

2022  
**APPALACHIAN  
MOUNTAINS  
JOINT VENTURE**  
YEAR IN REVIEW





Dear AMJV Partners,

We're excited to present our 2022 AMJV Year in Review.

As hoped, 2022 was a year of great opportunity. We finally pushed past many of the challenges created by COVID and enjoyed seeing each other in person again. The AMJV held their first in-person Technical Committee meeting since COVID in August, graciously hosted by the Tennessee River Gorge Trust, and our first in-person Management Board meeting in November in Blacksburg, VA. In both instances, it was the first time meeting many colleagues in person that, up until that point, had only been Zoom acquaintances.

We also continued to experience funding and resources available for conservation at levels most of us have never seen. While this creates exciting opportunities for addressing our bird conservation priorities, it also presents a unique challenge in having sufficient capacity to channel these resources efficiently and strategically into meaningful and successful work on the ground. This is where I believe we have the opportunity to excel and grow as a partnership! Throughout the year, we worked with partners to expand many of our current efforts, such as our private lands work, full annual cycle research, and coordinated monitoring efforts both on the breeding and wintering grounds. We're working to expand our Focal Landscape Initiative and increase our work in the coal fields region through new partnerships and projects. These endeavors are taking their initial steps this year and will continue to expand with our partnership in the future.

Many thanks to the AMJV staff, board members, and partners for seizing these opportunities in 2022, and I look forward to seeing how we grow in 2023!

Thank you!

Todd Fearer  
Coordinator, Appalachian Mountains Joint Venture

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## AMJV STAFF



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## AMJV MISSION & VISION

Our [mission](#) is to restore and sustain viable populations of native birds and their habitats in the Appalachian Mountains Joint Venture region through effective, collaborative partnerships.

[Vision](#) - Partners working together for conservation of native bird species in the Appalachian Mountains region to attain:

- Fully-functioning ecosystems with sustainable populations of the region's native avifauna, guided by state, regional, national, and international bird plans
- Effective delivery of habitat conservation through adaptive management and guided by a conservation approach consisting of biological planning, conservation design, delivery of conservation actions, evaluation, and research
- Success in capitalizing on funding opportunities relevant to partnership priorities
- An engaged Management Board, representative of the diverse landscape and effective partnerships in the Appalachian Mountains

## INTRODUCTION

The [AMJV Partnership](#) - which consists of over 55 state and federal agencies, conservation organizations, and universities throughout 12 states in the Appalachian Region - is focused on preserving, managing, and restoring diverse, healthy forest habitats in the region to benefit not only birds, but the diversity of Appalachian plants and wildlife.

This Year in Review is organized to reflect the two overarching themes of the current [AMJV Strategic Plan \(2018-2023\)](#). [Theme 1](#) goals, which focus on creating a dynamic, healthy forest landscape in the Appalachian Region, are supported by projects within the [six focal landscapes](#): Allegheny Highlands (PA/NY); Greenbrier/Alleghenies (WV); Southeastern Ohio; Cumberlands (KY/TN); Southern Appalachian High Country (NC/TN/VA); and Virginia Highlands as part of the [AMJV Focal Landscape Initiative](#) and also by state and regional projects that occur outside of those boundaries. [Theme 2](#) goals, which focus on full annual cycle conservation of birds, are supported by international projects completed by various AMJV partners.



## ALABAMA

### **Building a Community of Bird Enthusiasts through Conservation Planning - Alabama**

*Sara Hooghuis, Cornell Land Trust Bird Conservation Initiative Program Assistant, Cornell Lab of Ornithology*

*Sara Barker, Cornell Land Trust Bird Conservation Initiative Director, Cornell Lab of Ornithology*

In 2021, the Land Trust of North Alabama (LTNA) was awarded \$5,000 from the [Cornell Land Trust Bird Conservation Initiative's Small Grant Program](#) to collaborate with Alabama A&M University (AAMU), Tennessee Valley Audubon Society (TVAS), North Alabama Birding Society (NABS), as well as birding and botany experts to establish a bird habitat demonstration site on the 360-acre Chapman Mountain Nature Preserve with the goal of engaging landowners and volunteers in wildlife habitat enhancement and bird data collection via eBird. Members of this expert group designed the components of the bird demonstration site while staff and volunteers installed the features.

Using historical data collected from LTNA's nature preserves, the collaborative group was able to identify and prioritize conservation projects that focus on migratory birds in conjunction with land preservation by LTNA. Elements of the demonstration site include: (1) a permanent bird blind that offers viewing ports in several sections to provide non-intrusive, clear views of birds visiting the site, (2) a bubbling water feature designed and installed in a manner that reduces the risk of freezing in the winter, (3) landscaping around the water feature using native species to provide cover for birds, (4) two educational signs that present information on the native plantings providing benefits to both resident and migratory birds, and (5) one educational sign with information on invasive plants and how they impact resident and nesting birds.



*Figure 1. Bird blind at Chapman Mountain Nature Preserve. Photo by Andy Prewett*

The bird habitat demonstration site, partnered with a series of community events, increased the public's exposure to bird diversity in LTNA's service area and their connection to conservation. Community members were able to participate in bird data collection through four summer birding bio-blitzes located on LTNA nature preserves - Harvest Square Nature Preserve, Wade Mountain Nature Preserve, Bethel Spring Nature Preserve, and Chapman Mountain Nature Preserve - all of which are eBird hotspots. There were also a few bird banding events led by expert volunteers from AAMU, TVAS, and NABS. A permanent banding station was put in place by AAMU at Chapman Mountain Nature Preserve with the intent of capturing, banding, and releasing birds at least every 10 days during the breeding season. The banding project allowed for continued bird data collection with increased opportunities to promote the weekly events to the public. LTNA estimated 3,000 people were exposed to the Cornell Bird Demonstration Site on the Chapman Mountain Nature Preserve.



The community's positive response to this bird demonstration site and data collected during 2021 helped LTNA identify and prioritize a three-year project at the Harvest Square Nature Preserve that will create an inclusive, self-guided trail network and improved pollinator habitat. A portion of this project will incorporate educational information on birds that frequent this habitat, as well as the construction of a chimney tower for Chimney Swifts. In addition, the land trust will conduct species counts using eBird, including bird surveys on newly acquired properties. These data will not only engage their community, but also will help drive decisions on the best use and management of the properties in the future.

## NEW JERSEY

### **Building a Community of Bird Enthusiasts through Conservation Planning - New Jersey**

*Sara Hooghuis, Cornell Land Trust Bird Conservation Initiative Program Assistant, Cornell Lab of Ornithology*

*Sara Barker, Cornell Land Trust Bird Conservation Initiative Director, Cornell Lab of Ornithology*

[Raritan Headwaters Association](#) (RHA) was awarded funds from the [Cornell Land Trust Bird Conservation Initiative's Small Grant Program](#) in 2021, for the Raritan Headwaters Kestrel Partnership, a conservation program to engage and collaborate with land trusts, private landowners, and public land managers. The project's focus is to employ the state-threatened American Kestrel as a flagship species for bird conservation and other wildlife associated with open habitats, including specialized grassland and shrubland birds, and for preservation and management of land for overall watershed health in the Upper Raritan region of New Jersey.

The main components of the project were: (1) identifying areas of suitable open habitat for American Kestrels; (2) installing and monitoring kestrel nest boxes on partners' land to expand the current Raritan Headwaters Nest Box Cluster initiated by RHA and New Jersey Division of Fish and Wildlife Endangered and Nongame Species Program (ENSP) in 2019; (3) developing and disseminating best management practices (BMPs) to maintain these habitats to benefit kestrels and other wildlife; (4) utilizing eBird to connect overall bird conservation values of parks and preserves with suitable open habitats participating in the nest box program; and, (5) ultimately, achieving expansion of the regional breeding population of this state-threatened species.

RHA has been successful in initiating this kestrel partnership and cultivating relationships with land trusts, other public open space managers, and private



*Figure 2. Volunteer Kestrel Box Monitors at Fox Hill Preserve in Tewksbury, NJ.  
Photo courtesy of RHA*

landowners. The partnership consists of 14 private farms, three land trusts, three additional conservation non-profits, one state agency, one federal agency, two counties, and one municipality.



Figure 3. Banding a Kestrel chick. Photo courtesy of RHA

Through volunteer and partner power, there are currently 34 nest boxes in the Raritan Headwaters nest box cluster, with more being installed in the near future. The 2021 boxes were installed on private properties and county, non-profit, and municipal open spaces. RHA staff and volunteers prepared existing nest boxes for American Kestrel breeding season by cleaning out debris, making repairs, and adding wood shavings. Beginning in late-April, the RHA team monitored nesting activity every two weeks until mid-July. The number of acres of land owned by project partners and utilized for American Kestrel open space habitat is roughly estimated at 3,265 acres. The partnership continues to expand, with plans to install an additional 10 boxes once the 2022 nesting season ended.

RHA also achieved a second objective to collect data on bird diversity associated with open habitats that support American Kestrels, which was shared via eBird, newsletters, and press releases to demonstrate the broad conservation value of preserving and stewarding open habitats. Data from eBird were used to promote improved BMPs for meadow management to benefit American

Kestrels and other species as well as pollinators. Tangible evidence of these conservation values includes the successful nesting of American Kestrels, a high diversity of birds, plants and other wildlife associated with open habitats, and overall improved watershed health.

**A Sliver of Hope for Golden-winged Warblers in New Jersey**

*Sharon Petzinger, Senior Zoologist, New Jersey Division of Fish and Wildlife*

Being on the edge of the breeding range of a rare and declining Golden-winged Warbler (GWW), NJ has the privilege of observing low population numbers which helps detect fluctuations in the population. After two years of a decline, 2022 saw a 30% increase in GWWs!

Breeding GWWs prefer nesting in large (>5 acre) forest canopy gaps or open-canopy forest filled with a mix of grasses, wildflowers, shrubs, and saplings, provided those areas are surrounded by more than 70-75% forest cover. Most of the large forest tracts in NJ are publicly-owned and local opposition hinders the restoration of much-needed breeding habitat for this species and others that depend on similar habitat. As such, breeding habitat for GWWs in NJ is extremely limited, which is why most of them are found in high-tension powerline corridors that cut through publicly-owned forest.

Even with efforts to maintain GWW habitat on critical powerline spans, data still show that when new nesting habitat is created through active management in areas with more than 75% forest cover surrounding that nesting habitat, breeding GWW are more likely to breed in those sites than powerlines and passively managed shrubby wetlands combined (see table below).

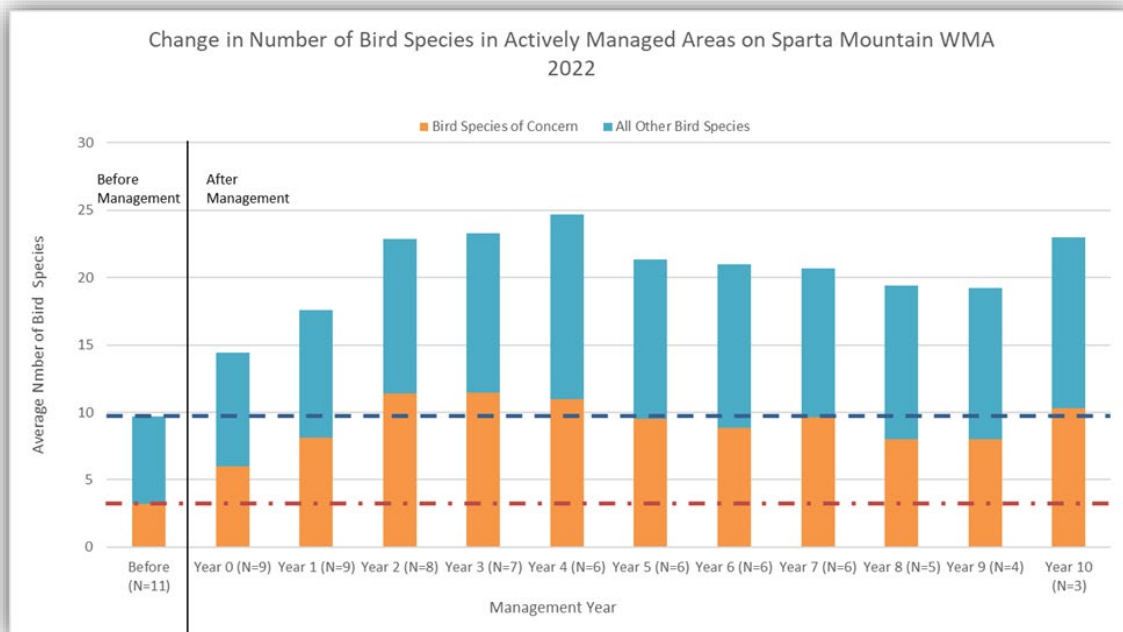
Table 1. Percentage of Sites with Golden-winged Warblers in 2022

Percentage of Sites with Golden-winged Warblers in 2022			
	Actively Managed Sites	Passively Managed Sites	Powerlines
Suitable Habitat with > 75% Forest Cover	20%	6.4%	11.6%



Forest management on public lands to create habitat for GWWs impacts more than just GWWs. To date, 84 different bird species have been observed using managed sites on Sparta Mountain Wildlife Management Area (SWMMA). Forty of these bird species are part of the 3 Billion Bird Decline, 32 are Species of Greatest Conservation Need outlined in the 2018 NJ State Wildlife Action Plan, and five are either tipping point or alert species per the 2022 State of the Birds Report.

The increase in the number of bird species is the result of the management that opened the forest canopy, which allows sunlight to reach the forest floor so native vegetation can grow. Closed-canopy forests contained fewer bird species than sites where 50-80% of the canopy was removed, even before the vegetation had a full spring and summer to grow (Year 0; see Figure 4 below).



*Figure 2. Average number of bird species (blue) and bird species of concern (orange) observed during breeding bird surveys on Sparta Mountain WMA from 2012-2022. Pre-treatment surveys (Before) were conducted on site prior to treatment or in 2008 near treatment sites. Dashed lines show the number of bird species pre-treatment for comparison across all years.*

Managing public forests is critical to prevent bird declines and extirpation in New Jersey. At this time, only 10 acres of this kind of habitat is allowed to be created on SMWMA each year, the only public land in all northwestern NJ where this kind of management is currently taking place. Furthermore, state legislators are preparing to draft legislation specifically about forest management on public lands. Please help get the word out that cutting trees to open the forest canopy is not deforestation and critically needed in New Jersey.

