

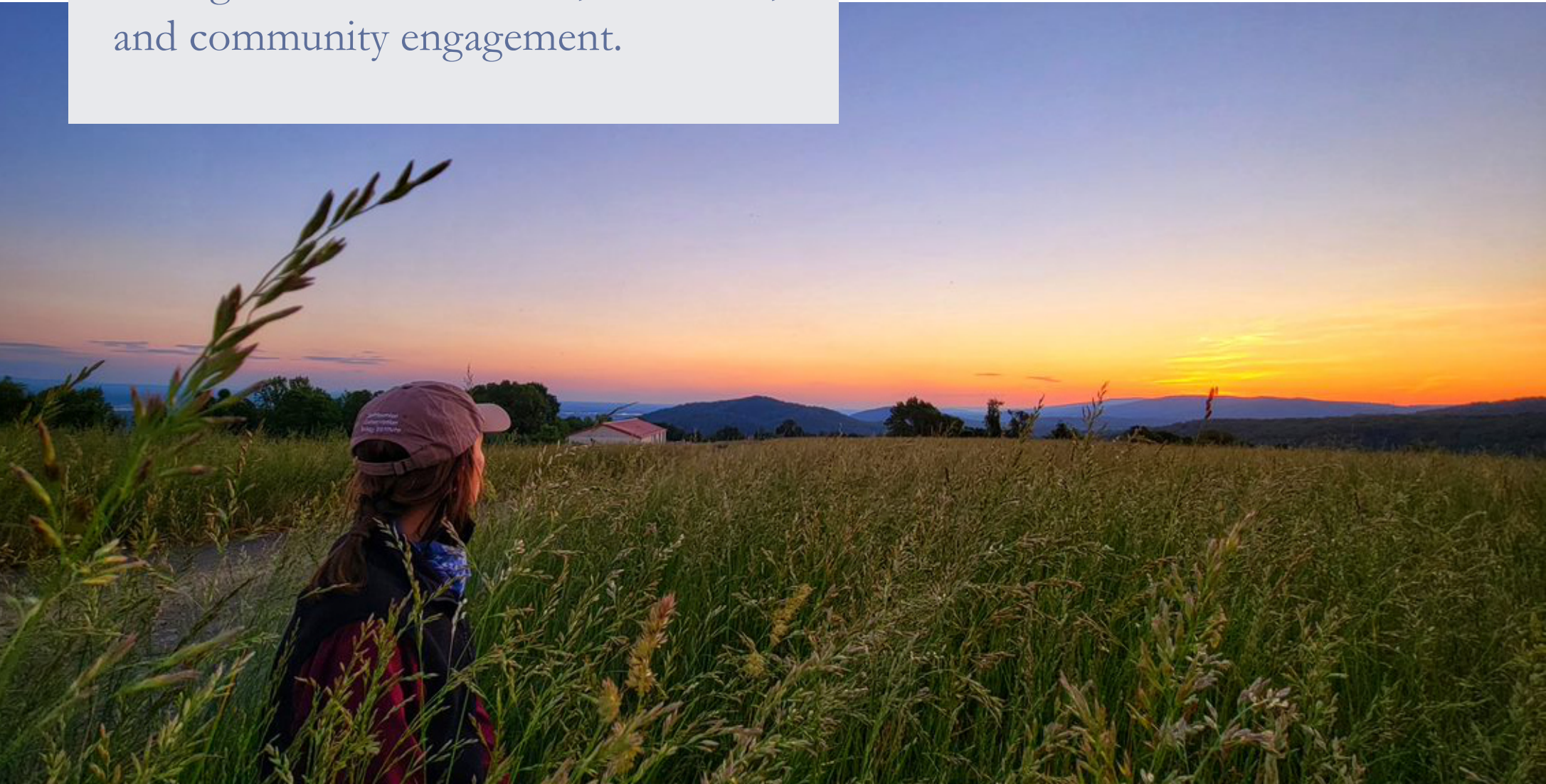
VIRGINIA WORKING LANDSCAPES

2021 Annual Report



Smithsonian
*National Zoological Park
Conservation Biology Institute*

Virginia Working Landscapes (VWL), a program of the Smithsonian Conservation Biology Institute (SCBI) in Front Royal, Virginia, promotes the conservation of native biodiversity and sustainable land management through scientific research, education, and community engagement.



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Left: Sunrise in the fields at SCBI during early morning meadowlark tagging. Photo by Amy Johnson

Center: Black and gold bumble bee (Bombus auricomus) visiting wild bergamot (Monarda fistulosa) in a native meadow on a farm in Fauquier County. Photo by Charlotte Lorick

Right: Female bobolink (Dolichonyx oryzivorus) flies over a hayfield in Warren County carrying food for nestlings. Photo by Amy Johnson

MESSAGE FROM THE PROGRAM DIRECTOR

Dear Friends,

In late 2021, the world lost one of the most influential conservation scientists of our time—Dr. Thomas Lovejoy.

Dr. Lovejoy was one of my mentors throughout my graduate career, sitting on both my Master’s and Ph.D. committees. Despite being a globally recognized conservation scientist, and having a schedule full of meetings with senators, philanthropists, and presidents, he somehow managed to make time for his students. As such, I was fortunate to engage in countless conversations with him over the years, absorbing critical insights as he shared his views on biodiversity loss, research milestones, and where we still need to do the work. While the conservation culture can be heavy at times, he challenged me to focus my energy on what’s working rather than what isn’t. This has instilled an ethic in me that yearns to identify and promote reasons to celebrate conservation successes in our daily work.

