The Clifton Institute

Native Habitat Management Issue

December 2024

Our goal is to create and maintain as much high-quality habitat in our region as possible so that native plants, animals, and fungi can thrive. We are working on that goal in several ways: we do scientific research on the best ways to manage land to support native biodiversity, especially species that are in decline, we manage our 900-acre property so that it can support as many species as possible and serve as a demonstration to other landowners of the effects of different land management strategies, and we provide free land management advice to hundreds of landowners in our area based on our research and our experience on our own property. We wanted to share some stories about how we're helping to manage native habitat in the Piedmont.

We couldn't do any of this without the help of donors, volunteers, partner organizations, and the many landowners who allow us to conduct research on their properties and are working to create habitat themselves. Please consider donating to support the work summarized in this newsletter. You can mail a check in the attached envelope or you can donate with a credit card at **cliftoninstitute.org/donate**. Thank you!

Co-Director Bert Harris returns a tagged kestrel (left hand) to her nest box.

Research for Better Land Management

American Kestrels are among the many bird species that rely on grasslands and other open spaces. They have been in decline across the continent for decades. We have been tracking American Kestrels with GPS transmitters since 2021, trying to learn about their habitat requirements and food sources.

Kestrels need open space to forage in and we have been studying three types of fields: cattle pastures, hay fields, and meadows (fields that are not being used agriculturally). We attached GPS transmitters to birds that had access to two or three of these types of fields in close proximity to their nest boxes so we could see what kind of fields they chose to forage in. They showed a clear preference for fields with short vegetation. Meadows, made up of either native or nonnative grasses, and cattle pastures are both suitable as long as they are short enough.

This past summer we also measured the abundance of kestrel prey. Meadow Voles are an important source of food for kestrels, Barn Owls, and other raptors, and (appropriately) we found more Meadow Voles in meadows than in pastures or hay fields. We also found that there were more voles in taller vegetation, regardless of how the field was managed. In other words, there is more food for kestrels in tall fields, but the kestrels either can't detect or can't catch prey in tall vegetation. **Based on these findings, we recommend leaving tall strips of wildflowers and grasses along the edges of pastures and hay fields to serve as food sources for raptors and as pollinator habitat.**

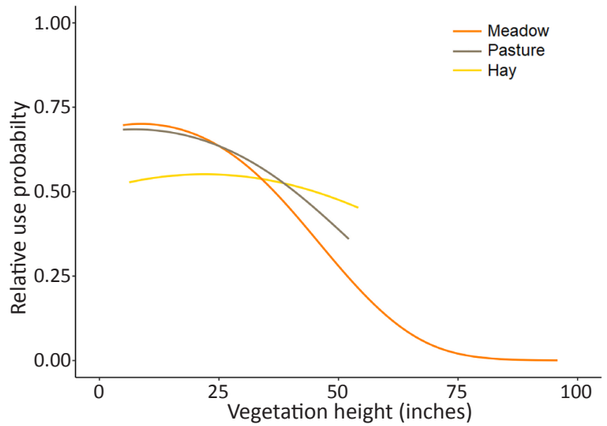
Box Turtles are also declining in our area. Box Turtles live up to 70 years in the wild, they take eight years to reach reproductive age, and their clutches average three eggs, only half of which are usually viable. Their very slow life history makes them unusually sensitive to adult mortality, such as that caused by mowing. In 2023, we set out to figure out what could be done to reduce turtle mortality by tracking turtles tagged with radio transmitters.