## NEW YORK

### Allegheny Highlands Workshop

*Suzanne Treyger, Senior Forest Program Manager, Audubon Connecticut and New York*

*\*This work overlaps the Allegheny Highlands (PA/NY) Focal Landscape\**

Audubon and the Western Finger Lakes Chapter of the New York Forest Owners Association held a workshop at the Canadaway Creek Wildlife Management Area. There were 42 attendees at the workshop with backgrounds ranging from landowners, loggers, soil conservationists, and recreational birders. The workshop focused on the benefits of creating young forests for American Woodcocks and Golden-winged Warblers through regeneration harvests. Attendees visited an overstocked mature

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stand, a stand marked to be cut, and a clearcut after 20 years of growth. This workshop yielded five scheduled site visits with landowners.

### **Audubon Announces First-Ever Endorsed Foresters**

*Sharon Bruce, Senior Communications Manager, Audubon Connecticut and New York*

*This article originally appeared [here](#).*

Audubon's Connecticut and New York regional office - in partnership with Audubon Vermont - launched the [Audubon Forester Training and Endorsement Program](#) to help create high-quality forest habitat at scale. The program is growing a national network of forestry professionals who, once endorsed, will work together with public and private landowners to prioritize habitat for birds and other wildlife.

Caitlin, a licensed forester with the [Vermont Land Trust \(VLT\)](#), participated in early trainings with Audubon circa 2011, and has loved looking at forestry through a “bird-friendly” lens. In her role, she manages woodlands owned by the land trust, and provides technical assistance to conserved landowners.

When Caitlin began managing VLT's [Jerusalem Skyline](#) property in 2015, she reached out to Audubon Vermont to look at the quality of the bird habitat. Audubon said the understory layer of the woods—vegetation that is up to 5' tall along with standing dead trees and trees with cavities—could be increased to provide better breeding habitat for rapidly declining songbird species.

Caitlin incorporated Audubon's recommendations into her plan for the woods. In conducting a timber harvest, Caitlin created several openings, ranging in size from 1/10th to ¾-acres, that brought sunlight to the forest floor. This in turn helped plants regenerate in the understory, creating new places for birds to nest, forage, and seek cover. She asked the loggers to leave the tree tops as intact as possible to protect the young trees from getting eaten by deer. The tree tops also provide cover and nesting sites for songbirds and other wildlife.



*Figure 3. Caitlin Cusack of VT Land Trust. Photo by Kyle Gray*

Within the first year, Caitlin saw an Eastern Wood-Pewee singing right on the edge of the largest opening, which was created with flycatchers like the pewee in mind. Since then, she has heard or seen Mourning Warblers, Ovenbirds, and Wood Thrush, all species which nest and forage in the lower canopy layers.

“All of the properties I manage have multiple conservation goals, and the actions we take are synergistic. Creating healthy habitat for birds adds age diversity, which helps the forest adapt and become more resilient, increasing its ability to respond to climate change. Luckily, there are some options for funding pre-commercial bird-friendly practices through the [Natural Resources Conservation Service \(NRCS\) financial assistance programs](#) or [Regenerate New York](#),” said Caitlin.

In his role with the [Catskill Forest Association](#), John MacNaught focuses on forestry education, habitat management, and connecting landowners with resources, especially when commercial timber sales may not be the right option.

“Most of our membership manages woodlands of 30 acres or less,” explained John, “and while they may not be in the spotlight for large-scale forestry, their property could be hugely important within the context of the hundreds or thousands of surrounding acres. You may have 2,000 acres of mature forest around you and the best thing you can do for birds and other wildlife is regenerate a younger forest on your property. Everyone has different goals and outcomes.”

To get his bird-friendly endorsement, John submitted a management plan to Audubon New York which included ways a landowner could create and improve bird habitat on their property.

“I met with a landowner whose primary interest was recreation and deer hunting. He had kept very detailed records on deer harvests and weights and realized that local deer harvests and weights were in decline. This led him to wonder if he (and his neighbors) had a habitat problem that was impacting the deer and other wildlife.”

The landowner acknowledged to John that “we also haven’t seen a grouse on the property in 10 years, so if you bring them back I’ll consider you a success.”



*Figure 4. John MacNaught in front of crop tree release (CTR) of red oak (Editor’s note: CTR is a forestry management method where competing trees are removed from the immediate vicinity of a desirable tree—perhaps an oak tree that provides mast for wildlife—so that the tree can flourish.) Photo by Catskill Forest*

John helped plan seven small-scale aspen cuts around one piece of the property, each about two acres or less, and mostly along field edges. Within the first year and with enough sunlight finally hitting the ground, it sprouted back in the thousands of stems per acre. Within one season, saplings were three or four feet tall! “We consider deer an ‘umbrella species,’ meaning when deer habitat is optimized, a suite of other wildlife benefits,” said John. They left coarse woody material from the cuts on the ground to prevent deer from reaching and browsing *all* seedlings and saplings, which in turn created camouflaged and hidden nesting sites. “This spring, I heard grouse drumming in the woods all morning long!” said John.

### **Harvests for Habitat: Project Updates**

*Suzanne Treyger, Senior Forest Program Manager, Audubon Connecticut and New York*

The Harvests for Habitat project remains busy delivering educational programming for forest owners, forestry professionals, working landowners, foresters, and loggers to help bring more acres under improved forest management for Wood Thrush, Cerulean Warbler, and other high priority birds. Audubon staff and project partners presented information about the Harvests for Habitat financial



assistance program to more than 50 attendees at the annual Tree Farm Landowner Workshop in Delhi, NY. Since summer 2022, four landowners participating in Harvests for Habitat completed habitat management projects on a total of 207 acres. These harvests brought a total of 180 acres under



*Figure 7. Recent harvest to improve habitat for Cerulean Warblers, Upper Delaware Watershed. Photo by Zack Boerman*

improved management for Cerulean Warbler and 27 acres under improved management for Wood Thrush. Harvests included commercial cuts and non-commercial forest habitat and health-focused projects which integrated bird habitat management specifications, like residual basal area target ranges, desirable tree species retention, invasive plant control, and increasing coarse woody material.

Harvests for Habitat is a partnership between Audubon NY, Watershed Agricultural Council, NY Tree Farm Program, and NY

Forest Owners Association, and is funded by the National Fish and Wildlife Foundation Delaware Watershed Conservation Fund. This project enables habitat improvements for forest birds in decline through active forest management and financial incentives for loggers and foresters. Currently, Harvests for Habitat is based in the northern most extent of the Delaware River Watershed, focusing work within the Upper and East Branch Watersheds.

While developing and launching this project, we have reached more than 3,500—and engaged more than 170—landowners, foresters, and loggers in Harvests for Habitat. Project partners hope to secure new funding for Harvests for Habitat to expand into the Middle Delaware Mongaup Brodhead Watershed, bringing opportunities to engage new audiences and improve habitat for Golden-winged Warbler. This new phase of Harvests for Habitat will complement Golden-winged Warbler habitat management occurring just across state borders in PA and NJ.



*Figure 8. Patch cut to improve habitat for Wood Thrush, Upper DE Watershed. Photo by Zack Boerman*



## Forest Management on New York State Wildlife Management Areas

*Katherine Yard, Wildlife Biologist, New York State Department of Environmental Conservation*

*Beth Cooper, Fish & Wildlife Technician, New York State Department of Environmental Conservation*

*Sandy Van Vranken, Wildlife Biologist, New York State Department of Environmental Conservation*

New York State Department of Environmental Conservation (DEC) continues to improve habitat for woodcock, grouse, turkey, whip-poor-will, Golden-winged Warbler, and other wildlife on Wildlife Management Areas (WMAs) throughout New York. Our work within the AMJV region includes 33 state-owned and managed WMAs. Over the past year, our forest management team has continued to invest in habitat management planning. We completed two plans (Mongaup Valley and Genesee Valley WMAs) and drafted another five (Bashakill, Cold Brook, Great Swamp, Poverty Hill, and Wolf Hollow WMAs). To date, 21 WMAs within the AMJV region have approved plans.

*Figure 9. (Right) A series of photos shows development of habitat structure over time in at a seed tree cut at Rattlesnake Hill WMA in Region 8. (Editor's note: A seed tree cut is a forest management method where the majority of trees are removed on a site, but the healthiest, most desirable species of trees are left to serve as a seed source for the next generation of forest. Once a healthy young forest is established but before the new trees would be easily damaged by a harvest, the seed trees are removed.) Photos by Emily Bonk and John Mahoney*

While only a small portion of the young forest management projects completed in 2022 were within the AMJV region (20 acres), we were able to tackle and treat over 75 acres of invasive plants! We continued administering active contracts for 680 acres of young forest and 43 acres of timber stand improvement (TSI) on eight WMAs, which we expect to be completed within three to five years. We've also begun planning an additional 1,075 acres of young forest, 180 acres of TSI, and 75 acres of shrubland habitat.





Since 2015, we've completed over 1,200 acres of young forest, 250 acres of TSI, and 100 acres of shrubland on 15 WMAs. At select project areas, we will continue to monitor regeneration and survey wildlife including grouse, woodcock, and songbirds.

## NORTH CAROLINA

### NCWRC is on the Motus Map!

*Chris Kelly, Wildlife Diversity Biologist, North Carolina Wildlife Resources Commission*

Right before the Thanksgiving holiday the North Carolina Wildlife Resources Commission (NCWRC) installed its first mountain-region Motus receiver station. The Motus Wildlife Tracking system is described by Birds Canada as “an international collaborative research network that uses coordinated automated radio telemetry to facilitate research and education on the ecology and conservation of migratory animals.” Motus radio technology is an especially good fit for tracking the movements of species such as songbirds, bats, and even insects, whose small size does not allow them to carry larger tracking technologies, such as GPS tags. For these species, Motus supports two types of uniquely coded radio transmitters (often referred to as nanotags) operating on the 166 MHz or 434 MHz frequencies.

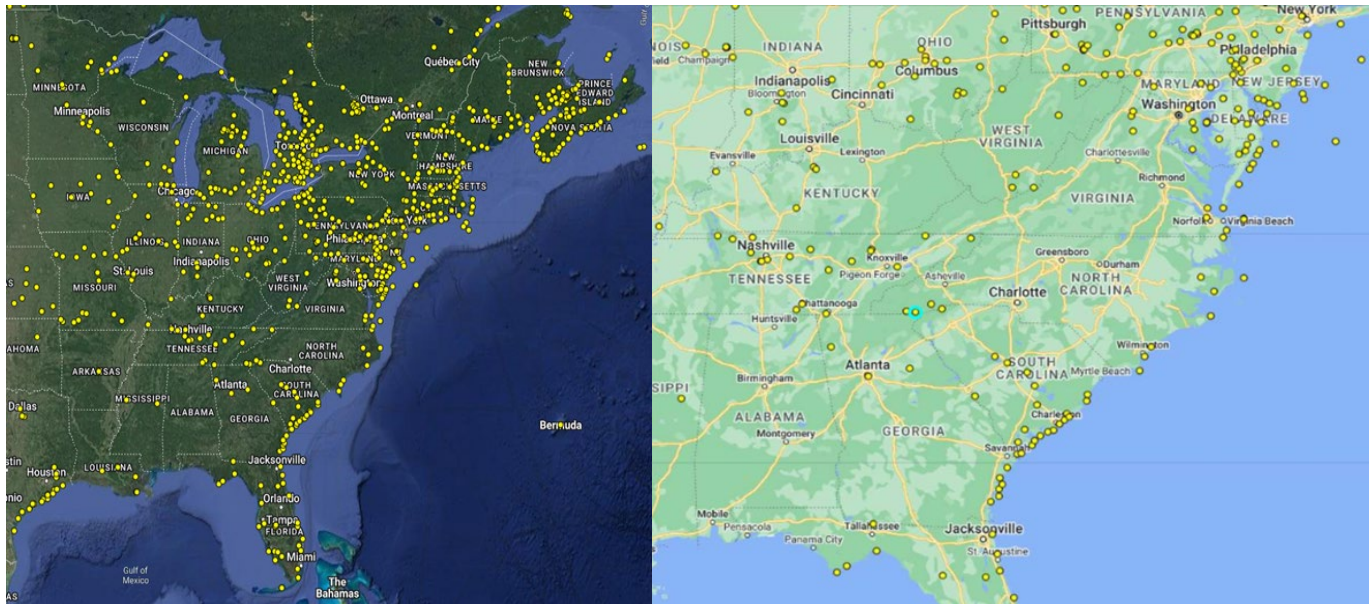


Figure 10. (Above left) Motus receivers in eastern North America as of January 2023 (screenshot from Motus.org 1/15/2022). Figure 11. (Above right) We are on the Motus map! Motus station at The Mountain Retreat and Learning Center on Little Scaly Mountain (circled blue) (screenshot from Motus.org 1/15/2022)

The Motus network is only as strong as the network of receiving stations across the landscape. Western NC as well as some other parts of the interior Southeastern United States present a big gap in coverage that NCWRC intends to fill! To do this, NCWRC has identified locations across the mountain region to install receiver stations consisting of a small computer (receiver) and directional antennas. Ideally adjacent stations will complement one another in their antennas' coverage span. This is referred to as a Motus Fence. The analogy is that each receiver station is a fence post; the antennas' signal ranges (up to 15km) are the fence rail.

The first post in the Motus Fence was installed on Little Scaly Mountain in Macon County in November. [Highlands Cashiers Land Trust](#) connected NCWRC to [The Mountain Retreat and Learning Center](#). Director Steph Anderson offered the use of the Center's 40-foot Parry Family Tower - a perfect base for our Motus station! This new station is a “dual mode” Motus station, meaning its four antennas are listening for signals from both 166 and 434 MHz frequency radio tags. The receiver





*Figure 12. Directional antennas atop The Parry Family Tower at The Mountain Retreat and Learning Center. Photo by Chris Kelly*

on Little Scaly complements an existing Motus receiver at the Pisgah Astronomical Research Institute in Balsam Grove. Biologists are planning the next posts in the Motus Fence at key points to the west of Little Scaly. We can hardly wait for spring migration to see what tagged birds, some traveling from as far away as South America, ping our new Motus station upon returning to North Carolina!