In 2021, the generous support of our community enabled us to expand our team of graduate fellows through a VWL research fellowship fund. Not only has this expanded our conservation and research capacity, but it has provided me and my team with opportunities to pass along Tom Lovejoy’s legacy through mentoring and training the next generation of conservation scientists. As all of us explore questions surrounding biodiversity-friendly farming, ecological outcomes of grassland restoration and even the drivers behind conservation behavior adoption, our students are building critical knowledge necessary for advancing conservation in our region. Simultaneously, they are absorbing insights from community partners, landowners, and citizen scientists to help us better understand how we can convert conservation problems into conservation opportunities. I suspect this is just the kind of optimism that gave Dr. Lovejoy that renowned twinkle in his smile.

While I am personally and professionally saddened by the loss of Dr. Lovejoy, I feel honored and inspired to know that he has left the world in our hand—to learn from, to respect, and to protect. He recognized that the future of our planet lies in the hands of the next generation and worked diligently to pass on the tools to tackle whatever challenges come our way. Alongside the entire VWL team, I’m feeling optimistic about the conservation challenges that lie ahead as I know that we are better suited to succeed thanks to his exhaustive efforts.

I look forward to working with you, the VWL community, as we carry his vision forward towards more conservation successes in 2022.

Amy Johnson, PhD



Amy Johnson and Tom Lovejoy

2021 VWL TEAM

STAFF



Amy Johnson | *Program Director*



Charlotte Lorick | *Program Manager*



Erin Thady | *Survey & Volunteer Coordinator*



Justin Proctor | *Piedmont Grassland Bird Initiative Coordinator*



VWL staff (left to right) Amy Johnson, Charlotte Lorick, Justin Proctor, Erin Thady

RESEARCH FELLOWS

Jordan Coscia

Rachael Green

Bernadette Rigley

INTERNS

Margot Breiner

Samantha Fishman

Marissa Jacquemin

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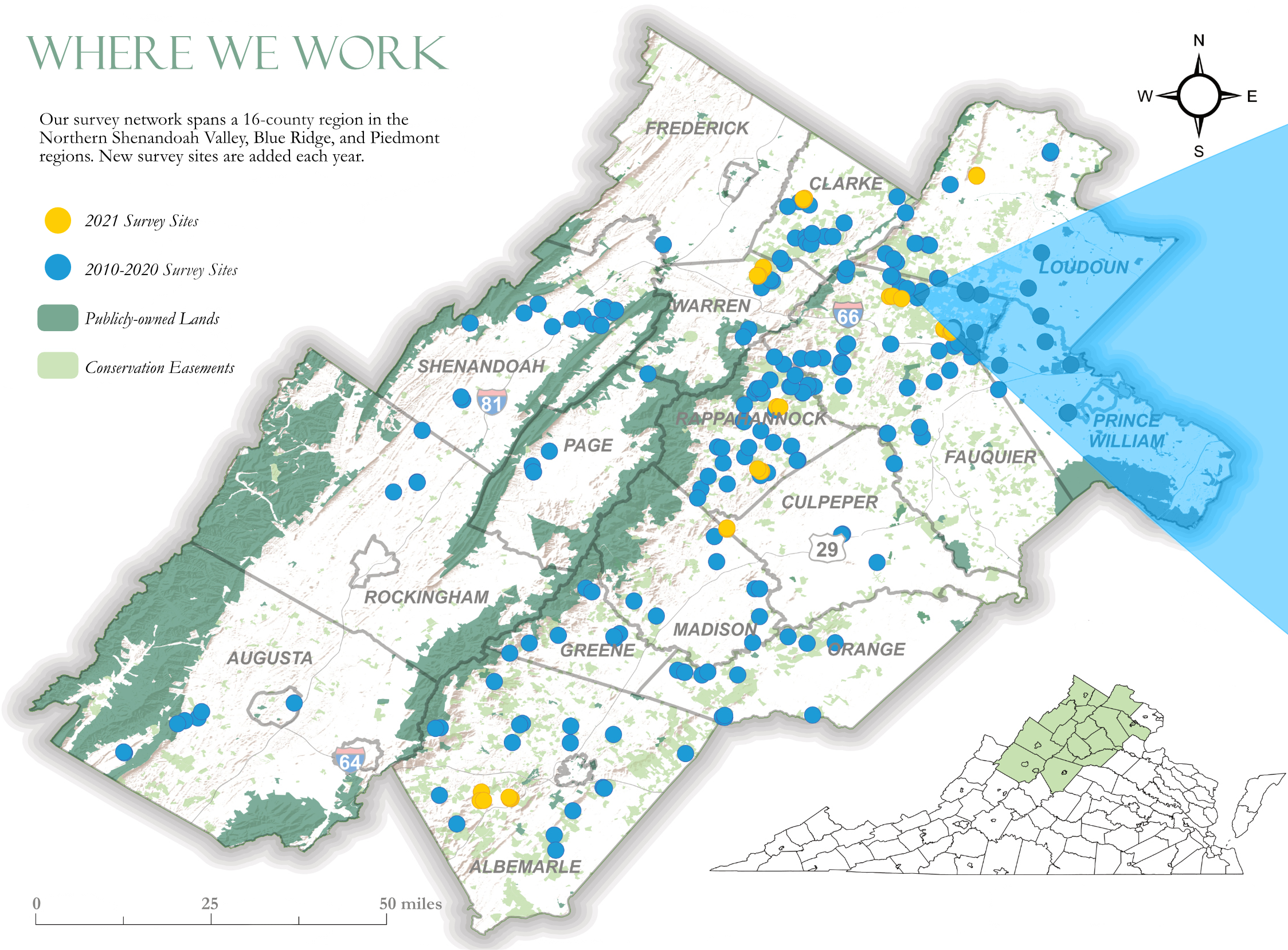
Will Pitt, SCBI