Since they are often thought of as a forest animal, we have been surprised to see how much time the turtles in our study spent in fields and early successional forests (shrublands). Unlike birds, turtles are very dependent on the weather and our preliminary results will need to be refined as we learn more about the effects of weather on their movements. As we continue to track turtles for the next few years, we will develop a warning system so that farmers and other landowners know when it's safe to cut hay or bushhog their fields. **For now, if landowners have fields that aren't being used for hay, we recommend that they be bushhogged once annually in February to create habitat for kestrels, to avoid killing breeding grassland birds and Box Turtles, and to leave habitat standing for sparrows through the winter.**

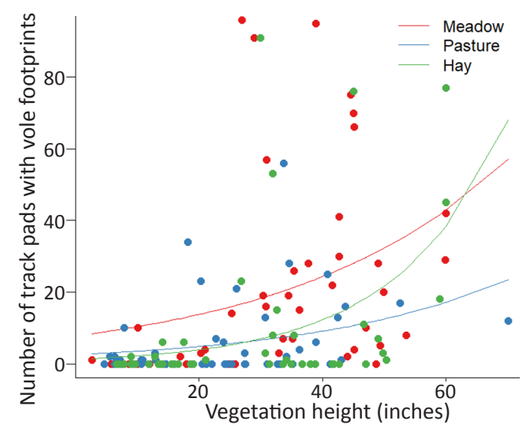
We gratefully acknowledge our co-PIs Joe Kolowski at the Smithsonian's NZCBI and Alan Williams and collaborators at Sunnyside Farm and Conservancy and the Oak Spring Garden Foundation on the kestrel project and partners at the Turtle Conservation Ecology Lab at NZCBI and the University of Maryland on the turtle project. Financial support from the Raines Family Fund, BAND Foundation, and an anonymous donor made both of these projects possible.

Research technician Tucker Callahan sets out track pads that will show the footprints of voles and other rodents.

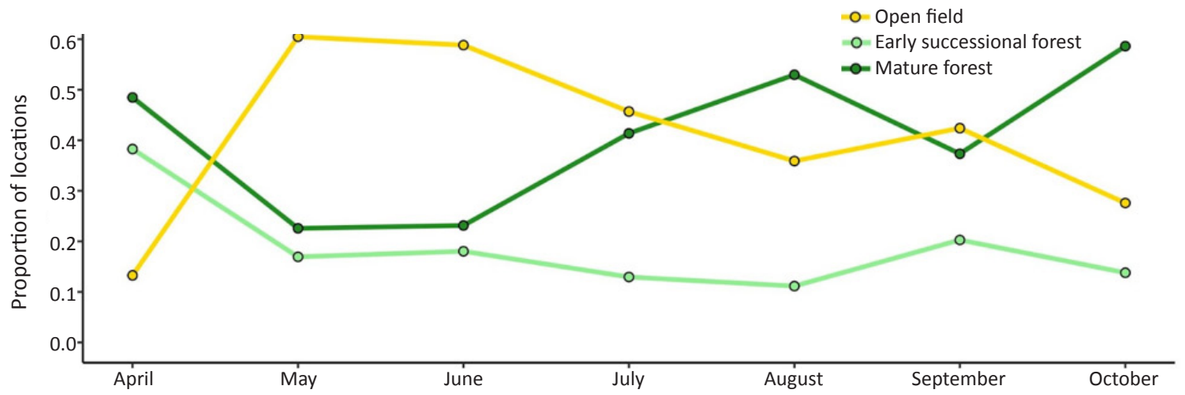
Research technician Mark Ketner holds up a tagged Box Turtle.



We used our GPS tracking data to calculate the probability of a kestrel hunting depending on field type and vegetation height. Kestrels strongly selected shorter fields. Their use of meadows and pastures was indistinguishable. In sum, the vegetation height was more important than the field type.



Meadow Voles are more common in taller vegetation. We collected these data this summer by counting vole footprints on track pads in different kinds of fields. Voles were more common in meadows compared to pastures or hay fields and they were rare in fields shorter than 20 inches



We tagged 40 Box Turtles with radio transmitters at the Clifton Institute and Blackrock, Raines, and Sunnyside properties in Rappahannock County. Most turtles overwintered in mature forests, but they spent a lot of their time in open fields and young forests in summer, especially from May to July. This confirms just how vulnerable Box Turtles are to mowing in our area.

Musings on Savanna Management

Habitat Specialist Andrew Eberly has many roles here, including growing seedlings for our plant sales, conducting plant and bird surveys, and helping to manage our 900-acre property. Here he shares some of the thinking that goes into taking care of our land.

