study and conserve wildlife. Find past issues online at vtecostudies.org/field-notes.



Staging a Comeback for Meadowlarks

At the request of the Vermont Fish & Wildlife Department, VCE is producing the state's official recovery plan for the threatened Eastern Meadowlark and will lead the monitoring effort to track progress.

The U.S. Department of the Interior's annual North American Breeding Bird Survey indicates that Vermont is now losing 8.7% of its remaining Eastern Meadowlark population, already decimated from historic highs, every year. In February of 2022, the Eastern Meadowlark was officially designated as a threatened species in the state, meaning it's likely to become endangered without timely intervention.

Successful conservation of any species depends on a robust understanding of its resource preferences, range and distribution, breeding behaviors, and other factors. But because Eastern Meadowlarks' preferred grassland habitat makes them difficult to observe, they've likely been underrepresented in traditional survey work and datasets. To begin addressing the situation, VCE has recently been conducting field surveys dedicated solely to Eastern Meadowlarks, more than doubling the number of meadowlark records in the Vermont eBird database.

Now, because of VCE's expertise in ornithology and conservation and our volunteer network's unequalled capacity to monitor meadowlarks statewide, the Vermont Fish & Wildlife Department has contracted with us to produce the state's official Eastern Meadowlark Recovery Plan. Among key elements will be finding and protecting previously unreported breeding sites and enlisting the help of property owners who have breeding birds on their land. We also need to learn more about these birds' relatively unknown migration patterns, which will allow for a whole-lifecycle approach to conservation that may extend beyond our borders.



Vermont is now losing 8.7% of its remaining Eastern Meadowlark population, already decimated from historic highs, every year.

U.S. DEPARTMENT OF THE INTERIOR'S ANNUAL NORTH AMERICAN BREEDING BIRD SURVEY





▲ VCE biologist Jason Hill inspects a GPS tag newly placed on a meadowlark.

 An Eastern Meadowlark sings at the edge of a field.

Adding Invertebrates to the Bird Equation

High-elevation ecosystems are fragile and spatially limited, and wildlife there exists in a delicate balance. VCE's Mountain Birdwatch program has launched a new project to find out how bird populations in New England's mountains might be changing based on an under-studied food source: invertebrates.

Every June for the last 22 years, VCE's Mountain Birdwatch biologists and volunteers have conducted bird counts in the high-elevation spruce-fir forests of New York and northern New England. Data now stored in the Vermont Atlas of Life show that the populations of the ten target species are, in fact, changing, with most in decline. The next logical question is why? One way to address that question is to follow the food.

Invertebrates are essential prey items for each of the birds in the Mountain Birdwatch study, but there haven't been enough invertebrate data collected in the spruce-fir zone for a baseline understanding of their populations. This year, VCE set out to change that, adding a separate survey of invertebrates at 42 Mountain Birdwatch locations across Vermont and New Hampshire.

In total, we collected and painstakingly identified over 5,000 specimens, mainly flies (60%) and beetles (18%). Notably, those communities were very consistent across sites, indicating that the sampling methods were reliable. As a result, we now have the clearest image yet of these specific invertebrate communities and, critically, a baseline for comparison with future surveys.

VCE biologist Jason Hill then did an initial correlation analysis between the new invertebrate data and data for six of the birds in question. He was surprised to find that the abundance of each bird species did not mirror invertebrate community diversity nor overall invertebrate biomass. Instead, each bird species' abundance was associated with just one or two groups of invertebrates.

We will continue this landmark study in parallel with our annual Mountain Birdwatch surveys. Over time, the data will help us understand much more about how bird and invertebrate populations are related, and how we might design more effective conservation strategies.



 Invertebrate traps being placed in the air by former VCE ECO AmeriCorps member Abbie Castriotta



5,000⁺ SPECIMENS COLLECTED

Matching Birders with Private Landowners

The vast majority of Vermont's forestland is privately owned and beyond the reach of traditional wildlife studies. To address one gap in our knowledge, VCE and Bird Diva teamed up to create Birder Broker, a service that connects expert birders with landowners interested in learning about the birds within their property lines. Three years in, the project is revealing important breeding data from previously uncharted territory.

Knowing where Vermont's forest birds nest and raise their young is critical to designing conservation plans likely to ensure their long-term success. Using eBird's mobile app, Birder Broker volunteers keep track of this valuable information on bird behavior by using "Breeding Codes," a standardized system for noting whether a bird is a possible, probable, or confirmed breeder. In 2022, our amazing Birder Broker volunteers coded 69 different species across 18 properties, with nearly 80% of all observations coded as either confirmed or probable breeders.