Peter Leimgruber, SCBI

WHERE WE WORK

Our survey network spans a 16-county region in the Northern Shenandoah Valley, Blue Ridge, and Piedmont regions. New survey sites are added each year.

- 2021 Survey Sites
- 2010-2020 Survey Sites
- Publicly-owned Lands
- Conservation Easements



NEW FARM HIGHLIGHT HIDDEN CREEK FARM

Fauquier County

“Hidden Creek Farm is a 558-acre Organic and Humane Certified regenerative conservation farm located about 50 miles from D.C. in Delaplane, VA. Regenerative farming treasures soil. We use our Red Poll cattle and Katahdin sheep in a rotational grazing system to help manage nutrient density and distribution across our lands. Our goal is to build productive pastures with deep roots and diverse forage, keeping them covered and undisturbed, and safeguarding the amazing biome that thrives in soils. Healthy pastures provide incredible habitat for many key species in our ecosystem, including ground-nesting birds such as meadowlark, bobolink, quail, and kestrels.

At Hidden Creek Farm we believe that our role on Earth is to leave her better off than we found her. It is also our goal to be a model of regenerative stewardship and to help other farmers build sustainable systems that work in harmony with nature. To that end, we are incredibly excited and proud to partner with fellow farmers and stewardship communities like Virginia Working Landscapes to build thriving pasture ecosystems in which both farms and wildlife can thrive. To find out more about our regenerative and stewardship practices, please visit www.hiddencreekfarmllc.com.”

– Andrea Young, Founder Hidden Creek Farm

Hidden Creek Farm is one of the study sites for two VWL projects, Bird Friendly Beef and Bee Friendly Beef. To learn about these projects, read the highlight on page 12.



Red poll cattle grazing in pastures at Hidden Creek Farm. Photo by Ronda Gregorio

2010 – 2021 VWL Survey Network Acreage

15,179

ACRES PUBLIC LAND

82,658

ACRES PRIVATE LAND



PRIORITY 1:

ADVANCING THE SCIENCE OF LAND MANAGEMENT

by conducting scientific research that informs best practices and integrates production and conservation goals to support farmers and wildlife



Hayfield and pasture side by side at Chamellors Rock Farm. Both are sites for the grassland bird nesting research VWT is leading. Photo by Amy Johnson

PROTECTING GRASSLAND BIRDS

MONITORING THE MOVEMENTS OF MEADOWLARKS

Eastern meadowlarks (*Sturnella magna*), an iconic indicator species of eastern grassland habitats, have declined by over 70% in the last 50 years. Understanding the drivers of their decline will require knowledge of their movement patterns throughout the annual cycle. As demonstrated in other species, this information can be elucidated using GPS and satellite technology that tracks movement patterns of individuals throughout the year.

In the spring of 2021, we deployed 10 Argos-GPS tags on meadowlarks breeding on private farms in the Piedmont and Shenandoah regions of Virginia. GPS tags were pre-programmed to collect weekly satellite fixes, allowing us to track the movements of meadowlarks for a full year. Our preliminary data suggests a mixed migratory strategy within the population, meaning some individuals remained sedentary while others migrated short distances. GPS data will be used to identify migratory routes and patterns and the timing of movements. Identifying such information will help us develop conservation strategies at the appropriate time and place for supporting populations on both breeding and wintering grounds.



Top: VWL research fellow Bernadette Rigley holding a male Eastern meadowlark (*Sturnella magna*) after outfitting it with a GPS tracker. Photo by Amy Johnson

Bottom: Close-up of a tiny GPS tracker on the back of an Eastern meadowlark. Photo by Amy Johnson

Far Right: VWL research fellow Bernadette Rigley and collaborating researcher from Smithsonian Migratory Bird Center, Amy Scarpignato, banding and GPS tagging an Eastern meadowlark (*Sturnella magna*). Photo by Amy Johnson



97% OF EASTERN MEADOWLARK POPULATIONS RESIDE ON PRIVATE LANDS



EXPANDING NATIONWIDE

The success of the pilot study has fueled an interest to expand research to a range-wide tracking study of both eastern and western meadowlarks. In 2022, the Smithsonian's Migratory Connectivity project (MCP), will lead a collaborative effort among partners across the U.S. and Canada, including VWL, to gain a better understanding of where breeding individuals migrate and spend the non-breeding season.

