Finding Ecological Answers and Educating at The Clifton Institute

This northern Virginia nonprofit seeks to inspire the next generation of environmental stewards, restore habitat, and conserve biodiversity.

By Glenda C. Booth
Photos and graphic courtesy of The Clifton Institute

At any given moment at The Clifton Institute, you can find researchers examining vernal pools, families enjoying a guided nature walk, volunteers helping with plantings, or a school field trip exploring a field. The vibrant 900-acre complex, a former farm bequeathed in 2011 for scientific research and education, has a wide variety of habitats—forests, grasslands, shrublands, wetlands, vernal pools, streams, and ponds—each of which is home to a different community of plants and animals. Researchers have documented more than 2,000 species of plants, animals, and fungi at the property near Warrenton, Virginia.

The Clifton Institute's mission is "to inspire a deeper understanding and appreciation of nature, to study the ecology of our region, to restore habitat, and to conserve native biodiversity." They do so through environmental education programs, conducting ecological research, and by restoring habitats for native plants and animals.

"The folks at The Clifton Institute are deeply committed educators and scientists. They provide invaluable programming, research, and volunteer opportunities for people of all ages and backgrounds," said Chris Miller, President of the Piedmont Environmental Council.

"The connection between science, restoration, and education is pretty unique," said Eleanor Harris, Clifton's managing director. "There are a lot of education centers, but they're not necessarily doing research there, and there are a lot of research stations that aren't necessarily working with young people

Clifton educators demonstrate identifying bird species by wing coloring.

Restoring habitats with native plants is key to The Clifton Institute's work.

to educate. I think it's cool that we're trying to integrate all three pieces—science, restoration, and education. We're getting young people experience in being involved in scientific research, which also benefits our scientific research, which then has a big impact because it's getting out to a lot of people. It's mutually beneficial for all the programs."

Answering Questions

Harris, who holds a PhD in computational biology, shares the running of Clifton with her husband, Bert Harris, who has a PhD in ecology and evolutionary biology. Eleanor oversees the educational program, while Bert focuses on the research and restoration projects.

On staff at Clifton is an education associate, a land management outreach associate, a habitat specialist, a native seed project coordinator, a communications associate, and an administrator. "Every year, we hire technicians to help with specific projects," said Eleanor. "They come to us with varying degrees of experience. We like to have one who has a good amount of experience, but we also like to hire people earlier in their careers so they can get experience in field science. We hope it's an educational experience for young scientists to participate in our projects." In addition, Clifton hosts graduate students for research projects.

The Institute's research centers around four topics:

- conservation and restoration of native grasslands and savannas
- conservation of declining species on working lands
- mitigating the effects of suburban and exurban development
- measuring the effects of climate change on biodiversity

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Habitat work done at The Clifton Institute aims to restore habitats used by grassland species in decline, such as the Eastern meadowlark.

Their land management and restoration work focuses on early successional habitats, areas that have been disturbed by mowing, fire, or grazing and are now re-growing into forests. These habitats support a disproportionate number of species that are declining across their range.

Bert and his team are restoring 110 acres of overgrazed cattle pasture to a native grassland by eliminating non-native plants and putting in native grassland plants that they maintain by mowing or prescribed burning. They are testing eight combinations of methods to determine how best to help declining native species and measuring the methods' effectiveness.

In the summer of 2020, Clifton joined researchers from the Restoration Ecology Lab at Virginia Tech in a study funded by the Virginia Native Plant Society. They surveyed 38 remnant grassland sites in five counties, recording more than 450 species of plants, including several rare or threatened species. Before European settlement, most of Virginia's crop and grazing land was likely grassland, but today it's just a fraction of that. Grasslands in Virginia typically have warm season grasses and

Children participating in summer camps or educational programs at Clifton can learn to appreciate nature.

Prescribed fire is one of the habitat management tools used at The Clifton Institute to create and maintain early successional habitat.

wildflowers—plants that can naturally regenerate after a fire.

Clifton's scientists use the terms "grassland" and "prairie" interchangeably to mean a habitat dominated by grasses and wildflowers, with few shrubs and no trees, explained Eleanor. A savanna is an open area with some widely spaced trees.

As grasslands and shrublands decline, so do the wildlife that depend on them. Examples of birds include American kestrels, grasshopper sparrows, Eastern meadowlarks, and bobolinks. Examples of shrubland species in decline are prairie warblers, field sparrows, and yellow-breasted chats. Northern bobwhite quail and Eastern meadowlarks have lost more than 75 percent of their populations in the last 30 to 40 years, *The Bay Journal* reported in November 2021. Beginning in 2018, Clifton staff, collaborators, and volunteers have conducted bird, butterfly, and plant population surveys at the property.