Participants also compiled 50 checklists, comprised of 96 total species, into Vermont eBird. Among them were two—Carolina Wren and Lincoln's Sparrow—that hadn't been previously seen or heard during Birder Broker surveys. And, thanks to the program, National Audubon Society scientists have discovered a new breeding hotspot for two species of warblers known to be in decline.

Finally, landowners who learn which species of birds are breeding and raising young right in their backyards can make informed decisions about forest management to support as many species of breeding birds as possible.







A loon chick Safeguarding catches a ride on its parent's back. Vermont's Loon Recovery

Thanks to VCE's Vermont Loon Conservation Program, the state's loon population is back to nearly full capacity after a period of alarming declines. Now, we're ramping up our biopsy and necropsy work to assess ongoing and emerging threats, and to inform strategic, future-focused management plans.

In 2022, VCE embarked on its third year of performing necropsies* on every recovered deceased loon in the state. Unlike most other methods, necropsies allow us to obtain a precise cause of death. Without performing necropsies, we'd be unaware of two rising causes of loon mortality: aspergillosis (a pulmonary infection caused by a fungus) and malaria (a mosquitoborne disease that causes anemia). We also examined loons killed by ingesting fishing gear, confirming that this



remains an issue that needs to be addressed. Another critical part of our loon health research is analyzing blood and feather samples. Through these samples, we can better understand the impacts of mercury, malaria, and aspergillosis at the population level among loons that may otherwise show no signs of illness. With mercury in particular, we can use our results to guide environmental policy and make management recommendations.

By collecting these valuable data and contributing them to continent-wide studies, we strengthen conservation efforts here in Vermont and help ensure the recovery of loons across their range.

* Special thanks to Bren Lundberg from the Vermont Institute of Natural Science (VINS), the University of New Hampshire Diagnostic Veterinary Laboratory, and Dr. Mark Pokras and his students at the Cummings School of Veterinary Medicine at Tufts University for their invaluable partnership in this effort.

Connecting Policymakers with Scientists

The Science to Policy Working Group, a new partnership including VCE and policy-focused organizations in Vermont, held its first Science to Policy Forum for legislators. The Forum clarified the scientific dimensions of key policy issues and opened new channels for ongoing consultation.

While VCE is not an advocacy organization, we are committed to ensuring decisionmakers understand our work and to serving as a scientific resource for legislators. Over three webinars, scientific experts from across Vermont discussed climate change and landscape resilience, forest health and biodiversity, and water quality. By sharing our work with policymakers, we inform ecologically sound policies, connect legislators with our knowledgeable team of biologists, and build collaborations with other policy-minded colleagues across the state.



A Sampling of VCE's Community Science Opportunities



Mountain Birdwatch

Each June, volunteers hit the trails to complete bird survey routes on 123 mountain ridgelines across the Northeast.



Vernal Pool Monitoring

In April, May, and September, volunteers visit and collect data to monitor "adopted" vernal pools following protocols and using VCE-provided equipment.



Moth Blitz

During National Moth Week in July, volunteers leave the porch light on—or use special lights and baits—and help map moth species distribution in Vermont.



Lady Beetle Atlas

In early June and August, volunteers keep an eye out for the state's 36 native species, including the four "most wanted": Nine-spotted, Two-spotted, Transverse, and Thirteen-spotted.



Loon Conservation

Whether you live alongside a lake or only occasionally visit your favorite pond, VCE offers several options for interested loon volunteers.



Whip-poor-will Project

On moonlit nights in early summer, volunteers set out on 17 roadside survey routes to listen for Eastern Whip-poor-wills and record conditions.



Forest Bird Monitoring

Each June, volunteers monitor breeding birds on 31 sites across Vermont in one of the continent's longest-running studies of forest bird population trends.



Cocoon Watch

During the month of November, volunteers find and photograph cocoons hanging in bushes and trees. They return in the spring to document what emerges. 2022 BY THE NUMBERS

Community Science Project Volunteers



MOUNTAIN BIRDWATCH

89

LADY BEETLE ATLAS **297**

FOREST BIRD MONITORING PROGRAM





Meeting Teachers Where They Are

With the launch of Community Science Teacher Education Workshops, VCE is empowering teachers to meet the Next Generation Science Standards using community-based project design, open data platforms, and the ecosystems right outside their doors.