WILDLIFE FRIENDLY AGRICULTURE



Opposite: Male bobolink (*Dolichonyx oryzivorus*) perched on a fence in a hayfield in Warren County, V.A. Photo by Amy Johnson

Above: Cattle grazing in a pasture. Photo by Amy Johnson

Far Right: Common Eastern bumble bee (*Bombus impatiens*) visits a New England aster (*Symphotrichum novae-angliae*). Photo by Charlotte Lorick



BIRDS, BEES, & BEEF

VWL is dedicated to conducting research to inform best practices that support both wildlife and farmers. To accomplish this, we have teamed up with leading experts in regenerative agriculture to investigate grazing practices that align with grassland bird and pollinator conservation.

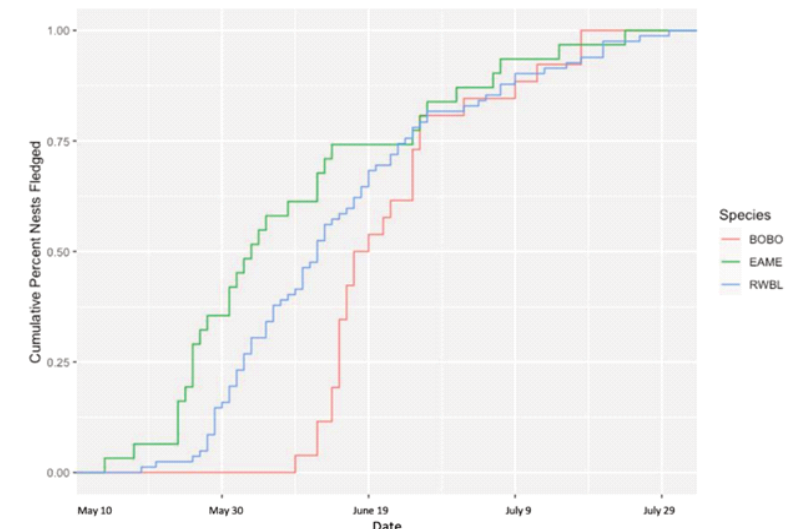
2021 HIGHLIGHTS

- ◆ **Bird-Friendly Beef:** In 2021 we monitored 228 bird territories and 162 nests throughout the breeding season. We used this data to better understand how haying and grazing regimens affect the reproductive success of grassland birds. Preliminary data shows that summer pasture stockpiling is comparable to delaying hay cutting as an optimal practice for maximizing the reproductive success of grasslands birds in working grasslands.
- ◆ **Bee-Friendly Beef:** In collaboration with Virginia Tech and the University of Tennessee, VWL piloted a new study in 2021 to develop bee-friendly beef production practices through a series of demonstration sites and on-farm trials. Six local beef producers in Northern Virginia will plant a native wildflower seed mixture into cattle pastures to increase floral resources for pollinators. VWL conducted baseline vegetation surveys in the study fields in preparation for the wildflowers to be planted in the spring of 2022. VWL researchers and citizen scientists will conduct annual surveys of the plant and pollinator communities to assess the ecological impacts of integrating wildflowers into actively grazed cattle pastures.

WHEN IS IT SAFE TO MOW MY GRASSLAND?

The graph to the right shows preliminary data collected during nest surveys in 2021. It illustrates the cumulative percentage of nests fledged by species (BOBO= bobolink, EAME= eastern meadowlark, RWBL= red-winged blackbird) in fields under regenerative grazing and haying management from 2020-2021. The graph can be used to assess the proportion of nests that have fledged by a particular date. For example, note how the three species begin fledging their young at different times—as early as mid-May for meadowlarks and as late as early June for bobolinks. By June 29th, nearly 75% of bobolinks, eastern meadowlarks, and red-winged blackbirds have fledged young. Nesting finishes around mid-July with 100% of nestlings fledged for all three species.

Note: This graph represents just one year of collection. These numbers may evolve as we continue data collection in 2022 and 2023, as each year brings different weather patterns that contribute to variability in reproductive activity and success.



NATIVE PLANTS FROM FIELD TO FOREST

MAKING OF A MEADOW: EXPERIMENTS IN GRASSLAND RESTORATION

In 2019, VWL began a collaborative grassland restoration study with the Oak Spring Garden Foundation and the Clifton Institute. The experiment is a multi-year study testing four grassland establishment treatments and two grassland management techniques to help inform restoration guidelines for the establishment and management of native grasslands in Virginia.

2021 HIGHLIGHTS

- ◆ The first controlled burns were conducted at all three experiential sites in March 2021.
- ◆ The meadow establishment treatments were completed in 2021, with the final rounds of discing and herbicide application completed in May followed by the seeding of a native warm season grass and wildflower mix in June.
- ◆ In the summer of 2021, we conducted plant surveys at 60 points across our three experimental sites to track the development of the plant communities as we continue our restoration treatments. We identified 84 plant species in these surveys.
- ◆ In the summer of 2022, plant community data will be collected across all three experimental sites to help inform restoration guidelines for the establishment and management of native grasslands in Virginia.



“NATIVE PLANTS ARE CRITICAL COMPONENTS OF FUNCTIONING ECOSYSTEMS. UNDERSTANDING THEIR CURRENT DISTRIBUTION AND HOW TO RESTORE THEM TO OUR LANDSCAPES IS A KEY TO INFORMING CONSERVATION LAND MANAGEMENT STRATEGIES.”