*Figure 13. (Above) Kendrick Weeks, Western Wildlife Diversity Program Supervisor, solders a connector to a coaxial cable. Photo by Chris Kelly*



*Figure 14. (Left) This is a “dual mode” Motus station. The large yagi antenna (right) is tuned to 166.380 MHz while the smaller yagi antenna (left) is tuned to 434 MHz. Photo by Chris Kelly*



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## NCWRC Participates in Range-wide Golden-winged Warbler Survival Study

Chris Kelly, Wildlife Diversity Biologist, North Carolina Wildlife Resources Commission

*\*This work overlaps the Southern Appalachian High Country (NC/TN/VA) Focal Landscape\**

In late April and May 2022, the Western Wildlife Diversity bird crew captured and color-banded 22 Golden-winged Warblers in the Cheoah Mountains (Graham County) for a study led by the University of Maine ([watch a slow motion video of a nanotagged Golden-winged Warbler being released](#)). The objective of the study, “Estimating the survival rate of Golden-winged Warblers for a range-wide integrated population model” is to better understand annual survival of this rapidly declining migratory bird. That is,



*Figure 15. University of Maine graduate student Emily Filiberti (left) helps Clifton Avery and Chris Kelly of NCWRC and Aimee Tomcho of Audubon NC learn to use the Lotek receiver. Photo by Anthony Squitieri*

do they make it from one breeding season to the next? In particular, how are the under-studied females faring? Between jaunts to western NC to nest in brushy old field habitat or patches of recently logged forest, Golden-winged Warblers make a 2,000-mile trip to their wintering grounds in the Andes Mountains of northern South America. Quality habitat is needed at each leg of the journey that comprises their full annual life cycle.

To fill in these knowledge gaps, the principal investigators enlisted nearly a dozen state, federal, and non-governmental partners in the eastern U.S. to study golden-wings in their states. The data that North Carolina Wildlife Resources Commission (NCWRC) helps collect will be plugged into the population model that will be presented to the U.S. Fish and Wildlife Service to consider in its listing decision. The NCWRC team fitted 12 of the birds (five females, seven males) with nanotags, a type of coded radio transmitters, that are detectable on the growing [Motus Wildlife Tracking Network](#) of fixed radio telemetry receiver stations.

Over the summer, the NCWRC mountain bird crew checked on the tagged and color-banded individuals on a bi-weekly basis. Radio signals led us to tagged females on nests, while males maintained their territory boundaries from favorite song perches. As the summer progressed, staff observed spatial shifts, likely attributed to the adult birds tending to their newly volant offspring. By August 12th, only two males could still be relocated by their radio signals, and by August 23rd none were detected. With migration in full swing, biologists were thrilled to discover that one of the birds, a male tagged on his breeding grounds in Graham County on April 30th, was alive and on the move. On September 29th at 10:15PM, his radio tag “pinged” a Motus Wildlife Tracking receiver station in Panama City, Panama. He was on his way to his wintering grounds in northern South America. Biologists hope that some of these tagged birds are picked up on Motus receiver stations during migration and at their overwintering sites in Colombia and Venezuela. The bird crew will search for the tagged and color banded golden-wings via ground tracking next spring when they return to nest in the Cheoah Mountains.





*Figure 16. (Left) A tiny nanotag sits on the back of a male Golden-winged Warbler. Photo by Anthony Squitieri*

*Figure 17. (Below) Wildlife Diversity Technician Clifton Avery and WD Biologist Chris Kelly band and take measurements from a Golden-winged Warbler they captured in the Cheoah Mountains. Photo by Anthony Squitieri*

*Figure 18. (Bottom left) Golden-winged Warbler habitat, consisting of a six-year-old harvest unit surrounded by forest. Photo by Anthony Squitieri*





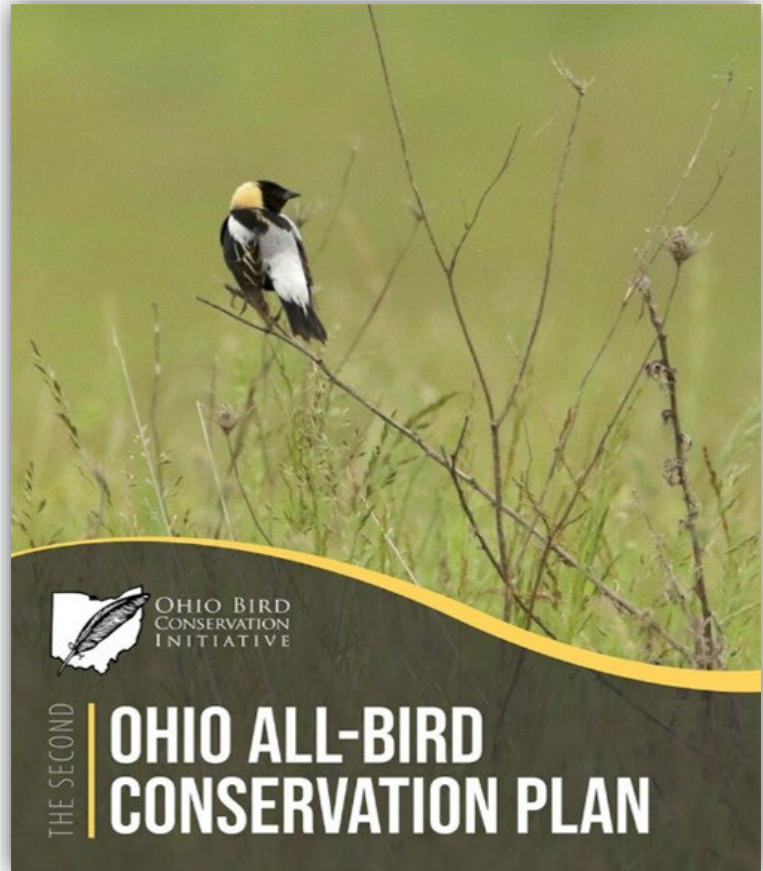
## OHIO

### **The Second Ohio All-bird Conservation Plan**

*Matthew Shumar, Coordinator, Ohio Bird Conservation Initiative - Conservation Planning and Research Committee*

*Kelly Williams, Chair, Ohio Bird Conservation Initiative - Conservation Planning and Research Committee & Associate Professor of Instruction, Ohio University*

The Ohio Bird Conservation Initiative (OBCI) Conservation Planning and Research Committee has published (online) [The Second Ohio All-bird Conservation Plan](#). The plan was a collaborative effort among OBCI's partner organizations, incorporates data and recommendations from national and regional conservation plans, and provides guidance for bird conservation in Ohio. We identified focal species (birds prioritized for conservation efforts) using decision support tools from Partners in Flight, priority species from regional joint ventures (UMGL JV and AMJV), Ohio Division of Wildlife's State Wildlife Action Plan (SWAP, ODW 2015), and species for which Ohio has high conservation responsibility or use unique habitats within the state. We used a habitat-based approach to provide conservation partners, including land managers, with practical information and recommendations to implement bird conservation.



*Figure 19. The Second Ohio All-Bird Conservation Plan, published by the Ohio Bird Conservation Initiative, is now available online.*

### **Adaptive Silviculture for Climate Change Study**

*Laura Kerns, Wildlife Biologist, Ohio Department of Natural Resources - Division of Wildlife*

***\*This work overlaps the Southeastern Ohio Focal Landscape\****

Several members of the US Forest Service and other Ohio natural resource partners participated in a planning workshop for the Adaptive Silviculture for Climate Change (ASCC) Network's- Ohio Hills experimental silviculture project in May 2022. The Ohio Hills project is located within the AMJV's Ohio Focal Landscape. The purpose of the experiment in Ohio is to test three different silvicultural treatments that are designed to facilitate the adaptation of oak forests to climate change. Silvicultural treatments will occur within Vinton Furnace State Forest in 2023-2024, but pre-treatment data collection has begun for both vegetation (US Forest Service) and forest songbirds (Ohio State). For more information see <https://www.adaptivesilviculture.org/project-site/ohio-hills>.

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## Cerulean Warbler and Forest Songbird Monitoring

Laura Kerns, Wildlife Biologist, Ohio Department of Natural Resources - Division of Wildlife

*\*This work overlaps the Southeastern Ohio Focal Landscape\**

In conjunction with the above Adaptive Silviculture for Climate Change Study, the Ohio State University and the Ohio Division of Wildlife conducted a small pilot study to continue long-term monitoring of Cerulean Warblers and other focal forest songbird species (Wood Thrush, Kentucky Warbler, Ovenbird, Hooded Warbler, Worm-eating Warbler, and Scarlet Tanager). Staff sampled additional sites in the Zaleski and Vinton Furnace State Forests in southeast Ohio, which included stands harvested specifically to benefit Cerulean Warblers and areas predicted by habitat models to hold high densities of ceruleans. Information from the study will be used to expand a graduate research project with Ohio State in the 2023-2024 breeding seasons.

## Motus Tower Expansion C-SWG Update

Laura Kerns, Wildlife Biologist, Ohio Department of Natural Resources - Division of Wildlife

Five of six Motus towers installed across central Ohio in May-July 2022 as part of the Midwestern state Competitive State Wildlife Grant (C-SWG) have continued to detect migrating birds through the fall and early winter. Locations, going from west to east are 1) Englewood Metropark, 2) Carriage Hill Metropark, 3) London State Fish Hatchery, 4) Deer Creek Wildlife Area, 5) Pickerington Ponds Metropark, and 6) Hebron State Fish Hatchery. Unfortunately, one (Pickerington Ponds Metropark) was hit by lightning soon after it was installed and is currently under repair. It has been determined that the electrical system in the host building (an old barn) needs to be upgraded. All towers use the CTT SensorStations, are attached to permanent buildings, and can detect 166 MHz nanotags and 434 MHz CTT LifeTags. Although these towers are positioned just outside the AMJV boundary, they fill important gaps in the Motus infrastructure across Ohio and may provide data on migrating AMJV focal species.

### Fall 2022 Detections

As of December 31, 2022, over 40 individuals representing 14 different species targeted by 11 different research projects were detected by the five working stations (Tables 2, 3).

Notable detections concerning the AMJV include the following:

- Thirteen Kirtland's Warblers, originally tagged in the summer in Michigan, were detected by the central Ohio towers. At least three individuals continued across the Appalachians as they headed toward the Atlantic Coast. Two were detected at central Ohio towers before heading



*Figure 20. One of the Motus Towers installed in Ohio as part of a Competitive State Wildlife Grant. Photo courtesy of Ohio Department of Natural Resources - Division of Wildlife*

across West Virginia, with final detections at the Hanging Rock tower near the border of Virginia. The other warbler was detected at the Deer Creek Wildlife Area tower, southwest of Columbus, before heading across West Virginia to the North Carolina coast near Wilmington.

- One Prothonotary Warbler, which was tagged in Ohio, headed across the Appalachians to Georgia, and then to Ding Darling NWR in Florida.
- One American Woodcock, which collided with a building in Cleveland, Ohio during spring migration, was rehabilitated and released in May. On December 9, it was detected at the Hebron State Fish Hatchery tower east of Columbus, before a final detection at Massengale Mountain in Tennessee on December 18.
- A Red-eyed Vireo from the Georgian Bay, Ontario songbird research project was detected at the Hebron State Fish Hatchery tower and then crossed the Appalachians through Kentucky and Tennessee before detection in Colombia.

*Table 2. Species and Individuals Detected at Central Ohio Motus Stations – July 1 - December 31, 2022*

Species	Englewood	Carriage Hill	London State Fish Hatchery	Deer Creek WA	Hebron State Fish Hatchery
Semipalmated Plover				1	
Short-billed Dowitcher		1			
American Woodcock				1	2
Common Nighthawk					1
Gray Catbird	1		2	3	
<del>Swainson's</del> Thrush	1				
Hermit Thrush				1	1
American Robin	1	1 (same as Deer Creek)		1 (same as Carriage Hill)	
Red-eyed Vireo					2
Ovenbird					5
Prothonotary Warbler					2
Kirtland's Warbler	4		2	3	4
White-throated Sparrow			2	2	
Song Sparrow			1		1
<b>TOTALS 12/31/2022</b>	<b>7</b>	<b>2</b>	<b>7</b>	<b>12</b>	<b>18</b>



Table 3. Research Projects with Tagged Birds Detected at Central Ohio Motus Stations – July 1 - December 31, 2022

	Individuals (N=x)
BC Interior Thrushes (#280)	Swainson's Thrush, N=1
Nol – Churchill Shorebirds (#67)	Short-billed Dowitcher, N=1
Arctic Shorebirds – CWS Yellowknife (#68)	Semipalmated Plover, N=1
Effects of High Lead on American Robins (#308)	American Robin, N=2
Intermountain West Collaboration (#213)	Common Nighthawk, N=1
Georgian Bay Songbirds (#417)	Red-eyed Vireo, Ovenbird, Song Sparrow, N=7
Ohio State University (#64)	Prothonotary Warbler, White-throated Sparrow, N=3
Kirtland's Warbler Tracking (#145)	Kirtland's Warbler, N=13
Powdermill Nature Reserve (#35)	American Woodcock, Ovenbird, Gray Catbird, White-throated Sparrow, N=11
Montreal Urban Forests (#551)	Hermit Thrush, N=1
Erie Bird Observatory – Presque Isle Migrants (#56)	Red-eyed Vireo, White-throated Sparrow, N=2