Each fall I find myself out in the fields doing the repetitive, physical work of controlling the trees and shrubs that have worked their way into the 300 acres we are trying to manage as grasslands or shrubby savannas. This is time-consuming and sometimes arduous work, but it's also enjoyable in many ways. It gives me a close look at what is growing out there and allows me time to ponder the pros and cons of the methods we are using to manage the land. What follows is a sample of some of these thoughts. To start with, there seem to be as many approaches to managing land as there are land managers and that's OK. We are working with ecological processes that play out over tremendous periods of time and we must be at peace with the fact that a human lifetime isn't long enough to see the results of all of our plans and hard work.

We are all about grasslands here at Clifton. They are the most imperiled habitat we have here and the plant species that comprise our remaining grasslands won't survive if trees shade them out. The easiest thing (besides just letting all of our open spaces grow up into forests) would be to mow them short every year, but transitional habitats are also valuable. It's a constant struggle to strike a balance between what is feasible from a management perspective and creating a mosaic of multiple successional stages.

The field we call Turkey Gap is an old pasture in the process of diversifying and reverting to a wilder type of shrubby savanna ecosystem. It's a good example of the kind of transitional habitat that we want to make sure persists. Most of Turkey Gap gets bush hogged regularly, but for the last three years I've set aside a small area to see if there's any chance of maintaining it without mowing. Mowing is a necessary tool in grassland management, but in my experience it has some downsides. For small animals living in fields, mowing is a catastrophic event. Also some invasive woody plants actually increase when they get mowed once a year. Finally, mowing has a tendency to smooth out the natural heterogeneity of sizes and ages naturally found in grasslands and shrublands.

"We are working with ecological processes that play out over tremendous periods of time and we must be at peace with the fact that a human lifetime isn't long enough to see what ultimately happens with all of our plans and ideas."

My experiment now hosts hundreds of Tulip Poplars, Black Walnuts, Autumn Olive, and many more tree species that have already reached 15' to 20' in height. The result is a beautiful early successional woodland that hosts nesting American Woodcocks, roosting Red Bats, Box Turtles, and countless other animal species that seem to depend on having some scraggly, immature woodland patches within their home ranges.

But soon my little section of Turkey Gap will grow up into mature forest unless I do something about it. Removing tree seedlings by hand with loppers and spraying the stumps with herbicide is the most targeted approach. Moving slowly through the habitat in this way allows me to find and avoid killing special native shrubs like Southern Crabapple and American Plum, along with more common species like sumacs and native roses that I believe should have a place in any savanna. Basal bark spraying with herbicide is a quicker strategy I plan on exploring in the future.

Above: Andrew works on cutting back woody plants in Turkey Gap.

Right: The view of the farmhouse from Turkey Gap through the seasons.

Why do I have to use chemicals anyway? Most of our perennial broad-leaved plants are adapted to being broken, burned, or cut periodically and they will happily resprout repeatedly with more individual stems each time. Invasive Autumn Olive is especially good at the "hydra" growth pattern. Herbicide is necessary to prevent the trees I'm removing from growing right back.

Ultimately we are trying to mimic the natural disturbances of fire and grazing, so why don't we just burn it and put some Bison out there? We will! Well, maybe not bison. Bison are a challenge to contain and they eat mostly grass, so they are hard to work with. We do prescribed burns, but they can be logistically hard to pull off. Fires are particularly challenging during the growing season when they would have the biggest impact on tree growth. Plus, in many parts of the Clifton property–even places that get burned repeatedly–woody species sometimes keep growing and eventually dominate to the point where they inhibit the growth of more flammable grasses and wildflowers, which prevents fire from having the effects we want it to. Some spots simply don't want to burn.