– Charlotte Lorick,
VWL Program Manager



Top: VWL Program Manager, Charlotte Lorick, finds a green fringed orchid (*Platanthera lacera*) growing in a meadow in Rappahannock County, VA. Photo by Amy Johnson

Bottom: VWL and collaborators from the Clifton Institute conduct a prescribed burn in the experimental plots at SCBI. Photo by Charlotte Lorick

Far Right: Yellow lady's-slipper orchid (*Cypripedium parviflorum*) found in a woodland in Fauquier County, VA. Photo by Charlotte Lorick



WILD ORCHIDS: CANARIES IN THE COAL MINE?

For the past two years, VWL has worked with collaborators to monitor and document native orchids across our region, and to explore if their abundance and diversity can be used as indicators of forest health. There are surprisingly few studies in the Eastern US on orchid distribution as it relates to forest characteristics and landscape features. This project can help to fill that gap in our understanding of these charismatic plants.

2021 HIGHLIGHTS

- ◆ 2021 was the second and final year of data collection for the project.
- ◆ VWL researchers and citizen scientists surveyed forest patches at over 35 properties.
- ◆ We documented 3,000 individual orchids of 7 different species.
- ◆ The orchid team has begun data analysis to determine which variables impact orchid abundance and diversity in Virginia forests.

HUMANS DIMENSIONS OF CONSERVATION

84% OF VWL CITIZEN SCIENTISTS REPORTED THAT THEY WERE POSITIVELY IMPACTED BY VWL TO CREATE, MANAGE, OR RESTORE WILDLIFE HABITAT ON PRIVATE LANDS.

This includes planting native plants, removing invasives, delaying mowing for breeding grassland birds, restoring grasslands, and reducing pesticide use.



Opposite: VWL leads a plant walk to explore native meadows as Chancellors Rock Farm in Rappahannock County, V.A. Photo by Charlotte Lorick

Above: VWL and collaborators discuss plans for studying the impacts of regenerative grazing practices on grassland nesting birds. Photo by Amy Johnson

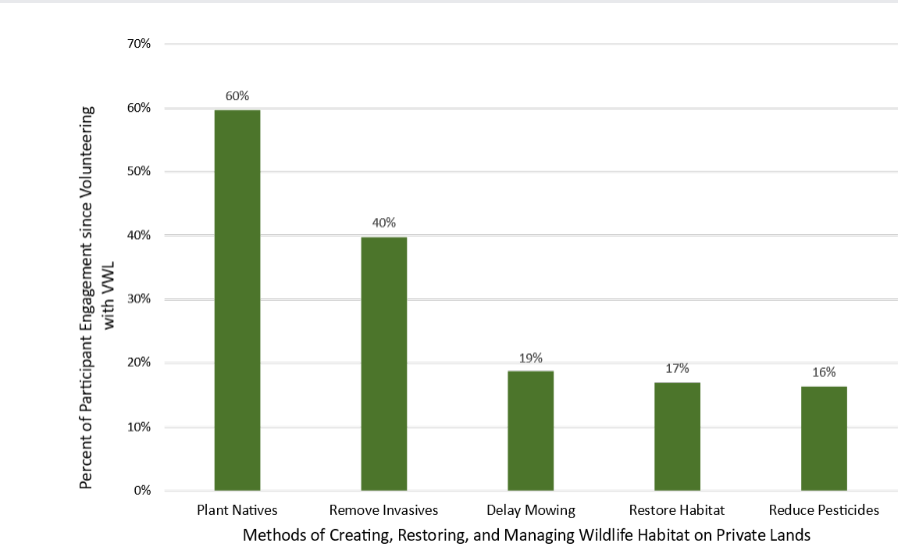
Right: VWL intern Sam Fishman holds a female red-winged blackbird. Photo by Bernadette Rigley



While most of our research to date has focused on biodiversity, the network that VWL has built over the last decade offers a unique opportunity to learn more about the people who steward our region's biodiversity. The more we can learn about what motivates people to adopt conservation behaviors, the more effective we can be in the design and implementation of research, conservation outreach and program communications. That's why VWL partnered with social scientists at Virginia Tech and recruited VWL Research Fellow and masters student, Rachael Green, to study the human dimensions of conservation. Advised by Virginia Tech's Dr. Ashley Dayer and co-mentored by VWL's Dr. Amy Johnson, Rachael designed a series of interviews and surveys to study how the participation of landowners, land managers, and citizen scientists in VWL programs impacts their conservation behaviors.

2021 HIGHLIGHTS

- ◆ Interviewed 56 VWL landowners and land managers who had provided access to VWL to conduct ecological research on their property between 2010 and 2020.
- ◆ Surveyed over 100 VWL citizen scientists and over 200 VWL newsletter subscribers.
- ◆ From these interviews and surveys, we gained valuable insights into conservation behavior outcomes associated with participation in a conservation research program, and the factors that influence participants' engagement in these conservation behaviors.



QUANTIFYING IMPACT

The graph to the left illustrates the percent of VWL citizen scientists' engagement in creating, managing, and restoring wildlife habitat on private lands.

The data for this graph was collected as part of a Masters thesis by VWL Research Fellow, Rachael Green.