More than 90 percent of Virginia land is in private ownership. By better understanding how declining wildlife species use agricultural and other open habitats, Clifton's researchers hope their findings can help private land managers better support wildlife and slow population declines.

Studying Wildlife

In partnership with the Smithsonian's Conservation Biology Institute, Clifton's scientists are seeking to understand why American kestrels (*Falco sparverius*) are declining across northeastern North America. They equip the birds with GPS transmitters and analyze how kestrels, which hunt by day, use different types of fields and how their use changes through seasons. Clifton's scientists want to know which agricultural habitats and grasslands are ideal for kestrel foraging so that landowners can help kestrels.

Their preliminary results suggest that kestrels use wildflower meadows for hunting rodents and insects early in the season and then switch to cattle pastures later in the season when meadow vegetation grows taller. This conclusion is from tagging only female kestrels, they caution. "The females are bigger and therefore the GPS transmitter is a smaller percentage of their weight," explained Eleanor. "Now that we've seen how well the tags worked, though, we feel confident enough to attach the transmitters to males as well, which is what we will do this coming summer."

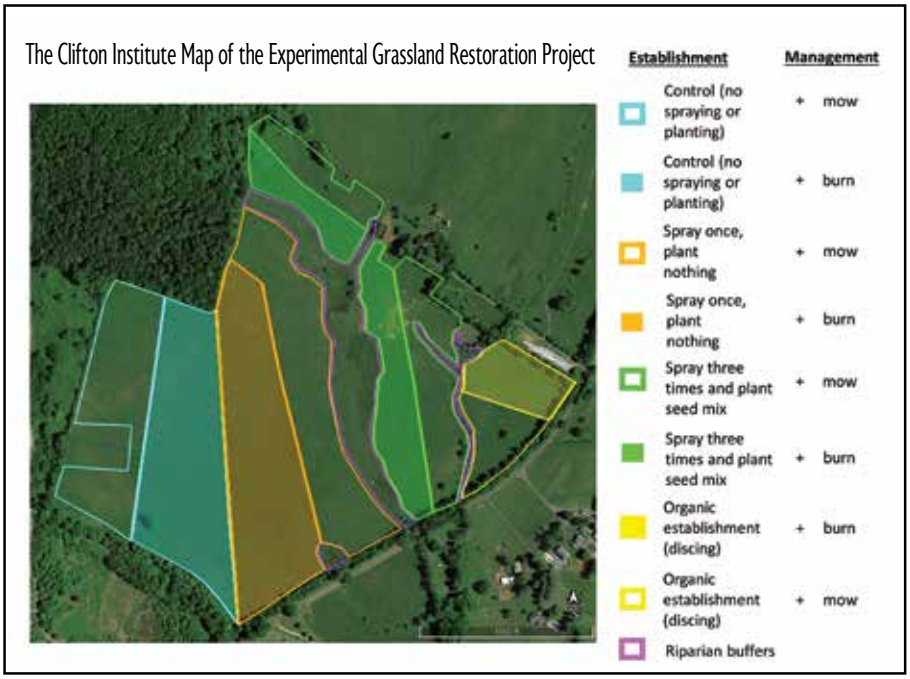
They also documented that two female kestrels flew to North Carolina and Georgia for the winter and then returned to their breeding territories, a new finding.

Teams are also radio-tracking box turtles every year. They notch each turtle's shell with a unique code to identify individuals and estimate their annual survival and population size. Box turtles have been known to live more than 100 years. Researchers hope to learn what habitats the turtles use, what time of year they're most active, the size of their territories, how much neighboring territories overlap, and how to conserve habitats and turtles. By understanding the turtles' movements in various habitats, they hope to advise landowners on mowing and haying practices that can minimize turtle mortality.

"Many of our projects start when someone asks us advice on what to do on their land," said Eleanor. "We were getting a lot of questions from people about helping kestrels on their land, so we figured we'd do some research to figure out how best to help kestrels. That's our goal—to design research projects that will help both manage our property and also result in concrete advice for landowners."

Clifton's land management outreach associate "gives advice to landowners about how to support native plants and animals on their properties, and she uses a lot of the results from our research in that," Eleanor continued.