Vermont and New Hampshire are among 20 states using a new teaching system to help K–12 students realize that science is not only something they can grasp—it's something they can do. The system, known as the Next Generation Science Standards, is inquiry-based, meaning students are encouraged to ask their own questions and develop hands-on research approaches to find the answers.

If that sounds like community science, it absolutely is. And that's why VCE decided to lend its unique expertise in that realm to the effort. For decades, VCE has been leading projects and building tools that open doors to anyone who wants to make a meaningful contribution to conservation science. Now we're sharing that knowledge with teachers through a new Community Science Teacher Education Workshop series, which includes a stipend to reduce financial barriers to participation.

The first of these annual four-day workshops, based at VCE's Upper Valley headquarters in July, was a huge success. Our scientists and educators worked with local teachers on experimental design and field sampling techniques that can be applied to a broad range of ecological questions their students might want to investigate right in their own neighborhoods. This is critical because one of the surest ways to make science feel relevant for young learners is using it to create a deeper connection to their everyday environments. We also integrated data-sharing platforms like VCE's Vermont Atlas of Life to demonstrate how hyper-local data collection can tie students' work into a much larger scientific picture.

Ryan Rebozo, VCE's director of conservation science and co-leader of the workshop, said it best: "The positive ripple effect generated by empowering teachers is hard to match, and VCE is immensely proud that this new venture does just that."

Special thanks to the New Hampshire Charitable Foundation's Wellborn Ecology Fund and Hypertherm's HOPE Foundation for their funding support for this program. Thanks also to science educator, naturalist, and community science project leader Ron Smith for co-facilitating the workshop.

Levi Smith

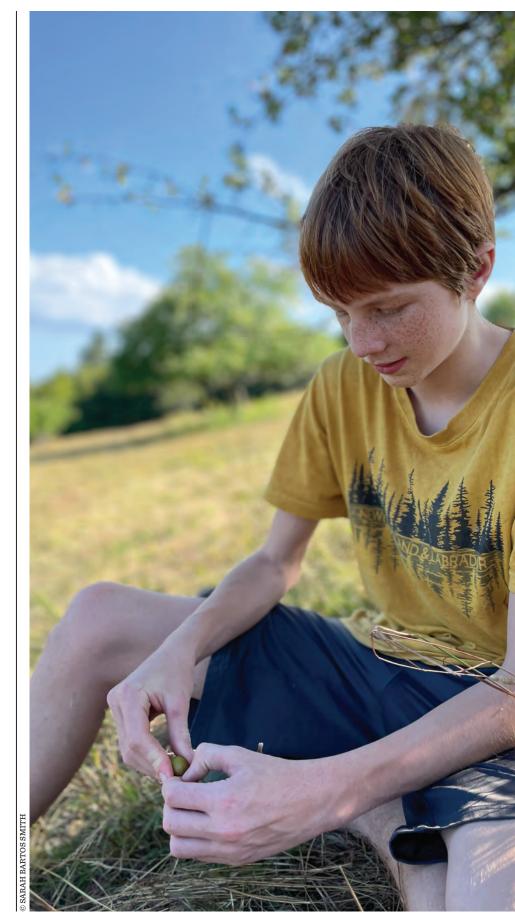
VCE Junior Community Scientist of the Year

On a brisk November day, former VCE ECO AmeriCorps member Julia Pupko led a group of community scientists in search of Giant Silk Moth cocoons at Brookmead Conservation Area. One young participant, Levi Smith, began sharing information about silk moths with those around him. It quickly became apparent that his knowledge of these insects was extensive, Julia recalls. "Not only can he tell you everything about each species' cocoon, but he also spends the weeks when the adult moths are flying meticulously recording each individual attracted to his blacklight, staying up until all hours of the night."

Julia invited Levi to co-lead the next cocoon hunt in the Zebedee Wetlands. He arrived well-prepared, right down to his collection of cocoon samples for each moth species. "Levi absolutely rocked that event," Julia says. "His ability to confidently describe each moth's phenology and cocoon strategy made our bioblitz a tremendous success."

"When I heard about the Vermont Giant Silk Moth Cocoon Watch last fall, I was excited to get involved," Levi said. He quickly became the project's top contributor on iNaturalist. "After I started posting cocoons, I got really interested in other taxa, like galls, mosses, fungi, and lichens." Today, Levi's iNaturalist contributions number nearly 13,000, representing more than 2,700 species. Each observation represents a single data point in the Vermont Atlas of Life, where it helps VCE biologists and professionals across the state better understand and predict biodiversity trends.