PRIORITY 2:

CONNECTING WITH OUR COMMUNITY

to build a community of conservation stewards through conversation, demonstration, and research collaboration



CITIZEN SCIENCE

Virginia Working Landscapes accomplishes its conservation research goals thanks in large part to a dedicated team of community and citizen scientists. VWL volunteers have contributed over 16,000 hours of time and energy to helping VWL collect valuable ecological data since 2010. Despite the challenges posed by the COVID-19 pandemic starting in early 2020, VWL volunteers devoted their time and expertise in 2021 to continue conducting biodiversity surveys in a safe manner.

We are constantly learning from our citizen scientists when we work together in the field to conduct avian point counts, grassland vegetation surveys, pollinator inventories, and soil sampling. Our volunteers each possess unique skill sets and backgrounds that enhance the impact of VWL’s survey efforts. The success of this program would not be possible without their knowledge, passion, and dedication. VWL citizen scientists connect our staff and the larger Smithsonian Institution to the landowner community, enhancing the collaborative relationship needed for biodiversity conservation efforts to move forward.

Volunteers—thank you for your passion and commitment, and we can’t wait to join you in the field again for another great season!



Opposite: VWL citizen scientist volunteer Paul Guay taking notes after finding a twayblade orchid (in foreground) during VWL orchid surveys. Photo by Charlotte Lorick
Below: VWL citizen scientists Hillary Davidson and Kate Heneberry conducting bird surveys at a farm in Fauquier County, VA. Photo by Hugh Kenney, The Piedmont Environmental Council



GRASSLAND BIODIVERSITY SURVEYS

Citizen scientists support us in many ways, but above all, they play a critical role in data collection for our longest running project, the Grassland Biodiversity Surveys. VWL has been conducting these surveys across a 16-county region since 2010. These surveys help us better understand the factors that affect our region’s biodiversity and help inform best land management practices for people and wildlife.

In light of the Covid-19 pandemic, we reduced our number of survey sites in 2021 to minimize travel throughout our survey region. We also modified our field protocols to follow strict social distancing and safety guidelines. Even at limited capacity, we collected a tremendous amount of data thanks to our dedicated volunteers.

2021 BY THE NUMBERS

- ◆ 303 individual species counted
- ◆ 91 biodiversity surveys conducted
- ◆ 29 citizen scientist volunteers
- ◆ 13 new sites
- ◆ 890 hours of volunteer time logged

REMEMBERING SALLY CUNNINGHAM

The VWL and SCBI community lost a dear friend and dedicated volunteer earlier this year—Sally Cunningham. Sally has been a valued member of our grassland biodiversity survey team since the beginning of VWL, bringing expertise and boundless enthusiasm to our citizen science program. In addition, Sally was a devoted volunteer to SCBI—organizing tours for visitors around the SCBI campus, sharing narratives about Smithsonian research, and the animals and the people who work to save them. As she was a strong advocate for conservation education, Sally’s legacy will be honored through an annual continuing education seminar for VWL volunteers. Stay tuned for our first event in Fall 2022.





Opposite: A spread from the plant ID book *Newcomb's Wildflower Guide*. Photo by Charlotte Loricke

Above: VWL research fellow Bernadette Rigley instructs VWL intern Sam Fishman and VWL research fellow Jordan Coscia how to observe grassland bird nesting behaviors. Photo by Amy Johnson

Right: VWL program manager, Charlotte Loricke, teaches grass ID at a plant walk in Rappahannock County, VA. Photo by Amy Johnson



EDUCATION FOR ALL

SCBI and VWL prioritize education and training at all levels, and we aim to share scientific research that helps inform management practices for biodiversity conservation. Under normal circumstances, we regularly host expert-led workshops, trainings, and lectures that are open to the public at our Front Royal campus and at properties throughout the region. Despite limitations to in-person gatherings throughout 2021, we continued to connect with our community in a variety of virtual platforms and through direct mentorship of interns, students, and fellows.

95% OF PARTICIPATING VWL LANDOWNERS REPORTED BEING POSITIVELY IMPACTED BY PROGRAM ACTIVITIES TO MANAGE THEIR PROPERTY FOR CONSERVATION PURPOSES.

This includes removing or managing invasive plants, adjusting timing of mowing to preserve nesting grassland bird habitat, and planting native plants. Landowners reported being most influenced by program events, interactions with VWL staff and citizen scientists during surveys, and year-end landowner reports.

35% OF PARTICIPATING VWL LANDOWNERS REPORTED HELPING MENTOR OTHER LANDOWNERS IN CONSERVATION MANAGEMENT ON THEIR PROPERTIES.

These research results demonstrate that the conservation impact of VWL spreads far beyond those directly participating in our research and outreach activities. The data for these statistics was collected as part of a Masters thesis by VWL Research Fellow Rachael Green. Learn more about her research on Page 16 of this report.

TOGETHER, WE CAN BRING BIRDS BACK

The Piedmont Grassland Bird Initiative (PGBI) launched in 2021 as a collaboration between Smithsonian's Virginia Working Landscapes and the Piedmont Environmental Council (PEC). PGBI brings together expertise in land preservation, science, regenerative agriculture, and restoration to streamline conservation planning and implementation on working lands.