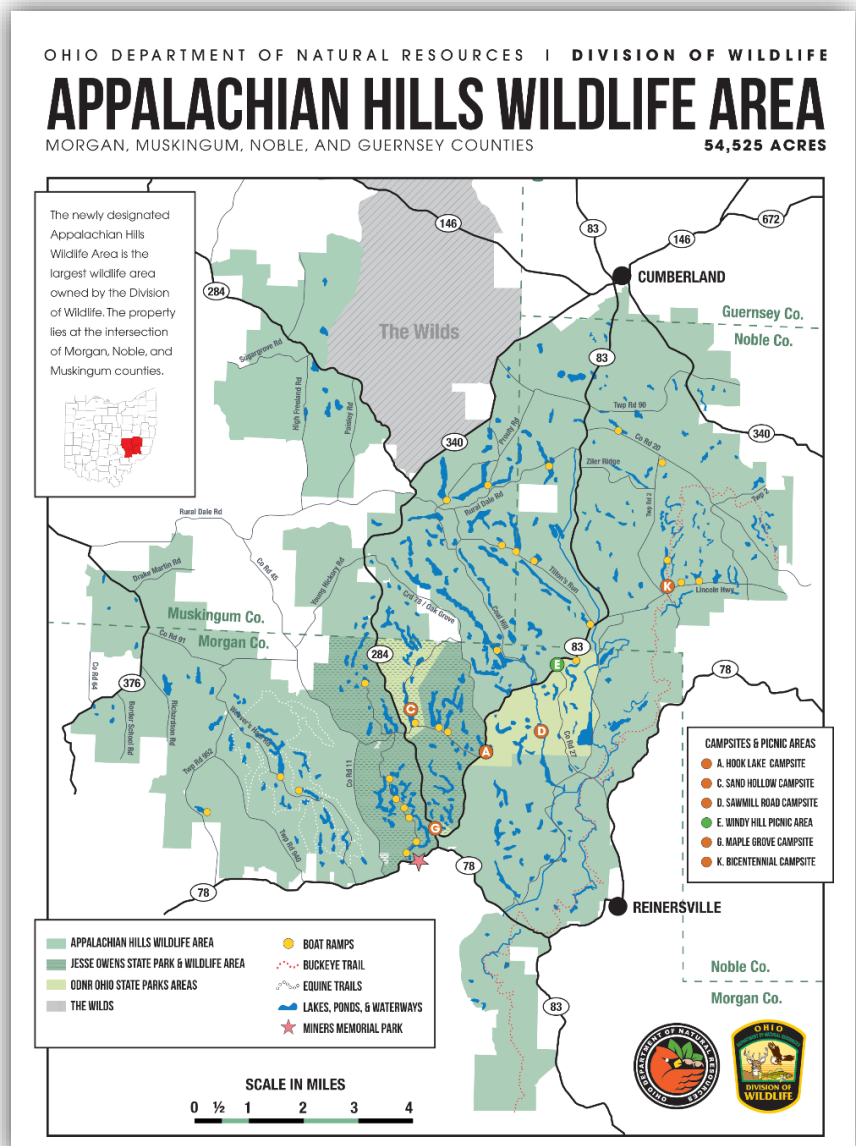
## New Acreage Added- Appalachian Hills Wildlife Area

Laura Kerns, Wildlife Biologist,  
Ohio Department of Natural  
Resources - Division of Wildlife

*\*This work overlaps the  
Southeastern Ohio Focal  
Landscape\**

In 2022, the Ohio Division of Wildlife added 16,058 acres to the new [Appalachian Hills Wildlife Area](#). It currently stands at 49,420 acres and is the largest public wildlife area in Ohio. The area is divided into approximately 70% forest, 26% grass/openland, and 4% ponds/wetlands. The entire purchase in the Appalachian Hills region, including Jesse Owens State Park and additional easements, totals 54,928 acres.

Figure 21. (Right) The Appalachian Hills Wildlife Management area is the largest public wildlife area in Ohio.



## Movement Ecology and Survival of Overwintering Sparrows

*Kelly Williams, Associate Professor of Instruction, Ohio University*

Students in the Williams Lab at Ohio University began studying the movement ecology and survival of overwintering sparrows in southeast Ohio during the winter of 2021-22 and are now in the second field season. At the time of this article, nanotags had been placed on 28 Dark-eyed (Slate-colored) Juncos and nine American Tree Sparrows, and over 50 individuals had been color banded. Automated radio telemetry (Motus) was/is being used to determine spring migration departure dates and migratory routes, and manual radio telemetry was/is being used to determine how birds use habitat patches within the landscape. Students are also watching bird feeders at local residences to resight color banded birds and determine the use of bird feeding stations on the rural landscape.



*Figure 22. American Tree Sparrow with nanotag. Photo by Kelly Williams*

## PENNSYLVANIA

### Cove Mountain Migratory Stopover Demonstration Site

*N. Scott Parkhill, Forest Program Manager, Audubon Mid-Atlantic*

In partnership with The Nature Conservancy (TNC), Audubon Mid-Atlantic completed the first phase of migratory stopover habitat work at TNC's Cove Mountain Preserve in Marysville, PA ([check out this beautiful video about the preserve here](#)). In a mile-a-minute overrun canopy opening resulting

from the previous removal of invasive tree-of-heaven, a combination of herbicide application and supplemental planting began the work of transforming the patch into stopover habitat for the many birds that migrate along the Kittatinny Ridge.

*Figure 23. (Left) Supplemental planting at the Cove Mountain Migratory Stopover Site following herbicide application. Photo by N. Scott Parkhill/Audubon Mid-Atlantic*



It is estimated that the 185-mile Kittatinny Ridge provides a crucial forested migratory corridor to 16 species of raptors and 140 species of migratory birds.



Being a major connector for migratory birds to breeding grounds in Pennsylvania, the northeast, and the Maritimes, Audubon Mid-Atlantic has prioritized conservation work in this designated Important Bird Area in its new Strategic Plan. Over the next decade, Audubon plans to create at least 10 migratory stopover sites along the ridge in order to enhance the landscape's ability to provision migrating birds with the fuel they need to complete their hemispheric journeys in a world with ever-increasing pressures on migratory species. Focusing on the creation of structurally complex, often young forest habitat at ridge-top sites, these patches of stopover habitat receive supplemental plantings of fruit-bearing plants to bolster food availability in the fall when some migrant diets switch from insects to soft-mast.

Phase 2 of this work is already under contract focusing on experimental techniques aimed at reducing the cost of implementation in order to expand the creation of stopover sites on Pennsylvania's private forests, which account for 78% of the forest landscape.

### **Northern Goshawk Recovery in Pennsylvania – the First Step**

*Patricia Barber, Endangered Bird Biologist – Wildlife Recovery, Pennsylvania Game Commission*

*\*This work overlaps the Allegheny Highlands (PA/NY) Focal Landscape\**

The Northern Goshawk was listed as endangered in Pennsylvania in 2021. The long-term population declines are disturbing, but there is an advantage to formally recognizing the decline. Their listing justifies expending more resources to understand the decline and develop ways to reverse it. The Pennsylvania Game Commission (PGC) has devoted more resources to monitoring and conservation of this elusive forest raptor.



*Photo by Holly*

*Figure 24. Adult Northern Goshawk flying past Hawk Mountain Sanctuary. Photo courtesy of the PA Game Commission*

The first step in helping goshawks is to know where they persist. Finding Northern Goshawks is substantially more challenging than finding the more familiar raptors like Bald Eagle, Osprey, and Peregrine Falcon. They live in remote areas, are widely dispersed, and avoid people. How do you search for a bird that's rarely seen, avoids humans, and has a very large territory? You stack the deck. You search for them when they're most obvious – during courtship. You use technology to maximize sampling in remote areas and at difficult times. But even so, there's a lot of possible goshawk habitat in Pennsylvania and most of it doesn't seem to have birds. Traditional searching methods are extremely labor intensive, and you end up searching a lot of empty habitat for each bird found.

In 2022, the PGC deployed 12 autonomous recording units (ARUs) to monitor for Northern Goshawk

courtship in historic territories. ARUs can sit in remote areas of the forest day after day, no matter the weather, listening for birds in the most likely places and recording at the most likely times of day. In practical terms that means ARUs were deployed in March and set to record for six hours each day, 30 min before dawn til five and a half hours after dawn for two weeks. ARUs were concentrated on recently active territories—those with territorial behavior documented between 1997 and 2018.

The recordings were first analyzed with a computer algorithm searching for likely Northern Goshawk calls. Otherwise, a person would have to listen to six hours of recording each day for each unit during March, roughly 2000 hours. Each potential Northern Goshawk call was then evaluated by a biologist with extensive goshawk experience and classified to species.

Four active goshawks territories were found in Pennsylvania in 2022. The territory found as a direct result of our increased survey effort was the only nest that raised young last year. While our numbers are very low, finding birds in a territory that hadn't had recent activity suggests that increased surveys are an important tool for locating the goshawks we still have and the first step in conserving the species for the future.



*Figure 25. An autonomous recording unit (ARU) deployed in historic Northern Goshawk territory. Photo courtesy of the PA Game Commission*

## TENNESSEE

### **Wolf River Cornerstone Habitat Restoration Grant**

*Sara Hooghuis, Cornell Land Trust Bird Conservation Initiative Program Assistant, Cornell Lab of Ornithology*

*Sara Barker, Cornell Land Trust Bird Conservation Initiative Director, Cornell Lab of Ornithology*

The Wolf River Conservancy (WRC) has preserved nearly 19,000 acres in Tennessee. With funding support from the Cornell Land Trust Bird Conservation Initiative's Small Grant Program in 2021, WRC was able to increase biodiversity on three plots of land in Fayette County by improving the quality of habitat, leading to a mosaic of wildlife habitat types including: shrubby early successional forest, mature hardwood forest, wetlands, a managed native grassland immediately to the south, and surrounding agricultural fields and woodlands.

WRC transitioned half an acre of loblolly plantation into a shrub/early successional forest. WRC contracted with the Tennessee Division of Forestry, then sub-contracted with a local logger, to harvest



the loblolly pine to increase biodiversity and bird habitat quality. As a result, many hardwood species resprouted from roots and beneficial pollinator plants began to grow. Moreover, a firebreak was established around a dry soil unit that once held loblolly pine by the Tennessee Division of Natural Areas. The logging of the pine plantation and subsequent establishment of a firebreak around similar soil types of the unique community enabled fire to be used to benefit the prickly pear and other uncommon plants.



*Figure 26. Prescribed burn on 3.5 acres at the Wolf River Conservancy's Cornerstone habitat restoration site. Photo courtesy of Wolf River Conservancy.*

WRC worked with the Tennessee Division of Forestry on a three and a half-acre field (see photo to the left) to conduct a prescribed burn followed by a volunteer-led planting of 600 native trees in the field. About a month later, a contractor successfully hydroseeded the native warm season grasses and wildflower mix on the field around the tree seedlings. This planting was a success despite a heat spell and early drought in June, which likely reduced tree seedling survival. By planting both trees and the grass/wildflower mix in the field, WRC helped to ensure the survival of the plant species best suited to the

site conditions and improved wildlife habitat. Since management took place, the field has attracted dozens of monarch butterflies, which have not been seen in these numbers in previous years.

WRC partnered with Invasive Plant Control, Inc. to treat exotic invasive plants with herbicide on six acres of freshwater marsh and four acres of upland hardwoods and bottomland hardwoods, focusing on marsh dayflower. Removal of non-native invasive plant species will yield benefits to the freshwater marsh and the wildlife that inhabit it.

In addition to hands-on management, WRC engaged local landowners and community members through educational events and volunteer opportunities. In Summer 2022, WRC held a webinar that highlighted the value of the project, the importance of bird diversity, and the Cornell Land Trust Grant's impact in order to share their findings and resources with other land trusts in their state. They installed two interpretative signs at the restoration sites and volunteers built and installed nest boxes for cavity-nesting birds such as Prothonotary Warbler and American Kestrel. Additionally, Tennessee Ornithological Society volunteers used eBird to conduct bird surveys that helped assess management and contributed to the eBird Hotspot established for this project. Volunteers will continue to conduct plantings and nest box installations in the future.

### **Tennessee River Gorge Trust: Land Conservation and Bird Research Updates**

*Eliot Berz, Director of Conservation and Access, Tennessee River Gorge Trust*

Over the course of 2022, the Tennessee River Gorge Trust (TRGT) worked to conserve imperiled habitats, learn more about the Belted Kingfisher, and teach the public through bird banding events. TRGT has partnered with the Southeastern Grasslands Initiative (SGI) to set up long term



monitoring plots on two mountain bogs on a recently acquired property atop Aetna Mountain in Tennessee. The plots were established in the fall of 2022 and will be inventoried for the first time in the spring of 2023. Rare plant species such as *Woodwardia virginica* (Virginia chainfern) and *Glyceria acutiflora* (sharp-scaled mannagrass) are flourishing in the bogs along with many other wetland species. The bogs were initially threatened by sprawling residential development, but now face threats from nearby sedimentation, ATV trespassing, and woody encroachment. TRGT and SGI will use the data to inform management decisions on the property and ensure the bogs continue to host the wide variety of wetland species that utilize this threatened habitat type.



Figure 27. A Banded Belted Kingfisher Recaptured in 2022. Photo by Eliot Berz, TRGT

In the spring and summer of 2022, the field research team recaptured two banded Belted Kingfishers that were marked in 2021 as part of a pilot study to understand the seasonal movements of this common yet not well understood bird species. Two of nine banded birds returned to the previous year's nest site. A GPS unit that was attached in 2021 revealed a minor dispersal from the breeding territory by a male to an area roughly 10 miles from the nest site. TRGT also hosted a variety of groups at the TRGT Bird Observatory for public bird banding. Participants were able to observe bird banding and

learn about local conservation efforts through an experiential program. The TRGT team looks forward to continuing this work into 2023.



Figure 28. (Left) Botanists with the US Fish and Wildlife Service Visiting the Recently Protected Aetna Mountain Bogs. Photo by Eliot Berz, TRGT



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## VIRGINIA

### The Virginia Grassland Bird Initiative: Protecting Nesting Grassland Birds in Working Landscapes

*Sara Hooghuis, Cornell Land Trust Bird Conservation Initiative Program Assistant, Cornell Lab of Ornithology*

*Sara Barker, Cornell Land Trust Bird Conservation Initiative Director, Cornell Lab of Ornithology*

With support from the [Cornell Land Trust Bird Conservation Initiative's Small Grant Program](#) in 2021 and 2022, Piedmont Environmental Council (PEC), Smithsonian's Virginia Working Landscapes (VWL), American Farmland Trust, Quail Forever, and other partners will continue to address the ongoing decline of grassland birds in northern Virginia through the Virginia Grassland Bird Initiative (VGBI), formerly the Piedmont Grassland Bird Initiative. The name change reflects the

collaboration's efforts to expand its programming and reach into five new counties within the Shenandoah Valley. These include the top four agricultural income-producing counties in the state, where demand for conservation resources and technical assistance exceeds availability.