As part of this award, VCE sent Levi and his mom to the 2023 Northeast Natural History Conference in Burlington, VT. Levi wrote to say, "Thank you so much for sending me to the conference. I really enjoyed it and I learned so much. I liked learning about stoneflies, carnivorous plants, and seeing my mom get excited about native bees. I also got to identify Jerry Jenkins' moss samples to win a signed book, and explore Colchester Bog and Niquette Bay State Park. I hope my mom will take me to the conference again next year in New York."





Ian Worley

Julie Nicholson Community Science Award

"I was born looking around the world to see what was there." Ian Worley's innate curiosity may help explain why he began finding salamanders at age three, building model airplanes at four, and ultimately studying multiple disciplines: math, physics, biology, philosophy, history, literature, and theology.

Today, Ian applies his expertise and passion to community science endeavors. He notes, "There are four hallmarks of modern science-repeatable methods, documentation, review, and publication." In all tasks, he considers how to add rigor to community science projects and thus is drawn to participating in those that feature all four hallmarks. Ian's participation in eBird and VCE community science projects is an endorsement of their robust methodology.

In 2009. Ian responded to a call for Vermont eBird volunteer reviewers from VCE's Kent McFarland. What started as reviewing checklists in the Champlain Valley for an hour per week steadily grew to over 30 weekly hours validating lists for many locations worldwide, spanning the Arctic and North Atlantic oceans to the subantarctic Indian Ocean. "I enjoy the global impact one can have as an eBird reviewer." Ian explains. However, Ian isn't only an energetic reviewer-he's also a major eBird contributor himself,



having recently submitted his 25.000th checklist.

In addition to his enormous eBird presence, Ian also conducts community science field work to support VCE projects. Among his numerous contributions to our research, he has maintained Forest Bird Monitoring Program routes at Bristol Cliffs Wilderness Area and in West Rupert for several years and conducted Eastern Whip-poor-will surveys for over ten years at many locations, including Snake Mountain and sites in Pawlet, Monkton. and Hinesburg.

We at VCE recognize Ian's contributions to community science and thank him for his outstanding work. As Chris Rimmer points out, he was

nominated for this award because "Ian has consistently gone to extraordinary lengths as an eBird reviewer and outreach champion. Not only has he invested innumerable hours reviewing eBird reports from around the state, he has also offered meticulous feedback to those who have submitted exceptional (sometimes questionable) records. Ian has also submitted an extraordinary number of checklists himself. The amplified rigor of Vermont eBird owes much to Ian's efforts." Ian continues to be a vocal community science ambassador, encouraging participation in VCE's ever-expanding long-term monitoring projects.

"I was born looking around the world to see what was there."

-IAN WORLEY

By supporting this work, you are *doing* this work.

Thank you!

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BUSINESSES

Birds & Beans Coffee Coaticook River Water Power Company Great Bay Hydro Great River Hydro Green Mountain Power Hardwick Electric Department Morrisville Water and Light Vail Resort

CONSORTIA & PARTNERSHIPS

- Automated Insect Monitoring Group (AMI)
- Biodiversity Vermont to Consortia & Partnerships eButterfly.org
- Forest Ecosystem Monitoring Cooperative
- International Bicknell's Thrush **Conservation Group**

FEDERAL – UNITED STATES

Green Mountain National Forest National Park Service U.S. Dept. of Defense Legacy

- Program
- U.S. Fish & Wildlife Service
- U.S. Forest Service Office of International Programs

U.S. Geological Survey

White Mountain National Forest

INTERNATIONAL

Canadian Forest Service-Atlantic Forestry Centre (Canada) Centro Oriental de Ecosistemas y Biodiversidad (Cuba) Consorcio Ambiental Dominicano (Dominican Republic) Environment and Climate Change Canada Global Biodiversity Information Facility (International) Grupo Jaragua (Dominican Republic) Insectarium Montreal (Canada) Mila – Quebec Artificial Intelligence Institute Space for Life in Montreal (Canada) UK Centre for Ecology and Hydrology