2021 HIGHLIGHTS

- ◆ Brought in two additional lead partners to steer the initiative, including American Farmland Trust and Quail Forever.
- ◆ VWL hired Justin Proctor to coordinate the initiative, and October Greenfield from PEC became the co-coordinator.
- ◆ Mentored 2 interns, led 3 outreach events, gave 8 presentations to the community, and carried out 16 landowner/producer site visits.
- ◆ Wrote and submitted four grant proposals to secure funding to amplify the initiative and its programming.
- ◆ Published three articles in regional newspapers and launched a PGBI website: vagrasslandbirds.org
- ◆ Created and launched a Landowner Survey to gauge landowner relationships with grassland birds, amount of acreage that is currently being managed to benefit grassland birds, and amount of additional acreage that could be managed for grassland birds.
- ◆ Built collaborations with more than ten new partners spanning the northern Piedmont and northern Shenandoah Valley region.
- ◆ Created a financial incentives program for producers willing to adopt new bird-friendly management practices.



“TOGETHER, WE ARE
COMBINING EXPERTISE
IN SCIENTIFIC
RESEARCH, LAND
CONSERVATION,
REGENERATIVE
AGRICULTURE,
ADVOCACY AND
HABITAT RESTORATION
TO STEM THE TIDE OF
GRASSLAND BIRD
DECLINE, IMPROVE THE
RESILIENCY OF
WORKING
LANDSCAPES AND
DEVELOP PRACTICES
THAT WORK FOR
PEOPLE AND BIRDS”

— Amy Johnson VWL Program Director

Top: Savannah sparrow (*Passerculus sandwichensis*) rests on a fence. Photo by October Greenfield
Bottom: Eastern bluebird (*Sialia sialis*) delivering food to nestlings. Photo by Charlotte Lorick
Far Right: Film crew scoping out the best shots during filming of “Grass Roots” documentary at Oxbow Farm in Warren County, VA. Photo by Amy Johnson



“GRASS ROOTS,” THE FILM

In the summer of 2021, VWL’s research team was joined in the field by a team of filmmakers to document the species, the people, and the farms that make our work possible. With a focus on our ongoing grassland bird research being conducted in collaboration with local producers, the film. Titled “Grass Roots,” represents the importance of multi-faceted partnerships for identifying and promoting best management practices that work for both people and wildlife. Stay tuned for our release date in Spring 2022!



PRIORITY 3:

CULTIVATING THE NEXT GENERATION OF CONSERVATIONISTS

by training and mentoring students, interns, and graduate fellows in research development and implementation, science communication, and community-based conservation

VWL staff Erin Thady and Charlotte Lortek on a site visit with practicum student Piper Jefferson.



Intern Sam Fishman conducting nest surveys on a farm in Warren County, V.A. Photo by Bernadette Rigley

2021 RESEARCH FELLOWS, STUDENTS, & INTERNS



Hannah Adamson, Undergraduate Practicum Student



Margot Breiner, Grassland Bird Intern



Jordan Coscia, Graduate Research Fellow

As part of the Smithsonian Mason School of Conservation practicum semester experience, **Hannah** focused on conducting an extensive literature review for best management practices for grassland birds on agricultural landscapes and helped facilitate dialogue with landowners about sustainable agricultural practices and bird conservation.

Margot focused on grassland bird research including nesting surveys, behavioral surveys, and vegetation sampling. She will begin a Master's program at University of Wyoming in 2022.

Jordan is Ph.D. student at Virginia Tech. With VWL, she is conducting a grassland restoration experiment to examine the effects of different grassland establishment and management methods on restored native plant communities. She also participates in plant surveys for the Bee Friendly Beef project and our biodiversity surveys.



Samantha Fishman, Grassland Bird Intern



Rachael Green, Graduate Research Fellow



Marissa Jacquemin, Grassland Ecology Intern



Olisaneme Okonkwo, C2S2 Intern in Conservation Agriculture



Bernadette Rigley, Graduate Research Fellow

Sam focused on grassland bird research including nesting surveys, behavioral surveys, and vegetation sampling. After her internship she moved on to pursue a Master's degree at Virginia Commonwealth University conducting research on golden-winged warblers.

Rachael is a Master's student in the Department of Fish and Wildlife Conservation at Virginia Tech. Her research focuses on the human dimensions of private lands conservation. Specifically, she works with VWL landowners, land managers, citizen scientists, and newsletter subscribers to explore how participation in a conservation research program influences peoples' conservation behaviors.

Marissa focused on monitoring native meadow diversity and plant-insect interactions, science communication, and developing outreach and education resources for various VWL projects, including Native Plant Watch.

As part of a remote intern program with the Conservation Centers for Species Survival, (C2S2) **Olisaneme** worked with the VWL team on an extensive literature review for PGBI, compiling and summarizing published research that help us better understand how native warm season grass plantings impact water quality on working landscapes.

Bernadette leads research efforts for the bird-friendly beef project which includes grassland bird surveys, data analysis, and science communication. She began a Ph.D. program at George Mason University in 2021, and will continue to work with VWL as a research fellow to study regional grassland bird ecology.