*Figure 29. Eastern Meadowlark, a species threatened by grassland habitat loss, perched in pasture. Photo: October Greenfield*

With funding from Cornell, VGBI is able to

offer a second year of farmer incentive payments for implementing one or both of their best management practices for protecting grassland birds during their vulnerable nesting season: delayed spring haying and summer pasture stockpiling. VWL's research has demonstrated that implementing these best management practices on agricultural lands can significantly benefit grassland birds, as well as restore ecosystem functionality to those working landscapes. With the majority of remaining grasslands in Virginia currently held in private hands and under agricultural use, both farmers and their working landscapes have become instrumental in the future of grassland bird conservation. The incentive payments encourage farmers to adopt delayed spring haying or summer pasture stockpiling into their long-term production goals; these farmers might otherwise be hesitant about the financial risks involved. VGBI's incentives program offers up to \$35 per acre to offset the initial costs of piloting these best management practices. In their second year of the incentives program, VGBI aims to enroll more than 1,000 new acres.

VGBI is expanding their conservation impact through public events for local landowners and producers. In the Fall of 2022, VGBI held a pasture walk at Glenmore Farm in Fauquier County to demonstrate summer stockpiling and to give producers opportunities to ask questions with forage

experts. The event featured presentations by a forage specialist from Virginia Cooperative Extension, the Soil and Water Conservation District, and October Greenfield, Wildlife Habitat Restoration Coordinator for PEC and co-coordinator of VGBI. VGBI partners have also created a [webpage about the financial incentives program](#). In addition to in-person events showcasing best management practices, VGBI draws support from community scientists trained by VWL to conduct breeding bird surveys on enrolled acreage to help measure the effects of delayed haying and summer stockpiling on declining grassland bird populations. Through these outreach efforts, VGBI hopes to demonstrate that working landscapes provide the platform for big changes in favor of conservation.

Next steps for VGBI include combining priority maps from partners. Smithsonian's VWL and PEC will work with partners to collate existing priority maps including layers for grassland bird occupancy, prime/unique soils, impaired watersheds, land at risk of development, land under easement, and NRCS Working Lands for Wildlife counties. They will use the resulting hotspot map to help prioritize the allocation of time, resources, and future funding for landowner outreach, education, and incentives.

### **The 2nd Virginia Breeding Bird Atlas – 2022 Summary**

*Sergio Harding, Nongame Bird Conservation Biologist, Virginia Department of Wildlife Resources*

2022 was a busy year for the Atlas Final Products Committee, which consists of representatives from the Department of Wildlife Resources, Virginia Society of Ornithology (VSO), and Conservation Management Institute at Virginia Tech (CMI). The Committee worked toward its ultimate goal of publishing the results of the 2nd Virginia Breeding Bird Atlas as a website in the fall of 2025. To that end, they laid the foundations for some of the principal content that will be featured on the website and for the hiring of key personnel who will make production of the website possible.

Species Accounts are at the core of Breeding Bird Atlases, relaying species-specific information on current and past distributions, timing of breeding cycles, and population trends. Modern Atlases (including Virginia's) also feature species population estimates and maps of species abundance. The Species Accounts will make up the majority of the content displayed on the website. In an effort to get a jump on how this information will be displayed, the Committee began developing an online prototype of a Species Account as it might appear on the finished website. They produced draft maps,

tables and figures using the Black-throated Blue Warbler as a pilot species, as the species is the focus of preliminary data analyses by Dr. Ashley Peele of CMI and her colleague Dr. Elizabeth Hunter.

Hiring of a Chief Editor is a next big step. A position announcement has been the completed and the position has been advertised, with the goal to have a person hired and ready to start by July of 2023. The position is being funded by the VSO and hired through a contract with CMI. The Chief Editor will oversee virtually all aspects of the Atlas website publication process, including guiding the



*Figure 30. Black-throated Blue Warbler. Photo by Kenneth Cole Schneider, courtesy of Flickr Creative Commons.*



writing of the Species Accounts and of all additional content. These written narratives will provide important interpretation to the maps, tables, and figures in the Species Accounts. The narratives will be largely written by two dedicated authors, who will be hired to begin work in January 2024 and supervised by the Chief Editor.

### **Habitat Management for Golden-winged Warbler on Highland WMA Pays Off**

*Sergio Harding, Nongame Bird Conservation Biologist, Virginia Department of Wildlife Resources*

*\*This work overlaps the Virginia Highlands Focal Landscape\**

Years of planning and implementation of habitat management at the Virginia Department of Wildlife Resources' (DWR) Highland Wildlife Management Area (WMA) have paid off with the 2022 discovery of a breeding pair of Golden-winged Warblers (GWWA) on the WMA.

GWWA in Virginia thrive in open, shrubby habitats at elevations of over 2,000 ft. Highland WMA provided the raw materials for ideal GWWA habitat in the form of four large forest openings atop the ridgeline of Jack Mountain, between 3000-4000 ft. A key ingredient missing from these grassy openings was shrubs - specifically, low-lying patches of *Rubus* species (ex. blackberry), at the base of which the bird builds its nest. In 2016, a habitat management plan to promote shrubs began to take shape through on-site visits and consultation with Virginia Commonwealth University's (VCU) Dr. Lesley Bulluck, Virginia's resident GWWA expert. In the years that followed, DWR Wildlife Area Managers created brush piles and conducted prescribed burns to stimulate *Rubus* growth and applied herbicide treatments to reduce non-native grasses. In 2022, with the support of the National Wild Turkey Federation, a small timber harvest was done to create an open forest-like overstory and to expand one of the openings.

Surveys of the openings by DWR and VCU have taken place since habitat management began. However, it wasn't until May 23 of 2022 that the tell-tale buzzy song of a male GWWA was heard, by DWR



*Figure 31. Golden-winged Warbler Habitat Patch on Highland WMA. Photo by Lesley Bulluck*

personnel shooting video to document the habitat work done on the WMA. The bird was visually confirmed on a follow-up visit on June 1. A formal survey by VCU confirmed a breeding pair in the same opening on June 12. On the heels of this exciting discovery, plans are underway to create even more space for the warbler by connecting each of the openings into one very large block of habitat.

The success at Highland WMA is a small yet significant step toward improving the recovery outlook of GWWA in Virginia. In the Commonwealth, as elsewhere, the majority of the GWWA population is found on private lands. Although working with willing landowners to manage habitat on their lands will continue to be essential to conservation of the species, habitat management on public lands can also contribute to broader conservation efforts.

## Investigations of Eastern Golden Eagle in the Appalachian Mountains

Jeff Cooper, Avian Projects Coordinator, Virginia Department of Wildlife Resources

*\*This work overlaps the Virginia Highlands Focal Landscape\**

Research investigating the eastern Golden Eagle population was initiated by Trish Miller (Conservation Science Global), Mike Lanzone (Cellular Tracking Technologies), and Todd Katzner (USGS). This research focuses on the spatial ecology of Golden Eagles in eastern North America to inform wind energy development. At the time of project initiation, very little was known about this sub-population. Miller began eagle capture in 2006 and attached the first cellular transmitter of the project. The Virginia Department of Wildlife Resources (DWR) joined the project in 2009, and, as of March 2023, has trapped 46 Golden Eagles and outfitted 41 individuals with transmitters in the mountains of western Virginia. Bath and Highland Counties on National Forest and DWR Wildlife Management Areas are of particular note due to high capture rates and eagle abundance.

Todd Katzner formed the Eastern Golden Eagle Working Group in 2011, shortly after DWR began participating in this research. This group is composed of representatives from state agencies, federal agencies, Canadian provincial and federal government, NGOs, academics, and private industry. The data from Miller and DWR has been combined with data from other eastern states and Canadian provinces to create the Eastern Golden Eagle Working Group's spatial dataset, which is the largest spatial data base for this sub-population. Currently, over 100 Golden Eagles have been outfitted with cellular transmitters in the east resulting in several million GPS locations of Golden Eagles throughout eastern North America (Figure 32).

Data from this research is novel. Virtually nothing was previously known about eastern Golden Eagle abundance, distribution, migratory routes, wintering areas, or spatial ecology. Data from this project has led to a very good understanding of source populations (NE Canada), core wintering areas (central Appalachians), habitat use during winter (high elevation forested ridges), and how eagles use air space along Appalachian ridge lines during migration and wintering periods.

Cellular Tracking Technology transmitters (Figure 33) collect data three-dimensionally, which allows for modeling of eagles' use of airspace. This allows for assessment of eagle risk of collision with wind turbines at both existing and proposed sites. DWR recently contracted with Conservation Science Global to create three-dimensional heat maps of Golden Eagle use of the Blue Ridge Physiographic Province in Virginia (completed in summer of 2022) and the Ridge and Valley Physiographic Province

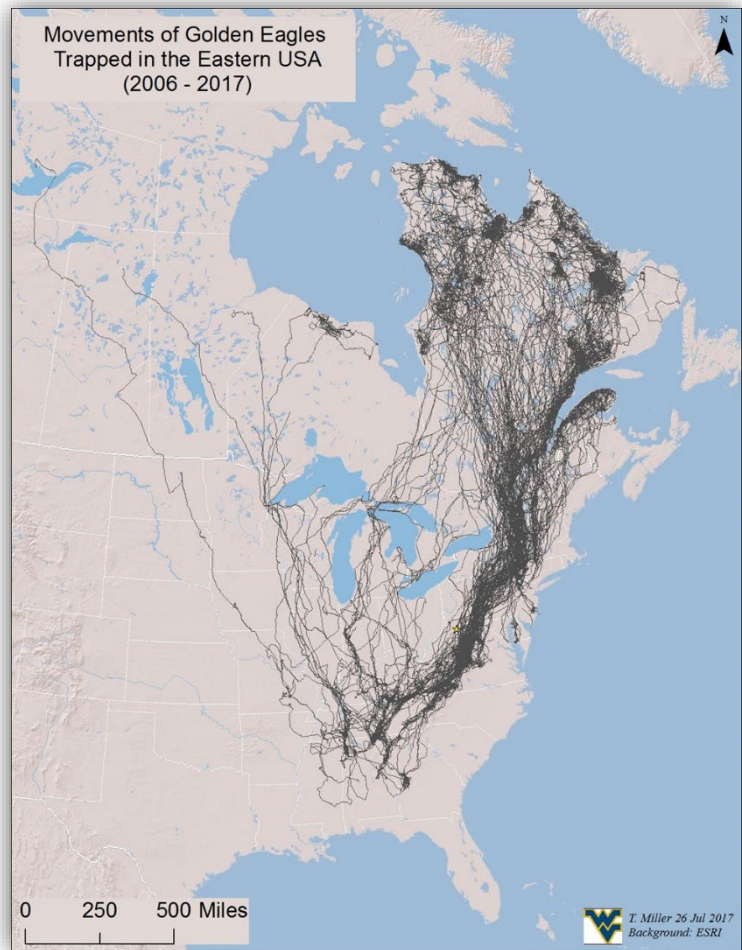


Figure 33. Golden Eagle telemetry tracks from 2006-2017. Map by Trish Miller



(to be completed during the fall of 2023). The models will serve as tools to inform the planning stages of wind facilities in Virginia.

DWR currently maintains a camera trap station on Walker Mountain in Bath County during the winter months of January and February. DWR continues to capture several individuals a year to archive blood and feather samples with Todd Katzner, who has ongoing research related to blood lead levels and stable isotope work to investigate source populations. Moreover, DWR will increase trapping efforts in 2024 at Walker Mountain and collect HPAI sample to assess its occurrence in Golden Eagles.



*Figure 33. Immature Golden Eagle outfitted with a Cellular Transmitter.  
Photo by Dave Kramar*

### **Virginia Tech Conducts Close-Out interviews with Copper Creek Landowners**

*Rebecca O'Brien, Graduate Student, Virginia Tech*

*Dr. Ashley Dayer, Associate Professor of Human Dimensions, Virginia Tech - Department of Fish and Wildlife Conservation*

*Dr. Bill Hopkins, Professor, Virginia Tech - Department of Fish and Wildlife Conservation*

This year Virginia Tech completed our follow-up interviews with landowners who have been involved in a three-year project studying hellbenders and water quality in the Copper Creek area. We were able to interview twenty individuals and are currently working on a paper summarizing our findings. Additionally, an undergraduate student was engaged in the interview process and was able to use the experience to pursue an independent research project assessing landowner attitudes towards Great Blue Herons. This project culminated in a poster that was presented at a university conference.

## **WEST VIRGINIA**

### **Atlantic Flyway Council**

*Richard Bailey, State Ornithologist, WV Division of Natural Resources*

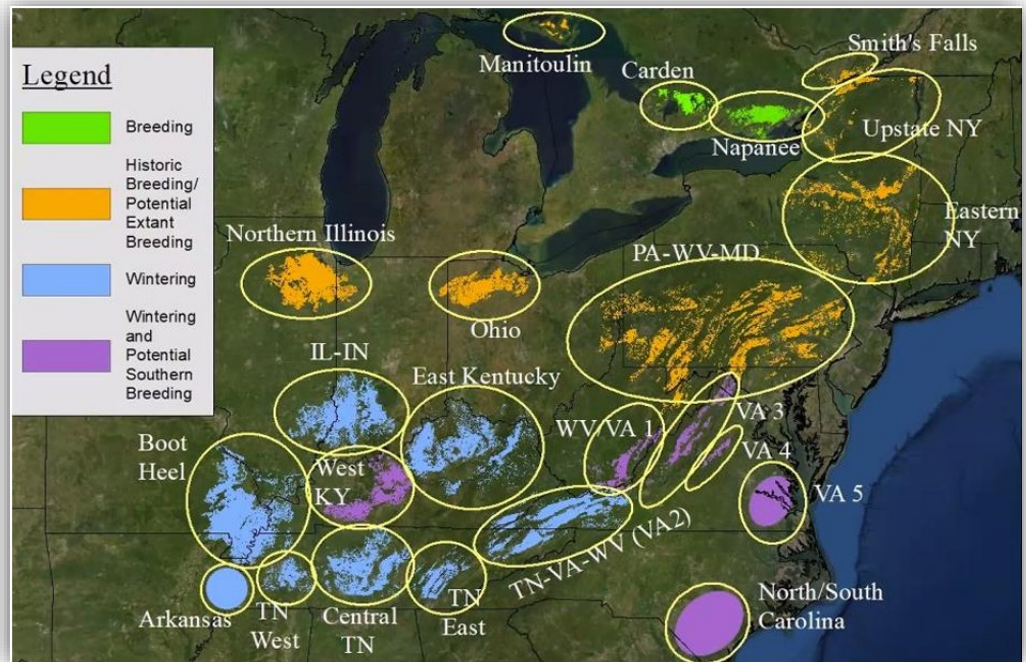
The Atlantic Flyway Council (AFC), founded in 1952, represents 17 states, Puerto Rico, one territory, and six Canadian provinces that work with their respective federal governments to manage migratory birds and their habitats in eastern North America. In 2022, WVDNR staff chaired the Nongame Migratory Bird Technical Section (NMBTS) and coordinated a number of notable projects. Examples include multiple rounds of comments to the U.S. Fish and Wildlife Service regarding development and drafts of forthcoming rules pertaining to incidental take of eagles as well as permitting of incidental take under the Migratory Bird Treaty Act.