It seems that if we want grasslands and savannas alongside forests on a medium-sized property like ours we have to be a little heavy-handed. I'm all for "letting nature take its course" in large wilderness areas where there will naturally be sections at different stages of succession, but we have to work hard to create and maintain the diversity of habitats we want here. This kind of thinking leads me to another question that I often think about when I'm out there. How feasible is it to maintain native grasslands here long-term? The Clifton Institute lies on metabasalt (greenstone) bedrock. The soil here is relatively nutrient rich and some spots hold water for a long time. There aren't as many remnant prairies on metabasalt compared to the poorer soils to our east, apparently because most sites have been converted to agriculture. These richer and moister soils tend to benefit non-native plants, which makes my job harder.

On the Clifton Institute property, we are living with the legacy of hundreds of years of agriculture. The current placement of our fields and forests is dictated by this history, as is the species composition of our plant communities. Moving toward a diverse mosaic of habitats dominated by native species will take time. We will continue to use the tools at our disposal and take cues from the environment to guide things toward greater biological diversity. This is a process that will take many years and will hopefully extend far beyond any of our lifetimes.

Landowner Spotlight

Sieren Ernst and Steve Maxwell bought their 10-acre property in Browntown, in 2021. Sieren currently works on designing small-scale regenerative food systems. We first visited the property in 2021 and have been giving periodic land management advice since then. We recently checked in with Sieren about the process of restoring her land. She told us "Clifton has been an amazing resource for us. It makes this such a better process on every level."

What was your starting point?

SE: When we purchased Whistler Meadow, there was a small vineyard, fields that were regularly mowed, and some cattle pasture. It was mostly hay and Autumn Olive when we got it. We decided to convert most of it back to native grassland.

What have you been working on?

SE: The first year, we did herbicide treatments on six acres of invasive cool-season grass and we forestry mulched two acres of Autumn Olive. In addition to getting advice from Clifton, we have been working with a Natural Resources Conservation Service agent. Their EQIP program has helped cover some of the costs. We got a native seed mix that was recommended by Clifton and planted it last year. We're still using selective herbicide for invasive grasses in some areas, but the meadow is getting stronger. It looks great this year, even with the drought.

What changes have you noticed?

SE: We see so much more wildlife: we see flocks of migrating birds, Summer Tanagers, Cape May Warblers, and a nesting Indigo Bunting. We have more raptors hunting over the property. We hear more insects. Both diversity and density have gone up tremendously. That's been really rewarding. You have a visible impact on the environment.

How do you deal with conflicting advice?

SE: Ambiguity is just part of land management. People everywhere are making their best educated guesses. They may have seen something work in one place, but that doesn't mean it will work in another. Understand that mistakes can be fixed. It's okay to not know what you're doing; you'll make mistakes, you'll learn about your land, and you'll develop confidence in yourself. Remember that sometimes the hardest things are the most rewarding things.

What are your goals for the future?

SE: I'm interested in maintaining the land through rotational grazing. I think in the long run that's something that could make doing this more sustainable for larger tracts of land.

Thank you to Sieren for speaking to us and for creating such beatiful habitat on your property! And thank to you the Raines Family Fund for supporting our landowner outreach program!

Top: Sieren Ernst at Whistler Meadow Farm.
Middle: Narrow-leaf Mountain Mint is one of the native plants growing in Sieren's meadow.
Bottom: Sieren's meadow full of native Purpletop grass.

Invasive Species Priorities

If you're starting your own project to improve the habitat on your property, getting rid of invasive plants is a good place to start. Our Landowner Outreach Associate Kadiera Ingram has some advice about how to get started.

Sometimes, the more we learn about invasive plants, the harder it can become to decide where to focus our management efforts. Many people reach out to me, understandably feeling overwhelmed and unsure of how to begin stewarding their land. Whether you're managing one acre or 50, it really helps to have a plan, and late winter through early spring is a great time to work on one!

The first step is learning how to identify invasive plants on your property. It can be challenging to identify things without their leaves, especially if you're just starting out. Vines are a great place to begin. In general, if you find a vine twining closely around a tree (imagine a Boa Constrictor strangling its prey), it's almost certainly invasive and should be removed and treated appropriately. Oriental Bittersweet, like the one pictured here, is a classic example. Vines that climb straight up or drape across a tree are more likely to be native and should be left alone.