ACKNOWLEDGMENTS

2021 CITIZEN SCIENTISTS

| | |
|--------------------|-------------------|
| Alex Bueno | Joyce Harman |
| Art Drauglis | Karl Brotzman |
| Ashley Landes | Kate Heneberry |
| Bob Butterworth | Laura Helm |
| Crystal Luong | Marilyn Kupetz |
| Dana Squire | Mark Bruns |
| Darnice Pettigrew | Paul Guay |
| Deborah Schram | Phil Kenny |
| Don Arnold | Phyllis Partain |
| Eve Gaige | Richard Stromberg |
| Greg Chapman | Robin Richards |
| Hillary Davidson | Sally Anderson |
| Janet Paisley | Sandy DiCarlo |
| Jennifer Holder | Teri Holland |
| John Corey Hunsdon | |

2021 RESEARCH COLLABORATORS

American Farmland Trust
Blandy Experimental Farm
Center for Species Survival, SCBI
Changing Landscapes Initiative, SCBI
Conservation Ecology Center, SCBI
The Clifton Institute
George Mason University
Manassas National Battlefield Park
Movement of Life Initiative, SCBI
National Park Service
North American Orchid Conservation Center
Oak Spring Garden Foundation
Smithsonian Environmental Research Center
Smithsonian-Mason School of Conservation
Smithsonian Migratory Bird Center
Smithsonian Working Lands & Seascapes
University of Maryland Center for Environmental Science
University of Tennessee
University of Virginia
Virginia Master Naturalists
Virginia Tech



Top: An early morning setting up mist nets for meadowlark tagging at Chancellors Rock Farm in Rappahannock County, VA. Photo by Amy Johnson

Left: A special thanks to Mowry, our painted meadowlark, for helping us lure in birds to the mist nets for tagging. Photo by Amy Johnson

Bottom: Research fellow, Bernadette Rigley, holding a tagged Eastern meadowlark (Sturnella magna). Photo by Amy Johnson



2021 SURVEY PROPERTIES

| | |
|--|--|
| Andreae Property | Oak Grove Farm |
| Andy Guest State Park | Oak Spring Garden Foundation |
| Beaver Creek | Old Whitewood |
| Bellair Farm | Over Jordan Farm |
| Bessie Bell Farm | Oxbow Farm |
| Blackrock Farm | Pembroke Springs |
| Boyd Property | Polyface Farms |
| Broad Hollow Farm | Redlands Farm |
| Bull Run Mountains Natural Area Preserve | Rhodes Ridge |
| Bundoran Farm | Roland Farm |
| Castleton View | Schelford Farm |
| Chancellors Rock Farm | Seilheimer Property |
| Edgehill Farm | Seven Bends State Park |
| Eldon Farms | Shady Maple Farm |
| Fannon Farm | Shelby Property |
| George Washington National Forest | Smithsonian Conservation Biology Institute |
| Hidden Creek Farm | South River Nature Preserve |
| Kinloch Farm | Stonebridge Farm |
| Lakota Ranch | Sunny Canyon |
| Lanark Farm | The Clifton Institute |
| Langhorne Farm | The Farm at Sunnyside |
| Learning Tree Farms | The Volgenau Farm |
| Little Milan | Twin Oaks Farm |
| Marriott Ranch | Waverly-Hamstead Property |
| MeadowSong | Whitewood Farm |
| Mehring Property | Whyman Farm |
| Miller Farm | Willow Spring Farm |
| Montevento | |
| North Wales | |

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A boblink nest hiding in a bay field among the grasses and clovers. Photo by Amy Johnson



Opposite: A brown-belted bumble bee (*Bombus griseocollis*) visiting wild blue indigo flowers (*Baptisia australis*). Photo by Charlotte Lorick

Above: VWL volunteers on a bird walk. Photo by Justin Proctor

Right: Female bobolink (*Dolichonyx oryzivorus*) flies over a hayfield in Warren County carrying food for nestlings (cant quite tell is she carrying food?. Photo by Amy Johnson



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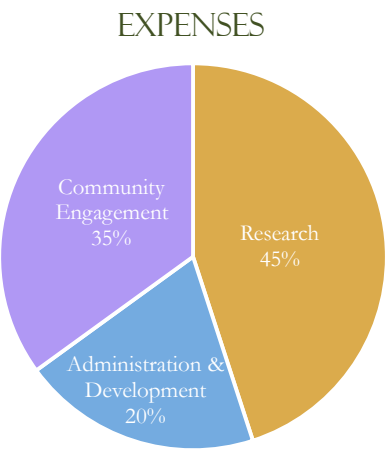
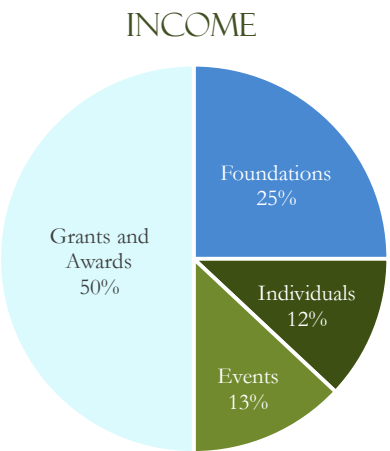
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FINANCIAL REPORT

OPERATING BUDGET

\$332,500



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*Front & back covers | A male bobolink (*Dolichonyx oryzivorus*) perched among pasture grasses and chicory (*Cichorium intybus*) in a hayfield in Warren County, VA. Photo by Amy Johnson*

Report designed by
Charlotte Lorick, VWL



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