NONPROFIT - DOMESTIC

Adirondack Center for Loon Conservation Adirondack Mountain Club Appalachian Mountain Club Ascutney Mountain Audubon Society Audubon Vermont Avian Haven BirdsCaribbean Birds of Vermont Museum California Academy of Sciences Cornell Lab of Ornithology

FINANCIALS

Corporation for National and Community Service (AmeriCorps) Friends of the Missisquoi National Wildlife Range Green Mountain Audubon Society Loon Preservation Committee Manomet Inc. Merck Forest & Farmland Center National Aviary National Geographic Society New Hampshire Audubon North Branch Nature Center Northeast Kingdom Audubon Society NY Natural Heritage Program Otter Creek Audubon Society Sociedad Ornitologica Puertorriquena Inc. Southern Vermont Natural History Museum The Nature Conservancy Vermont Community Foundation Vermont Entomological Society Vermont Institute of Natural Science Vermont Land Trust Vermont Reptile and Amphibian Atlas

STATE - MAINE

Maine Dept of Inland Fisheries & Wildlife

STATE - NEW YORK

N.Y.S. Dept of Environmental Conservation

STATE - VERMONT

Vermont Agency of Transportation Vermont Department of Environmental Conservation Vermont Fish & Wildlife Department Vermont Forests, Parks & Recreation Department

MUNICIPAL Barre Public Works Department

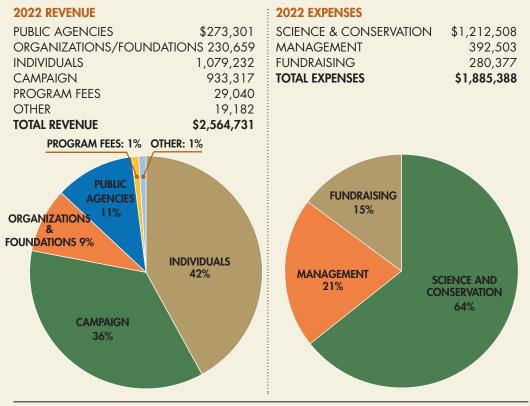
UNIVERSITIES

Aarhus University (Denmark) Alabama Museum of Natural History - Odonata Central McGill University SUNY New Paltz Tufts University Wildlife Veterinary Clinic University of Arizona Université Laval (Canada) University of New Hampshire University of Ottawa Université de Sherbrooke (Canada) University of Vermont University of Vermont Extension University of Vermont Natura History Museum University of Vermont Spatial Analysis Lab

STATEMENT OF FINANCIAL POSITION

ASSETS CURRENT ASSETS	AS OF 12/31/22	AS OF 12/31/21
CASH	\$813,840	\$1,019,812
CONTRIBUTION RECEIVABLES	44,081	56,355
GRANT RECEIVABLES	222,560	178,290
PREPAID EXPENSES	32,489	25,756
CURRENT PORTION PLEDGES RECEIVABLE	182,461	202,000
TOTAL CURRENT ASSETS	1,295,431	1,482,213
INVESTMENTS	3,695,987	2,791,325
EQUIPMENT, VEHICLE, WEB, NET	864,470	45,719
PLEDGES RECEIVABLE, LESS CURRENT PORTION SHOWN ABOVE	58,750	373,563
TOTAL ASSETS	\$5,914,638	\$4,692,819
LIABILITIES AND NET ASSETS CURRENT LIABILITIES		
ACCOUNTS PAYABLE	52,490	63,237
ACCRUED PAYROLL & RELATED TAXES	148,572	129,636
CURRENT PORTION OF CAPITAL LEASE OBLIGATION		1,181
CURRENT PORTION OF LONG TERM DEBT	10,606	
TOTAL CURRENT LIABILITIES	211,668	194,053
LONG-TERM DEBT, LESS CURRENT PORTION ABOVE	579,859	·
TOTAL LIABILITIES	\$791,527	\$194,053
NET ASSETS	. ,	
WITHOUT DONOR RESTRICTIONS	4,353,209	3,553,786
WITH DONOR RESTRICTIONS-TIME OR PURPOSE	769,902	944,981
TOTAL NET ASSETS	\$5,123,111	\$4,498,766
TOTAL LIABILITIES & NET ASSETS	\$5,914,638	\$4,692,819

STATEMENT OF ACTIVITIES



The figures that appear in the financial summary shown above have been audited and received an unqualified opinion.

MISSION

Eastern Meadowlark study site at dawn

The Vermont Center for Ecostudies advances wildlife conservation across the Americas through research, monitoring, and community engagement.



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