In addition, the NMBTS submitted a recommendation in 2022, subsequently approved by Council, to develop a narrative and budget for a Conservation Delivery Specialist position, to be overseen by the NMBTS. The narrative and budget have been completed and was submitted to Council in March, 2023. If approved, the position would coordinate Flyway-wide Colonial Waterbird monitoring, bird-building collision support to state wildlife agencies, and a number of projects with high relevance to AMJV, including nightjar monitoring and research.

### Loggerhead Shrike Working Group

*Richard Bailey, State Ornithologist, WV Division of Natural Resources*

In 2022, WVDNR staff provided technical assistance to the [International Union for Conservation of Nature](#) (IUCN) Species Survival Commission (SSC) Conservation Planning Specialist Group to complete a Population Viability Analysis (PVA) for the Loggerhead Shrike (LOSH) subspecies *L. l. migrans*, which will in turn complement a forthcoming full-annual-cycle model that will better inform targeting of conservation actions. In-person technical sessions were included in the November 2022 Working Group meeting in Nashville, TN. In 2023, the PVA will be completed and distributed for peer review.



*Figure 34. A draft map of *L. l. migrans*, showing predicted breeding, historical, and winter occurrence. Figure courtesy of the Loggerhead Shrike Working Group*



*Figure 35. Loggerhead shrike habitat in West Virginia. Photo by Rich Bailey, WVDNR*



Data for the PVA are being generated through the collaborative LOSH banding and monitoring project. Since 2014, more than 50 shrikes have been trapped and banded in West Virginia. In 2022, previously banded birds were resighted, and two individuals were trapped in April. Banding continues in 2023.



*Figure 36. Shrike banded in Monroe County. Photo by Rich Bailey, WVDNR*

### **Renewable Energy Guidance Development**

*Richard Bailey, State Ornithologist, WV Division of Natural Resources*

Over coming decades, the composition of the U.S. energy portfolio is expected to increasingly shift towards renewables. The central Appalachian Mountains generally have high suitability for wind energy development, with existing and planned facilities all occurring on high ridges or plateaus. In West Virginia, there are six operational facilities totaling more than 400 turbines, with additional construction planned. In response to documented eagle fatalities in the past five years, WVDNR has begun development of guidance for industry to reduce risk of take, including an Important Use Area (IUA) map for eagles that highlights areas of higher risk, within which companies are advised to seek

Incidental Take permits from the U.S. Fish and Wildlife Service.



*Figure 37. Example of songbird mortality at West Virginia wind facilities. Photo by Rich Bailey, WVDNR*

eBird, hosted by The Cornell Lab of Ornithology, is the world's largest citizen science database for birds, and analyses have enabled the production of maps depicting species abundance across the annual cycle. WVDNR worked with eBird staff in 2022 to create a map for both bald and golden eagle that will minimize qualitative judgements in assessing risk, thereby providing industry a consistent, data-driven standard for recommending take

permitting. For the purposes of developing the map, eBird observations were selected with certain required parameters that placed them in time and space. Based on these points, search effort, weather, detection probability, and landscape and habitat variables, were used to predict relative abundance across the state, with cells representing max relative abundance across all weeks of the year. An overview of the work in WV was presented at a plenary session at the 2022 AOS conference Puerto Rico.

Among many components, WVDNR renewable energy guidance will also include recommendations pertaining to facility lighting, mass mortality event response, incidental take permitting, and development of Worker Environmental Awareness documents.



Figure 38. Example of eagle mortality at West Virginia wind facilities. Photo courtesy of WVDNR

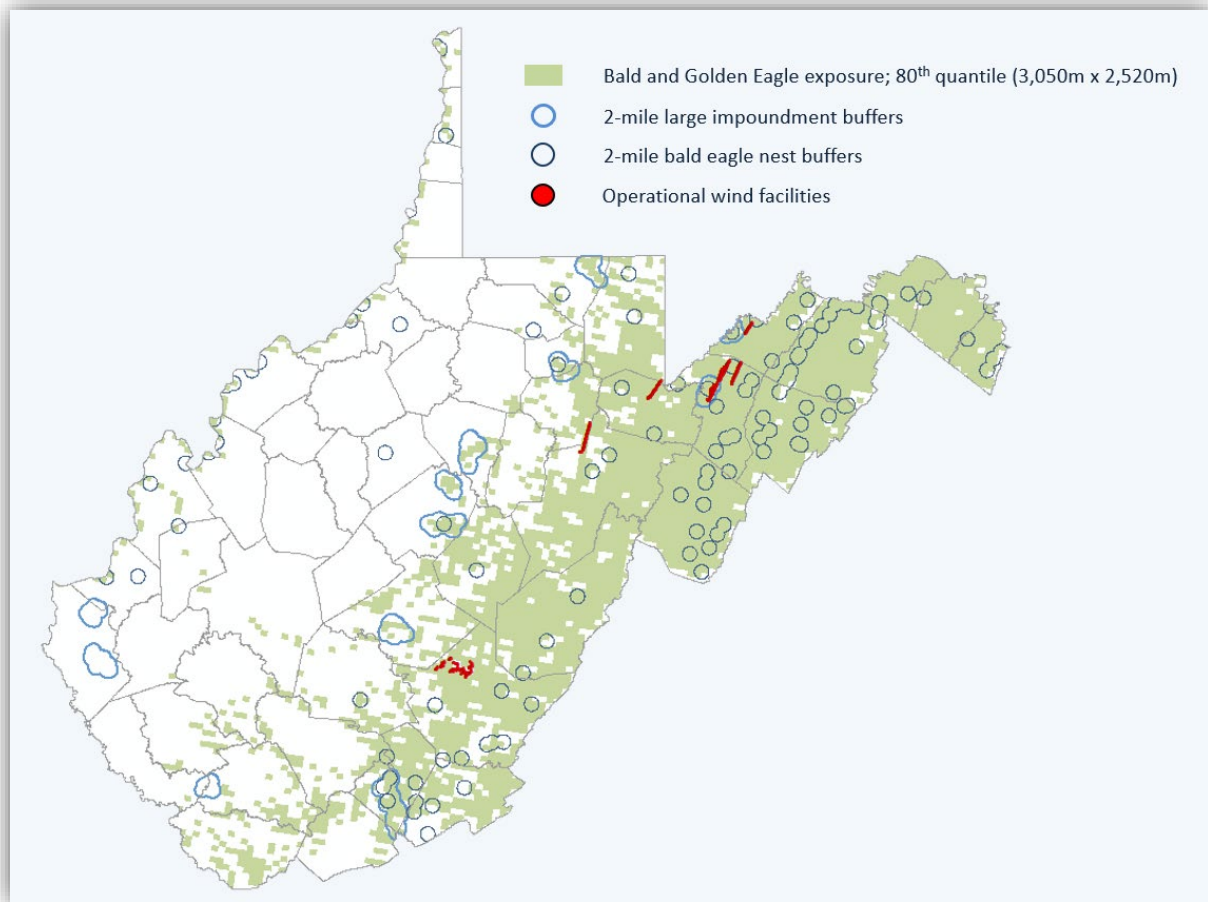


Figure 39. The draft map, shown above, represents a conservative approach also typically employed by the U.S. Fish and Wildlife Service, using the 80th quantile for both Bald and Golden Eagle combined. Green cells represent areas of elevated risk of exposure. In addition, the map includes nest locations buffered to 2 miles, as well as large impoundments where bald eagles are likely to concentrate, also buffered to 2 miles. Areas of white in the map not included by buffers represent areas of reduced risk. Existing wind facilities are shown in red. Map courtesy of WVDNR



## Warbler Habitat Work in West Virginia

Jane Capozzelli, Avian Partner Biologist, West Virginia Division of Natural Resources & Natural Resources Conservation Service

*\*This work overlaps the Greenbrier and Alleghenies Focal Landscape\**



West Virginia's Avian Partner Biologists Katie Fernald and Jane Capozzelli were working hard for the Golden-winged Warbler in 2022! They planned 170 acres of early-successional habitat development on private lands, disbursing \$100,000 of cost-share assistance from the Natural Resources Conservation Service (NRCS) to landowners to complete the work. Additionally, 70 acres of ongoing habitat restoration work on private lands was completed in 2022.



Jane and Emily Reasor, another Avian Partner Biologist with West Virginia Division of Natural Resources and NRCS, had a busy 2022 working for the Cerulean Warbler (CERW) as well! They planned 200 acres of forest enhancements on private lands, disbursing \$64,000 of cost-share assistance from NRCS to landowners to complete the work. Additionally, 55 acres of habitat was created in 2022 in ongoing projects.

*Figures 40 & 41. (Above) Fresh crop tree releases (CTRs) to create CERW habitat and restore old-growth white oak forest on private lands in West Virginia. (Editor's note: CTR is a forestry management method where competing trees are removed from the immediate vicinity of a desirable tree—perhaps an oak tree that provides mast for wildlife—so that the tree can flourish.) Photos by Paul Bankowski*



## Assessing Forest Features and Nocturnal Flying Insect Diversity as Predictors of Eastern Whip-poor-will Occupancy in Foraging Habitat

Alexander D. Clark, Master's Student, Division of Forestry and Natural Resources, West Virginia University (WVU)

Christopher M. Lituma, Assistant Professor, Division of Forestry and Natural Resources, WVU

Petra B. Wood, Assistant Unit Leader, US Geological Survey Cooperative Unit, Morgantown, WVU

*\*This work overlaps the Greenbrier and Alleghenies Focal Landscape\**

Cooperators: Weyerhaeuser Inc, Sustainable Forestry Initiative, Natural Resources Conservation Service, American Bird Conservancy, The Appalachian Mountains Joint Venture, National Alliance of Forest Owners, West Virginia Division of Natural Resources, US Fish and Wildlife Service, US Geological Survey, National Council for Air and Stream Improvement

Eastern Whip-poor-wills (*Antrostomus vociferus*) (EWPW), insectivorous caprimulgids, have seen an approximate 2.76% annual population decrease since the 1960s, with their breeding and foraging ecology largely unknown due to their nocturnal and cryptic behavior. West Virginia University (WVU) and partners conducted research to assess abiotic and biotic variables correlated with detection, occupancy probability, and prey species diversity on ~104,000 hectares of forest in West Virginia owned by the private timber company Weyerhaeuser.



Figure 42. Eastern Whip-poor-will. Photo by Heather L. Hubbard/Shutterstock and courtesy of ABC

Previous literature indicates that EWPW, and their prey, require ephemeral habitat such as recently cleared and early successional forests, like those historically created by forest fires, wind shears, hurricanes, and tornados. Research measuring the effects of forest stand-specific landscape features and available prey species diversity with EWPW occupancy has not been conducted. This gap in our knowledge of EWPW is addressed by this thesis which includes three chapters examining how both abiotic and biotic factors affect the likelihood of EWPW occupancy in sampled forest stands in central Appalachia.

Study participants examined how EWPW detection and occupancy in their foraging habitat was influenced by forest-stand specific features. They also evaluated relationships among landscape and stand-level variables in regards to occupancy on Weyerhaeuser property in West Virginia. Surveys were completed using autonomous recording units (ARUs) from June – July 2021 and 2022. Results indicated that lunar illumination—as measured by percentage—significantly influenced detection probability (Figure 43). On surveys with lesser illumination detection probability decreased.



Elevation, distance to riparian area (in meters), basal area, % ground cover of grass, solidago, and forb were the most influential occupancy probability predictors. Ecological implications from the results suggest EWPW selected early successional forest areas at lower elevations, with limited basal area and vegetative structure indicative of early age (e.g., grasses) to forage for insect prey.

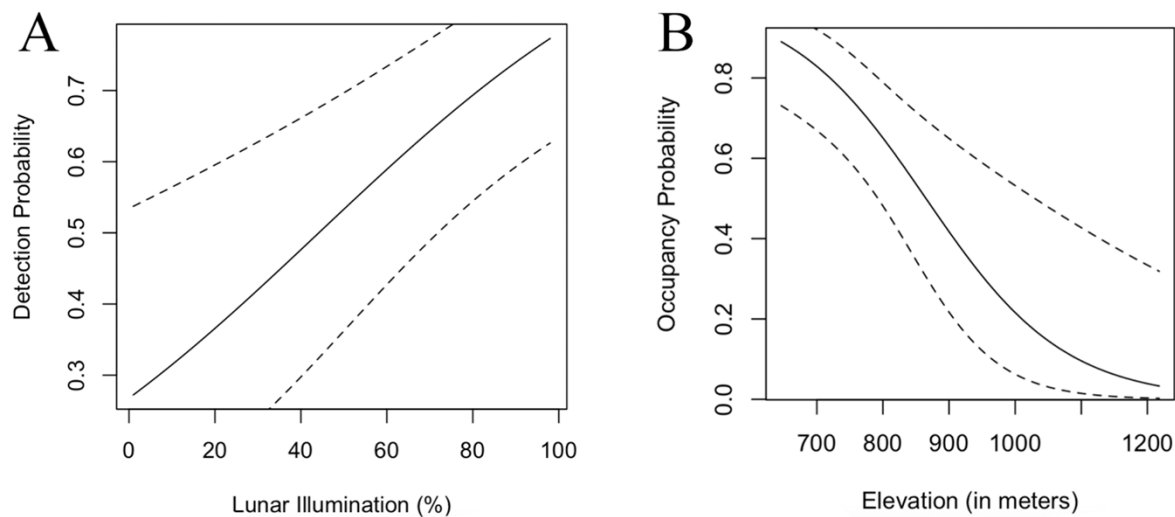


Figure 43. Top detection covariate (lunar illumination) (A) and occupancy covariate (elevation) (B) plotted using generalized linear models with 95% confidence interval curves.