Once you've become familiar with picking out these plants in the landscape, you can begin to prioritize their management. I recommend focusing on three main priorities:

1. Address the largest seed sources first.

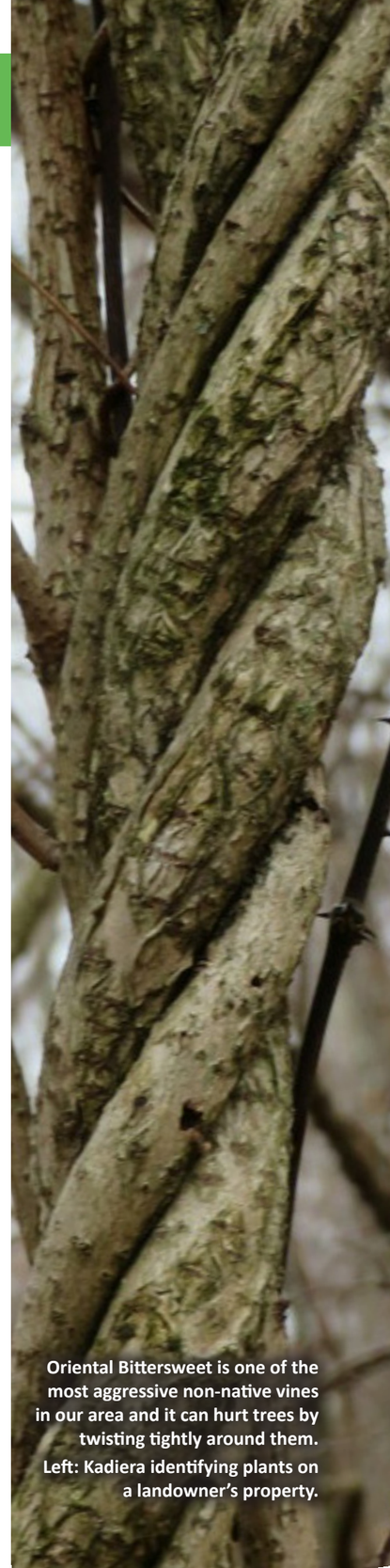
Large invasive vines can climb all the way up into the canopy, where they not only threaten to strangle the trees that they grow on but also serve as a source of seeds that can be dispersed by birds and other wildlife. Similarly, mature Autumn Olive on the edges of fields produce hundreds, if not thousands, of berries that can easily spread into nearby fields or forests. Taking out the largest sources of seeds will help prevent the spread of invasives to other parts of the property and can save you a lot of time down the road.

2. Protect keystone tree species.

Oaks support over 800 species of caterpillars, the primary source of food for most nestling birds. With oak decline on the rise, looking out for these keystone trees is more important now ever. Smaller oaks are just as important as the ancient giants in our forests and fields. Protecting young oaks from strangling vines and deer pressure will help ensure proper forest regeneration in years to come.

3. Continually monitor uninvaded areas.

Old growth forests tend to be more resistant to invasion than early successional forests that grow up in abandoned pastures. However, even in late-successional forests, unexpected disturbances like treefalls can create a new opportunity for invasives to take hold. That's why it's a good idea to regularly monitor uninvaded areas – if something new makes an appearance, you'll be able to nip it in the bud..



Oriental Bittersweet is one of the most aggressive non-native vines in our area and it can hurt trees by twisting tightly around them.
Left: Kadiera identifying plants on a landowner's property.

Managing the habitat on our 900-acre property requires lots of help from volunteers, like this wonderful crew that assembled in November to help remove Autumn Olive from our fields. Thanks to these and all the volunteers who dedicate their time to helping improve native habitat here! If you'd like to get involved, you can find upcoming volunteer days on our website.

Website: www.cliftoninstitute.org | Socials: @clifton.institute | Email: info@cliftoninstitute.org