Dr. Tom Wood of George Mason



A map of The Clifton Institute's 110-acre grassland restoration experiment. They are comparing the effectiveness of different management strategies to restore native grassland habitats, which also benefits a variety of species of wildlife.

University bands birds in different habitats every 10 days from late spring through summer. Of particular interest are the neotropical migratory birds that breed on the Clifton property. Scientists at 1,200 stations across North America use the data to study the habitats that different species use, the resources they need, and changes in abundance. This work is part of the nationwide Monitoring Avian Productivity and Survivorship (MAPS) program, coordinated by the Institute for Bird Populations.

Eastern woodland turtles (box turtles) are radio-tracked each year to learn more about them.

In other research, Bert is doing a 20-year study of birds' movement up mountains because some respond to climate change by moving to cooler, higher elevations.

Prioritizing Native Plants

Clifton's research encompasses a wide variety of plant life as well. This spring, with Nature's Notebook, the Harrises will begin a multi-year monitoring of the phenology or seasonality of shrubs flowering. They're looking to see if as plants respond to climate change, the timing of flowering changes.

In September 2022, Clifton, along with Virginia State University (VSU), received a Conservation Innovation Grant (CIG) from the USDA Natural Resources Conservation Service to fund a new program called The Virginia Native Seed Pilot Project. The project seeks to increase pollinator-friendly native wildflowers and grasses for solar installations, meadows, farms, and roadsides.

The grant will fund a new Native Seed Coordinator position at The Clifton Institute who will work with partners and volunteers to collect seeds of 15 species of wildflowers and grasses across the state. A new greenhouse at The Clifton Institute will also be partly funded by the grant and seedlings will be grown to then be transplanted in farmers' fields. VSU and Clifton Institute staff will work to establish a network of local producers who can serve as a commercial source of native seeds. The project will focus on equipping underserved farmers with the tools and skills they need to grow and sell this new high value crop.

The Virginia Department of Wildlife Resources (DWR) is a partner in the project, along with other organizations. "DWR was a key partner in developing the CIG grant proposal and is providing much to the effort through continuing staff support of the effort," said Stephen Living, DWR's habitat education coordinator.

As part of Clifton's work on researching and restoring native grasslands,

A study looking at how American kestrels use different habitats for hunting can assist landowners looking to help the species.

Volunteers pitch in to help clean seeds for the native plant seed propagation program.

Virginia Tech PhD student Jordan Coscia is studying remnant Piedmont prairies and their plants. She has identified four distinct types of prairies and is working to measure the effectiveness of each experimental treatment in restoring native plants. Her work can also help inform restoration and management of these habitats.

Engaging the Community

This past October, Clifton held a workshop for Fauquier County teachers to help them incorporate field science into their teaching. In plant and insect surveys, teachers analyzed fields that had been burned and mowed. School groups of various levels, from pre-kindergarten to grade 12, visit Clifton to study science and get practical experience in nature.

Younger students explore Clifton's trails and participate in guided hands-on activities, while older students can work on species identifications, learn about geology, and work on projects.

Community volunteers conduct plant, bird, dragonfly, butterfly, and frog egg surveys. Some monitor the 30 bluebird boxes. Clifton staffers host nature walks, programs, outdoor classrooms, and a summer camp for youngsters, including a "Young Scientist" session that lets children explore and carry out their own research project.

School trips, summer camps, and guided walks provide outdoor education for children of all ages.

John-Paul Martinez, a father of four, visits the property often. "Having the opportunity to partake in the myriad of programs that The Clifton Institute has to offer in this amazing setting has become part of our family experience," he said. "Whether we're on a guided hike to learn about the various species of mushrooms or how to identify various species of tree by their bark or even witnessing, from a safe distance, a controlled prescribed burn to help reduce populations of invasive plants and insects and to rejuvenate the area, our family of six can always look forward to a new adventure where we always learn something new."

Eleanor noted that The Clifton Institute's location just southwest of Washington D.C. provides a unique opportunity. "It's a great big piece of land that's under conservation easement, but we're also readily accessible to people who are in or close to a big urban center in D.C.," she said. "It's an accessible, big piece of preserved land where they can come and learn about all the wild things. It's a special place to explore."

Glenda C. Booth, a freelance writer, grew up in Southwest Virginia and has lived in Northern Virginia over 30 years, where she is active in conservation efforts.

Restoring native plants to grasslands is a priority at The Clifton Institute.

The Clifton Institute hosts a number of guided family hikes on the property.