Additionally, available nocturnal prey richness, evenness, abundance, and approximate biomass among forest stands ranging from 0 – 20 years old against EWPW occupancy on Weyerhaeuser property in West Virginia was measured. Specific prey groups measured were nocturnal volant *Lepidoptera* and *Coleoptera*. We failed to reject the null hypothesis that any prey diversity metrics were correlated with EPWP occupancy probability. Additionally, richness, evenness, abundance, and total biomass of captured prey values were significantly positively influenced by basal area, and to a lesser degree stand age. Percent ground cover of forb and bare ground also negatively significantly affected prey species richness. Capture rate of moths was significantly influenced by the temperature at opening of the trap. Results suggest that available prey species are not a primary signal that EWPW consider when determining foraging habitat, instead likely honing on vegetative structure cues. According to our findings, early successional forest structure is to be maintained to encourage both available prey species abundance and EWPW occupancy. In conclusion, the results of this study add to our understanding of this cryptic nocturnal species whose foraging ecology and landscape preferences are largely unknown.

### Improving management strategies linked to certification of sustainable forest practices for priority songbirds in West Virginia

Robert M. Ryan, Doctoral Student, Division of Forestry and Natural Resources, West Virginia University (WVU)

Christopher M. Lituma, Assistant Professor, Division of Forestry and Natural Resources, WVU

*\*This work overlaps the Greenbrier and Alleghenies Focal Landscape\**

Cooperators: Weyerhaeuser Inc, Sustainable Forestry Initiative, Natural Resources Conservation Service, American Bird Conservancy, The Appalachian Mountains Joint Venture, National Alliance of Forest Owners, West Virginia Division of Natural Resources, US Fish and Wildlife Service, US Geological Survey, National Council for Air and Stream Improvement

Many eastern deciduous forest songbirds continue to experience significant population declines, which are often linked to breeding habitat requirements. Managing breeding habitat for some declining focal species in the eastern deciduous forest will require managing for canopy heterogeneity (diversity) and

variable forest age classes through canopy disturbance, which are critical factors for optimizing bird species biodiversity. Species-specific management to improve conditions for multiple bird species, including Golden-winged Warbler (*Vermivora chrysoptera*) (GWWA), Cerulean Warbler (*Setophaga cerulea*) (CERW), Wood Thrush (*Hylocichla mustellina*) (WT), and numerous associated species have



Figure 44. Cerulean Warbler. Photo by Ed Schneider / Shutterstock and courtesy of ABC

been implemented in recent years on public and private lands. Although GWWA, CERW, and WT each require different habitat conditions for nesting, each also uses a variety of forest structure and age classes as the breeding season progresses from nesting to post-fledging. To develop management strategies at a landscape scale, it is important to engage landowners that provide opportunity for implementation at that scale. In West Virginia, Weyerhaeuser Inc.

owned lands, which are certified to the Sustainable Forestry Initiative (SFI) Forest Management Standard and National Alliance of Forest Owners (NAFO) standard, create a unique opportunity to understand the potential intersection between institutional land management strategies and objectives, with partner efforts to advance bird conservation at a large landscape scale. Landowners that are certified to the SFI Forest Management Standard are subject to requirements relative to landscape-scale outcomes, placing them in a position of responsibility and opportunity to capture advance contributions toward biodiversity at large scales.

From May-July, West Virginia University researchers surveyed 119 avian point counts in 2021, and 211 point counts in 2022, recording all species seen and heard during a 10-minute survey (Figure 45). Additionally, we deployed 50 autonomous recording units (ARUs) in each forest research block for seven-day increments each year. Associated with each avian point count we also collected structural

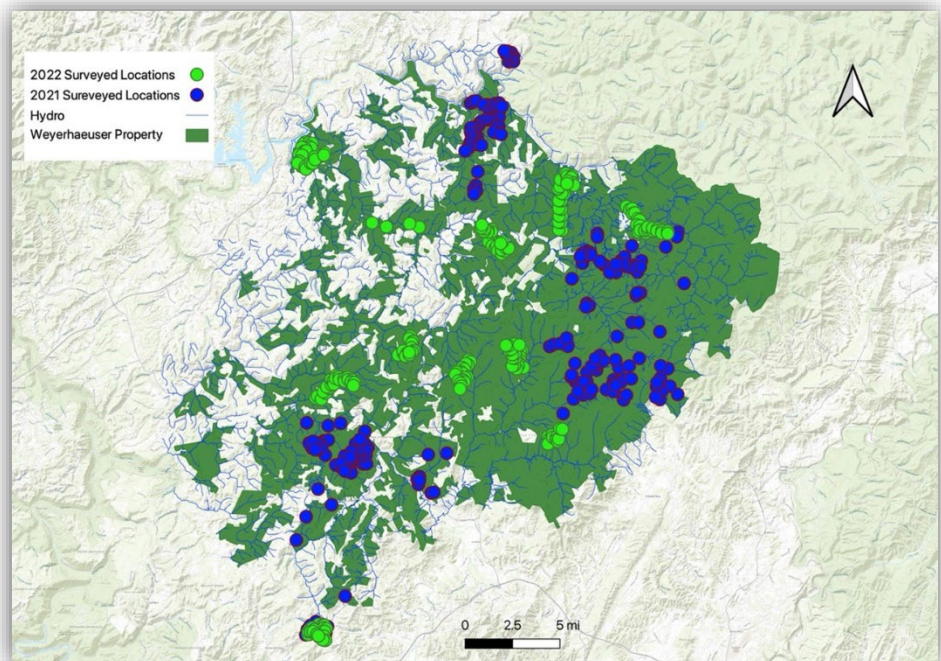


Figure 45. Avian point count surveys conducted from May-July 2021 and 2022 on Weyerhaeuser property in Greenbrier, Nicholas, and Fayette Counties, West Virginia, USA. Map courtesy of WVU



vegetation data, using protocols developed for GWWA and CERW. From avian point counts in 2021, we identified ~4,173 individual birds from 100 species, and ~3,844 individual birds from 102 species in 2022. We detected 18 GWWA, 4 CERW, and 91 WT in 2021 and four GWWA, one CERW, and 99



Figure 47. Golden-winged Warbler. Photo by Agami Photo Agency / Shutterstock and courtesy of ABC

WT in 2022. In addition to the focal species, we also had detections of some species which have also experienced population declines in West Virginia. We detected 86 Eastern Wood-pewee (*Contopus virens*) across both years, 38 Canada Warbler (*Cardellina canadensis*), and 60 Blue-winged Warblers (*Vermivora cyanoptera*). Species counts differed among forest age structures (Figure 46). We plan for one more year of data collection (2023); these results are preliminary and descriptive. The PhD student, Robert, will complete data analyses by 2024, and the research team will try to continue to expand on our results by developing the next stages of monitoring and adaptive management with Weyerhaeuser.

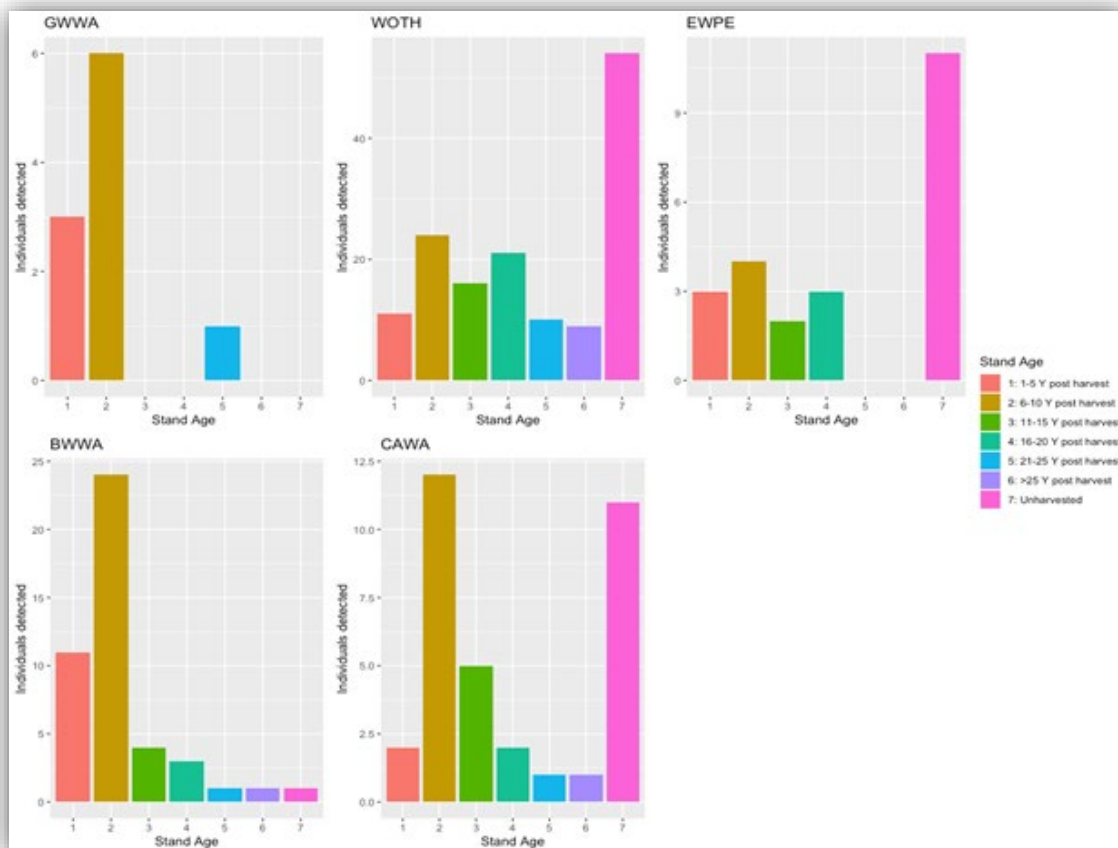


Figure 46. Counts of two focal species as well as three declining species in West Virginia across 7 stand age categories across 2 years (2021-2022) of point counts. The third focal species, Cerulean warbler, is not depicted here because only 4 individuals have been detected on the study site and all were found within stands in age category 4. Figure courtesy of WVU

This project is funded by: National Fish and Wildlife Foundation via the West Virginia Division of Natural Resources, US Geological Survey via US Fish and Wildlife Service and the National Council for Air and Stream Improvements.

## REGIONAL

### NFWF Regional Updates

*Todd Fearer, Coordinator, Appalachian Mountains Joint Venture*

In 2022 the National Fish and Wildlife Foundation's Central Appalachia Habitat Stewardship Program awarded \$3.7 million to 11 new or continuing projects that will improve the quality and connectivity of forest and freshwater habitat and increase the distribution and abundance of fish, birds, and other wildlife. The 11 awards announced were matched by over \$3.8 million from the grantees, providing a total conservation impact of over \$7.5 million. Six of the selected projects, totaling over \$2,140,000 in funds from NFWF and matched with over \$2,177,000 from grantees, are focused on enhancing forest age and structural diversity and will benefit the suite of our AMJV priority forest birds.

New to the program this year was a special opportunity for mine land restoration. Dedicated funding was provided from the Bezos Earth Fund and the U.S. Forest Service to reforest and restore native vegetation on mined land. Projects were encouraged to use the Forestry Reclamation

Approach (FRA) developed through the Appalachian Regional Reforestation Initiative (ARRI), which includes the AMJV and several of our partners. AMJV staff worked with NFWF as well as staff from the federal Office of Surface Mining, Reclamation, and Enforcement, Green Forests Work, and others to prioritize sites within the NFWF Central Apps geography for restoration.

The AMJV is a partner on one of these projects, led by the United States Endowment for Forestry and Communities. This project will implement forest restoration on privately owned legacy mine lands in Pennsylvania and place conservation easements on participating properties that will increase the ability of landowners to sell carbon credits to offset some of their financial investment. Project will plant 170,000 new trees to create needed young forest habitat, offer permanent protection for these trees, and demonstrate a financing model that can be replicated elsewhere in Appalachia.

The AMJV continues to work with NFWF and all grantees to facilitate coordination and collaboration across all forestry projects to maximize their collective impact across the Central Appalachia region. Todd Fearer, AMJV Coordinator, and Amanda Duren, AMJV Director of Conservation Partnerships, are part of the advisory team for this program.



*Figure 48. Wood Thrush, one of the AMJV's priority forest bird species.  
Photo by Larry Master and courtesy of ABC*



The Central Appalachia Habitat Stewardship Program is a partnership initiative involving the U.S. Department of Agriculture's Natural Resources Conservation Service, the U.S. Forest Service, the U.S. Fish and Wildlife Service, the Richard King Mellon Foundation, and Shell Oil Company. It was established in 2017 and through 2021 has awarded more than \$8.4 million in funding to 57 projects in portions of the Appalachian region of New York, Pennsylvania, Ohio, Maryland, Virginia and West Virginia.

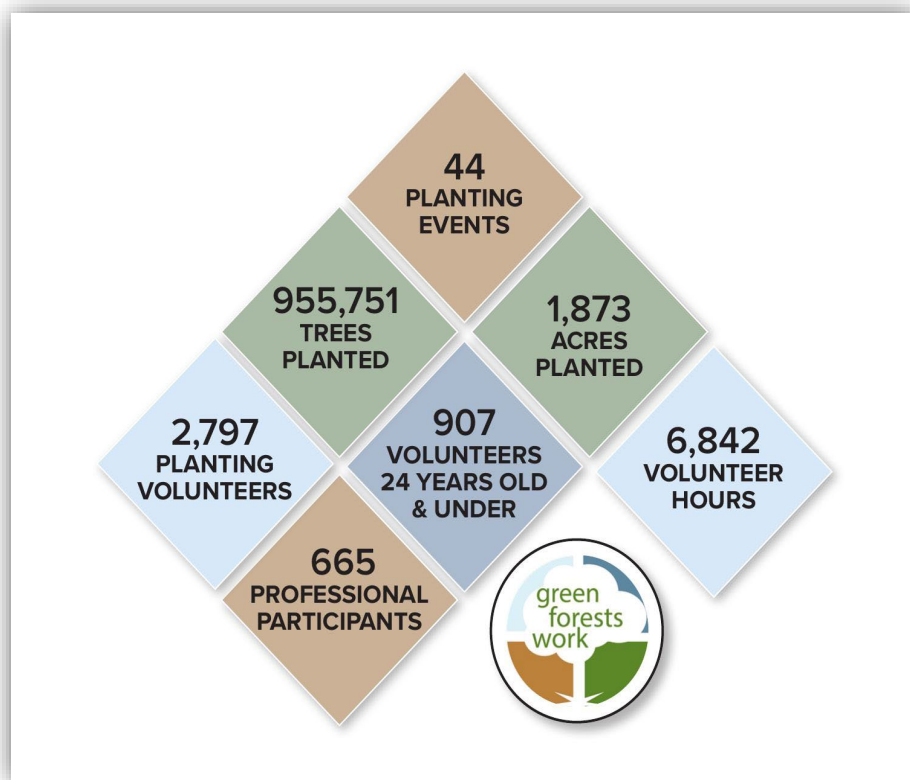
### Green Forests Work Update: Reforestation of Former Appalachian Surface Mines in 2022

*May May Barton, Director of Marketing and Communications, Green Forests Work*

*Anna Branduzzi, Reforestation Coordinator, Green Forests Work*

*\*This work overlaps the Cumberland (KY/TN) and Southern Appalachian High Country Focal Landscape (NC/TN/VA)\**

Green Forests Work (GFW) entered 2022 with anticipation that the pandemic, and all its associated complications, were slowly coming to an end. Although many challenges still lingered due to COVID-19, much of GFW's work was back to normal. Volunteer tree planting events were held, new partnerships were developed, young adults were trained, several long-term projects were finished, several new projects were started, nearly 1 million trees were planted across Appalachia, and economic contributions to Appalachian communities were provided.



*Figure 49. By the end of the planting season in 2022, GFW had surpassed its previous largest annual totals for the number of trees planted and acres restored.*

In 2022 GFW supported restoration projects in Kentucky, Ohio, Pennsylvania, Virginia, and West Virginia. By the end of the planting season, GFW had surpassed its previous largest annual totals for the number of trees planted and acres restored. Furthermore, GFW hired a Director of Marketing and Communications and is preparing to hire more foresters and interns as the need and desire to increase reforestation activities expand globally.

In 2022, GFW, the US Forest Service, CASRI, and our many other partners continued the red spruce

restoration efforts on two areas of the Monongahela National Forest. To date, 1,500 acres have been restored across the Mower Tract and Sharp Knob through soil decompaction, wetland creation, and planting of more than 810,000 native tree and shrub seedlings. Additionally, 1,740 wetlands have been constructed, and 582 volunteers have been involved in tree-planting events across both project areas.



*Figure 50. University of Kentucky graduate students collect data on amphibians utilizing the constructed wetlands on the Monongahela National Forest. Photo courtesy of GFW*

GFW and Appalachian Headwaters partnered again to restore native forest on sections of a surface mine located near Mammoth, West Virginia. After invasive exotic species had been removed, the site was ripped to loosen the compacted ground, and with additional support from American Forests, 202,400 seedlings consisting of 24 native species were planted across 220 acres of the property. A small volunteer group, including students from Charleston, WV, and Appalachian Headwaters staff, planted an additional 370 seedlings on the property to celebrate Arbor Day.

In 2021, GFW was awarded a grant from the US Forest Service – State & Private Forestry which allowed The Nature Conservancy and GFW to begin performing ecological restoration work on the [Cumberland Forest Ataya property](#). To prepare the site, invasive exotic species were removed and flat and gently rolling slopes were ripped. With funding from the Arbor Day Foundation, TNC, Angel's Envy, and Beam Suntory, a professional crew was hired to plant nearly 96,000 trees and shrubs across the 100 acres and an additional 38 acres of steep slopes that lacked tree cover. A total of 24 species of trees and shrubs were planted. 525 lbs. of seeds were spread across the ripped areas. Beam Suntory volunteers planted the remaining 10 acres with more than 6,800 seedlings in April. Areas reforested for this project range from 2,700 ft. to over 3,000 ft. in elevation and should create suitable breeding and foraging habitats for Golden-winged Warblers in the coming years.



*Figure 51. GFW and Appalachian Headwaters partnered again to restore native forest on sections of a surface mine located near Mammoth, West Virginia*





*Figure 52. (Above) GFW, TNC, and partners worked together to complete ecological restoration work on the Cumberland Forest Ataya Property in Kentucky. Photo courtesy of GFW*

*Figure 53. (Right) A white oak seedling grows among native grasses and wildflowers on TNC's Cumberland Forest Ataya property after reforestation. Photo courtesy of GFW*



*Figure 54. GFW worked with partners, the 'Friends of Flight 93', families and friends of the passengers, and volunteers to plant native plants and trees at the Flight 93 National Memorial.*

Since 2012, GFW has participated in the reforestation efforts at the Flight 93 National Memorial. This project has largely been completed through the planting of 150,000 native trees on the former coal mine. GFW's role in the project varied over the years – from donating seedlings to organizing the site preparation and planting plans with our

partners from the Appalachian Regional Reforestation Initiative (ARRI) and the National Park Service. A grant from the US Department of the Interior's 'Get Outdoors' program allowed over 250 college students from six colleges and universities to travel to the Memorial site and participate in the events. In addition, Indiana University of Pennsylvania, ARRI, and GFW conducted research at the site to evaluate the success of the plantings. Most of all, GFW was honored to have an



opportunity to work with the ‘Friends of Flight 93’, families and friends of the passengers, and all the volunteers who showed up to honor those affected by the 9/11 tragedy and participate in the work to ‘Heal Hearts and Heal the Land.’

In 2022, GFW partnered with the PA Department of Environmental Protection, Susquehanna River Basin Commission, ARRI, DEP Bureau of Abandoned Mine Reclamation, Pennsylvania Environmental Council, Foundation for Pennsylvania Watersheds, Chesapeake Bay Foundation, One Tree Planted, Altoona Water Authority, Pennsylvania Game Commission, The Nature Conservancy, and other partners to plant more than 358,767 native seedlings across 830 acres in Pennsylvania. Three mined land projects were reforested, forest resiliency was improved for three State Game Lands projects, and six volunteer tree planting events and one seedling giveaway took place.



*Figure 55. GFW and partners planted more than 358,767 native seedlings across 830 acres in Pennsylvania. Photo courtesy of GFW*

## **Southern Appalachian Highlands Conservancy – Land Protection and Habitat Management Updates**

*Marquette Crockett, Highlands of Roan Stewardship Director, Southern Appalachian Highlands Conservancy*

*\*This work overlaps the Southern Appalachian High Country (NC/TN/VA) Focal Landscape\**

Since 2021, the Southern Appalachian Highlands Conservancy (SAHC) has protected more than 2,000 acres across Western North Carolina and East Tennessee through our conservation easement and fee simple purchase programs. In addition, we have assisted our partners at North Carolina State Parks and Pisgah National Forest in protecting 1,028 acres which will become public land. These new acquisitions bring SAHC’s land protection total to more than 80,000 acres of pristine forest, working farmland, and parks for sustainable recreation.

Some of the most notable properties closing in 2022 include the 299-acre Reems Creek Bowl property in the Black Mountains of North Carolina and the 52-acre Tom’s Branch property which joins the Cherokee National Forest near Roan Mountain, Tennessee. Both properties reach over 4,500 feet in





*Figure 55. Mars Hill University students spent a weekend learning about high elevation habitats and patch-mowing blackberry and other shrubs on SAHC's Grassy Gap Life Estate property. Photo by Travis Bordley*

elevation and include red oak and northern hardwood communities, supporting a host of landbird species listed as “High” or “Highest” Priority for conservation by the Appalachian Mountain Joint Venture.

Maintaining habitat on our conserved properties takes time, funding, and great partnerships. So, we were thrilled to be selected as the recipients of the Blue Ridge Audubon’s 2022 Birdathon fundraiser program. With their support, we have been able to implement best management practices to restore and maintain Golden-winged Warbler habitat on SAHC preserves in the Roan Highlands. These treatments include thinning blackberry,

light forestry (thinning) of small trees in edge habitat, and treatment of invasive species, including tree-of-heaven and Japanese knotweed which lower habitat quality. All restoration work was completed on our preserves, adjacent to occupied territories and we look forward to spring surveys to monitor success.



*Figure 57: Both the Tom's Branch (pictured here) and Reem's Creek Bowl preserves protect high elevation forested habitat for priority landbird species. Photo by Michelle Pugliese*





*Figure 58. The Blue Ridge Audubon's annual Birdathon fundraiser was used to support habitat restoration and management on SAHC preserves in the Roan Highlands, including maintaining edge and open habitats on the Grassy Ridge "Birdhouse" Preserve shown here. Photo by Stephanie Long*

## THEME 2: FULL ANNUAL CYCLE CONSERVATION

### INTERNATIONAL

#### **American Bird Conservancy BirdScapes - Updates from Latin America & Caribbean Regions**

*Andrés Anchondo, Associate Director, Impact Investment in Latin America & the Caribbean, American Bird Conservancy (ABC)*

*Marci Eggers, Director for Migratory Bird Habitats in Latin America & the Caribbean, ABC*

*The updates on the next page originally appeared in ABC's 2022 Conservation Report Highlights, a concise version of which can be found in this [blog](#).*



*Figure 59 Agroforestry plantation with cacao, fruit, and native shade trees as part of ABC's migratory bird habitat enhancement project in the Sierra de Algata – Lost City BirdScape in La Moskitia, Honduras. Photo by Andrés Anchondo, ABC*



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### Conserving migratory stopover and wintering areas in Latin America & Caribbean Region

With support from ABC, Guatemalan partner FUNDAECO acquired two properties totaling 1,112 acres in the Conservation Coast BirdScape, expanding their reserve network within the core area of Cerro San Gil Protected Area that will permanently preserve habitat for migratory and resident birds, such as Golden-winged Warbler, Wood Thrush, and Great Curassow. ABC supported partners across six BirdScapes to improve more than a thousand acres by planting 123,137 trees and shrubs and removing exotic plants. This total includes 68,237 native trees planted since May in Colombia's Central Andes BirdScape. This project has now planted 135,414 trees (160 native species) over 1,000 acres (300 farms) since 2019 and protected 153 acres of forest with 10.5 miles of fencing. To improve wintering Bicknell's Thrush habitat, our partner Zorzal Cacao planted 20,160 cacao and native trees on 41 acres across (27 farms) in the Septentrional BirdScape of the Dominican Republic. In the Pico Bonito-Yoro BirdScape of Honduras, ABC supported our partner ASIDE to reforest almost 54 acres in the La Muralla Wildlife Refuge with 23,000 native pine seedlings to restore the mixed pine-oak forest habitat for migratory birds, such as Canada Warbler and Blue-winged Warbler. Also in Honduras, in the Sierra de Agalta-Lost City BirdScape, our partner Smart Consulting planted 1,350 hardwoods and fruit trees on 40 acres (17 farms) to add tree cover in shade-grown cacao plantations. In the Northern Venezuela Coastal Mountains BirdScape, our partner Provita planted 8,925 coffee and native trees as part of their Initiative Birds and Coffee. As part of this project there are currently more than 30 producers certified as Bird-Friendly Coffee by the Smithsonian.



*Figure 59. (Above left) A truck containing some of the nearly 19,000 cacao trees being transported to restoration sites. Figure 60. (Above right) Farmers planting a cacao tree as part of ABC's bird habitat enhancement project in the Septentrional BirdScape in the Dominican Republic. Photos courtesy of Zorzal Cacao*

### Impact investing & best practices on working lands

ABC is working to maintain and enhance wintering migratory bird habitat by promoting best management practices on working lands that benefit birds and people, and to scale up this work via funding from impact investors in addition to philanthropic funds. In Guatemala's Conservation Coast BirdScape, our shade cardamom impact investing pilot project with FUNDAECO produced \$6,000 in returns for ABC. We reinvested these profits back into the project and restored 16 acres of shade cardamom lost due to hurricanes Eta and Iota in late 2020, with 3,150 native trees from five different native species and 7,222 cardamom plants. ABC is also working to promote shade cacao farming that supports wintering Golden-winged Warblers in the Moskitia region of Honduras. In May 2022, ABC helped Cacao Miskito (a community-run cacao company in this region) to sell five tons of cacao from 80+ farms on 200+ acres in the Tawahka and Río Plátano Biosphere Reserves. The cacao was sold to one of our newest partners, Uncommon Cacao, a company buying sustainably sourced cacao from around the world. In July 2022, Uncommon Cacao sent a new purchase order for 12 tons of cacao from Cacao Miskito. Without ABC's assistance to connect this supply chain, the farmers might not have found a buyer and could have changed land-uses in ways detrimental to Golden-winged Warblers.



American Forest Foundation



NATIONAL AVIARY  
PITTSBURGH, PA







OHIO BIRD  
CONSERVATION  
INITIATIVE



**PennState**  
College of Agricultural Sciences



Pennsylvania Natural Heritage Program



THE  
AMERICAN  
CHESTNUT  
FOUNDATION®



THE OHIO STATE UNIVERSITY

COLLEGE OF FOOD, AGRICULTURAL,  
AND ENVIRONMENTAL SCIENCES



United States  
Department of  
Agriculture

Natural Resources Conservation Service



University of Maryland  
CENTER FOR ENVIRONMENTAL SCIENCE  
APPALACHIAN LABORATORY

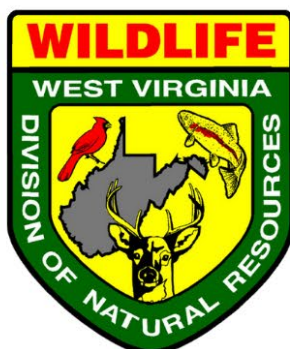


VCU

Center for  
Environmental Studies  
Life Sciences



COLLEGE OF NATURAL RESOURCES AND ENVIRONMENT  
**FISH & WILDLIFE CONSERVATION**  
VIRGINIA TECH.







## REGIONAL PARTNERSHIPS

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AMJV partners and regional partnerships not represented above with logos:

Eastern Golden Eagle Working Group  
National Park Service  
Southern Appalachian Spruce Restoration Initiative (SASRI)